The London School of Economics and Political Science

Sectoral policy-making in China's strategic industries: Government guidance and state firm influence in the electricity supply sector

Christopher Sampson

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Abstract

This thesis engages with a debate in the literature on the political economy of China's industrial reforms about the determinants of major policy trajectories in that country's strategic industries. A common approach understands central-level policy processes and their structural outcomes in strategic sectors to be subject to active and effective central government guidance, often applied via control over state-owned industry. A less common perspective, on the other hand, has argued that policy formulation and implementation in a number of strategic industries are often dominated by large central state-owned enterprises (SOEs) capable of imposing their own preferences on sectoral policy.

Addressing these partially opposing perspectives, this thesis analyses political processes underlying major policy developments in China's electricity supply industry since 2002, finding that neither approach sufficiently accounts for the complexity of interactions between government and SOEs during the formulation and implementation of sectoral policy. 'Government-centred' accounts were found to have exaggerated the effectiveness of central government's policy guidance while underappreciating SOEs' considerable sectoral policy impact. 'SOE-centred' accounts, on the other hand, have similarly overstated their claims while furthermore giving a distorted perspective of the mechanisms through which SOEs' policy influence occurs.

Building on findings from the case of electricity supply, this thesis establishes an alternative account of the political interplay between both sides and its relevance for sectoral policy-making in China's strategic industries. It illustrates that central SOEs autonomously pursue their own industrial reform agendas which often deviate from government's sectoral preferences and from existing sectoral policy. However, it contends that these firms are only able to realise contentious sectoral objectives by tactically 'synchronising' them with cross-sectoral policy agendas pursued by central government. When sectoral reform goals diverge and 'synchronisation' is absent, policy gridlock often ensues. Overall, this thesis finds that central government's sectoral guidance over strategic industries is subject to substantial interference by central SOEs, but that this interference largely takes place within the confines of government-sanctioned cross-sectoral policy.

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Abbreviations

1U4L	'One Ultra, Four Large' (SGCC's grid development strategy involving the construction of UHV transmission infrastructure and large energy bases)
CCP	Chinese Communist Party
CEEC	China Energy Engineering Group Co.
CEPRI	China Electric Power Research Institute (中国电力科学研究院), Beijing
CIECC	China International Engineering Consulting Corporation (中国国际工程咨询公司)
CPECC	China Power Engineering Consulting Group Co., Ltd. (中国电力工程顾问集团有限公司)
CSGC	China Southern Grid Corporation (南方电网公司)
EPPEI	Electric Power Planning & Engineering Institute (电力规划设计总院)
KW	Kilowatt
kV	Kilovolt
MEP	Ministry of Electric Power
MoE	Ministry of Energy
MoF	Ministry of Finance
MOFCOM	Ministry of Commerce
MOST	Ministry of Science and Technology
MW	Megawatt
MWREP	Ministry of Water Resources and Electric Power
NDRC	National Development and Reform Commission (国家发展和改革委员会)
NEA	National Energy Administration (国家能源局)
PRC	People's Republic of China
R&D	research and development
RMB	Renminbi (currency)
SASAC	State-owned Assets Supervision and Administration Commission (国务院国有资产监督管理委员会)
SDPC	State Development Planning Commission (predecessor of the NDRC, 1998-2003)
SEO	State Energy Office
SEPRC	State Electricity Planning Research Centre (国家电力规划研究中心), established under EPPEI
SERC	State Electricity Regulatory Commission (2003-2013)
SETC	State Economic and Trade Commission (since 2003 merged with the NDRC)
SGCC	State Grid Corporation of China (国家电网公司)
SGEPRI	State Grid Electric Power Research Institute (国网电力科学研究院), Nanjing
SGERI	State Grid Energy Research Institute (国网能源研究院), Beijing

SOE	state-owned enterprise
SPC	State Planning Commission (predecessor of SDPC and NDRC, pre-1998)
SPCC	State Power Corporation of China (国家电力公司; vertically integrated electricity utility, 1997-2002)
SPERI	State Power Economic Research Institute (国家电网公司北京经济技术研究院), Beijing
T&D	transmission and distribution
UHV	ultra-high voltage (transmission)
UHV-AC	alternating current ultra-high voltage (transmission)
UHV-DC	direct current ultra-high voltage (transmission)

1 Introduction

Scholarly debates on the political economy of China's industrial reforms since the turn of the millennium have focused much of their attention on interpreting the role of central government in the reform process and trying to discern and categorise dominant modes of economic governance underlying China's central level economic policy-making. A particular focus of inquiry has been the determinants of policy trajectories within the country's 'strategic' industries, i.e. industries that, due to their importance for broader economic development or national security, have been declared by government 'lifelines' of the economy.[1] A commonly held perspective maintains that while less strategic industries are liberalised and opened to market competition with decentralised and delegated government oversight, central government perpetuates its immediate control over strategic parts of the economy via state-owned industry. Despite significant variance regarding overall interpretations of China's trajectory in the realm of economic governance, there is a widely shared perception of active and effective central government guidance underlying central-level policy processes and their structural outcomes in the 'commanding heights' of the country's economy. Correspondingly, central government's policy preferences are often viewed as the main explanatory factor for how economic policy decisions in these areas arise and are applied.[2] This 'government guidance' viewpoint has become widely accepted and on some occasions has even been applied as an a priori assumption in the analysis of policy processes[3] or as a post-hoc explanation of policy output or outcomes in lieu of empirical scrutiny.[4]

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[1] Margaret M. Pearson, "The Business of Governing Business in China," *World Politics* 57, no. 2 (2005): 297; Mikael Mattlin, "The Chinese Government's New Approach to Ownership and Financial Control of Strategic State-Owned Enterprises," Bank of Finland, Institute for Economies in Transition, BOFIT Discussion Paper (October 2007), p. 16.

[2] See, e.g., Pearson, 2005; Margaret M. Pearson, "Governing the Chinese Economy: Regulatory Reform in the Service of the State," *Public Administration Review* 67, no. 4 (2007): 718–730; Roselyn Hsueh, *China's Regulatory State: A New Strategy for Globalization* (Ithaca, NY: Cornell University Press, 2011); Sebastian Heilmann and Lea Shih, "The Rise of Industrial Policy in China, 1978-2012," Harvard-Yenching Institute Working Paper Series, 2013; Sarah Eaton, "The Gradual Encroachment of an Idea: Large Enterprise Groups in China," *The Copenhagen Journal of Asian Studies* 31, no. 2 (2013a): 5–22; Chen Li, *China's Centralised Industrial Order. Industrial reform and the rise of centrally controlled big business* (London and New York: Routledge, 2015).

[3] Daniel Ho and Angus Young, "China's Experience in Reforming Its State-Owned Enterprises: Something New, Something Old and Something Chinese?" *International Journal of Economy, Management and Social Sciences* 2, no. 4 (April 2013): 84.

[4] Eric Girardin, Guy Liu and Jinghai Zheng, "An introduction: the challenges of the Chinese electricity industry and its reform," *Journal of Chinese Economic and Business Studies* 12, no. 4 (2014): 334.

At the same time, there are claims in niche areas of the literature on China's industrial reforms that the formulation and implementation of central-level policy in some of China's most strategic sectors, particularly in the energy field, are not grounded in deliberate central government guidance, but rather tend to be driven by large central state-owned enterprises (SOEs) based on motives that are not necessarily aligned with those of central government. A core claim among these studies is that central state firms have become forceful participants in central-level policy processes and often dominate both policy-making and policy implementation due to their high administrative rank, excellent political connections, and increasing political and financial autonomy, while central government's oversight at the industry level is often deemed weak and ineffective.[5]

Overview of research conducted and of the main findings

In order to address these theoretical and empirical inconsistencies regarding the determinants of sectoral policy and its application in China's strategic industries, this study analyses central-level political processes underlying shifts in major policy trajectories in one of China's most strategically important sectors – the electricity supply industry – and the particular role played by state industry as part of these processes, thereby touching upon the balance of political power between central government and large SOEs, as well as the limits of power on both sides. Applying a mixture of within-case research strategies such as process tracing and the congruence method,[6] the validity of the counterclaims made by 'SOE-centred' accounts about central state firms' sectoral policy influence is tested against empirics from a 'most likely' case for claims of active and effective central government guidance over China's strategic industries as expressed in a series of widely-read 'government-centred' accounts of the political economy of China's industrial reforms. Following this single industry case study logic, it is

[5] See, e.g., Erica S. Downs, "Business Interest Groups in Chinese Politics: The Case of the Oil Companies," in *China's Changing Political Landscape: Prospects for Democracy*, edited by C. Li (Washington D.C.: Brookings Institution Press, 2008a), pp. 121–41; Yi-chong Xu, "'Strong enterprise, weak government': energy policy making in China," *International Journal of Global Energy Issues* 29, no. 4 (2008): 434-453; Ling Chen, "Playing the Market Reform Card: The Changing Patterns of Political Struggle in China's Electric Power Sector," *The China Journal* 64 (2010): 69–95; Yi-chong Xu, "The State Grid Corporation of China," in *The Political Economy of State-Owned Enterprises in China and India*, edited by Yi-chong Xu (London: Palgrave Macmillan, 2012), pp. 128-150; Chung-min Tsai, "Regulating China's Power Sector: Creating an Independent Regulator Without Autonomy," *The China Quarterly* 218 (2014): 452–73; Yin-Fang Zhang, "The Regulatory Framework and Sustainable Development of China's Electricity Sector," *The China Quarterly* 222 (2015): 475-498.

[6] Alexander L. George and Andrew Bennett, *Case Studies and Theory Development in the Social Sciences* (Cambridge, MA: The MIT Press, 2005), pp. 179-184.

investigated whether central SOEs, through both action and intent, have been able to influence the formulation and implementation of sectoral policy, and if so, under which conditions, through which mechanisms and to what effect. Based on the deductively derived conclusions to this endeavour, a basic model of central SOEs' policy impact on the formulation and implementation of sectoral policy in the electricity industry is presented which suggests revised claims and accounts for the interaction of both top-down and bottom-up dynamics between central government and state industrial actors. In a final step, the validity of this model is re-tested by applying a series of targeted 'before-after' comparisons[7] to a body of additional empirical material from the same industry case.

Both the formulation and implementation of central-level sectoral policy in the electricity supply industry were found to be characterised by contentious interactions between central state industry (a focus being placed on the State Grid Corporation of China) and central government departments/agencies that occur in the form of a bi-directional deliberative process in which both sides are generally capable of blocking each other's policy and project pursuits while usually being unable to overcome their mutual resistance without compromise (*'basic conflict mode'*). Generally open-ended in outcome, these deliberative processes also produced evidence of a distinct mechanism via which central state industry is able to circumvent central government opposition to its often controversial sectoral policy and project development propositions, namely by making use of the lack of coordination between policy at different levels of abstraction. By tactically 'synchronising' the argumentative portrayal of its own sectoral reform agendas with related or relatable cross-sectoral policy, state industry has shown the ability to overcome political obstacles at the sectoral level and to pressure sectoral authorities into compliance (*'synchronisation mode'*).[8] The successful application of this 'synchronisation' mechanism appeared to be dependent on sufficient administrative rank to allow access to policy-making circles, and on a high level of control over

[7] George and Bennett, 2005, p. 166.

[8] '*Sectoral policy*' is defined here as policy which is targeted at industry-specific issues and which only applies within the confines of a specific industry. It can be published either by the State Council, comprehensive economic commissions, or by industry-level authorities. '*Cross-sectoral policy'*, on the other hand, refers to policy or guidelines which are targeted at non-industry-specific issues and which apply beyond the confines of single industries. They include no, or only vague, sector-specific implementation indicators which are then to be specified at the sectoral level. They can be of a formal nature (i.e. formal policy published by the State Council or comprehensive economic commissions) or of an informal nature (i.e. policy preferences or opinions expressed by top officials).

industry expertise, while bureaucratic manoeuvring on the basis of these two factors alone rarely sufficed for shaping sectoral policy.

Overall, it was found that central government's guidance over the electricity supply industry as a strategically important sector of the country's economy is subject to substantial interference by central state firms. Based on the aforementioned mechanism and subject to the distinct limitation of needing to engage with industry-level policy on the basis of, and within, the confines of existing – usually cross-sectoral – policy, these firms showed the ability to shape the sectoral environment according to their own policy preferences which often differed sharply from both the respective cross-sectoral guidelines and existing sectoral policy. In the case study at hand, the immediate goals pursued by state industry in response to a major State Council policy aimed at far-reaching industry marketisation were found to be threefold, namely a) the preservation and expansion of monopoly structures across industry segments, b) the establishment of controlling market positions in adjacent, nominally competitive industry segments, and c) the creation of industry structures in which factors a) and b) could be permanently combined and sustained so as to safeguard organisational unity and maximise economic results at the firm level.

Based on the uncovered dynamics of mutual dependence, prolonged policy deadlock and recurrent state firm policy influence derived from the systematic application of 'synchronisation' tactics, it is argued that authors following almost exclusively government-centred approaches fail to explain shifts in policy trajectories in their own 'most likely' case.[9] While further research is necessary to determine the extent to which this study's results are applicable to other strategic industry settings in China, the findings suggest that this part of the literature overstates central government's ability to exercise active and effective policy guidance in strategic industries while understating the influence of large SOEs on sectoral policy formulation and implementation processes at the central level. SOE-centred accounts, on the other hand, while being correct in placing strong emphasis on the policy influence of large state firms, were found to have exaggerated their impact while presenting a partially skewed perspective of the mechanisms through which this influence occurs. Both camps are encouraged to reconsider their claims so as to account for the intervening influence on the part of state

[9] E.g., Hsueh, 2011; Pearson, 2005, 2007; Heilmann and Shih, 2013, among others.

industry displayed in this study, as well as for the particular conditions and mechanisms under/through which this influence may occur.

1.1 Review of middle-range theory on the political economy of China's industry reforms

Given the authoritarian nature of China's political system, analyses of the modes of economic governance underlying China's central level economic policy-making have tended to focus on the role of central government, its administrative structure and the actions of the different bodies it is comprised of, as well as its policy preferences and the pursuit of those preferences. Core topics of study have been the various rounds of restructuring of the state bureaucracy in the economic governance realm, the gradual separation of government and enterprise functions, and the reorganisation of state industry. While very different interpretations emerged regarding the overall rationale and trajectory of reforms, numerous studies have shared the view that central government has maintained or enhanced its authority over the country's path of economic development. This finding was then usually interpreted either as the increasingly efficient application of governmental authority during an ongoing transition to a functioning market economy,[10] as the deliberate perpetuation of politically motivated government intervention in strategic industry sectors in order to steer the overall economy, particularly via the control of large state firms,[11] or as a mixture of the two.[12]

The following section will briefly discuss some important contributions reflective of these different interpretations of the purpose and nature of central government authority over strategic industries. While recognising the significant variance among them it will not, however, attempt to compare their relative explanatory power or resolve their disagreements. This study rather aims to engage with the basic premise of active and effective central government guidance which tends to underlie these

[10] See, e.g., Dali L. Yang, *Remaking the Chinese Leviathan. Market Transition and the Politics of Governance in China* (Stanford: Stanford University Press, 2004); Edward S. Steinfeld, *Playing Our Game: Why China's Rise Doesn't Threaten the West* (New York: Oxford University Press, 2010).
[11] See, e.g., Pearson, 2005, 2007; Minxin Pei, *China's Trapped Transition. The Limits of Developmental Autocracy* (London, Cambridge, MA: Harvard University Press, 2006); Eaton, 2013a; Li, 2015.
[12] See, e.g., Hsueh, 2011; Heilmann and Shih, 2013.

otherwise very different interpretations of the determinants of policy output and outcomes in strategic parts of the country's economy. As such, these studies will, in a further step, be contrasted with a less prominent but related sub-literature which has argued for the paramount significance of a factor that tends to be rarely discussed in these government-centred accounts, namely the policy influence of large central state firms.[13]

1.1.1 The spectrum of 'government-centred' accounts of the political economy of China's industrial reforms

Perspectives that emphasised enhanced government authority via growing institutional efficiency in an emerging market economy

One important narrative of the political economy of China's industrial reforms has been that the country is undergoing an incremental transition from planned economy to market economy, slowly opening up to domestic and international market competition and gradually adapting to international practises of economic regulation in liberalised markets. In an earlier account of change in China's economic governance after the beginning of the 'reform and opening' period post-1978, Naughton (1995) argued that China was "growing out of the plan" and noted that the decline of state planning was matched by the emergence and growth of a progressively more market-oriented economy, a perspective which has shaped the analytical parameters for cohorts of scholars following after.[14] Building on this overall outlook, Dali Yang (2004), for instance, argued that the restructuring and downsizing of China's government bureaucracy, the divestiture of state institutions' business operations and numerous unprofitable SOEs, and the emergence of new "institutions of horizontal accountability" were all signs of "real progress toward making the Chinese state into a regulatory state suited to a functioning market economy"[15] characterised by a level competitive playing field.[16] While curbing its own immediate participation in the

[13] See, e.g., Downs, 2006; Xu, 2008, 2012; Chen, 2010; Tsai, 2013.
[14] Barry Naughton, *Growing Out of the Plan: Chinese Economic Reform, 1978-1993* (Cambridge: Cambridge University Press, 1995).
[15] Yang, 2004, pp. 17-18.
[16] Ibid., pp. 296, 308-311. Other studies that have presented similar arguments on the gradual emergence of a liberal market economy include Yingyi Qian and Jinglian Wu, "China's Transition to a Market Economy. How Far Across the River?" in *How Far Across the River? Chinese Policy Reform at the Millennium*, edited by Nicholas C. Hope, Dennis Tao Yang and Mu Yang Li (Stanford: Stanford University Press, 2003), pp. 31-64; Jinglian Wu, *Understanding and Interpreting Chinese Economic Reform* (Singapore: Thomson,

economy via a "transformation of institutions", the reforms undertaken by the Chinese leadership were, however, "by no means intended to weaken the power of the state and their own control over that power", but were rather a "key aspect of [...] efforts to enhance the efficiency and legitimacy of the state apparatuses and augment the central leadership's capacity to project power nationally in an era of socioeconomic liberalisation".[17] Yang particularly located these increases in government authority via enhanced regulatory capacity in crucial segments of the economy such as the financial system as well as industry and commerce.[18]

Perspectives that emphasised sustained political control by central government via 'strategic' industries

Around the mid-2000s, several counter-perspectives to the narrative of China's gradual conversion to a regulated liberal market economy emerged. In an anti-thesis to Yang, Minxin Pei (2006) depicted China as being caught in a 'partial reform equilibrium' caused by gradualist economic reforms which were predominantly geared towards ensuring the political survival of the ruling elites.[19] "Constrained by this logic", Pei wrote, "economic reform cannot infringe upon the ruling elites' ability to protect and allocate rents in critical economic sectors. This means that reform measures taken to improve the efficiency of these sectors are bound to be partial, compromised, and ultimately ineffective."[20] Consequently, rather than testifying to the gradual emergence of a functioning market economy, Pei placed more argumentative emphasis on the state's continued immediate intervention in strategically important industries, albeit as a symptom of generally unsuccessful partial reforms of the economic system resulting from the necessity to preserve existing patronage networks as well as the leadership's ability to allocate critical resources.[21]

A slightly different perspective on persistent government intervention in the Chinese economy was presented by Margaret Pearson (2005, 2007), who also responded to 'regulatory state'-based narratives of China's economic reform process while contrasting them in their applicability to the Chinese case with the East Asian 'developmental state'

2005); Steinfeld, 2010. For more information on the concept of the 'regulatory state', see Giandomenico Majone, "From the positive to the regulatory state: causes and consequences of changes in the mode of governance," *Journal of Public Policy* 17, no. 2 (1997): 139–167; Giandomenico Majone, "The regulatory state and its legitimacy problems," *Western European Politics* 22, no. 1 (1999): 1–24.

[17] Yang, 2004, pp. 64, 291-311.

[18] Ibid., pp. 291-311.

[19] Pei, 2006, pp. 109, 223.

[20] Ibid., p. 109.

[21] Ibid., p. 134.

model.[22] In her studies, Pearson analysed patterns of state involvement in industries that had been tagged by central government itself as strategically important "lifeline industries" (经济命脉),[23] arguing that the Chinese leadership ultimately followed a number of "financial/strategic and social/political imperatives" such as "the need to control and maintain a revenue stream from major state assets, the creation of national champions, and the achievement of employment, universal services, and social security goals" which it aimed to achieve through these sectors.[24] Her model of regulatory patterns in strategic industries suggested that, even during a push for market transition, strong central-government influence and a dominant 'market' position of state firms remained defining aspects of economic life, that government agencies would aim to identify state enterprises as 'winners' and proceed to reorganise them in order to find industry structures suitable for fulfilling those imperatives.[25] Applied mechanisms of government authority over strategic industries following the "leadership's metavision"[26] included the "predominance of state ownership, oversight by the comprehensive economic commissions, continued inclusion of firms in the state planning process, and continued high-level governmental and, ultimately, party control of personnel appointments in regulatory bodies and state firms". Based on these tools, a major role of government within strategic industries was to actively structure markets and "control the nature of competition".[27] Overall, Pearson attested to a "strongly state-led system of economic governance"[28] at the centre of which stood central government with its enhanced administrative control over strategic segments of the economy and insistence on direct and active guidance, all in pursuit of broader economic development.

Perspectives that attempted to model variance across sectors and shifts over time in the extent and nature of government control over industry

In response to the studies of China's economic governance that focused their attention either on elements that signalled a shift towards a functioning market economy or

[22] Pearson, 2005, 2007. For a discussion of the East Asian 'developmental state' model and its lacking applicability to the Chinese case with particular emphasis on central government's implementational limitations, please refer to Jude Howell, "Reflections on the Chinese State," *Development and Change* 37, no. 2 (2006): 273–297.
[23] Pearson, 2005, p. 297.
[24] Ibid., pp. 313-314.
[25] Ibid., pp. 315-317.
[26] Ibid., p. 320.
[27] Pearson, 2007, p. 725.
[28] Ibid., p. 727.

rather on indications of sustained state control, other approaches emerged that attempted to combine both perspectives and explain the coexistence of decentralised competitive market structures in some sectors of the economy and of centralised monopolies or oligopolies in others, as well as shifts over time between phases that saw a deepening of market reforms and phases that were characterised by enhanced government intervention and guidance in different segments of the economy.

Building strongly on Pearson's work, Hsueh (2011) contended that China has fused liberalisation at the macro-level with a selective continuation of state control at the sectoral level, and that sectoral variation in the extent and pattern of state control was mainly explained by variance in the strategic value of an industry as perceived by central government.[29] Defining 'strategic value' across different political and economic dimensions,[30] Hsueh observed that central government had liberalised markets and delegated rule-making to lower administrative levels in industries with low strategic value while industries with high strategic value, on the other hand, were subject to selective regulation or re-regulation that was primarily geared towards securing central government's "authority to manage sectoral developments" through administrative and corporate restructuring and by strictly controlling ownership structures and market entry, as well as companies' business scope.[31] Given China's authoritarian form of government, central government, according to Hsueh, remained "insulated from domestic political pressures" and "intervenes in strategic sectors and issue areas when it sees fit without having to face political retaliation or opposition."[32] Following this logic, she argued, "the Chinese government ensures the enhancement of state authority in these industries first and foremost, and from there it pursues industrial development that achieves security and economic goals."[33] Particularly noteworthy in Hsueh's perspective are the posited immediate linkages between central government's 'strategic value'-based policy preferences, a particular approach towards sectoral restructuring which in strategically important industries is aimed at reinforcing government control, and government's uninhibited ability to implement said sectoral restructuring in a way that mirrors its original 'strategic value' considerations. The conceptual conflation of "the Chinese government" and the "state", together with the assertion that government possessed the unrestricted capacity to shape strategic industries in a top-down fashion

[29] Hsueh, 2011, pp. 3-4.
[30] Ibid., p. 34.
[31] Ibid., pp. 16-17, 22-23, 193, 255.
[32] Ibid., p. 269.
[33] Ibid., p. 255.

and "when it sees fit", indicate that Hsueh understands central government as a more or less unitary actor that independently devises and implements structural reform strategies at its own discretion.

A further important 'reconciliatory' contribution was made by Heilmann and Shih (2013) who aimed to explain shifts over time across strategic segments of China's economy between macro-level policy in favour of competitive market building and policy reflective of more immediate state control via targeted industrial policy, i.e. "measures and programs undertaken by government to shape the sectoral structure of the economy through channelling resources into selected 'pillar', 'strategic' or 'emerging' industries while - ideally or purportedly - preserving market competition and firm-level decision autonomy in the targeted sectors."[34] Through the lens of industrial policy the authors emphasised a growing role of government guidance over crucial parts of the economy and China's economic development path as a whole, partially at the expense of prior tendencies towards market liberalisation. Differing from Hsueh's emphasis on central government's 'strategic value logic' and Pearson's focus on 'regulatory imperatives', Heilmann and Shih explained these changes via shifts in ideas about economic governance within central government which, according to the authors, coincided with shifts in the balance of power between different central government factions in favour of market liberalisation, sectoral industrial policy, cross-sectoral indicative planning and imperative planning respectively. Following this line of reasoning, the authors attempted to pinpoint causal linkages between such broader ideational shifts within central government and changes in national-level macro policy for China's strategic industries without, however, tracing the declared connections to specific policy decisions.

Shared perspectives of government control via strategic industries

To summarise, despite strongly varying interpretations of overall development trajectories in China's economic governance, numerous widely-read contemporary works on the political economy of the country's industrial reforms share the perception of effective central government guidance over the country's strategic industries and explain the content, as well as the structural outcomes, of core policy pertaining to the functional logic of these industries "almost exclusively in terms of leadership

[34] Heilmann and Shih, 2013, p. 2.

perceptions and preferences".[35] There is widespread agreement across otherwise very different studies that central government in these segments of the economy more or less autonomously develops solutions to policy challenges on the basis of a broader strategic political vision and then applies its political leverage in order to implement those solutions.

A second shared feature among these studies is that the presupposition of active and effective central government guidance also tends to be extended to the main industrial players in China's strategic industries as well as to the functional logic of the industrial environment that they operate in. Large central-level state firms' organisational structure, business scope and business endeavours are analysed almost exclusively through a central government prism. Since assets are state-owned and top executives are chosen by CCP and central government organs,[36] central SOEs, as the formal target of numerous reform and restructuring endeavours, have been predominantly viewed as being on the 'receiving end' of central government decision-making while their own political relevance has rarely been taken into account in this part of the literature. Hsueh's (2011) study, for instance, displays a perspective on the Chinese state sector in which the terms 'government' and 'the state' are used almost interchangeably and in which state ownership and actual government control over state assets are for the most part treated as synonyms, while central SOEs themselves hardly feature at all and are viewed as little more than passive recipients of government orders. Pearson (2005, 2007) refers to government's slow restructuring of state assets as a hindrance to the overall economic reform process, but equally views state industry mainly as government's extended political arm through which it realises different strategic imperatives at the sectoral level. Other studies briefly refer to state industrial firms as potentially influential participants in sectoral policy processes, but do not further engage with this issue. Heilmann and Shih (2013), for instance, hint at the political strength of large SOEs in a brief side note, but deliberately avoid further engagement that would

[35] As noted by Lieberthal in criticism of much earlier accounts of policy-making in China, an observation which remains applicable to the contemporary perspectives discussed here. See Kenneth G. Lieberthal, "The 'Fragmented Authoritarianism' Model and its Limitations," in *Bureaucracy, Politics and Decision Making in Post-Mao China*, edited by Kenneth G. Lieberthal and David M. Lampton (Berkeley, Los Angeles, Oxford: University of California Press, 1992), p. 11. Even Yang's (2004) otherwise very different and strongly contested perspective of an emerging functional market economy and 'regulatory state' is ultimately based on the argument that formal changes to government bureaucracy have translated into effective policy and efficient government authority over crucial parts of the economy as part of the leadership's agenda to "augment [its] capacity to project power nationally". See Yang, 2004, p. 64.
[36] Kjeld Erik Brødsgaard, "Politics and Business Group Formation in China: the Party in Control?" *The China Quarterly* 211 (2012): 624–48.

specify the nature of their relevance.[37] Eaton (2013b), in a study of China's airline industry, equally alludes to the potential impact of large SOEs on crucial sectoral policy decisions,[38] while Pei's (2006) account of China's 'gradual reform' dilemma lists opposing action by state industry as one reason behind a number of failed market reform attempts, notably in the telecommunication sector, but then focuses entirely on conflicts within the government bureaucracy to explain outcomes.[39]

Studies on the emergence of large central state-owned enterprise groups

While the government-centred perspectives referenced above largely circumvent questions related to the relevance of central state firms for the logic underlying central-level decision-making, a number of very insightful studies exist that do analyse the significance of central SOEs in a more detailed fashion and with particular attention to central government's rationales for and approaches towards concentrating the, in pre-reform times, dispersed economic activities under various central government ministries into large state-owned industry conglomerates. Both Sutherland (2003) and Eaton (2013a), for instance, have traced the ideational foundations of the government's 'large enterprise strategy' since its first appearance in the 1980s.[40] Nolan (2001, 2003, 2004), moreover, conducted important work on government's attempts to transform state-owned enterprises into globally competitive firms.[41] Groundwork for understanding the formal linkages between government and state industry was prepared by Naughton (2005, 2006a, 2006b, 2007) in a series of articles on China's State-owned Assets Supervision and Administration Commission (SASAC), the government agency mandated with overseeing central-level SOEs. In these articles, Naughton discussed the evolving relationship between SASAC and its subordinate firms, as well as the structural foundations for the partially contradictory political and economic pressures that central

[37] Heilmann and Shih, 2013, p. 4.
[38] Sarah Eaton, "Political Economy of the Advancing State: the Case of China's Airlines Reform," *The China Journal* 69 (2013b): 64–86.
[39] Pei, 2006, pp. 116-122.
[40] Quotes taken from Eaton, 2013a, pp. 11-13. See also Dylan Sutherland, *China's Large Enterprises and the Challenge of Late Industrialisation* (London and New York: Routledge, 2003).
[41] Peter Nolan, *China and the Global Business Revolution* (Basingstoke and New York: Palgrave Macmillan, 2001); Peter Nolan and Jin Zhang, "Globalization Challenge for Large Firms From Developing Countries: China's Oil and Aerospace Industries," *European Management Journal* 21, no. 3 (2003): 285–99; Peter Nolan and Huaichuan Rui, "Industrial Policy and Global Big Business Revolution: the Case of the Chinese Coal Industry," *Journal of Chinese Economic and Business Studies* 2, no. 2 (2004): 97-113.

SOEs are exposed to.[42] Building on Naughton's work, Brødsgaard (2012) raised questions about the complexities of institutional linkages between central government and central SOEs and about the meaning of potential conflicts of interest between the two for the practise of government oversight.[43]

In conjunction, these studies gave a compelling account of the emergence of large central state firms since the beginning of China's economic reforms as well as of the formal system of state asset management, but their predominant focus was on these firms' evolution as industrial and economic actors, both in a domestic and international context, as well as on government policy towards state firms aimed mainly at enhancing their performance. The political role in domestic policy processes played by these firms since their emergence as well as the ways in which these firms themselves may shape politics, however, remained largely unexamined.

1.1.2 'SOE-centred' literature as a counter-perspective

Around the mid-2000s, a small sub-literature began to emerge that challenged the widely held view of active and effective top-down central government guidance of China's strategic industries. It focused specifically on the political role of large central SOEs which were portrayed as extremely influential political actors with policy preferences that often differed strongly from those of central government and which were argued to play a crucial role in shaping the policy environment in strategic segments of the economy.[44]

The origins of this sub-literature can be traced back to prominent earlier studies on economic policy-making in China which for many years have pointed towards a significant horizontal and vertical fragmentation of state authority as well as resulting obstacles to political decision-making and policy implementation. Particularly influential in this regard was Lieberthal's (1988, 1992) 'fragmented authoritarianism' framework, which posited that "authority below the very peak of the Chinese political system is

[42] Barry Naughton, "SASAC Rising," Hoover Institution, China Leadership Monitor #14 (2005); Barry Naughton, "Claiming Profit for the State: SASAC and the Capital Management Budget," Hoover Institution, China Leadership Monitor #18 (2006a); Barry Naughton, "Top-Down Control: SASAC and the Persistence of State ownership in China," paper presented at the University of Nottingham, 23 June 2006 (2006b); Barry Naughton, "SASAC and Rising Corporate Power in China," Hoover Institution, China Leadership Monitor #24 (2007).
[43] Brødsgaard, 2012.
[44] See e.g. Downs, 2006, 2008a; Xu, 2008, 2012; Chen, 2010; Tsai, 2013; Liao, 2014.

fragmented and disjointed" and that "China's bureaucratic ranking system combines with the functional division of authority among various bureaucracies to produce a situation in which it is often necessary to achieve agreement among an array of bodies, where no single body has authority over the others."[45] In conclusion, Lieberthal attested to a "reduce[d] [...] extent to which organs respond in disciplined fashion to instructions from higher levels" as well as to a "strengthened [...] tendency of bureaucratic units to work vigorously to promote and protect their own interests in the policy-making process".[46] Against this background, Lieberthal viewed the explanatory power of 'top down' perspectives on Chinese politics as insufficient and instead focused on processes of bureaucratic bargaining among different government departments and within the state sector at large, as well as on the "effects of the interactive processes among the constituent elements of the Chinese polity" on policy formulation and implementation.[47] Arguing in the tradition of Lieberthal's 'fragmented authoritarianism' framework, a number of cross-sectoral as well as industry-specific studies have emerged that considered the political influence of large central SOEs on China's economic governance in more detail.

Cross-sectoral studies on large SOEs' policy relevance

Important foundational work on the 'bottom-up' component of the interaction between government and industry over particular policy challenges was conducted by Kennedy (2005) who compared the influence of state-owned and private businesses on central-level policy-making across different industry sectors.[48] Emphasising mutual dependence between government and industry, Kennedy argued that:

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[45] Lieberthal, 1992, p. 8. Kenneth Lieberthal and Michel Oksenberg, *Policy Making in China. Leaders, Structures, and Processes* (Princeton: Princeton University Press, 1988).
[46] Lieberthal, 1992, p. 9.
[47] Ibid., pp. 10-12; See also David M. Lampton, "A plum for a peach: Bargaining, Interest, and Bureaucratic Politics in China," in *Bureaucracy, Politics and Decision Making in Post-Mao China*, edited by Kenneth G. Lieberthal and David M. Lampton (Berkeley, Los Angeles, Oxford: University of California Press, 1992), pp. 33-58. A strong focus among studies in this area has furthermore been placed on central-local relations (e.g. Jean C. Oi, "The role of the local state in China's transitional economy," *The China Quarterly* 144 (1995): 1132-1149), and furthermore on the influence of non-governmental actors on policy. Notable studies in this regard, albeit with an exclusive focus on private actors, were written by Mertha (2009) on 'policy entrepreneurs' and by Steinberg and Shih (2012) on the effect of export-oriented manufacturers' business interests on China's exchange rate policy. See Andrew Mertha, "'Fragmented Authoritarianism 2.0': Political Pluralization in the Chinese Policy Process," *The China Quarterly* 200 (2009): 995-1002; David A. Steinberg and Victor C. Shih, "Interest Group Influence in Authoritarian States: The Political Determinants of Chinese Exchange Rate Policy," *Comparative Political Studies* 45, no. 11 (2012): 1405–1434.
[48] Scott Kennedy, *The Business of Lobbying in China* (Cambridge, MA: Harvard University Press, 2005).

> While the government is in a position to influence business, firms have gained policy leverage because they are central to accomplishing government objectives such as a growing economy, stable prices, high employment, and expanding tax receipts. Without industry's cooperation, these and other goals cannot be achieved, either for a specific bureaucracy or for the government as a whole. Relatedly, because of their involvement in the economy, businesses are a critical source of knowledge on issues that affect their success.[49]

Its importance for achieving policy objectives and superior knowledge together provided industry with a '"privileged position' at the policy table."[50] Large SOEs, having developed their own political standing as well as their own set of interests, were viewed as especially influential due to their direct access to the government bureaucracy, as well as their ability to criticise existing policies and recommend policy changes.[51] Kennedy's comparative work convincingly showed that industrial firms are important participants in central-level Chinese politics and large SOEs are particularly successful at furthering their interests via national policy. For the purpose of the present study, however, a limitation of his work is that it focused entirely on assessing the *relative* policy impact of firms given variance in ownership, size and levels of access to the bureaucracy, while lacking an analysis of firms' policy influence in settings where their policy preferences were at odds with those of central government. Almost all of the examples of state firms' policy influence presented by Kennedy in his most 'strategically relevant' case study (the steel industry) were related to policy challenges that were equally problematic for both central government and industry and that government appeared eager to remedy as both government and state firms were set to benefit. Without providing evidence that showed SOEs making use of their 'access to the bureaucracy' in order to overcome government opposition or change government opinions on previously contentious matters, it remains unclear through which mechanisms and under which conditions 'access' as such translates into political influence.

Slightly stronger claims of state firms' policy impact were made in a study by Lorentzen, Landry and Yasuda (2013) who analysed the effect of the presence of predominantly large state-owned industrial firms on the practical application of environmental policies in different localities, finding the presence of such firms associated with serious implementation problems to a degree which, the authors argued, "restrict[s] the ability of China's top leaders to implement political reforms, even when these reforms are

[49] Ibid., p. 55.
[50] Ibid.
[51] Ibid., pp. 72-74.

aimed at promoting sustainable long-run economic growth and preserving CCP rule".[52] Due to their focus on showing quantitative effects the authors, however, equally have little to say about the mechanisms through which large firms may affect policy in its application or about the nature of policy-relevant interactions between central government and large SOEs. Nevertheless, their findings support the notion that large state-owned industrial firms need to be taken seriously as political actors, particularly across China's strategic industries in which they feature so heavily.

Industry-specific studies on SOEs' policy impact

A number of other studies have focused more specifically on the policy impact of central SOEs at the sectoral level and have arrived at findings which further challenged the notion that large state firms mostly fulfil a function as central government's 'instruments' for exercising control. They argue instead that a de facto erosion of government authority had occurred in a number of strategic industry settings, regarding both state firm oversight as well as regarding processes of policy-making and policy implementation.[53] While some of the government-centred accounts introduced in the previous section had already hinted at the influence of large SOEs in fields such as the telecommunication and airline industries, a strong empirical focus among these SOE-centred studies was placed on the different segments of the energy sector; they contended that structural and policy developments in highly strategic fields such as oil, natural gas and electricity were subject to severe state firm interference or even mainly driven by state firms' policy preferences.

Xu (2008), in an article on energy policy-making, argued that the transformation of previously existing line ministries into corporatised state firms had created an "asymmetric situation" between government and SOEs in which state firms had gained control over the energy segment while government "seems to have lost its ability to regulate".[54] As state firms had become "the key players" in China's energy policy-making, administrative control over large state-owned energy corporations was not only "long gone and the party and the government can no longer 'order' them what to do

[52] Peter Lorentzen, Pierre Landry and John Yasuda, "Undermining Authoritarian Innovation: The Power of China's Industrial Giants," *Journal of Politics* 76, no. 1 (2013): 182–194.
[53] See e.g. Downs, 2006, 2008a; Xu, 2008, 2012; Chen, 2010; Tsai, 2013; Liao, 2014.
[54] Xu, 2008, p. 435.

and what not to do",[55] central SOEs furthermore treated sectoral regulators "at best as an inconvenience and at worst as the impediment of their development", often simply ignoring them.[56] Regarding the nature of the policy process, Xu further specified that this 'asymmetric situation' did not mean that government devised policy "on behalf of the energy companies at the expense of the country", but rather that policies were "formulated ex-post by the government's endorsement of a series of incremental and individual decisions made by the energy corporations that are driven more by market opportunities than a set of ideologies or pre-determined national energy strategy".[57]

Similar views on central SOEs' increased autonomy from government have been expressed by Downs (2006, 2008a) and Liao (2014) in their work on China's oil industry.[58] Given the weakness and fragmentation of the sectoral bureaucracy and a "heightened divergence between corporate and national interests", Downs posited, "China's top leaders are not only less able to bend the NOCs [national oil companies] to their will but must also balance the companies' demands with those of an increasing number of other interest groups". In summary, Downs maintained that "the projects pursued by the energy SOEs tend to shape the country's energy policies rather than vice versa".[59] Findings of government inability to provide effective policy guidance in strategic industries also come from studies on China's electricity sector where Chen (2010) and Xu (2012), in brief but insightful overviews, sketched out strategies applied by state-owned electricity companies to interfere with sectoral restructuring, which Xu summarised as "gaming the system and taking advantage of the diverse interests of government agencies".[60] Zhang (2015) furthermore depicted state-owned electricity companies as "too powerful to be fully subject to the authority of the agencies"[61] that are meant to supervise them, while a study by Tsai (2014) on administrative reforms in the electricity sector designated them as the "mightiest interest group in the country"

[55] Ibid., pp. 442, 445.
[56] Ibid., pp. 447-448.
[57] Ibid., p. 450.
[58] Downs, 2008a, pp. 121-122; Erica S. Downs, "China," The Brookings Foreign Policy Studies Energy Security Series, 2006; Janet Xuanli Liao, "The Chinese government and the national oil companies (NOCs): who is the principal?" *Asia Pacific Business Review* 21, no. 1 (2014): 44–59. For further information on China's oil sector see Kun-Chin Lin, "Corporatizing China. Reinventing State Control for the Market," (Ph.D. diss., University of California, Berkeley, 2003).
[59] Downs, 2008a, pp. 128-129, 137.
[60] Xu, 2012, p. 141; Chen, 2010.
[61] Zhang, 2015, p. 486.

which had successfully undermined the authority of a newly created regulatory agency via 'capture' and by playing off different government agencies against each other.[62]

Summary of claims made across the 'SOE-centred' literature

While testifying to the political power and influence of central state firms, the studies introduced above have suggested a number of mechanisms through which these companies are able to shape policy in its formulation and implementation. As core avenues, all of the studies emphasised these firms' direct access to all relevant parts of the bureaucracy, their formal connections to central government due to their high administrative rank, informal connections to top officials due to firm executives' membership in CCP committees which allowed them to circumvent sectoral authorities and liaise directly with top leaders, and their active participation in policy-making.[63] Furthermore, Kennedy (2005) argued that central SOEs' role during policy-making was strengthened by central government's strong reliance on firms' expertise concerning their respective industries.[64] Downs (2008b), in her work on energy policy, and with slight variance also Chen (2010) and Xu (2012) with findings from the electricity sector, additionally asserted that central SOEs were particularly successful at driving sectoral policy if they managed to argumentatively link their suggestions for sectoral policy content or project development to broader notions of the 'national interest' as expressed by the top leadership.[65] Finally, building on Downs's (2008a; 2008b) and Xu's (2008; 2012) observations of the uncoordinated interplay of central government institutions and the weakness of the sectoral administration in a number of highly strategic sectors, Tsai (2014) argued that large electricity SOEs have been able to 'capture' sectoral regulators and to play off different parts of the bureaucracy against each other in their own favour.

[62] Tsai, 2014, pp. 470, 471. See also Chung-min Tsai, "The Paradox of Regulatory Development in China. The Case of the Electricity Industry" (Ph.D. diss., University of California, Berkeley, 2010).
[63] Kennedy, 2005, pp. 72-74; Downs, 2008a, pp. 128-129, 2008b, 42-25; Xu, 2008, pp. 443-444, 447-448; Liao, 2014, p. 52; Zhang, 2015, p. 486.
[64] Kennedy, 2005, p. 55.
[65] Erica S. Downs, "China's 'New' Energy Administration," *China Business Review* (November 2008b): 42-45; Xu, 2012; Chen, 2010, focuses exclusively on state firms' argumentative references to government's market building principle under the heading of "playing the market reform card".

Lack of empirical depth as a core shortcoming of the 'SOE-centred' literature

While delivering strongly phrased counter-claims to government-centred accounts, all of the industry-specific SOE-centred studies surveyed here share as a distinct weakness a severe lack of empirical depth. Emphasising large SOEs' profound influence on policy in its emergence and application, these studies all argue their case based on sparse and anecdotal empirical evidence, for the most part either select examples of state firms' oppositional conduct to central government policy during the implementation stage or examples of policy output that coincided with (often-times assumed) SOE interests. Although the evidence presented certainly suffices as a basis for arguing that central government and SOE policy preferences are often at odds with each other and have led to prominent instances of confrontation over the shape and content of sectoral policy, none of these studies engage in in-depth analyses of SOEs' conduct during, and influence on, policy processes which would actually systematically demonstrate the declared mechanisms of state firm influence in action. Tsai (2014), for instance, writes about SOEs' role in "obstructing" policy and "capturing" regulators, as well as "lobbying" and "persuading" government,[66] yet the processes through which these different types of policy influence materialise are not presented in any notable detail, just as the conditions under which they may occur, succeed or fail remain undiscussed. Downs (2008a) provides some evidence of SOEs' obstructive behaviour in the oil sector, but she fails to show that this behaviour was actually instrumental in bringing about any of the desired changes and furthermore declares outcomes as being congruent with SOE interests without showing how or why these outcomes arose. Xu (2008) declares that central government had lost its "ability to regulate"[67] China's energy sector and that it formulates policy based not on any broader strategic considerations but rather by choosing in hindsight among policy alternatives derived from actions that have already been taken by state firms, yet the evidence presented to demonstrate this purported dynamic remains extremely scarce.[68] Chen (2010) and Xu (2012) similarly assert that state firms advocated their own policy suggestions in particular ways and that particular outcomes arose because of it, but aside from a very small number of relevant, but anecdotal, examples they do not show whether or how advocacy and outcomes were procedurally linked to each other.

[66] Tsai, p. 470.
[67] Xu, 2008, p. 435.
[68] Ibid., pp. 435, 450.

The general lack of systematic process-based empirical evidence across this part of the literature makes it very difficult to judge whether and how the presented mechanisms apply and whether there is indeed a systematic nature to the ways in which the action and intent of central state firms influence the shape, content and application of central-level policy. At the same time, the persisting uncertainty regarding this potentially important factor, which has been widely omitted across the previously introduced government-centred accounts, opens opportunities for further research.

1.1.3 Clash of perspectives as point of departure for new research

In summary, there remains considerable doubt across the literature on the political economy of China's industrial reforms regarding the factors that determine policy trajectories in China's 'strategic' industries and particularly regarding the influence of central-level SOEs in the associated policy processes. Dominant parts of the literature strongly emphasise central government guidance, for example, Hsueh's (2011) focus on central government's *strategic value* considerations, Pearson's (2005, 2007) emphasis on central government's different political *imperatives* across strategic industries and Heilmann and Shih's (2013) focus on *shifts in ideas* among government leaders as the determinants of political shifts in how strategic parts of China's economy are governed. While the political role of large SOEs in central-level policy processes is largely ignored, some authors acknowledge limitations to government's institutional capacities while partially recognising the relevance of state industry's policy preferences, but then equally limit their analysis to the causes and outcomes of lacking institutional capacity and give little indication of how central state firms might add to the overall scenario.[69] Others again refer to central state industry under the label of a government-steered "China Inc.", attesting to the evolution of an effective system of centralised government leadership over industry[70] or even to the emergence of a "new form of state led paternalistic governance"[71] under central government's "near absolute control."[72]

SOE-centred accounts as introduced in the previous section, on the other hand, argue that central government's sectoral oversight in several strategic industries is weak and that central state firms essentially dominate the policy arena. At the same time, they

[69] E.g. Pei, 2006; Eaton, 2013b; Heilmann and Shih, 2013.
[70] Li, 2015, p. 107.
[71] Ho and Young, 2013, p. 84.
[72] Ibid.

provide very little systematic evidence as to how, why, or under which conditions state firm influence occurs, which may partially explain why the claims made by this small sub-literature have thus far been of limited practical consequence to more broadly debated perspectives of China's economic policy-making. Despite its empirical weaknesses, the basic questions raised by this literature regarding the practical controllability of China's strategic industries and the large state firms which populate them are of considerable importance for our broader understanding of the trajectory of China's industrial reforms. Building on the mismatch between both perspectives – deliberately reduced to essentials for the purpose of operationalisation – this study further analyses the role played by large central state-owned industrial enterprises in strategic industry sectors during processes of policy-making and policy implementation. This endeavour is pursued by testing in a 'most likely' industry case for government-centred accounts whether the hitherto largely unsupported claims made by the SOE-centred literature regarding mechanisms for state firms' policy influence actually apply, i.e. whether, under which conditions, how and to what effect large central SOEs are able to shape core sectoral policy in China's strategic industries.

1.2 Research design

1.2.1 Research question

'Are central SOEs able to influence sectoral policy in China's 'strategic' industries? If so, under which conditions, how and to what effect?'[73]

1.2.2 Introduction to the case study

The stated research question will be applied to the case of the electricity supply industry which, due to its great strategic importance both economically and politically, fulfils the criteria of a 'most likely' case for 'government-centred' perspectives on economic governance in China's 'strategic' industries as introduced in the literature review. At the same time, the industry can also be characterised as a 'most likely' case for the SOE-centred perspective given the presence of some of China's largest central state-owned enterprises.

The electricity supply industry is furthermore particularly suited as a test case for the different viewpoints on economic governance in China's strategic industries as it has witnessed considerable shifts in sectoral reform agendas since the turn of the millennium. In 2002, a comprehensive reform agenda aimed at *unbundled competitive regional market building* was introduced to the hitherto vertically integrated monopolistic industry setting but then started to lose its political momentum in the mid-2000s when a new reform plan aimed at the development of an *integrated non-competitive nationally unified supply system* began to emerge and was partially applied thereafter. These two agendas stood in stark contrast to each other and imagined entirely different outcomes regarding industry structure (unbundled and regionalised vs. integrated and centralised) as well as regarding the functional logic of electricity supply (competitive upstream and

[73] Indicators and definitions: '*Central SOEs*' refer to state-owned enterprises administered by the central State-owned Assets Supervision and Administration Commission. A full list of these firms is available under: SASAC, "List of central SOEs," http://www.sasac.gov.cn/n2963340/n2971121/n4956567/4956583.html, accessed 05/2013. '*Influence*' is here understood as requiring evidence that SOEs' "action and intent" were "sufficiently effective to have plausibly caused an appreciable part" of the respective outcome under scrutiny. See Daniel Carpenter and David A. Moss, "Introduction," pp. 10-12 and Daniel Carpenter, "Detecting and Measuring Capture,", p. 60, both in *Preventing Regulatory Capture. Special Interest Influence and How to Limit It*, edited by Daniel Carpenter and David A. Moss (New York: Cambridge University Press, 2014). '*Sectoral policy*' is defined here as policy which is targeted at industry-specific issues and which only applies within the confines of a specific industry. It can be published either by the State Council, comprehensive economic commissions, or by industry-level authorities.

downstream markets vs. non-competitive downstream monopoly/oligopoly). They therefore represent precisely the kind of fundamental policy choices the drivers of which the broader literature has theorised about. This setting provides an opportunity to deductively compare the explanatory power of the two basic approaches throughout phases of policy implementation and policy formulation and to thereby deepen our understanding of sectoral policy drivers in China's strategic industries, which form the broader universe of cases that this study relates to.[74]

While a single industry study only allows for a limited generalisability of findings across cases, the selection of a 'most likely' test case marks an attempt at combining empirical richness and analytical depth with maximal leverage regarding existing country-specific middle-range theory. The deliberately narrow empirical emphasis on mechanisms of administrative competition between central government and state firms in sectoral policy-making arguably contains considerable theoretical relevance as it directly addresses core premises underlying numerous influential accounts of the political economy of China's industrial reforms. If the SOE-centred perspective can be shown to have explanatory merit in a 'most likely' case for government-centred explanations, this would pose a challenge to the latter accounts as they would have failed to fully explain an 'easy' test case for their largely shared postulate of active and effective central government guidance over fundamental development trajectories in China's strategic industries. This type of finding could require adjustments to common government-centred interpretations of policy output and outcomes in some of the most important parts of China's economy, particularly to studies such as Hsueh (2011) with her insistence on exclusively government-driven 'strategic value logic' or Heilmann and Shih (2013) with their focus on ideas about economic governance within central government. Modifications could become necessary to these viewpoints regarding the role of central SOEs in China's economic policy realm and the mechanisms through which they are able to influence central-level policy processes, and consequently also regarding the capacity of central government to steer the development of the country's strategic industries according to its political and economic preferences. Simultaneously, such

[74] Other examples of 'strategic' industries include telecommunications, railway, airlines, banking, as well as energy and resource-related industries including electricity, oil, gas, and mining. See Mattlin, 2007. The deliberate restriction of the scope of this thesis to central-state politics in China's 'strategic' industries is important to emphasise as very different types of state-industry interactions may be observed in other segments of the economy or at lower administrative levels. See e.g. Howell (2006) for a discussion of the polymorphous nature of the Chinese state or Pearson (2005) for a discussion of the country's tiered economy.

findings would provide partial support to the SOE-centred approach and could yield inferences about the extent to which the hitherto largely unproven mechanisms for SOEs' policy impact posited by this literature are actually significant, i.e. to see which of them apply, whether there are other mechanisms that apply and whether there is anything systematic about how they apply. On the other hand, if there is no evidence for the existence and effectiveness of such mechanisms in a test case where the arguments presented by the SOE-centred camp should equally be expected to apply, this would not only further solidify the already strong position of government-centred perspectives on economic governance in China's strategic industries but also strongly weaken the argumentative reach of SOE-centred accounts. Finally, if neither of the two approaches are able to sufficiently explain policy shifts in the industry test case at hand, this would require more broadly revised claims about the determinants of sectoral policy and the political interplay of central government and central state firms in China's strategic industries.

1.2.3 Basic variable setting

Outcome to be explained: Shifts in reform trajectories for sectoral policy in China's electricity industry between 2002 and 2015. This overall dependent variable is further broken down in order to reflect different phases of this shift. Part A of the empirical sections attempts to explain the outcomes of central government's attempts to develop *unbundled competitive regional markets* in electricity supply. Part B attempts to explain the subsequent emergence and partial installation of an *integrated non-competitive nationally unified electricity supply system.*

Independent variables: The main line of inquiry in this dissertation will be to ask whether "action and intent" by large SOEs in pursuit of shifts in sectoral policy have been "sufficiently effective to have plausibly caused an appreciable part of the shift"[75] that eventually occurred (Parts A and B of the empirical sections). In addition, the question of whether shifts in central government's sectoral policy preferences (as a second

[75] This benchmark for assessing industry influence on policy-making have found application in the literature on 'regulatory capture' and will be borrowed for the purposes of this study. See Carpenter and Moss, 2014, pp. 10-12.

independent variable of theoretical relevance) may equally or better explain shifts in sectoral policy will be addressed.[76]

1.2.4 Basic test hypotheses and indicators

Two basic test hypotheses are used while deductively applying the stated research question to the selected industry case. In order to facilitate the inquiry in light of the differences between authors *within* the government-centred and SOE-centred parts of the literature, both hypotheses are phrased as simplified condensations of claims made in both loosely organised camps. Hsueh (2011) and Pearson (2005, 2007) are used as the main references for the government-centred null hypothesis while the SOE-centred alternative hypothesis is derived mainly in reference to claims made by Xu (2008) and Downs (2006, 2008a).

'Government-centred' null hypothesis: 'The way in which sectoral policy in China's electricity industry has been formulated and applied is sufficiently explicable by central government's policy preferences for that industry sector as well as by shifts over time regarding those preferences.'

Indicators for the null hypothesis: It should be found that central government policy preferences shifted, i.e. market building was no longer desired, while recentralisation and expansion of monopoly/oligopoly was now preferred. There also needs to be empirical evidence that central government has acted as a guiding force, orchestrating programmatic and structural change. There should be evidence that the initial impetus for change originated within government and that it was consistently pursued thereafter. As far as state industry is found to have been the origin of the new agenda and the main proponent of its application, there needs to be convincing evidence that central government supported this agenda from a sectoral guidance standpoint and was in full and conscious control of the way in which it was applied. As a very minimum, there should be no evidence of government opposition to the changes that occurred or, if there is evidence of distinct government opposition to industry action, government should be expected to prevail.

[76] This study remains agnostic towards the precise nature of a potential shift in government preferences. There will, for instance, be no conceptual differentiation between government's *interests* and *ideas* as practised e.g. by Hsueh (2011) and Heilmann and Shih (2013).

'SOE-centred' alternative hypothesis: 'Action and intent by large SOEs have had a dominant effect on the way in which sectoral policy in China's electricity industry has been formulated and applied, while policy shifts in the industry are insufficiently explicable by shifts in central government's sectoral policy preferences.'

Indicators for the alternative hypothesis: There should be evidence of state firms actively defending their dominant industry position when confronted with competitive market building policy, i.e. policy that challenges their organisational integrity and their scope/scale of business. State firms should display a very high success rate in their opposing endeavours. The origin of the new restructuring agenda should be traceable to state industry itself and there should be evidence that the shift between policy trajectories was both actively and knowingly driven by state industry and, if necessary, also against central government's stated policy preferences. Any political and bureaucratic conflicts concerning these two agendas should be dominated by SOEs and subsequent decision-making should be in line with their stated policy preferences. Indicators of 'intent' by state industry may include, among others, evidence of attempts to lobby or place targeted pressure on regulators to change existing policy or its application or the shaping of the informational setting within which decision-making takes place.[77]

1.2.5 Overview of the dissertation structure and of within-case methods for hypothesis testing

Throughout the analytical narrative both process tracing and the congruence method will be applied in order to deductively test and compare the explanatory power of claims inherent to the two stated hypotheses.[78] The associated findings will then be used to suggest and subsequently re-test a number of revised claims through a series of 'before-after' comparisons.[79] This thesis therefore primarily follows a deductive logic but includes an inductive element.

An empirical focus will be placed on the SOE-centred alternative hypothesis as the main research interest while also dedicating adequate consideration to the government-centred perspective. While working with competing explanations during data analysis,

[77] For further discussion of the concept of 'intent' see Carpenter and Moss, 2014, p. 11; Carpenter, 2014, p. 60.
[78] George and Bennett, 2005, pp. 179-184, 205-223.
[79] Ibid., p. 219.

instances suited to conducting congruence tests will be sought for which the different perspectives either make distinctive predictions regarding the process under scrutiny or where, based on the logic of their argument, they should expect to find one type of process or mechanism at play but not another (specifications for such processes and mechanisms will be provided as part of the empirical chapters). These predictions/derived expectations will subsequently be compared to factual occurrences in order to judge the relative strength of the different explanatory approaches.[80] Increasing the number of observations while combining congruence method and process-tracing is expected to simplify the assessment of whether posited relationships between the dependent variable and different independent variables are causal or spurious.[81]

The empirical part of the dissertation is organised in three parts. After a brief historical overview of major structural and administrative developments in China's electricity industry, Part A analyses the implementation processes underlying a far-reaching sectoral marketisation policy issued by the State Council in 2002. Particular scrutiny will be applied to the political role of the State Grid Corporation of China (SGCC) as the country's third largest state firm and the infrastructural heart of the electricity industry, as well as to its interactions with central government following the publication of this policy. The questions of whether, under which conditions, how and to what effect SGCC has influenced the course of policy implementation will be approached predominantly by analysing its responses to a number of asset unbundling requirements inherent in the marketisation plan, the practical enforcement of which constituted a structural prerequisite for the emergence of sectoral competition as envisioned by the State Council. Associated processes and outcomes will furthermore be cross-checked against the government-centred explanation.

Part B of the empirical sections will analyse the appearance in the mid-2000s of a new sectoral reform plan that contained a reform route that in many ways ran opposite to the original marketisation agenda. Emphasis will be placed on analysing SGCC's role during the emergence and partial application of this new policy agenda. In particular, it will be assessed whether, under which conditions and through which mechanisms the grid company has been able to exert influence on associated political processes and

[80] Ibid., p. 117.
[81] Ibid., pp. 179, 208.

outcomes, while once more cross-checking findings against the government-centred explanation.

The conclusions of Parts A and B will be presented in the form of a simple interactive model of state firm influence on central-level policy processes as derived from the industry case at hand, while furthermore discussing the limitations of both the main explanatory approaches scrutinised in this dissertation. As part of this model, the prevalence of a 'synchronisation' mechanism (briefly presented in the introductory section) will be suggested through which central state industrial actors in the electricity supply sector, based on both action and intent, can influence the formulation and implementation of sectoral policy, supplemented by claims regarding the conditions under which they are able to do so.

To ensure the validity of Parts A and B's findings, they will be re-tested in Part C against additional empirical material from the same industry case using a sequence of targeted 'before-after' comparisons [82] in which the presence/absence of said 'synchronisation' mechanism (the independent variable for Part C) during policy-related confrontations between SGCC and central government will be used to explain variance in outcomes regarding the grid company's ability to shape sectoral decision-making according to its preferences (dependent variable for Part C). The study concludes by discussing findings regarding state firm influence on crucial sectoral policy in the electricity supply sector both in its emergence and implementation, the logic of interactions between state firms and central government over contentious central-level policy and the limits of influence on both sides. In a final step, the relevance and consequences of these findings for the existing literature will be considered.

1.2.6 Overview of sources used

The empirical sections of this dissertation rely heavily on primary sources published in Chinese. While the secondary literature on China's electricity industry has been widely surveyed, to the author's best knowledge no publications existed at the time of writing that analysed political shifts and the role of central state firms during those shifts to the level of detail required for the particular project at hand, a reservation which also appeared to apply to China's other strategic industries. Numerous sector-specific studies

[82] Ibid., p. 219.

exist, but none of them systematically and with empirical depth consider the policy influence of central SOEs.[83]

In addition to publicly available central government policy documents as the foundations for assessing the evolution of the sectoral policy realm, the most important sources of information were state-owned and privately-owned Chinese media outlets covering national-level economic and industry news. These media outlets ranged from government publications such as the *People's Daily* to partially more liberal newspapers such as *Caixin* or *Caijing*, while cited newspapers also include the *21st Century Business Herald*, the *Economic Observer* and the *China Securities Journal*, among numerous others.[84] A considerable number of industry-specific news articles were obtained via the *North Star Electric Power News Network*, a Chinese website that functions as an industry news aggregator.[85] Some empirical sections also draw heavily on articles published by industry experts and former government officials who participated in industry-level project assessments and evaluations organised by the National Energy Administration and who gave account of these procedures.[86] While engaging with these sources, a general focus was placed on extracting fact-based statements that could be triangulated against or placed into the context of other sources. Personal statements and opinion pieces were generally approached with careful attention to the authors' organisational affiliation and political leanings, wherever possible.

The available written empirical material was supplemented with semi-structured interviews held in Beijing between 2011 and 2014 with employees of the National Energy Administration (NEA), the State-owned Assets Supervision and Administration Commission (SASAC) and the State Grid Corporation of China (SGCC). During all interviews, the 'LSE Research Ethics Policy and Procedures' and the 'ESRC Framework

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[83] Examples of recent secondary literature: Yi-chong Xu, *Powering China* (Aldershot: Ashgate, 2002); Chi Zhang and Thomas C. Heller, "Reform of the Chinese electric power market: economics and institutions," in *The Political Economy of Power Sector Reform: the Experiences of Five Major Developing Countries*, edited by David G. Victor and Thomas C. Heller (Cambridge: Cambridge University Press, 2007); Edward A. Cunningham, "A Portfolio Approach to Energy Governance: State Management of China's Coal and Electric Power Supply Industries" (Ph.D. diss., Massachusetts Institute of Technology, 2009); Michael Meidan, Philip Andrews-Speed and Ma Xin, "Shaping China's Energy Policy: actors and processes", *Journal of Contemporary China* 18, no. 61 (2009): 591-616; Ngan, H. W., "Electricity regulation and electricity market reforms in China," *Energy Policy* 38 (2010): 2142-2148; Chen, 2010; Xu, 2012; Kun-Chin Lin and Mike M. Purra, "Transforming China's Electricity Sector: Institutional Change and Regulation in the Reform Era," Centre for Rising Powers, Department of Politics and International Studies, University of Cambridge, CRP Working Paper #8 (November 2012); Tsai, 2014; Zhang, 2015.

[84] Due to the large number of Chinese online news sources used and in order to enhance footnote readability, URLs for online news articles are only listed in the bibliography.

[85] 'North Star Electric Power News Network' (北极星电力新闻网), http://www.bjx.com.cn.

[86] See in particular Zeng Dewen's Electricity Industry Blog (曾德文的博客), http://eee001.blog.caixin.com/.

for research ethics' were followed.[87] The interviewer identified himself to all interviewees as an LSE doctoral researcher, explained the purpose of the study and clarified that information provided during interviews would be used for research purposes and for eventual publication. All interviewees made an informed and free decision to participate and gave their consent for the use of their information. They were also provided with the researcher's contact information to enable them to retract information or withdraw their consent should they wish to do so at a later point. To protect interviewees from personal or career-related risks as possible consequences of their participation in the study or the nature of their statements, their anonymity was secured through the removal of personal identifiers.

[87] London School of Economics and Political Science, *Research Ethics Policy and Procedures*, November 2014, http://www.lse.ac.uk/intranet/LSEServices/policies/pdfs/school/resEthPolPro.pdf, accessed 12/2014; Economic and Social Research Council, *ESRC framework for research ethics*, January 2015, http://www.esrc.ac.uk/files/funding/guidance-for-applicants/esrc-framework-for-research-ethics-2015/, accessed 12/2015.

2 China's electricity sector reforms and the evolving institutional linkages between central government and state industry

This chapter will give a brief overview of structural and administrative developments in China's electricity industry in order to provide the relevant context for the following empirical analyses of both the attempted implementation of market building policy (Part A) and the subsequent emergence and partial application of a new sectoral reform agenda (Parts B and C). These analyses focus on the role of state industry in shaping the underlying policy processes and their interaction with central government bodies.

The first section of this chapter will briefly discuss major policy reform steps in China's electricity industry over the past decades. As a foundation, the pre-reform history of the previously government-operated industry will be outlined in order to then review early reforms geared towards a separation of the state's administrative and entrepreneurial functions in the 1990s. Against this background, the 2002 marketisation reforms to China's electricity industry will be discussed through an analysis of the main guiding policy document, the No. 5 Document (2002), as well as a brief summary of the discrepancies between reform goals and outcomes. It will be shown that (a) China's electricity sector has been confronted with major reforms through which central government aimed to introduce regionalised market competition into a hitherto vertically integrated monopoly and (b) the structural outcomes of these reforms have diverged significantly from stated goals.

The second section will discuss the administrative structure as it has developed via and since the introduction of the marketisation agenda. First, an overview of the regulatory setting at the industry level will be provided before then outlining China's system for the administration of state assets and the resulting incentive structures under which state firms operate. After introducing the State Grid Corporation of China (SGCC) as the primary empirical target while investigating mechanisms of state firm influence on sectoral policy in the electricity industry, the chapter will conclude with a brief discussion of variances between mandates among different government bodies and the political standing of central state firms.

2.1 Overview of major sectoral reform steps in China's electricity industry

2.1.1 The pre-reform history of China's government-operated electricity supply industry

Prior to the onset of economic reforms in 1978, the allocation and distribution of resources in China's economy was based almost entirely on administrative measures, as prices, interest rates and wages were set within a centrally devised economic plan.[88] Accordingly, China's electricity industry was structured as a vertically integrated utility where ownership, control and management functions within the industry were performed by government officials according to policies based on centrally negotiated political objectives.[89] Through its hierarchically organised arrangement of economic planning commissions, the Chinese government allocated investment and the supply of labour and raw materials. Electricity was produced and distributed by state-run plants and transmission systems according to quotas and prices set by the State Planning Commission (the highest-ranking central state economic planning body at the time); the quotas and prices were based on demand projections and political considerations, while industry revenues flowed directly into the government budget.[90]

Over the decades, the electrical power industry was subject to various rounds of organisational restructuring conducted in order to alleviate ongoing problems with power shortages and inefficient power distribution, which were generally believed to result from the faulty arrangement of the government institutions responsible for devising and implementing economic policies.[91] Throughout periods of decentralisation and recentralisation of government authority over the energy sector, organisational experiments regarding sectoral administration were carried out in an attempt to build a framework within which it would be possible to establish a coherent national energy strategy.[92] During these different phases, administration over the electricity industry

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[88] Samir Amin, "Theory and practice of the Chinese 'market socialism' project: is 'market socialism' an alternative to liberal globalization?," in *The Chinese Model of Modern Development*, edited by Tian Yu Cao (London and New York: Routledge, 2009), p. 129.
[89] Xu, 2002, p. 83.
[90] Emily T. Yeh and Joanna I. Lewis, "State Power and the Logic of Reform in China's Electricity Sector," *Public Affairs* 77, no. 3 (2004): 442-445; Xu, 2002, p. 83.
[91] Xu, 2002, p. 83.
[92] Edward A. Cunningham, "China's Energy Governance: Perception and Reality," MIT Center for International Studies Audit of the Conventional Wisdom Working Paper, No. 07-04, 2007, p.3; Steven W. Lewis, "Chinese NOCs and World Energy Markets: CNPC, Sinopec and CNOOC," James Baker III Institute for Public Policy, Rice University, Policy Report (March 2007), p. 40.

shifted between different ministries with varying scopes of authority, including a Ministry of Fossil Fuels (until 1955) and a Ministry of Water Resources and Electric Power (MWREP) which was repeatedly dissolved and reinstated throughout the 1960s and 1970s, interrupted by brief periods in which a separate Ministry of Electric Power existed.[93] In 1988, following years of fast economic growth and substantial increases in energy demand, an all-encompassing Ministry of Energy (MoE) was created which merged the MWREP, the Ministry of Coal and the Ministry of Petroleum.[94] The MoE was a short-lived government department because the different industry sectors it had to supervise proved to be very heterogeneous and an overlap of administrative duties with the State Planning Commission (SPC) led to conflicts that constrained its effectiveness.

The disintegration of the MoE in 1993 was followed by the re-emergence of a separate Ministry of Electric Power (MEP).[95] The MEP, subordinate to the SPC, which in turn reported to the State Council, administered and operated the electricity sector in a dual role of government department and commercial enterprise. In these two functions, it was responsible for policy-making and supervision but also for managing microeconomic operations, while the SPC retained control of macro-levers such as investment approvals and price setting.[96] Below the MEP, provincial electrical power bureaus acted as vertically integrated regional monopolists operating power generation, dispatch, transmission and power distribution, while a number of these bureaus were also merged into regional power groups to promote cross-provincial electricity transmission.[97]

2.1.2 The separation of the state's administrative and entrepreneurial functions in the 1990s

Throughout the 1990s, industrial reforms throughout China's state sector aimed to increase the efficiency of both government administration and industry operations. At the centre of these reforms stood the cleaner separation of government and industry

[93] Yeh and Lewis, 2004, p. 445; Xu, 2002, pp. 84-86.
[94] Xu, 2002, p. 91.
[95] Downs, 2006, p. 17; Todd M. Johnson, "Development of China's Energy Sector: Reform, Efficiency, and Environmental Impacts," *Oxford Review of Economic Policy* 11, no. 4 (1995): 118-132.
[96] Philip Andrews-Speed, *Energy Policy and Regulation in the People's Republic of China*, (The Hague: Kluwer Law International, 2004), pp. 175-176.
[97] Ibid., pp. 179-180, 207.

functions in the form of identifying and clarifying property rights, transforming operational parts of industrial ministries into state companies and further commercialising those SOEs that already existed.[98] An important reform trigger was that government funds alone were not sufficient to satisfy industrial investment needs and the corporatisation of state firms was viewed as a first step towards solving this problem, as it meant that the enterprises could try to gain access to other sources of investment.[99] Consequently, direct government funding for SOEs was slowly reduced which altered incentives and drove SOEs toward a stronger profit orientation.[100] With almost half of China's SOEs still sustaining losses during the middle of the 1990s, the majority of smaller state firms were ultimately privatised. By 'grasping the large and releasing the small', government authorities from this point on shifted their attention toward revitalising a limited number of the most profitable and strategically relevant large and medium-sized SOEs in different industries.[101]

This overall reform agenda found entry into the electricity industry via the 1997 Electricity Law, according to which the enterprise management functions of the Ministry of Electric Power were transferred to a newly created State Power Corporation of China (SPCC) which was to manage its own operations while the electric power bureaus at lower administrative levels were converted into subsidiary firms.[102] The SPCC as a holding company from here on owned and operated most of China's transmission and distribution infrastructure and about half of the country's generating capacity. The asset transfers to the SPCC also included a large variety of construction, manufacturing, and service companies, and different research institutions.[103] In the following year, the MEP was ultimately abolished together with a number of other industrial ministries, and its regulatory and policy-making functions were assigned to the Electric Power Department of the State Economic and Trade Commission (SETC),[104] which was instructed to step back from directly administering enterprise operations and to take up a function that emphasised industrial management from a macro-

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[98] You Ji, *China's Enterprise Reform. Changing state/society relations after Mao* (New York: Routledge, 1998), pp. 18-24, 176; OECD, *China: Defining the Boundary between the Market and the State*, OECD Reviews of Regulatory Reform (Paris: OECD Publishing, 2009), p. 233; Qian and Wu, 2003, pp. 41-43.
[99] Xu, 2002, pp. 93-94.
[100] Peter Nolan and Xiaoqiang Wang, "Beyond Privatization: Institutional Innovation and Growth in China's Large State-Owned Enterprises," *World Development* 27, no. 1 (1998): 169-200.
[101] Naughton, 1995, pp. 319-320; Ji, 1998, p. 167; OECD, 2009, p. 66; Sebastian Heilmann, *Das politische System der Volksrepublik China*, 2nd edition, (Wiesbaden: VS Verlag für Sozialwissenschaften, 2004), p. 172.
[102] President of the People's Republic of China, "Electric Power Law of the People's Republic of China," Order No. 60, 28.12.1995, effective as of 01.04.1996.
[103] Andrews-Speed, 2004, pp. 207-208.
[104] OECD, 2009, p. 233; Andrews-Speed, 2004, p. 180; Yang, 2004, p. 37.

perspective.[105] While the separation of governmental and entrepreneurial functions had formally been accomplished, in practise the SETC maintained a close relationship with the State Power Corporation and so struggled to exercise its regulatory functions. The SETC's authority deteriorated further due to continued competition between government departments regarding energy sector oversight. In particular, the organisational successor to the State Planning Commission, the State Development Planning Commission (SDPC), successfully challenged the SETC for its dominance in long-term energy policy-making.[106]

2.1.3 The 2002 marketisation reforms in China's electricity industry

In February 2002, following a lengthy phase of political debates, the State Council published a policy document outlining an extensive marketisation agenda for the electricity industry.[107] In line with market-building attempts in other sectors of the Chinese economy and partially influenced by a worldwide trend in the 1990s towards market liberalisation in network industries,[108] this 'No. 5 Document' represented a radical break with past practises of power sector administration and management in China and laid out a road map for a large-scale reorganisation of industry assets and the policy framework within which they were operated.

The reasons behind orchestrating such a shift towards market building were manifold.[109] According to former prime minister Li Peng, who at the time was still a member of the CCP's Politburo Standing Committee and known for his close ties to the electricity industry, the reforms were meant to increase the efficiency of state-owned electricity companies by urging them to cut costs and to improve the quality of service via the introduction of competition, thereby lowering retail prices for consumers and stimulating broader industrial development.[110] As specified by Wang Jun, the then head

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[105] Xu, 2002, pp. 93-94, 116-117; Yang, 2004, p. 41.
[106] Andrews-Speed, 2004, pp. 177, 180, 183-184, 211.
[107] State Council, "State Council notification on the issuing of the electrical power system reform plan" (国务院关于印发电力体制改革方案的通知). Document No. 5 [2002], 10.02.2002.
[108] Jun Wang (王骏), "Power sector reforms are causing dismay" (令人沮丧的电业改革), *Regional Electric Power Management (*地方电力管理*)* 10 (2000): 11-14; Philip Andrews-Speed, "Reform postponed: The evolution of China's electricity markets," in *Evolution of Global Electricity Markets. New Paradigms, New Challenges, New Approaches*, edited by Fereidoon P. Sioshansi (Waltham, MA: Elsevier, 2013), p. 4.
[109] For a discussion of the political debates that preceded the marketisation agenda, please refer to Xu, 2002, and Chen, 2010.
[110] "During inspection of Zhejiang Electric Power Company, Committee leader Li Peng indicated: Power reforms must promote the development of the power sector" (李鹏委员长在浙江电力公司考察时指出：电力

of the Electric Power Division in the State Development Planning Commission's (SDPC) Department of Basic Industries[111] and who led the SDPC's 'Leading Group' which drew up a draft for the new industry reform plan,[112] the introduction of market competition was also meant to address protectionist tendencies among provinces under the all-encompassing State Power Corporation, as well as curtail the vertically integrated power companies' large above-quota profits while achieving tariff reductions for consumers.[113]

The following section will provide an introduction to the No. 5 Document as the heart of the 2002 marketisation agenda, followed by a brief summary of the discrepancies between reform goals and reforms outcomes.

Industry restructuring according to the marketisation agenda of the No. 5 Document (2002)

While the guiding ideas behind the reform as stated in the No. 5 Document were to support the growth and development of the entire power sector, increase the security and reliability of supply, mitigate the impact of power generation on the environment and satisfy growing power demand,[114] it is the more specific organisational objectives listed in the policy document which give tangible meaning to the 2002 reforms and indicate the sweeping changes they were meant to trigger. As part of an *unbundled competitive regional market building* agenda, and much to the dismay of the State Power Corporation and its general manager Gao Yan (高严),[115] the State Council under prime minister Zhu Rongji demanded the break-up of the SPCC's vertically integrated monopoly via a number of clauses that were aimed at the unbundling of potentially competitive industry segments from naturally monopolistic segments and subjecting them to market competition, which together with the establishment of a mechanism for competitive wholesale pricing were meant to lead to a more efficient allocation of resources.[116]

改革必须促进电力事业发展), *China Electric Power News* (中国电力新闻), 17.04.2001; China Vitae, Biography of Li Peng, http://www.chinavitae.com/biography/Li_Peng, accessed 05/2016; Andrews-Speed, 2013, p. 4.

111 Chinese name of the Division: 国家发展计划委员会基础产业司电力处.

112 "SGCC's 600 billion Yuan UHV project referred to as strengthening monopoly" (国家电网 6 千亿元特高压项目被指巩固垄断), Nanfang Web (南方报网), 07.07.2009.

113 Jun Wang (王骏), "Power sector reforms are causing dismay" (令人沮丧的电业改革), *Regional Electric Power Management (*地方电力管理*)* 10 (2000): 11-14.

114 No. 5 Document (2002), Part 2, §4.

115 Interview with an official at the National Energy Administration, Beijing, 11.07.2014.

116 No. 5 Document (2002), Part 2, §5.

The most consequential unbundling step was the separation of power generation assets from the grid with respect to both ownership and operation in order to lay the foundation for the development of wholesale competition in electricity supply.[117] The SPCC's assets in the area of power generation were divided up and allocated to five newly created power generation firms which remained under full central state ownership and which were each granted a 20% share in regional markets.[118] These five companies were the China Datang Corporation, China Huadian Corporation, China Guodian Corporation, China Power Investment Corporation and the China Huaneng Group (see Figure 2.1).[119]

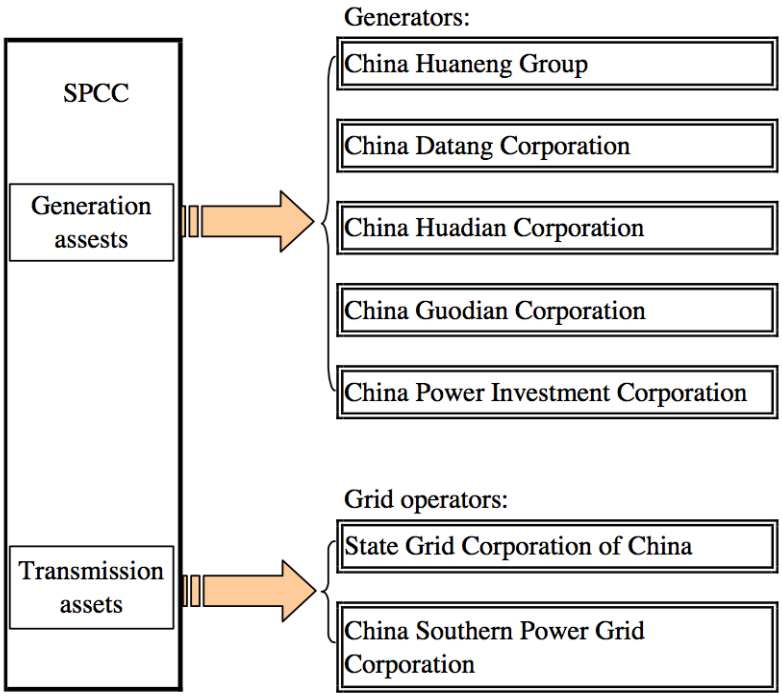

Figure 2.1 The 2002 restructuring of the State Power Corporation of China

Source: Chun Chun Ni, "The Xinfeng Power Plant Incident and Challenges for China's Electric Power Industry," The Institute of Energy Economics, Japan, Working Paper (February 2007), p. 12.

A second unbundling step concerned the separation of the overall grid structure into clearly defined regional grids as the basis for separate regional electricity markets. Following this approach, the majority of the SPCC's grid assets were brought together

[117] Ibid., Part 3, §7.
[118] Ibid., Part 3, §8; List of central SOEs, "List of central SOEs," http://www.sasac.gov.cn/n2963340/n2971121/n4956567/4956583.html, accessed 31.05.2013.
[119] OECD, 2009, pp. 236-237; Pearson, 2005, p. 317.

in the newly established state-owned State Grid Corporation of China (SGCC) under which the State Council formally established five regional grid companies (the North, North-East, North-West, East and Central China Grids) either in the form of limited liability or joint-stock companies. A sixth regional grid company, the China Southern Grid Corporation (CSGC), was split off from the former SPCC structure and set up as a separate state-owned entity (see Figure 2.2).[120]

Figure 2.2 China's regional grids

Source: Author's visualisation of material presented in this section.

All six of these regional grid companies were to cover a number of provinces, in each of which a provincial subsidiary was established to operate intra-provincial power transmission and distribution.[121] SGCC as the mother company was given a coordination function between the five regional grids and made responsible for all

[120] No. 5 Document (2002), Part 3, §9; State Economic and Trade Commission (SETC), "Plan for the establishment of the State Grid Corporation of China" (国家电网公司组建方案), Document No. 268 [2003], 17.03.2003; National Development and Reform Commission (NDRC), "Plan for the establishment of the China Southern Power Grid Co., Ltd." (中国南方电网有限责任公司组建方案), Document No. 2101 [2003], 04.12.2003. A comprehensive list of references to other policy documents related to power sector reforms in China can be accessed under: http://www.lawyer-sh.com.cn/Html/?13382.html (accessed 31.05.2013).

[121] No. 5 Document (2002), Part 3, §9.

facets of cross-regional power transmission.[122] The regional grid companies on the other hand were charged with autonomously operating and managing their respective regional networks, cultivating regional power markets, and managing dispatch centres "according to market rules",[123] making them the most relevant grid entities of the envisioned regional market system.

As a third unbundling step, the No. 5 Document called for the separation of the grid companies' transmission and distribution assets[124] to lay the foundation for the creation of retail competition in the electricity industry[125] in which consumers would eventually be able to choose between suppliers based on the parameters of price and service quality.[126] By the end of 2005, the grid companies were expected to have introduced separate internal accounting for their distribution business in order to then gradually progress with asset separation which was to leave them in charge of only the transmission segment.[127] In a fourth and final unbundling step, all auxiliary businesses related to design, construction or maintenance of grid infrastructure were to be split off from the newly formed grid companies and to enter market competition.[128] The grid firms were supposed to engage solely in grid operations and beyond that were only allowed to retain their own research institutions and a small amount of installed generation capacity, the timely sale of which was supposed to assist in financing the reform transitions.[129]

A brief overview of market building outcomes

Despite several attempts to apply the different unbundling steps, reform progress markedly slowed down in the years after 2003. Only the separation of generation assets from grid assets proceeded largely as planned, although little factual wholesale competition has developed. Correspondingly, since SGCC's and CSGC's integrated transmission and distribution monopolies stayed intact, the retail segment remains

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122 Ibid., Part 3, §10.
123 Ibid., Part 3, §11.
124 'Transmission' refers to the transfer of electricity from power generation plants to high-voltage substations close to demand centres, while 'distribution' refers to the local distribution of electricity from substations to end users.
125 No. 5 Document (2002), Part 6, §26.
126 Jun Wang (王骏), "Power sector reforms are causing dismay" (令人沮丧的电业改革), *Regional Electric Power Management (*地方电力管理*)* 10 (2000): 11-14.
127 No. 5 Document (2002), Part 3, §12; Part 6, §25.
128 Ibid., Part 3, §13.
129 Ibid.

almost completely closed to competition, while the establishment of autonomous regional grid companies as the envisioned backbone of regional market building has also stalled by most accounts.[130]

Overall, the marketisation agenda set out by the No. 5 Document has been deemed a failure by many observers as monopoly structures have remained in place and levels of competition in the industry have remained negligible. Wu Zhonghu, a former high-ranking official in the National Development and Reform Commission's (NDRC) Energy Research Institute, stated in 2009 that the general direction of the No. 5 Document had not been called into question, but that it had become impossible to progress with further reform steps.[131] Ding Gongyang, former department head in the Electric Power Planning & Engineering Institute (EPPEI), summarised the state of affairs more bluntly by stating that "many people think very highly of the No. 5 Document, but its implementation just cannot be achieved. [...] The plan is set, but its implementation is not."[132]

2.2 Overview of the administrative setting in China's electricity industry

2.2.1 Adjustments to government functions and organisation via and since the No. 5 Document (2002)

The following overview of administrative developments via and since the publication of the No. 5 Document shows the complex regulatory structure in China's electricity industry. Reminiscent of the fragmented outlook given by the SOE-centred literature referred to in the introductory chapter, the reform process has brought about the coexistence of several government bodies with partially complementing and partially overlapping mandates pertinent to both sector-specific and cross-sectoral policy issues applicable to the industry. In the following section, the most frequently encountered government bodies will be briefly introduced in the context of two important administrative reform steps that took place in 2002/2003 and in 2008.

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[130] "SERC department head Yang Mingzhou: Power sector reforms basically unsuccessful" (电监会处长杨名舟：电力体制改革基本不成功), 21st Century Business Herald, 17.12.2005.
[131] "SGCC's 600 billion Yuan UHV project referred to as strengthening monopoly" (国家电网 6 千亿元特高压项目被指巩固垄断), Nanfang Web (南方报网), 07.07.2009.
[132] Ibid.

The 2002/2003 administrative reforms

The National Development and Reform Commission (NDRC, since 2003)

The ministerial-level National Development and Reform Commission (NDRC), established in 2003 as the successor to the State Development Planning Commission, is responsible for long-term macroeconomic guidance and adjustments across China's industrial landscape.[133] The NDRC's most important levers of macro-control over the electricity industry include its final authority over wholesale and retail price setting which is exercised by the Electric Power Division within the NDRC's Pricing Department (发改委价格司电力处). While applied pricing mechanisms were supposed to be gradually shifted towards reflecting the level of competition within industry, manifold obstacles to successful asset unbundling and, particularly, the persistence of downstream monopoly structures have stood in the way of progressing with market-based pricing reforms despite numerous attempts (discussed in more detail in Chapter 3).[134] As a further important lever over industry development, the NDRC retains approval powers for large-scale investment projects. Other energy-related policy functions were initially bundled in the NDRC Energy Bureau (2003-2008); however, due to its bureau-level administrative rank it was not in a position to coordinate directly between ministries and state-owned energy companies.[135]

The State Electricity Regulatory Commission (SERC, 2003-2013)

The No. 5 Document, besides laying out a pattern for the reform of industry structures, also embodied an attempt to adapt government's industrial management through the creation of the State Electricity Regulatory Commission (SERC) subordinate to the State Council as an 'independent' addition to the existing array of ministries and commissions participating in sectoral policy processes.[136] Established in 2003, SERC's task was to formulate market regulations, maintain fair competition among market

[133] Bo Kong, "An Anatomy of China's Energy Insecurity and Its Strategies," Pacific Northwest National Laboratory, Seattle, Working Paper (October 2005), p. 21; OECD, 2009, p. 237; Pearson, 2007, p. 725.
[134] "One must not give up halfway - Exclusive interview with former SERC vice chairman Shao Bingren" (不能半途而废--专访国家电力监督委员会前副主席邵秉仁), Caixin "New Century" 10 (2013), 18.03.2013.
[135] Kong, 2005, p. 23; Andrews-Speed, 2004, p. 26; Downs, 2006, p. 18.
[136] No. 5 Document (2002), Part 5, §23; General Office of the State Council, "Provisions regarding the configuration of the functions, internal structure and staffing of the State Electricity Regulatory Commission" (国家电力监管委员会职能配置内设机构和人员编制规定), Document No. 7 [2003], 24.02.2003.

actors and make proposals for price adjustments.[137] A particular challenge for SERC's administrative standing, however, was that it lacked its own sources of funding and therefore ultimately remained dependent on the State Council. Most importantly, the fact that full unbundling of industry segments as the most basic foundation for the emergence of competition as envisaged by the No. 5 Document did not occur (discussed in detail in the following chapter) left SERC without a competitive setting to monitor.[138] With final pricing and investment approval authorities resting with other bodies, SERC's activities ultimately concentrated on conducting industry research and inspecting the quality of service provision across the industry.[139] As will be shown in following chapters, SERC did participate in heated debates during the attempted implementation of industry unbundling, but as it was de facto lacking a meaningful assignment the Commission was eventually abolished in 2013 and merged with other parts of the energy administration.[140]

Macro-level sectoral guidance institutions under the State Council

Aside from institutions charged with sector-specific policy-making and supervision, a series of bodies assigned with macro-level guidance roles for sectoral reform were set up under the State Council. Based on the No. 5 Document, the Electricity System Reform Working Group (国家电力体制改革工作小组) was created in 2002 with a broad mandate to supervise the implementation of the marketisation agenda.[141] Headed by the NDRC chairman and consisting of high-ranking delegates from numerous administrative and industrial entities, the Working Group itself only convened sporadically; it was assisted by a subordinate Working Group Office as a standing body which by itself, however, had no real decision-making power and whose responsibilities were transferred to SERC in 2003.[142]

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[137] No. 5 Document (2002), Part 5, §24.
[138] "One must not give up halfway - Exclusive interview with former SERC vice chairman Shao Bingren," Caixin "New Century" 10 (2013), 18.03.2013; Interview with an official at the National Energy Administration, Beijing, 25.07.2013. For a detailed discussion of the SERC's lacking regulatory independence please refer to: Chung-min Tsai, "Regulating China's Power Sector: Creating an Independent Regulator Without Autonomy," *The China Quarterly* 218 (2014): 452–73.
[139] Interview with a senior engineer/top-level advisor, State Grid Energy Research Institute, Beijing, 08.11.2012.
[140] "China to restructure National Energy Administration," China Daily, 10.03.2013.
[141] No. 5 Document (2002), Part 8, §31.
[142] "SERC department head Yang Mingzhou: Power sector reforms basically unsuccessful" (电监会处长杨名舟：电力体制改革基本不成功), 21st Century Business Herald, 17.12.2005; "SGCC's 600 billion Yuan

In 2005, the State Council created the National Energy Leading Group (NELG, 国家能源领导小组, 2005-2008) in order to synchronise overall energy policy trajectories and to receive 'suggestions' pertaining to China's energy development strategies. Formally subordinate to the State Council, the NELG was headed by Wen Jiabao as the prime minister at the time and further consisted of two vice-premiers and thirteen high-ranking officials from China's most important ministries and commissions.[143] Below the NELG, a vice-ministerial standing body was created to manage its daily affairs.[144] The State Energy Office (SEO) with its 24 members of staff was nominally responsible for supervising the implementation of the NELG's suggestions, observing energy markets, and advising the NELG on energy policy, which appears to have been a rather heavy workload for such a small workforce and calls into question its operational capacities.[145] The SEO's functions furthermore strongly overlapped with those of the NDRC Energy Bureau which led to complications with the NDRC.[146]

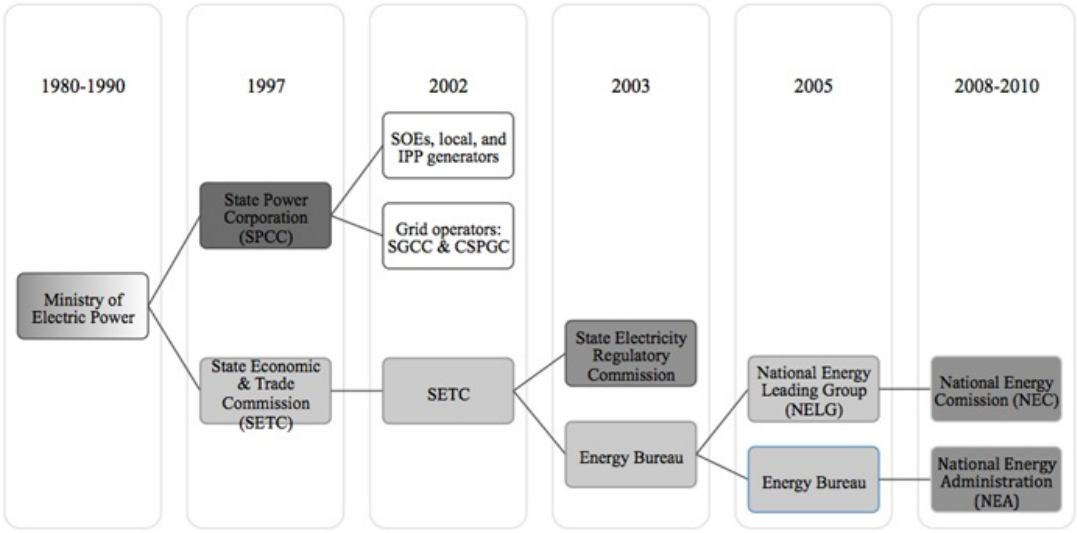

Figure 2.3 Restructuring steps in China's electricity industry (1980-2010)

Source: Todd J. Edwards, "China's Power Sector Restructuring and Electricity Price Reforms," *BICCS Asia Papers* vol. 6, no. 2 (2012), p. 11.

UHV project referred to as strengthening monopoly" (国家电网 6 千亿元特高压项目被指巩固垄断), Nanfang Web (南方报网), 07.07.2009.

[143] "China sets up national energy leading group," People's Daily Online, 04.06.2005; "State Council Document No. 14 specifies the establishment of the Energy Leading Group" (国发 14 号文件明确: 国家能源领导小组成立), China Petroleum News, 30.05.2005.

[144] "Premier Wen heads new energy group," Embassy of the People's Republic of China in the United States of America, press release, 27.05.2005, http://big5.fmprc.gov.cn/gate/big5/us.china-embassy.org/eng/gyzg/t197477.htm, accessed 04.11.2008.

[145] "State Energy Leading Group Office formally set up," People's Daily Online, 03.06.2005; Xu, 2008, p. 449.

[146] Downs, 2006, pp. 20-21.

The 2008 administrative reforms

The State Energy Commission (SEC, since 2008)

In 2008, a new round of administrative reforms took place as both the National Energy Leading Group and its subordinate State Energy Office were dissolved.[147] They were replaced in 2010 by a very similar body referred to as the State Energy Commission (SEC, 国家能源委员会) which also comprises a number of high profile bureaucrats from different ministries and commissions and is led by the prime minister. It is designed as a high-level coordination body charged broadly with devising overarching strategies for national energy development and energy security.[148] Like its predecessor, the SEC's role seems to be less operational and more of a guiding and symbolic nature, as it hardly ever participates in specific policy processes. It appears to mainly provide a forum for top-leaders to exchange energy policy-related perspectives, but it seems to matter mostly because of those top-leaders' own political standing rather than its own institutional mandate.

The National Energy Administration (NEA, since 2008)

In 2008, the NDRC Energy Bureau was also replaced by a larger and more highly ranked new governance body named the National Energy Administration (NEA, 国家能源局). The NEA was set up as a semi-independent department within the NDRC to ensure that its approaches to energy sector management matched the central government's overarching economic development agendas.[149] The NEA's core mandate encompasses policy-making, project planning and project approvals for electricity, coal, petroleum, nuclear power and alternative energy.[150] Unlike its predecessor, the NEA is ranked at vice-ministerial level and therefore stands on an equal footing with large state firms. However, while it devises binding policies, it is not in a position to fully enforce them or to issue fines for policy breaches, for which ministry-level authorities such as the NDRC are required. The NEA's main lever over industry development therefore remains its investment approval authority grounded in China's investment law which it

147 "China announces overhaul of energy agencies, management," People's Daily Online, 11.03.2008; "China to form National Energy Bureau", Interfax China, 12.03.2008.
148 "China to Establish New National Energy Commission," Economic Observer Online, 15.12.2009; "China Unveils New National Energy Commission," Beijing Review, 27.01.2010.
149 "China announces overhaul of energy agencies, management," People's Daily Online, 11.03.2008.
150 "China Establishes New Energy Authority," ChinaStakes, 27.06.2008; "Energy management reshuffle starts," China Daily, 07.07.2008; "NDRC to focus on balanced growth," China Daily, 22.08.2008.

exercises together with the NDRC. For smaller and medium-sized projects, the NEA decides independently, while decisions regarding larger projects are made by the NDRC based on (and usually following) suggestions made by the NEA with its more industry-specific expertise.[151] After the State Electricity Regulatory Commission (SERC) was abolished in 2013, its functions were merged with those of the NEA.[152]

Overall, the most influential government body at the sectoral level has arguably been the National Development and Reform Commission (NDRC) due to its pricing authority and its project approval power that it exercises in cooperation with the National Energy Administration (NEA). The NDRC Energy Bureau as the NEA's predecessor, and the State Electricity Regulatory Commission (SERC), on the other hand, both struggled to develop real sectoral authority, as will become evident in the following chapters. The Electricity Reform Working Group, the National Energy Leading Group (2005-2008) and the National Energy Commission (since 2010) have mainly functioned as macro-level coordination and guidance bodies which rarely participate in everyday sectoral decision-making. Other government entities that occasionally participate in sectoral policy matters are the Ministries of Commerce (MOFCOM), Finance (MoF), Science and Technology (MOST), Environmental Protection, and the Ministry of Land and Resources, all within the confines of their respective scopes of authority.

[151] Interview with an official at the National Energy Administration. Beijing, 25.07.2013.
[152] "Former SERC Head Takes Reins at New NEA," Caixin Online, 26.03.2013; "China promotes governor of troubles Xinjiang to top energy post," Reuters, 31.12.2014.

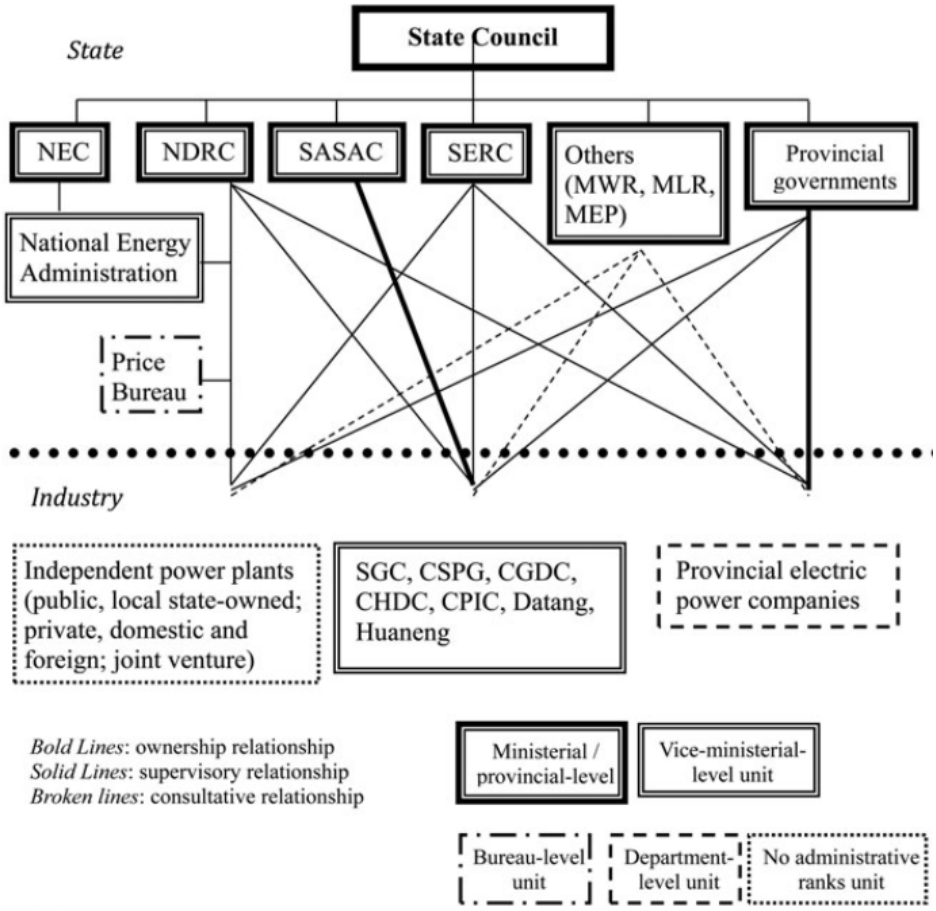

Figure 2.4 The administrative structure in China's electricity industry (2010-2013)

Source: Tsai, 2014, p. 467.[153]

2.2.2 The administration of state ownership and the incentive structures for state firms

Adding to the complex sectoral regulatory structure, the system for administering state-owned assets needs to be considered. The most relevant body in this realm is the State-owned Assets Supervision and Administration Commission (SASAC), which exercises the state's ownership rights to all major state-owned enterprises in China's electricity industry, including the State Grid Corporation (SGCC), China Southern Grid Corporation (CSGC) and all of the 'Big Five' power producers.[154] The relationship

[153] This figure remains accurate in 2016 with the single exception that the SERC was abolished and merged with the NEA in 2013, resulting in a supervisory role over industry for the NEA which is more direct than indicated in this figure. Furthermore, 'MEP' in this figure refers to the Ministry of Environmental Protection and not to the Ministry of Electric Power which was introduced earlier under the same abbreviation. Other relevant abbreviations are SGC: State Grid Corporation, CSPG: China Southern Power Grid Corporation, CGDC: China Guodian Corporation, CHDC: China Huadian Corporation, CPIC: China Power Investment Corporation.

[154] State-owned Assets Supervision and Administration Commission, "List of central SOEs," http://www.sasac.gov.cn/n2963340/n2971121/n4956567/4956583.html, accessed 31.05.2013.

between SASAC and the central SOEs is very important for understanding state sector reform politics in the electricity industry as well as the incentive structures under which state firms operate, and it will therefore be introduced in slightly more detail.

SASAC's scope of authority vis-à-vis SOEs and the resulting incentive structures for state firms

Established in 2003 to further institutionalise the division between government and firm management as well as to support the restructuring of state firms, SASAC acts as an investor, supervising and managing assets held by central state enterprises.[155] SASAC's primary responsibility is to protect and increase the value of state assets and to "maintain and improve the controlling power and competitive power of the state economy in areas which have a vital bearing on the lifeline of the national economy and state security".[156] As a ministerial-level special 'public service unit' (事业单位), SASAC is directly subordinate to the State Council but formally positioned outside the bureaucratic chain of command, while its members are appointed by the CCP's Central Organisation Department (中组部).[157]

In its position as state investor, SASAC is nominally barred from intervening directly in SOEs' management decisions as State Council regulations specify that SASAC shall "respect and safeguard the operational autonomy of [SOEs]".[158] The Commission's scope of authority does, however, include a number of important oversight and control mechanisms that can have a profound impact on SOE decision-making. SASAC's arguably most influential instrument is its authority over personnel appointments coupled with its system of performance evaluation.[159] Appointments of executive management personnel are made by SASAC based on suggestions by the CCP's Organisation Department. The positions in question include those of the general manager and his deputy, as well as the entire board of directors. SASAC also partakes in the nomination of the board of supervisors of central SOEs.[160] However, it remains unclear exactly how SASAC and the Organisation Department collaborate in this regard. While in the early years appointment procedures were dominated by the

[155] State Council, "Interim Regulations on Supervision and Management of State-owned Assets of Enterprises", Document No. 378 [2003], 27.05.2003, Art. 1, 12, 13, 19.
[156] Ibid., Art. 7.
[157] Naughton 2006a; Naughton, 2006b, p. 3.
[158] State Council, "Interim Regulations on Supervision and Management of State-owned Assets of Enterprises", Document No. 378 [2003], 27.05.2003, Art. 10, 14.
[159] Ibid., Art. 13.
[160] Ibid., Art. 17.

Organisation Department and merely executed by SASAC, a number of interviewees have indicated that over time a more consensual system of alternation has evolved and that SASAC has developed a powerful voice of its own during the appointment procedures, partly based on the higher level of industry expertise within the Commission.[161]

Within this context, SASAC specifies incentives for managers and sets benchmarks for their evaluation using its own performance measurement system (绩效考核系统), the score in which is tremendously important for managers' career development.[162] Under this system, managers are evaluated through a comparison between the performance of the SOE that they are leading and SASAC's broad annual performance objectives.[163] The factors that SASAC pays particular attention to are the development of SOE revenue, profit, and economic value added. At the end of each year results and compliance are then evaluated on a scale between A (highest score) and E (lowest score), based on which managerial income and bonuses are adjusted up- or downward. If deemed necessary, SASAC may also replace key management personnel on the basis of their performance score.[164] The associated compliance pressure extends well beyond top management, as salaries and bonuses across the entire company are adjusted downward if SASAC regards an enterprise's general performance as inadequate.[165] Given SASAC's appointment and evaluation procedures, top managers in central SOEs have a clear personal stake in the performance of their companies and are incentivised to prove their managerial capabilities to SASAC through sound enterprise performance.[166]

The financial ties between both sides are of particular relevance for understanding SASAC's mandate and SOEs' incentive structure. At the time of writing, SASAC

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[161] Interview with a senior engineer/top-level advisor, State Grid Energy Research Institute, Beijing, 08.11.2012; Interview with official from the Planning Bureau 计划司 within the former Ministry of Energy (1989-1993), Beijing, 27.06.2012; Becky Chiu and Mervyn K. Lewis, *Reforming China's state-owned enterprises and banks* (Cheltenham: Edward Elgar, 2006), pp. 122-123; Naughton, 2006b, pp. 3-6.
[162] Interview with a senior engineer/top-level advisor, State Grid Energy Research Institute, Beijing, 08.11.2012.
[163] State-Owned Assets Supervision and Administration Commission, "Temporary Regulations on the Evaluation of Chief Officers of the Central Enterprises" (中央企业负责人经营业绩考核暂行办法), Decree No. 17 [2006], 30.12.2006, Art. 2VIII(1).
[164] Interview with an official at the State-owned Assets Supervision and Administration Commission, Beijing, 22.07.2013.
[165] Interview with a senior engineer/top-level advisor, State Grid Energy Research Institute, Beijing, 08.11.2012; Interview with a smart grid researcher at the State Grid Energy Research Institute, Beijing, 20.07.2012; State Council, "Interim Regulations on Supervision and Management of State-owned Assets of Enterprises", Document No. 378 [2003], 27.05.2003, Art. 18-19.
[166] Interview with a smart grid researcher at the State Grid Energy Research Institute, Beijing, 20.07.2012.

receives between 5-15% of its companies' annual net profits in the form of dividends which it accumulates into a 'state capital management budget' (国有资本经营预算) drawn up by SASAC and overseen by the Ministry of Finance (MoF). The MoF itself also receives a share of SOE dividends for the general state budget, in addition to corporate income taxes which have been fixed at a rate of 25%.[167] SASAC's capital management budget is meant to be employed for capital outlays, restructuring outlays and reform costs, which means that dividends are essentially used for the benefit of the SOEs themselves, while what is deemed beneficial for the SOEs is formally determined by SASAC and approved by the MoF.[168] While SASAC is officially not allowed to provide direct financial assistance to central SOEs, it does occasionally step in if external factors create ongoing financial distress for its companies. Under such circumstances, SASAC will ask the Ministry of Finance for approval to use part of its dividends to reinvest in affected companies in the form of 'reimbursements'.[169] To safeguard the value of state assets, SASAC also possesses approval authority over state firm investments and acquisitions, giving the Commission back-door leverage over the significant ratio of net profits that remains within the SOEs. Important managerial decisions regarding mergers, large acquisitions, capital increases or decreases, the issuing of bonds or transfers of equity all need to be reviewed and approved by SASAC.[170]

[167] Naughton, 2006b, pp. 11-12; Naughton, 2007, p. 7. Corporate income tax rate as of 01.01.2008, prior to that 33%.
[168] Naughton, 2007, p. 7; "Investment. Prudence without a purpose," The Economist, 26.05.2012.
[169] Interview with an official at the State-owned Assets Supervision and Administration Commission, Beijing, 22.07.2013; "Closer Look: Pull the Plug on Bailouts for Power Companies," Caixin, 11.03.2013; "SASAC helps SOEs, fuel tax reform about to launch," Caijing, 29.11.2008; "Power Grid Cost up 20 Percent in 2008," Caijing, 22.04.2009.
[170] State Council, "Interim Regulations on Supervision and Management of State-owned Assets of Enterprises", Document No. 378 [2003], 27.05.2003, Art. 20-23.

SASAC 'ownership' role in practise

The different aspects of SASAC's formal oversight functions indicate that its role differs markedly from other institutions in the regulatory sphere of China's state sector generally and the electricity industry more specifically. Where the NDRC, NEA and SERC tend to examine policy challenges on a national or industrial level, SASAC conducts its "shareholder management" on an individual firm level where the most important consideration is how the value of state assets has developed together with company performance, while industry-level considerations are of secondary relevance.[171]

There has been considerable controversy over SASAC's utilisation of the different levers at its disposal; observers have criticised it for regularly interfering with enterprise operations and "viewing itself as the boss" despite its formally absent 'right of speech'.[172] As the State Council assesses SASAC's own performance based on its success in raising the competitiveness of state firms and the value of state assets,[173] some observers from the regulatory sphere have furthermore argued that SASAC's position regarding investment strategies tends to generally coincide with the position of central SOEs.[174] *The People's Daily* even addressed what it interpreted as "SASAC's functional shift from being the controller of, to being a service provider for, central SOEs"[175], while an interviewee from the National Energy Administration asserted that SASAC and central SOEs shared a common vision which he summarised as "the more [assets] the better, the bigger [the enterprise] the better".[176] An interviewee from SASAC itself firmly disagreed with this interpretation, insisting that "SASAC does not think 'the bigger an enterprise the better'. We rather want strong, highly competitive enterprises."[177]

Driven by central government's 'large enterprise strategy' (做大做强), which has been pursued since the 1980s and which today is championed largely by SASAC, the Commission's work agenda has mainly circled around the question of how to

[171] Interview with an official at the State-owned Assets Supervision and Administration Commission, Beijing, 22.07.2013; Interview with a smart grid researcher at the State Grid Energy Research Institute and an enterprise strategy consultant at the State Grid Energy Research Institute, Beijing, 26.09.2013.
[172] "The state must take back all public authority held by enterprises under administrative monopoly" (国家必须把存在于行政性垄断企业中的公共权力收回来), Expert interview with Prof. Lu Feng, School of Government, Peking University, Business Watch Magazine (商务周刊), 05.03.2010.
[173] Interview with an official at the National Energy Administration, Beijing, 25.07.2013.
[174] "One must not give up halfway - Exclusive interview with former SERC vice chairman Shao Bingren", Caixin "New Century" 10 (2013), 18.03.2013.
[175] "CNPC's Jiang 'to head SASAC'," People's Daily Online, 19.03.2013.
[176] Interview with an official at the National Energy Administration, Beijing, 25.07.2013.
[177] Interview with an official at the State-owned Assets Supervision and Administration Commission, Beijing, 22.07.2013.

restructure the large SOEs under its auspices so as to "impel [them] to strengthen their competitive power"[178] and to eventually turn them into both domestic and global industry leaders.[179] As part of an ongoing consolidation process the number of companies supervised by SASAC has decreased from 196 (2003) to 117 (2013), while their size and profitability has increased dramatically.[180] Many of the companies held by SASAC combined their highest quality assets into subsidiary firms that were subsequently listed on domestic and international stock exchanges to raise capital (although majority ownership of the subsidiaries, and full ownership of the mother companies remained with SASAC).[181] In the electricity industry, this applies to all of the 'Big Five' power generation companies, but not to the two grid companies, which have remained under full SASAC ownership.

The following section will give a brief introduction to the State Grid Corporation which, due to its crucial function as China's main grid operator and 'bottleneck' between the generation segment and the majority of China's power consumers, will serve as the principal empirical target while investigating the influence of state industry on the course of sectoral policy in the electricity industry.

2.3 A brief introduction to the State Grid Corporation of China

The State Grid Corporation of China (SGCC), successor to both the integrated power sector monopolist, the State Power Corporation of China, and its governmental predecessor, the Ministry of Electric Power, was founded on 29 December 2002. Between 2004 and 2013, the bulk of the timeframe under scrutiny in this study, SGCC's CEO was Liu Zhenya (刘振亚) who has also acted as an alternate member of the CCP's

[178] State Council, "Interim Regulations on Supervision and Management of State-owned Assets of Enterprises", Document No. 378 [2003], 27.05.2003, Art. 10, 14.
[179] Naughton, 2007, p. 2. For more a more detailed discussion of the 'large enterprise strategy' see Nolan, 2001; Nolan and Zhang, 2003; Sutherland, 2003; Eaton, 2013a.
[180] State-owned Assets Supervision and Administration Commission, Overview of shifts in central state ownership, http://www.sasac.gov.cn/n2963340/n2971121/n4956567/4956583.html, accessed 11.10.2013; "CNPC's Jiang 'to head SASAC'," People's Daily Online, 19.03.2013.
[181] Sizhi Guo, "The Recent Financial and Operational Situation Conditions of the Chinese Oil Majors," The Institute of Energy Economics, Tokyo, Working Paper (2004), pp. 5-6.

central committee (2007-2012) and who continues to be ranked as a vice minister.[182] In May 2013, when SGCC formally established a board of directors, Liu was appointed to the position of board chairman, and Shu Yinbiao (舒印彪) became CEO in his place.[183] Headquartered in Beijing, SGCC's grid network covers 26 of China's 31 provinces, autonomous regions and central-government administered municipalities, constituting 5 out of China's 6 regional grids, representing 88% of the country's territory, and serving more than 1 billion customers. SGCC is also one of China's largest domestic employers with 1.87 million employees as well as China's third largest company in terms of revenue, surpassed only by the two state-owned oil firms Sinopec Group and the China National Petroleum Corporation.[184]

Since its establishment, SGCC has grown tremendously. In 2005, when SGCC was first listed in the Fortune Global 500, it was ranked 40th as the world's largest utility firm with assets worth US$134 billion and revenues of US$71 billion.[185] By 2015, the company had climbed to seventh (after BP and before Volkswagen), its asset value having more than tripled to US$466 billion. In the same time frame, revenue had nearly quintupled to US$340 billion, while net profits had reached US$10 billion, equalling a profit margin of 2.9% (2.1% if calculated against total asset value) (see Figure 2.5, Figure 2.6, Figure 2.7 and Figure 2.8 below for financial performance indicators in RMB, also in comparison to international electricity utilities).[186] As a fully central state-owned enterprise, the ownership rights to the assets maintained by SGCC are exercised by SASAC. Dividends paid to SASAC are fixed at 15% of net profits, but are expected to rise to 20-25% in the near future.[187]

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[182] China Vitae, Biography of Liu Zhenya, http://www.chinavitae.com/biography/Liu_Zhenya|3884, accessed 05/2013.
[183] "Liu Zhenya appointed SGCC board chairman and party secretary" (刘振亚任国家电网公司董事长、党组书记), Communist Party of China News Network (中国共产党新闻网), 20.05.2013; "Liu Zhenya appointed as board chairman - SGCC's grand grid strategy to possibly remain stable" (刘振亚任董事长 国网大电网战略或保持稳定), Caixin Net, 21.05.2013.
[184] State Grid Corporation, Corporate profile, http://www.sgcc.com.cn/ywlm/aboutus/profile.shtml, accessed 02/2016; Fortune Magazine, Fortune Global 500 List (2015), http://fortune.com/global500/, accessed 02/2016.
[185] CNN, Fortune Global 500 List (2005), http://money.cnn.com/magazines/fortune/global500/2005/snapshots/1271.html, accessed 05/2013.
[186] Fortune Magazine, Fortune Global 500 List (2015), http://fortune.com/global500/state-grid-7/, accessed 02/2016.
[187] Interview with a senior engineer/top-level advisor, State Grid Energy Research Institute, Beijing, 08.11.2012.

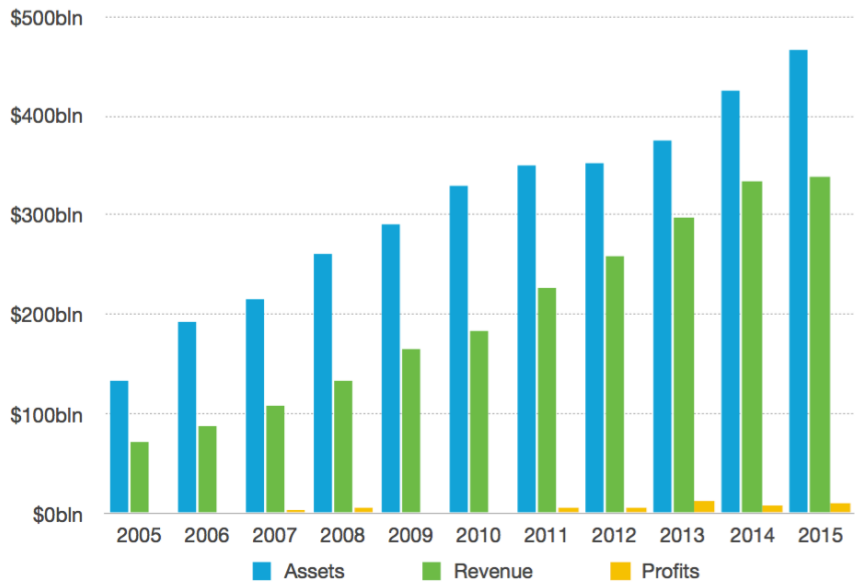

Figure 2.5 State Grid Corporation assets, revenue, and profits (2005-2015)

Sources: State Grid Corporation, Corporate Social Responsibility Report 2014, Beijing, 2014, p. 86; Fortune Magazine, Fortune Global 500 Lists (2005-2015), http://fortune.com/global500/

Financial Performance	2010	2011	2012	2013	2014
Revenue (billion RMB)	1531.8	1675.4	1883	2049.8	2096.1
Total assets (billion RMB)	2077.5	2211.6	2333.5	2570.1	2900.9
Total profits (billion RMB)	45.07	53.78	109.03	70.58	81.01
Pre-tax profits (billion RMB)	130.87	137.11	210.15	173.96	203.48
Return on equity (%)	4.45	4.54	8.36	4.72	4.98
Asset-liability ratio (%)	61.83	60.02	57.02	57.00	56.20
SASAC Evaluation on Operation Performances (Class)	A	A	A	A	A

Figure 2.6 SGCC's financial performance (2010-2014)

Source: State Grid Corporation, Corporate Social Responsibility Report 2014, Beijing, 2014, p. 86.

Company	2009	2010	2011	2012	2013	Average annual growth rate between 2009 and 2013
SGCC	10.28	21.76	9.37	12.39	8.86	12.53
KEPCO	-7.22	28.04	15.2	10.99	12.52	9.34
E.ON	-10.52	9.85	25.58	8.09	-4.24	4.17
Kansai Electric Power Co.	1.1	15.19	10.11	-3.31	-3.53	3.03
ENEL	-0.75	8.79	13.76	-1.33	-2	2.91
Iberdrola	-7.44	18.07	9.18	-0.12	-0.91	2.81
Chubu Electric Power Co.	-3.5	12.88	13.99	2.83	-11.06	2.14
SSE	-19.83	28.23	14.88	-11.68	8.7	2.11
TEPCO	-7.81	16.02	8.09	6.22	-8.02	2.05
EDF	-2	-6.39	5.21	2.93	7.37	1.08
RWE	-9.82	3.68	1.72	-4.52	4.57	-0.86

Figure 2.7 SGCC's revenue growth rate in international comparison (2009-2013)

Source: State Grid Corporation, Corporate Social Responsibility Report 2014, Beijing, 2014, p. 90.

SGCC's steep revenue growth has gone hand-in-hand with tremendous annual investment sums.

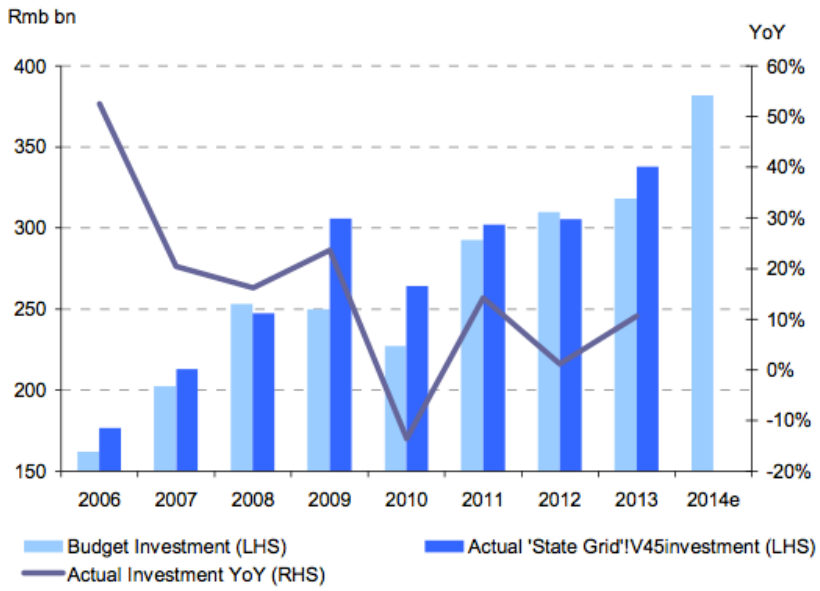

Figure 2.8 State Grid Corporation annual investment (2006-2014)

Source: Morgan Stanley, Morgan Stanley Research Asia-Pacific, 08.01.2014

In concluding this overview chapter, the following section will briefly discuss the fragmented administrative setting in China's electricity industry, the variances in mandates among government bodies and the political standing of central state firms, before then transitioning to the empirical analysis of SGCC's responses to the State Council's market building and asset unbundling requirements.

2.4 Concluding discussion: Fragmented administrative settings, variances in mandates, and the political standing of central state firms

The institutional structure that has emerged from the reform process laid out in this overview chapter has been highly consequential for the state firms operating the electricity industry as they have had to respond to political and economic pressures applied from different directions and reflecting different mandates. At the sectoral policy level, the No. 5 Document challenged existing enterprise structures by compelling state industry to unbundle historically grown monopolistic asset arrangements while setting in motion a transition from a system still grounded in central planning to a setting that was eventually to be characterised by upstream and downstream market competition between various state-owned actors. Based on 'shareholder management' considerations, central SOEs were furthermore expected to deliver substantial economic results and develop as successful business entities, while SOE management was incentivised to primarily consider their firm's business performance as a means for furthering their own career prospects. Although these requirements do not contradict each other, it is not difficult to imagine that corporate decision-making in accordance with one of these requirements may occasionally run counter to the other. Furthermore, the way in which administrative mandates have been assigned gives the impression that the government commission primarily charged with assessing state firms' performance and asset value (SASAC) is not overly observant of industry-level reform considerations, while the government bodies mandated with overseeing industry developments (i.e. NDRC, NEA, SERC) are only secondarily concerned with companies' business performance and the value of state assets.

In addition to the diversity of the administrative sphere, the role of China's state firms as politically relevant actors needs to be considered. Regardless of the formal separation of government and enterprise functions, central SOEs such as SGCC have retained vice-ministerial ranks as remnants of their institutional history as industrial ministries under central planning, thereby enabling their management to engage on an equal level with some of the government bodies that supervise them.[188] Even after corporatisation occurred, many of the old personnel structures remained in place, allowing for

[188] Downs, 2008b, p. 43.

persistent participation in administrative matters.[189] Furthermore, despite SASAC's broad authority over state asset-related matters and the sectoral regulatory sphere built around the NDRC, NEA, and SERC, central SOEs de facto possess considerable operational autonomy. As a former board member of one of China's state-owned oil firms conveyed, their interaction with political superiors often has "less to do with rigid top-down control than with mixed signals, ambiguity and even outright silence".[190] The fact that many central SOEs have been able to greatly enhance their revenues and furthermore retain large shares of their profits due to comparatively low dividend rates has allowed many of them to develop considerable financial autonomy which has also enhanced their political standing.[191]

As will emerge more clearly over the following empirical chapters, the discrepancies between cross-sectoral, sectoral, and firm-level mandates among government bodies, coupled with central state firms' own political relevance, are of considerable importance for the ways in which sectoral reforms have evolved. State industry, it will be argued, has been able to make use of the partially uncoordinated overlaps and variances in mandates between administrative bodies, and of the varying policy priorities at different administrative levels within central government, to effectively further its own sectoral development preferences. The following 'Part A' of this dissertation's empirical core consists of one long chapter which analyses the attempted implementation of the No. 5 Document's (2002) market building agenda and examines state industry's responses to market reform and unbundling requirements.

[189] Interview with an official at the National Energy Administration, Beijing, 25.07.2013.
[190] Edward Steinfeld, a university professor and former board member at the China National Offshore Oil Corporation, quoted in: "A choice of models: Theme and variations," The Economist, 21.01.2012.
[191] Interview with an official at the National Energy Administration, Beijing, 25.07.2013.

PART A: Analysis of SGCC's influence on sectoral policy implementation

3 The No. 5 Document (2002) and the State Grid Corporation's responses to market building and asset unbundling requirements

Part A of the empirical sections in this dissertation investigates obstructive or modifying influences by state industry during phases of policy implementation. Particularly contentious parts of the central government's 2002 '*unbundled competitive regional market building*' agenda, introduced into China's hitherto vertically integrated monopolistic electricity industry, are analysed to see how state industry reacted to them, whether it attempted to block or modify them, and if so how and to what effect. Due to its vital function as the country's main grid operator and the electricity industry's infrastructural core, and its position as the corporate successor to the vertically integrated State Power Corporation (SPCC), the role played by the State Grid Corporation (SGCC) will be particularly emphasised. Empirical focus is furthermore placed on the application of a set of important clauses in the No. 5 Document that demanded the successive unbundling of industry segments as a basis for the marketisation of non-naturally monopolistic and therefore potentially competitive upstream and downstream business areas; the success of these particular unbundling processes can be viewed as a prerequisite for the success of most, if not all of the marketisation goals laid out in the No. 5 Document. If the clear separation of grid and generation assets fails, competitive wholesale markets as envisioned by the policy are very unlikely to emerge because direct links between generators and grid operator can lead to preferential grid access agreements that are not necessarily based on price and that may distort competition. For similar reasons, retail competition as set out in the policy cannot emerge without the separation of transmission and distribution assets, just as any hypothetical progress in wholesale competition is unlikely to benefit consumers without corresponding retail competition while instead giving further leverage to grid operators as the single

wholesale buyers and retailers of electricity. Furthermore, as long as the grid operator – as the most important customer of grid engineering and construction services – remains invested in these comparatively profitable auxiliary industries it can distort competition by entering into preferential procurement contracts with its own subsidiaries, and finally, without assigning at least a minimum of autonomy to regional grid companies it is very difficult to promote regional market development. Thus, the behaviour of the State Grid Corporation as the main grid operator in response to these unbundling requirements must be viewed as highly consequential for the original reform plan as a whole, and therefore stands at the centre of the empirical analysis. If it emerges that SGCC's actions and intents have had an effect on the process of implementing crucial parts of the market building agenda, for example by causally contributing to the failure of these particular unbundling steps, and that the failure of these steps cannot be more readily attributed to shifts in the central government's policy preferences, it may become possible to extend the causal claim regarding state firm influence on the fate of the whole marketisation agenda as such.

The empirical focus of the following chapters is also important from a methodological perspective as the application of unbundling procedures and SGCC's reaction to them translate into clearly defined processes in which conflicts over the content and application of policy become visible and can be traced over time. Moreover, these processes provide the opportunity to ask the same guiding questions in a number of different industry segments in which the same government and industry actors interact over comparable policy issues. Findings from one field can then be reapplied to the empirics of other fields to check their validity.[192] The congruence method is used to test whether the specific way in which the marketisation agenda was ultimately applied may also – or better – be explained by changes in government preferences, i.e. whether there is evidence for active and explicit government guidance and support or rather opposition to factual developments. If similar mechanisms reflective of the different perspectives on the drivers of sectoral policy shifts are found to operate in different sub-cases, this would strengthen claims regarding these hypotheses' respective overall explanatory power.

Part A is organised in the form of one long chapter divided into four sections which will investigate the grid company's interaction with the State Council's four different

[192] George and Bennett, 2005, p. 219.

unbundling requirements. Firstly, the development of SGCC's links with the electricity generation segment will be scrutinised, followed by an analysis of the evolution of grid regionalisation envisioned by the No. 5 Document. Subsequently, findings will be presented regarding the attempted separation of grid assets between the transmission and distribution segments, as well as between primary and auxiliary grid businesses. It will be demonstrated that in all four fields SGCC strongly interfered with attempts to implement State Council-initiated market building policy and that its obstructive actions coincided with distinct slowdowns in implementation progress. Furthermore, evidence of ongoing and credible, yet not very successful government opposition to the grid company's obstructive actions will be presented, illustrating that the market building agenda was consistently pursued by central government and that no substantial changes in its sectoral policy preferences had occurred. Overall, it will be argued that under clashing policy preferences central government was unable to implement the marketisation plan against SGCC's will and that the grid company's opposition to the establishment of regionalised upstream and downstream competition resulted in lengthy phases of policy gridlock in which neither side was able to progress with its agenda.

3.1 The unbundling of grid and generation assets and the grid companies' responses

Of the four crucial unbundling steps included in the market building policy, the separation of grid and generation assets is the only one that actually materialised to a considerable extent as the majority of the integrated State Power Corporation's generation assets were distributed among five newly created state-owned electricity generation companies often referred to as the 'Big Five' (the Huaneng, Huadian, Guodian, Datang and China Power Investment Corporations).[193] According to interview sources, an important reason for the relative success in implementing this unbundling step was that it did not challenge the core interests of the industry (maintaining unified control over the grid segment) as strongly as the planned separation of transmission and distribution assets or the division along regional lines, despite the fact that the generation segment contributed a much larger share to the SPCC's profits (ca. 70%) than the grid operation and construction segments (ca. 30%).

[193] OECD, 2009, pp. 236-237; Pearson, 2005, p. 317.

Secondly, the separation of grid and generation assets created a large number of new leadership positions in the five new electricity generation SOEs, thereby providing new opportunities for many people in the industry.[194] However, there were multiple attempts by both the State Grid Corporation and the China Southern Grid Corporation to circumvent this unbundling requirement and to remain invested in the generation segment, despite central government opposition to these attempts which violated the unbundling requirements of the No. 5 Document. The following section gives an account of the methods that were used by the grid companies to maintain direct linkages with the generation segment, obstruct the emergence of wholesale competition in different grid regions, and utilise their leverage as single buyers to shape wholesale 'markets' in their own favour.

3.1.1 The circumvention of generation asset unbundling via employee stock ownership plans

An important method used by the grid companies to circumvent power generation unbundling was the perpetuation and expansion of employee stock ownership plans (ESOPs). ESOPs began to be used in the 1980s as a means of addressing widespread electricity shortages by incentivising integrated electricity companies across the country to independently raise funds in order to build additional electricity plants. As part of this push for enhanced sectoral investment, electricity company employees were induced to pool capital and purchase stakes in those generation assets, which then entered independent operation and negotiated electricity prices directly with the grids.[195] While most ESOP ventures were initially rather small and dispersed, some grew into highly profitable electricity producers in leading positions at the provincial level. When the separation of grid and generation was initiated in 2002, the number and capacity of ESOP ventures grew even further as the hitherto integrated electricity companies were forced to rid themselves of generation assets and in many cases sold them cheaply to existing ESOP firms owned by their very own employees. Despite the unbundling requirements, SGCC's and CSGC's provincial branches continued to expand ESOPs as a way of retaining ownership linkages between the grid and generation segments,

[194] Interview with an official at the National Energy Administration, Beijing, 25.07.2013; Profit ratios taken from: "Xinyuan's Rise: The Reemergence of Power Monopoly?" Caijing, 22.08.2005.
[195] "Giant Power Group's Privatization Under Fire," Caijing, 08.01.2007; "Buyout Unplugs Another ESOP Power Firm," Caijing, 07.01.2009.

allowing them to partially continue their pre-reform style of integrated business and at the same time creating serious obstacles to the development of competitive wholesale markets.[196]

One example of how the newly established and nominally unbundled grid companies, in this case the China Southern Grid Corporation (CSGC), utilised ESOP-based approaches to circumvent the separation of grid and generation assets is provided by the case of the Jinyuan Power Investment Company, an electricity generation firm based in Guizhou Province. Referring to itself as the "the largest publicly-owned, non-state-controlled enterprise in Guizhou",[197] Jinyuan achieved spectacular growth rates throughout the early 2000s and by 2004 had become the province's largest electricity producer, accounting for a third of its total installed generation capacity. Media investigations eventually revealed that a large majority of Jinyuan's shares were in fact held by employees of the Guizhou Electric Power Company, CSGC's provincial grid subsidiary.[198] It also emerged that both companies had even shared the same chief executive, Xiang Dehong, who a few years later was sentenced to prison for his role in the disappearance of state assets.[199] The intimate relationship between Jinyuan and the provincial grid company had noticeable repercussions on the provincial wholesale 'market'. Jinyuan's competitors, especially those belonging to the recently established 'Big Five' state-owned electricity generation companies, repeatedly complained about preferential investment rights granted to Jinyuan for a number of projects.[200] Further irritation was caused by Jinyuan's privileged treatment regarding the allocation of generating hours by the grid company's dispatch centre and the higher prices paid for its electricity.[201] By distorting competition in this way, the provincial grid company was able to ensure that a significant part of the profits from Guizhou's electricity generation business remained within the provincial grid company, although this may have mainly benefitted company management through their personal shareholdings rather than the grid company at large.

The Jinyuan case does not appear to have been an isolated one. Another prominent incident in which ESOP structures were used to avoid asset unbundling involved the Luneng Group from Shandong Province; founded in the late 1980s under the provincial

196 "Buyout Unplugs Another ESOP Power Firm," Caijing, 07.01.2009.
197 "Conflict of Interests Breeds New Power Monopoly," Caijing, 05.09.2004.
198 Ibid.
199 "Head of Guizhou Power Producer Detained," Caijing, 05.09.2008.
200 "Conflict of Interests Breeds New Power Monopoly," Caijing, 05.09.2004.
201 Ibid.

branch of the vertically integrated State Power Corporation (SPCC), over the following two decades Luneng grew into one of China's largest corporations.[202] A central reason for its fast growth was that it was granted the monopoly over provincial grid operations and later also acquired generation assets from its parent company, leading to control over a significant share of Shandong's electricity supply. In the wake of the 2002 reforms and their push for the nationwide separation of grid and generation assets, Luneng quickly transferred the majority of its stock to its own employees, as the status of being employee-owned allowed the company to avoid a break-up of its assets. Not only was this a breach of the market building policy laid out by the No. 5 Document, it was also a violation of a State Council order from the year 2000 which prohibited any sale or transfer of electricity industry assets without central government's prior consent. After years of profiting from this arrangement, in 2006 Luneng began to buy its shares back from its employees at a very low premium, only to subsequently sell them to two Beijing-based private investors. Both the state assets administrator, SASAC, and the industry regulator, SERC, announced that they had not received any notification of this stock transfer, which was interpreted by observers as a case of illegal privatisation of state assets.[203] The uncovering of Luneng's company background and its secret privatisation attracted much media attention as it became evident that shareholding in power generation companies by employees of grid operators had resulted in dubious deals over electricity dispatch that were deeply rooted in vested industry interests. Not only did this practise guarantee the generation companies preferential treatment during competition for supply contracts, it also opened the door to the illicit sale of state assets at deflated prices.[204]

Several other provincial grid companies under SGCC, including its provincial branches in Jiangsu, Sichuan, Hunan and Ningxia, were also reported to have applied similar strategies of shifting ownership of generation assets to their employees in order to prevent unbundling and profit from preferential grid access.[205] As a reaction to this trend, in March 2008, six years after the beginning of market building, SASAC, NDRC, the Ministry of Finance and SERC jointly issued a new piece of regulation specifying that managers in state-owned grid companies were prohibited from owning shares in

[202] For more background information on both the Jinyuan Group and the Luneng Group refer to Edward A. Cunningham, "A Portfolio Approach to Energy Governance: State Management of China's Coal and Electric Power Supply Industries" (Ph.D. diss., Massachusetts Institute of Technology, 2009).
[203] "Giant Power Group's Privatization Under Fire," Caijing, 08.01.2007.
[204] "Regulators Cut Ties That Bind Power Sector," Caijing, 20.03.2008.
[205] "Xinyuan's Rise: The Reemergence of Power Monopoly?," Caijing, 22.08.2005.

electricity generators operating in the region served by the grid company in question.[206] This was followed by widespread 'clean-ups'[207] of ESOP structures at SGCC and CSGC during which the grid companies' ESOP generation assets were auctioned off, mainly to the 'Big Five' state-owned electricity generation firms.[208]

3.1.2 SGCC's continued investment in electricity generation assets via the renewables segment

The campaign against ESOP structures amongst power generation companies affiliated with SGCC and CSGC did not prevent the grid companies from continuing their engagement in the power generation industry. During the 2002 reforms, SGCC had been permitted to retain installed thermal power generation capacity of 6.47 million kW on a provisional basis and on the condition that it would be sold off immediately in order to cover restructuring costs. Instead of trading in these assets, in March 2005 SGCC merged them with three other electricity generation projects to create an electricity generation subsidiary, Xinyuan Holding.[209] While SERC reportedly objected to the company's establishment due to the breach of reform policy,[210] the NDRC initially gave its approval because SGCC argued that it required emergency backup generation capacity for peak adjustments and load balancing so as to guarantee grid security.[211] In its approval request to SASAC, on the other hand, SGCC adapted its justification to match SASAC's mandate by arguing that the Xinyuan venture would enable it to develop potentially highly profitable technology for renewable energy storage facilities.[212] After the approvals were granted, Xinyuan became an important component of SGCC's strategy to invest in alternative energy in order to regain commercial opportunities lost during the 2002 reforms. In 2007, for instance, Xinyuan initiated a 200,000kW wind power project in Inner Mongolia, while other investments were made in wind farms in Xinjiang and Gansu Provinces, as well as in a 100,000kW

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206 "Shareholding by Management of Power Companies Finally Banned," Caijing, 01.04.2008. See also: Electricity System Reform Working Group (电力体制改革工作小组), "Opinions on carrying out a deepening of electricity system reforms during the 11th Five-Year Plan period" (关于"十一五"深化电力体制改革的实施意见), State Council General Office Document No. 19 [2007], 06.04.2007, Section 2, Part 1.
207 "Hard Jolt for ESOPs in Power Sector Reform," Caijing, 12.08.2009.
208 "Buyout Unplugs Another ESOP Power Firm," Caijing, 07.01.2009.
209 "Xinyuan's Rise: The Reemergence of Power Monopoly?," Caijing, 22.08.2005.
210 Ibid.
211 Interview with an official at the National Energy Administration, Beijing, 25.07.2013.
212 Interview with an official at the State-owned Assets Supervision and Administration Commission, Beijing, 22.07.2013.

wind-solar project in Hebei Province. Other SGCC subsidiaries also pursued acquisitions in the renewables segment. The Shanghai Green Energy Company, a subsidiary of the SGCC-controlled Shanghai Municipal Electric Power Company, for instance, invested heavily in offshore wind power, while in 2005 SGCC's Shenzhen Energy Development Group ventured into biomass electricity generation by acting as a co-investor in the National Bio Energy Holdings Ltd.[213]

While all of these investments clearly ran counter to the idea of separating grid and generation assets, SGCC and CSGC defended their renewed involvement in electricity generation by arguing that the existing marketisation policies only referred to *thermal* power generation as being off-limits for the grid companies but that they said nothing about alternative energy production.[214] It was not until early 2012, ten years after unbundling reforms were initiated, that SGCC finally withdrew from the power generation business. SGCC's remaining generation assets, worth around US$8 billion, were sold to the Shenhua Group, a large state-owned coal company.[215]

3.1.3 Section conclusion

This section provided empirical evidence of SGCC's and CSGC's attempts to circumvent the unbundling of grid and generation assets, and that this contributed to the obstruction of the electricity wholesale market development in various parts of the country. Across China, employee stock ownership structures set up by the grid companies were equipped with large amounts of installed generation capacity and given preferential access to provincial grids, which in a number of cases allowed them to become regionally dominant industry players. At the same time, grid company personnel continued to hold significant stakes in these highly profitable ESOP companies while using the grid companies' status as single buyers to shape wholesale 'markets' in their own favour. Furthermore, evidence of ongoing government opposition to these attempts was presented, showing that central government's overall preference for unbundled and marketised industry structures remained consistent after the introduction of the No. 5 Document in 2002. Despite government interference, SGCC found other ways of remaining invested in the generation section, namely via

213 "New Energy and Running Against Reform's Wind," Caijing, 25.05.2010.
214 Ibid.
215 "Special Report: China's other power struggle," Reuters, 16.10.2012.

significant investments in renewable energy. While seeking formal approval for these investments, SGCC engaged in venue-shopping[216] by tactically synchronising its illicit investment plans with different approval bodies' respective mandates. As such, the investment plans were pitched to the NDRC as part of an attempt to improve grid security, while SASAC was told that they would allow the development of potentially highly profitable energy storage technology. After initially approving SGCC's investment plans based on these tailored arguments, central government eventually reversed its decisions and by 2012, ten years after the introduction of the No. 5 Document, managed to induce SGCC to sell its generation assets. However, even though central government ultimately managed to achieve formal unbundling, market-based wholesale competition as envisioned by the No. 5 Document is yet to emerge. Given opposing policy preferences regarding sectoral reforms, neither central government nor SGCC were able to fully achieve their goals as they repeatedly cancelled out each other's efforts.

3.2 The State Council's grid regionalisation attempt and SGCC's push for reunification

This section explores the attempted implementation of the State Council's goal to structurally separate China's grid infrastructure into independent regional grid entities so as to provide the infrastructural foundations for the establishment of separate regional electricity markets. After a brief introduction to the policy debate surrounding the issue of grid regionalisation, the factual separation of China's grid assets into the State Grid Corporation and the China Southern Grid Corporation will be outlined, as will be the formal restructuring of assets under SGCC along regional and provincial lines. Subsequently, evidence will be presented that demonstrates SGCC's repeated and generally successful attempts to obstruct further regionalisation by structurally weakening the regional grid companies in order to regain control over the assets it had lost in the aftermath of the 2002 reforms, and central government's engagement with these attempts.

[216] There is a wider literature on venue-shopping in the study of regulation. While borrowing the term, this study does not seek to engage with said literature. See Carpenter and Moss (2014) for further details.

3.2.1 Grid regionalisation as a matter of contention between central government and state industry

In the lead-up to the publication of the No. 5 Document, the establishment of independent regional grid companies together with the transfer of supervisory responsibility from the centre to the regions was viewed by the State Council as indispensable for industry marketisation as such.[217] An important rationale underlying the regionalisation push was to address monopolistic rents, inefficiencies and the lack of transparency within the grid segment by improving the comparability of transmission costs across regional grids.[218] It was also hoped that decentralisation would facilitate external investment, which in turn was also meant to improve overall sectoral transparency under more diverse ownership structures. Finally, it was asserted that China's grid network under the integrated SPCC had already been administered along distinct regional lines and that these six administratively separate entities should now also be made independent in terms of their assets.[219]

However, while there had been a general consensus within government and at least partial tolerance within industry regarding the question of separating grid assets from generation assets, the State Power Corporation (SPCC) was resolutely opposed to breaking up the grid itself. The SPCC's leader at the time, Gao Yan, strongly advocated the establishment of a nationally unified electricity grid under the roof of a single state-owned grid company instead of organising grid assets and operations in multiple firms along regional lines.[220] According to Zhang Guobao (张国宝), who participated in the drafting of the 2002 reforms as the State Development Planning Commission's (SDPC, predecessor of the NDRC) deputy director, the ongoing clashes with state industry over the regionalisation issue became a major obstacle to the final drafting of the entire No. 5 Document. This eventually led Jiang Zemin, CCP secretary general and state president at the time, to get personally involved and demand a compromise to solve the deadlock.[221] This compromise ultimately consisted of the establishment of the China Southern Grid Corporation (CSGC) as a separate pilot project for regional market

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217 "SGCC's UHV construction referred to as monopolistic" (国家电网建"特高压"被指垄断), Nanfang Web (南方网), 27.11.2006.
218 "State Grid May Buy Southern Rival: Power Industry Reform," Caijing, 04.09.2006.
219 "SGCC's UHV construction referred to as monopolistic" (国家电网建"特高压"被指垄断), Nanfang Web (南方网), 27.11.2006.
220 Zhang Guobao (张国宝), "A review and analysis of ten years of power sector reforms (Part 1) - The breaking up of power generation and grid" (电改十年的回顾与思辨 (1) 电与网的分与拆), *China Economic Weekly (*中国经济周刊*)*, 07.01.2013. [written by Zhang Guobao, vice-director of the NDRC and former director of the National Energy Administration].
221 Ibid.

development, while the State Grid Corporation as the SPCC's successor was to transitionally retain the remaining grid assets. The premise behind this step was that once experience with regional grid management had been built in the case of CSGC, further reform steps could be taken to strengthen the other five regional grids that for the time being remained with SGCC.[222] Although the establishment of CSGC entailed the provincial grids of Yunnan, Guizhou and Guangxi being split off from SGCC and subsequently merged with the provincial grids in Guangdong and Hainan, this solution was still agreeable to regionalisation opponents within the industry because it momentarily prevented the grid's further dissolution into a system with six completely independent grid companies.[223]

Subsequently, in addition to the establishment of the China Southern Grid Corporation, SGCC's grid assets were divided up along regional and provincial lines, as legally separate grid companies were established in five grid regions, creating the North, North-East, East, Central, and North-West China grids, as well as in each of the provinces comprising these different grid regions. While full ownership of all of these assets remained with SGCC for the time being, SGCC's operational relationship with the five regional grid companies was defined via its responsibility to manage "exchange and dispatch between the regional grids, and solve coordination problems between regional grids in daily production"[224]. This explicitly limited SGCC's mandate to inter-regional grid management while giving substantial autonomy to the regional companies in managing the provincial grids underneath them, thus demonstrating the State Council's clear prioritisation of further grid regionalisation over the persistence of a unified grid.[225]

3.2.2 SGCC's attempts to obstruct and reverse grid regionalisation

Having already succeeded in watering down the original regionalisation plans, SGCC continued its efforts to obstruct the development of functional and independent regional grid companies. Going well beyond the mandate provided by the No. 5

[222] "SGCC's UHV construction referred to as monopolistic" (国家电网建"特高压"被指垄断), Nanfang Web (南方网), 27.11.2006; "State Grid May Buy Southern Rival: Power Industry Reform," Caijing, 04.09.2006.
[223] Zhang Guobao (张国宝), "A review and analysis of ten years of power sector reforms (Part 2) - One grid or six grids" (电改十年的回顾与思辨 (2) 两张网还是六张网), *China Economic Weekly (*中国经济周刊*)*, 14.01.2013.
[224] No. 5 Document (2002), Part 3, §10.
[225] "SGCC's UHV construction referred to as monopolistic" (国家电网建"特高压"被指垄断), Nanfang Web (南方网), 27.11.2006; "State Grid May Buy Southern Rival: Power Industry Reform," Caijing, 04.09.2006.

Document, in 2005 SGCC began to pursue a recentralisation of operational control over transmission and distribution within the separate grid regions.[226] In an attempt to bypass and essentially hollow out the regional grid companies, SGCC, according to an official from the Electric Power Division of the Hebei Province Economic Committee, demanded that all provincial grid companies "hand over" their "backbone transmission grid assets" directly to SGCC as the parent company.[227] In December 2005, having become aware of SGCC's recentralisation attempt, the State Electricity Regulatory Commission (SERC) intervened; it did not, however, penalise SGCC but rather petitioned the State Council, thereby demonstrating its weak authority vis-à-vis the state-owned grid company. In this petition, SERC department head Yang Mingzhou argued that SGCC had already mostly undermined the purpose of having separate regional grid entities by arranging that the regional and provincial grid companies except for CSGC remained its direct subsidiaries. In both his 2005 petition and an open letter published in 2006, Yang called for a full bottom-up reorganisation of SGCC in favour of the regional grid companies. He advocated a decentralisation plan under which provincial grid companies within each region would combine their transmission assets and establish independent regional joint-stock grid companies, which would then jointly establish a national-level superstructure solely responsible for cross-regional electricity transfers and the related infrastructure investment. Following this suggestion, SGCC as the top of the grid asset pyramid would essentially cease to exist, while all ownership rights to the national grid company would be held by the regional grid companies.[228]

The 2006 China Southern Grid Corporation takeover battle

Undeterred by the SERC's counter-initiative, SGCC argued that it was a matter of national security to keep China's grid unified and that only a united national grid company would be able to safeguard China from large-scale supply disturbances.[229] It also continued its attempts to regain control over the assets it had lost during the 2002 reforms.

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226 "State Grid May Buy Southern Rival: Power Industry Reform," Caijing, 04.09.2006.
227 "'Electric power activist' bombards SGCC's monopoly" ("电力斗士"炮轰国家电网垄断), Eastday (东方网), 12.11.2006.
228 "Yang Mingzhou: A few major problems with the reform of the electric power industry system" (杨名舟：电力工业体制改革的若干重大问题), Study Times (学习时报), 20.12.2005 [Petition written by Yang Mingzhou (SERC) to the State Council]; "'Electric power activist' bombards SGCC's monopoly" ("电力斗士"炮轰国家电网垄断), Eastday (东方网), 12.11.2006.
229 "Special Report: China's other power struggle," Reuters, 16.10.2012.

A particularly telling example of this dynamic occurred in 2006, when SGCC began to pursue a formal reunification with the China Southern Grid Corporation. This reunification attempt resulted in an administrative battle over CSGC's ownership, originally established in 2002 as divided between Guangdong Province (70.4% – reflecting the share of assets the province had contributed while forming the new grid entity), Hainan Province (3.2%), and the State Grid Corporation (26.4%).[230] SGCC's share was originally supposed to be quickly transferred to the national-level state-owned asset commission (SASAC), but this did not occur until 2013.[231] After the NDRC had decided in 2003 that important personnel decisions within China Southern Grid should be approved by central government, CSGC management was no longer accountable to the Guangdong provincial state-asset commission despite the province's majority stake, but rather to central SASAC which also exercised state ownership of SGCC. Having lost most of its personnel and financial control over CSGC, in September 2006 the Guangdong provincial government announced that it would sell its share in order to alleviate financial difficulties at the provincial level. As soon as the announcement was made, the State Grid Corporation placed a bid for Guangdong Province's majority share and entered negotiations with the provincial authorities.[232] In immediate response to SGCC's unilateral acquisition attempt – a drastic violation of the No. 5 Document which would have nullified all grid regionalisation progress – a meeting was held at the State Council during which representatives from SERC, SASAC, NDRC and the Ministry of Finance discussed the issue. SASAC alone voted in favour of the acquisition, while SERC and NDRC both objected on the basis of the existing sectoral regionalisation policy. Following this impasse between ministerial actors, the State Council required SASAC to draw up a more detailed asset restructuring plan that was to ensure that Guangdong Province remained the majority shareholder and that CSGC's 'management direction' would not change due to the share transfer. Soon after, SASAC proposed an investment by the China Huaneng Group, either alone or in conjunction with SGCC and the China Life Insurance Group, a suggestion which also violated the No. 5 Document as Huaneng Group was one of the 'Big Five' state-owned electricity producers and therefore barred from holding grid assets.[233] As SASAC's second

[230] "State Grid May Buy Southern Rival: Power Industry Reform," Caijing, 04.09.2006.
[231] Interview with an official at the State-owned Assets Supervision and Administration Commission, Beijing, 22.07.2013; "State Grid to End Peer Shareholding," SinoCast Energy Beat, 04.02.2013.
[232] "State Grid May Buy Southern Rival: Power Industry Reform," Caijing, 04.09.2006.
[233] "Why is China Life Insurance buying shares in Southern Grid Corp.?" (南方电网售股为什么是中国人寿), China Securities Journal (中国证券报), 13.12.2006; "Huaneng granted license for equity participation in

suggestion again led to differing standpoints among government departments, SASAC finally withdrew the plan for a joint investment in late November 2006.[234] In early December it was announced that the China Life Insurance Group had 'won' the bidding process for 32% of shares in CSGC: Guangdong SASAC remained the largest shareholder with 38.4%.[235] SERC officials were recorded as applauding this solution, calling it conducive to the success of sectoral reforms.[236]

This sequence of events clearly demonstrates SGCC's pursuit of a recentralisation of grid infrastructure in violation of existing sectoral policy, and sheds light on the nature of central government's responses. While NDRC and SERC were ultimately able to prevent State Grid from acquiring China Southern Grid based on sectoral reform considerations, SASAC acted in a very supportive way. SASAC's rationale for supporting SGCC's bid, however, was not linked to industry restructuring considerations but was rather informed by state asset management requirements. After the supervision of CSGC's operations had been recentralised under SASAC in 2003, CSGC was legally still majority-owned by Guangdong's provincial state asset commission, but SASAC at the time lacked the funds to finance the internal transfers from the provincial to the central level (SOE dividends as its main source of funds were only introduced later in 2006). Building on suggestions made by the energy companies, SASAC agreed to have SGCC and Huaneng use their own funds to buy the shares as substitutes and to then transfer them to SASAC "at a later point", as explained by a SASAC employee during an interview.[237] Viewed through this lens, the CSGC takeover battle demonstrates how SGCC attempted to utilise differences in mandates and priorities among government departments, particularly between NDRC/SERC with their sectorally informed standpoints and SASAC with its focus on state asset management, in order to counter the regional break-up of its asset structure. The presentation of its acquisition plans as a solution to SASAC's difficulties in organising internal asset transfers allowed SGCC to temporarily play off different parts of the central government administration, even though the acquisition was ultimately blocked.

Southern Grid - Subtle turbulences arise during power sector reforms" (华能特许参股南方电网 电力改革出现微妙变局), Economic Observer (经济观察报), 16.10.2006.

234 "Why is China Life Insurance buying shares in Southern Grid Corp.?" (南方电网售股为什么是中国人寿), China Securities Journal (中国证券报), 13.12.2006.

235 "Behind the sale of Southern Grid Corp. equity shares" (南方电网股权出售背后), 21st Century Business Herald (21 世纪经济报道), 11.12.2006.

236 "Why is China Life Insurance buying shares in Southern Grid Corp.?," (南方电网售股为什么是中国人寿), China Securities Journal (中国证券报), 13.12.2006.

237 Interview with an official at the State-owned Assets Supervision and Administration Commission, Beijing, 22.07.2013.

Further attempts at weakening regional grid companies

Having failed to reintegrate the southern provinces into its grid system, SGCC continued its efforts to undermine the status of the five regional grid companies within its own corporate sphere, as they were perceived as obstacles to its influence over the different provincial grids. Not having progressed far with earlier recentralisation attempts, in mid-2011 SGCC shifted its approach by inducing an internal restructuring plan whereby the assets held by four of the five regional grid companies were turned over to their own provincial subsidiaries. As a consequence, all regional grid companies with the exception of the North China Grid, which is headquartered in Beijing and deemed comparatively influential, essentially became empty shells as their legal status was maintained while the basis of their existence was withdrawn.[238] In early 2012, former SERC vice chairman Shao Bingren confirmed this overall dynamic by stating that the "interests of the electricity transmission companies" had blocked further progress towards regional market development and had severely weakened the previously strong influence of regional firms within the SGCC system.[239] In July 2012, SGCC then stripped the already hollowed out regional grid companies of all their administrative and operative functions. All responsibilities related to electricity transmission and sales, planning, construction and personnel were shifted either to SGCC headquarters or to the provincial grid companies, while the respective departments within the regional companies were shut down, leaving them with little more than a number of security supervision and auditing functions. The provincial grid companies, on the other hand, were forced to submit all their profits to the central firm, where they have since been used for centrally steered investment. After this internal restructuring, regional and provincial grid companies were de facto treated as subsidiaries at the same administrative level.[240]

[238] "'State Grid Empire' 'cut apart': How four large regional grid companies became hollow shells overnight" ("国网帝国" "削藩"：四大区域电网公司一夜间成为空壳公司), Sina Blog, 14.05.2011, http://blog.sina.com.cn/s/blog_667242870100qus0.html, accessed 03/2016.
[239] "Former Electricity Official: Reform Suffers Step Backward," Caixin, 09.04.2012.
[240] Zeng Dewen (曾德文), "Who will be the terminator of the 'State Grid Empire'" (谁将是"国网帝国"的终结者), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*),* 12.10.2012.

Organizational Structure——Provincial Companies

1	Beijing Electric Power Company, SGCC	10	Anhui Electric Power Company, SGCC	19	Jilin Electric Power Company, SGCC
2	Tianjin Electric Power Company, SGCC	11	Fujian Electric Power Company, SGCC	20	Heilongjiang Electric Power Company, SGCC
3	Hebei Electric Power Company, SGCC	12	Hubei Electric Power Company, SGCC	21	East Inner Mongolia Electric Power Company, SGCC
4	Jibei Power Grid Company, SGCC	13	Hunan Electric Power Company, SGCC	22	Shaanxi Electric Power Company, SGCC
5	Shanxi Electric Power Company, SGCC	14	Henan Electric Power Company, SGCC	23	Gansu Electric Power Company, SGCC
6	Shandong Electric Power Company, SGCC	15	Jiangxi Electric Power Company, SGCC	24	Qinghai Electric Power Company, SGCC
7	Shanghai Electric Power Company, SGCC	16	Sichuan Electric Power Company, SGCC	25	Ningxia Electric Power Company, SGCC
8	Jiangsu Electric Power Company, SGCC	17	Chongqing Electric Power Company, SGCC	26	Xinjiang Electric Power Company, SGCC
9	Zhejiang Electric Power Company, SGCC	18	Liaoning Electric Power Company, SGCC	27	Tibet Electric Power Company, SGCC

Figure 3.1 SGCC's provincial grid subsidiaries
Source: State Grid Corporation, *Corporate Social Responsibility Report 2014*, Beijing, 2014, p. 7.

3.2.3 Section conclusion

This section provided evidence of SGCC's opposition to the regionalisation of China's grid structure in the aftermath of the 2002 reforms. Over the years, SGCC engaged in numerous attempts to reverse and obstruct regionalisation steps and weaken the initially strong position of regional grid companies within the SGCC system. Notable instances were the ultimately unsuccessful attempt to achieve a reunification with the China Southern Grid Corporation and the internal restructuring plan through which SGCC effectively hollowed out the regional grid companies as intermediaries and strongly enhanced its direct operational influence on provincial grid companies. While the No. 5 Document had only granted it the mandate to manage electricity transfers between regional grids, SGCC successfully undermined further regionalisation progress while moving very close to achieving a horizontal reintegration of grid assets across a majority of regions and provinces.

This development did not coincide with any noticeable shift in central government's policy preferences regarding the organisation of the grid segment. In particular, the sectoral regulators' obstruction of State Grid's attempted reunification with China Southern Grid due to breaches of the regionalisation principle inherent in the No. 5 Document demonstrated that within government there was a stable preference for grid regionalisation and that a recentralisation of grid assets was neither preferred nor supported.[241] Although the state asset regulator SASAC had temporarily granted its unilateral approval for this otherwise very consequential acquisition attempt, its support was explicitly not grounded in sectoral policy considerations but rather based on state

[241] This will become particularly clear in later chapters on ultra-high voltage grid development which strongly revolve around ongoing political infighting between SGCC and central government over issues of grid centralisation vs. regionalisation.

asset management necessities which SGCC had tactically engaged with for the purpose of venue-shopping. Further proof of the State Council's continued support of the regionalisation principle was provided by a 2007 policy document which criticised the lagging regionalisation progress and called for an "acceleration of regional electricity market establishment" and a "strengthening of regional grid structures".[242]

In summary, central government was unable to implement grid regionalisation against the will of SGCC, as State Grid successfully obstructed the development of functional regional grid companies via its internal restructuring plan. At the same time, SGCC failed to fully reverse regionalisation by acquiring China Southern Grid as central government blocked its investment. Given opposing sectoral policy preferences among central government and SGCC, neither side was able to fully realise their goals.

3.3 Attempts at separating electricity transmission and distribution grid assets

In addition to the separation of the electricity grid and generation segments and division of the grid into regionalised entities, the State Council's No. 5 Document also aimed to create retail competition following a separation of assets and operations between electricity transmission (the transfer of electricity from power generation plants to high-voltage substations close to demand centres) and electricity distribution (the local distribution of electricity from substations to end users). This section first delineates the State Council's agenda for transmission and distribution (T&D) unbundling before then analysing central government's practical pursuit of this objective via a series of pilot projects and SGCC's responses to these projects. Outlining formal counter-proposals for T&D reforms made by SGCC, it will furthermore demonstrate that the grid company actively pursued its own policy solutions which, however, were incompatible with central government's sectoral preferences and therefore coincided with more than a decade of deadlock in retail market reforms. It will be argued that SGCC's general refusal to cooperate during pilot projects and its insistence on altering the chosen reform approach were important obstacles to both unbundling and the establishment of

[242] Electricity System Reform Working Group (电力体制改革工作小组), "Opinions on carrying out a deepening of electricity system reforms during the 11th Five-Year Plan period" (关于"十一五"深化电力体制改革的实施意见), State Council General Office Document No. 19 [2007], 06.04.2007, Preamble and Section 2, Part 2.

retail competition. Neither side was able to fully achieve its goals against the opposition of the other: central government was unable to restructure the grid segments and establish retail competition against SGCC's will, and SGCC could not fully avoid government interference with its monopoly position in the retail segment.

3.3.1 The No. 5 Document's 'roadmap' to transmission and distribution unbundling and SGCC's counter-positions

While all of the unbundling requirements listed in the No. 5 Document were perceived as threats by the grid company, the planned separation of the transmission and distribution segments was arguably feared the most because it would sever the grid companies' direct ties between generators and consumers while limiting their business scope to the mere operation of transmission lines. According to the No. 5 Document, only transmission assets and operations were to remain with the regional grid companies (which never really developed, as explained in the previous section), while as the superstructure, SGCC's responsibilities were formally curtailed to solely that of cross-regional transmission.[243] Distribution assets, on the other hand, were eventually to be split off from the grid companies and allocated to separate distribution entities.[244] The State Council viewed the clear separation of the transmission and distribution (T&D) segments as a crucial step towards breaking up the grid companies' position as both wholesale buyer and retail seller, and a precondition for the emergence of retail competition under which consumers would eventually be able to choose between different suppliers based on service quality and price.[245] As former State Electricity Regulatory Commission (SERC) vice-chairman Shao Bingren summarised: "The separation of transmission and distribution is a key step towards marketisation".[246]

A particular concern underlying this reform step had been to "curb unfair pricing by monopolists abusing their dominant market position".[247] The unbundling of downstream grid assets in order to create retail competition was therefore to be

[243] No. 5 Document (2002), Part 3, §§10-11.
[244] Ibid., Part 3, §12; Part 6, §§25-26.
[245] Ibid., Part 6, §26; Jun Wang (王骏), "Power sector reforms are causing dismay" (令人沮丧的电业改革), *Regional Electric Power Management* (地方电力管理) 10 (2000): 11-14.
[246] "The very distant prospects of separating transmission and distribution" (遥遥无期的输配分离), second annex to the lead article "State Grid Empire" (国网帝国), Business Watch Magazine (商务周刊), 05.03.2010.
[247] State Development Planning Commission, Pricing Department, "Several Opinions on Further Improvements to Pricing" (进一步改进价格工作的若干意见), Document No. 1225 [2001], 15.06.2001, Part 2, Art. 6.

supported by reformed electricity pricing mechanisms. Accordingly, on-grid prices paid to electricity generators were to be set by combining a wholesale market competition-based price component and a government-set component. Transmission and distribution prices paid to the respective grid operators were to be set separately by the NDRC's Pricing Department based on operators' cost structures and retail prices set on the basis of the different upstream prices, thereby establishing a direct linkage between retail prices and partially competitive on-grid prices.[248] The separation of transmission and distribution assets as part of this setting was seen as essential for clarifying grid companies' cost structure as the basis for the administration of separate T&D prices, which after the envisioned opening of the distribution segment were to have a strong bearing on the evolution of retail competition, as well as on end-user electricity prices which are of paramount importance for the economy as a whole.[249]

On the way to a full unbundling of transmission and distribution assets and the introduction of retail competition, the No. 5 Document provided a number of intermediary steps. It determined that the regional grid companies first needed to successfully introduce the technology necessary for implementing price-based wholesale competition. Also, it conceded that the newly created electricity generation firms needed time to be able to actually enter into price competition with each other.[250] Given these mitigating upstream circumstances, it specified that T&D assets would temporarily be kept unified until the end of the 10th Five-Year Plan period (2005), by when the grid companies were to have separated their accounting for both segments in preparation for the following separation of assets.[251]

While the No. 5 Document clearly defined the separation of T&D assets as part of the chosen reform path, it left open how and to whom exactly distribution assets were to be allocated after unbundling, as well as how distribution entities should be organised. Given this lack of specificity, there was ample scope for the grid companies, and particularly for SGCC as the grid superstructure for most of China, to argue over the form and purpose of this unbundling step. Unsurprisingly, SGCC firmly objected to a separation of T&D assets. Splitting up T&D, it argued, would decrease levels of

[248] No. 5 Document (2002), Part 4, §21.
[249] "Special Report: China's other power struggle," Reuters, 16.10.2012.
[250] No. 5 Document (2002), Part 6, §25.
[251] Ibid., Part 3, §12; Part 6, §25-26.

coordination across the industry and increase the likelihood of supply disruptions.[252] As SGCC's chairman Liu Zhenya asserted, it was "primarily because of the advantages of integrated power transmission and distribution" that China's grids were operating so safely, especially in contrast to other countries that endured frequent blackouts.[253] Liu furthermore raised doubts that this planned unbundling step would lead to efficiency improvements, citing studies that had reportedly shown efficiency losses in supply systems with separated grid assets;[254] an SGCC employee in an interview also insisted that unbundling would lead to considerable increases in operational costs and end-user prices because economies of scale would be lost if T&D were separated into small units.[255] In response to the reform objective of enhancing cost transparency, SGCC asserted that levels of transparency did not correlate with company size and that it ultimately made no difference how many large or small companies were present in the distribution segment as long as policy-makers failed to devise and implement suitable accounting standards.[256] Li Ying (李英), chief economist at SGCC's State Power Economic Research Institute (SPERI), similarly insisted that separate T&D auditing and pricing was entirely possible without breaking up assets.[257] What was needed, an SGCC employee argued, was proper regulation which primarily necessitated a reform of government functions rather than a separation of transmission and distribution assets.[258] In the future, a high-level advisor at the State Grid Energy Research Institute conceded, it might be possible to trigger retail competition by introducing new parties into the segment, but it was neither necessary nor advisable to split up assets to achieve this.[259]

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[252] Interview with a smart grid researcher at the State Grid Energy Research Institute and an enterprise strategy consultant at the State Grid Energy Research Institute, Beijing, 26.09.2013.
[253] Liu Zhenya, *Electric Power and Energy in China* (Singapore: John Wiley & Sons, 2013), p. 262.
[254] Ibid., p. 266.
[255] Interview with an employee from the Enterprise Strategy Research Institute, State Grid Energy Research Institute, Beijing, 11.07.2014.
[256] Interview with a senior engineer/top-level advisor, State Grid Energy Research Institute, Beijing, 08.11.2012.
[257] "SGCC's 600 billion Yuan UHV project referred to as strengthening monopoly" (国家电网 6 千亿元特高压项目被指巩固垄断), Nanfang Web (南方报网), 07.07.2009.
[258] Interview with a smart grid researcher at the State Grid Energy Research Institute, Beijing, 08.11.2012.
[259] Interview with a senior engineer/top-level advisor, State Grid Energy Research Institute, Beijing, 08.11.2012.

3.3.2 Government's attempts at inducing retail competition – and SGCC's opposition to these attempts

In the face of SGCC's open opposition, a number of attempts were made to gradually introduce a separation of the transmission and distribution segments, both through State Council policy specifications and a series of pilot projects. All were rendered ineffective during the implementation phase by SGCC's refusal to cooperate and were also challenged at the policy level by the grid company's own counter-proposals for restructuring the retail segment.

Pilot projects for gradual T&D unbundling

With slight delays to the unbundling timetable included in the No. 5 Document, in mid-2006 SERC and NDRC introduced trial runs that required the regional grid companies to conduct separate auditing for their transmission and distribution operations so that pricing reforms could progress. SGCC openly disputed the plan stating that price reforms were an issue of their own, utilising the T&D unbundling issue to push-start lagging pricing reforms was to confuse cause and effect, and the separation of T&D should not be contemplated until broader questions regarding administrative price setting were solved first.[260] As the auditing reforms did not lead to the desired outcomes and overall progress in market building was lagging, in 2007 the State Council General Office published a grand reaffirmation of the "reform direction and overall targets set by the No. 5 Document", acknowledging that reform assignments had not been completed as new challenges had arisen. Outlined by the Electricity System Reform Working Group, the document criticised the "insufficient role of the market in electricity allocation" and called for the steady implementation of pilot projects for the separation of transmission and distribution in order to "change the current single buyer system", thereby directly targeting SGCC's persisting downstream monopoly. It went on to explicitly demand separate internal auditing for the T&D segments, direct power purchases for large end-users and a general deepening of competition-based pricing reforms.[261]

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[260] "The very distant prospects of separating transmission and distribution" (遥遥无期的输配分离), second annex to the lead article "State Grid Empire" (国网帝国), Business Watch Magazine (商务周刊), 05.03.2010.
[261] Electricity System Reform Working Group (电力体制改革工作小组), "Opinions on carrying out a deepening of electricity system reforms during the 11th Five-Year Plan period" (关于"十一五"深化电力体制改革的实施意见), State Council General Office Document No. 19 [2007], 06.04.2007.

Consequently, a pilot scheme was introduced in 2009 that encouraged large industrial consumers to purchase electricity directly from generation companies. The aim was to eventually open 20% of China's electricity exchanges to bilateral trade, thereby bypassing the wholesale market and challenging the grid companies' role as the sole retailers.[262] Based on a policy originally issued by SERC as early as 2004,[263] retail prices in these pilot schemes were to be directly negotiated between industrial end-users and power generators, allowing electricity purchases at lower prices. Grid companies were to add a grid access fee to this figure but were otherwise not to participate in these exchanges as retailers.[264] Fifteen large industrial firms were eventually admitted to the pilot projects, but the trials soon began to stagnate as dissent between participating parties mounted.[265] According to a former SERC official, the main point of contention was that the calculation of the price component for grid access lacked transparency. Even if generators and consumers agreed on direct sales they still needed to access transmission lines, but neither SGCC nor China Southern Grid in the southern provinces were willing to fully disclose their cost calculations, much to the dismay of the China Electricity Council which represents the interests of generation companies. Given the grid companies' refusal to cooperate, direct electricity sales proved very difficult to implement.[266]

Despite central government's commitment to gradually opening the retail market to competition and various implementation initiatives, transmission and distribution assets remained integrated while SGCC and China Southern Grid continued to act as the single retailers in their respective regions. As no separate distribution entities existed that could have entered into competition with each other, retail price competition stalled while transmission and distribution prices continued to be set as a combined figure based on the NDRC Pricing Department's interpretation of SGCC's statements

[262] "Chinese direct power deal approved," Aluminum International Today, 01.11.2009; "Chinese grid companies at the crossroads," Power in Asia, 21.01.2010.
[263] State Electricity Regulatory Commission, "Temporary measures for pilot projects regarding direct power purchases from generation enterprises by electricity users" (电力用户向发电企业直接购电试点暂行办法), Document No. 17 [2004], 29.03.2004.
[264] "China Approves Direct Power-Purchase Prices in Three Provinces," Bloomberg Businessweek, 05.06.2010.
[265] "Direct Power Purchase Trial Stalled," Caixin, 21.04.2010.
[266] "Shao Bingren: Power sector reforms need a holistic push forward" (邵秉仁：电力改革需整体推动), Caixin, 06.04.2012; "Direct Power Purchase Trial Stalled," Caixin, 21.04.2010.

regarding its combined T&D costs, and these, according to the industry regulator SERC, have been notoriously difficult to verify.[267]

SGCC's own suggestions for retail market development and a subsequent compromise

Obstructing all progress on T&D unbundling, SGCC also began to advocate to central government its own suggestions for retail market development which were primarily geared towards keeping its asset structure as well as its role as the sole, or at least the dominant, intermediary between generators and end-users intact. The first system that SGCC advocated was referred to as the 'separation of distribution and retail' (配售分开) under which distribution assets were to remain with the grid companies while the retail function was to be taken over by newly created retail firms which would act as brokers between generators and consumers without actually owning or operating distribution networks. SGCC subsequently experimented with the transfer of its retail business to private firms at the local level, although it later became clear that the managers in these firms had all been appointed by SGCC's local subsidiaries and that large shares in these private retailers were held by SGCC employees. Local SGCC-owned suppliers on various occasions furthermore reorganised their assets in a way to create separate retail centres that were then operated by other companies which, however, also belonged to the SGCC structure.[268] While creating the impression of willingness to cooperate with government's reform requirements, both approaches to 'separating' business segments entirely defeated the purpose of the original reform idea as ownership structures effectively remained untouched and local SGCC subsidiaries additionally distorted retail competition with the motive of privatising profits.

The grid company subsequently introduced a further suggestion for retail market reforms referred to as the 'opening of a side retail market' (售电侧市场放开). This model was again based on the idea of maintaining the integrity of T&D assets while creating competition between different retailers. The catch in this scenario was that SGCC itself would formally participate in the retail market through a separate subsidiary entity.[269]

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[267] Han Wenxuan (韩文轩), "Reflections on the problems regarding power sector reforms that are currently facing China" (关于当前我国电力体制改革问题的思考), *Caixin Net*, 05.03.2014; "The very distant prospects of separating transmission and distribution" (遥遥无期的输配分离), Business Watch Magazine (商务周刊), 05.03.2010.

[268] "The very distant prospects of separating transmission and distribution" (遥遥无期的输配分离), second annex to the lead article "State Grid Empire" (国网帝国), Business Watch Magazine (商务周刊), 05.03.2010.

[269] Liu, 2013, p. 265; Interview with a smart grid researcher at the State Grid Energy Research Institute and an enterprise strategy consultant at the State Grid Energy Research Institute, Beijing, 26.09.2013.

Two SGCC employees who commented on this model in interviews argued that under this system the preferences of all relevant industry and government actors would be brought together for mutual benefit. For SGCC, the proposed adjustment would prevent a separation of assets and was therefore preferable to the solution postulated in the No. 5 Document, although "the later such a new model is implemented, the better".[270] For the NDRC, NEA, and Ministry of Finance, the model was also acceptable since it did involve forms of competition in both generation and retail. Both interviewees also predicted that this approach would probably enable SGCC to distort the retail market in its favour by charging its affiliated retailer lower grid fees at the expense of its competitors. They contended, however, that if suitable regulation was in place the participation of the grid company in the retail business should not be an obstacle to market competition.[271]

After more than a decade of unsuccessful pilot project attempts and SGCC-driven counter-proposals, a compromise between central government and SGCC finally began to take shape. Having vowed in its *2014 Energy Work Guide* to "actively push forward direct power purchases and the reform of the retail sector", as well as to "advance the reform of [...] separate T&D auditing",[272] in late 2015 the National Energy Administration in cooperation with the NDRC presented a new approach to retail market building which combined separate administrative price setting for transmission and distribution with a partial opening of the distribution segment to external investment. However, while the setting of separate prices for T&D was to go hand in hand with additional auditing by the government, few actual changes for the grid companies should be expected from this step. As demanded by SGCC, all existing distribution grids remained firmly in the hands of the grid companies which were furthermore formally allowed to continuously participate in the retail segment, while only the construction of new distribution infrastructure entailed the possibility of drawing in 'societal capital' (社会资本).[273] Presented as a large step forward for the

[270] Interview with a smart grid researcher at the State Grid Energy Research Institute and an enterprise strategy consultant at the State Grid Energy Research Institute, Beijing, 26.09.2013.
[271] Ibid.
[272] National Energy Administration, "Opinions on the 2014 Energy Work Guide" (2014 年能源工作指导意见), Document No. 38 [2014], 20.01.2014.
[273] "China takes big step in electricity system reform," China Daily, 30.11.2015; "Six new electricity reform measures - Three types of companies expected to profit" (新电改六管齐下 三类公司料受益), China Securities Journal Online (中国证券网), 01.12.2015; "Regarding electricity distribution, transmission grids, transactions and dispatch - Might State Grid be broken up?" (从售电、配网、交易与调度角度 国家电网会被拆分?), North Star Electric Power News Network (北极星电力新闻网), 01.12.2015; "State Council Aims to Cut Power Prices for Big Manufacturers," Caixin, 15.12.2015.

marketisation of China's electricity industry, the 2015 policy alterations should rather be understood as a skewed compromise by which government accomplished the introduction of separate T&D pricing and achieved a rather limited possibility for external actors to enter the retail business, while SGCC on the other hand not only maintained all of its existing distribution assets but also formally secured its dominant market position in the retail business, which new entrants will find very difficult to challenge. Finally, SGCC may even end up benefitting from the partial opening of the retail segment to external investors as it may enhance its access to external capital.

3.3.3 Section conclusion

This section analysed central government's attempts to gradually unbundle the grid companies' transmission and distribution grid assets as a way to introduce competition to the electricity retail segment. Empirical evidence was provided that demonstrated SGCC's rhetorical and practical opposition to this unbundling step, including its consistent interference with pilot projects for separate T&D auditing and with trials aimed at the widespread introduction of direct power transfers which threatened to dissolve its monopoly position for the supply of industrial end-users. The manifold SGCC-initiated counter-proposals for the retail segment furthermore demonstrated that the grid company continuously pursued its own reform preferences while feigning a willingness to cooperate with sectoral regulators. Presented as strategies to introduce retail competition without needing to break up assets, SGCC's voluntary experiments with a 'separation' of the distribution and retail segments were more akin to attempts at consolidating its position as the dominant retailer while additionally allowing for a partial privatisation of profits, showing similarities to earlier findings from SGCC's continued involvement in the power generation business. Taken together, the grid company's behaviour presented a major obstacle to the emergence of retail competition as set out in the State Council's No. 5 Document.

While SGCC persistently countered the attempts at implementing T&D unbundling, central government's policy preferences in this regard remained stable, as demonstrated by its consistent pursuit of pilot projects and the 2007 reaffirmation of the State Council's commitment to the No. 5 Document's market building agenda and the continued validity of all unbundling requirements. Following a decade-long deadlock between SGCC and central government over this issue, the NDRC and NEA eventually

engaged with one of SGCC's counter-proposals to formulate a compromise that entailed a very limited opening of the distribution segment while, for the time being, assuring SGCC its dominant participation in the retail segment.

Taken together, these findings once more show that under opposing policy preferences both sides were unable to fully realise their goals. Central government could not conduct market building in the retail segment against the will of SGCC, and SGCC was unable to rid itself of the ongoing pilot project-based attacks on its retail monopoly. This ultimately necessitated a late compromise prior to which very little progress in any direction appeared achievable.

3.4 Unbundling primary and auxiliary grid assets

A final unbundling step included in the No. 5 Document as part of the State Council's plan to marketise the electricity industry required a separation of grid operations as the primary grid business from all 'auxiliary' grid businesses related to the design, construction, and maintenance of network equipment and infrastructure, which were to be converted into separate entities engaging in market competition.[274] While one purpose of splitting up primary and auxiliary assets was to enhance overall efficiency in the auxiliary segment, another core aspiration was to further clarify the cost structure underlying grid operation, where the lack of transparency had been a continuing obstacle to industry oversight.[275] Consequently, grid companies were supposed to solely act as network operators and were only allowed to retain their own research institutes as additional support.[276]

This section will analyse the State Council-initiated attempts to implement this unbundling step, as well as SGCC's counter-approach which allowed it not only to avoid a separation of assets but also to expand its market position in the grid equipment segment. Particular emphasis will be placed on examining SGCC's strategy of acquiring independent equipment suppliers and engaging in venue-shopping among different central government bodies, utilising uncoordinated variances among mandates to

[274] No. 5 Document (2002), Part 3, §13.
[275] Interview with a senior engineer/top-level advisor, State Grid Energy Research Institute, Beijing, 08.11.2012; Wang, Qiang (王强), "State Grid Empire" (国网帝国), *Business Watch Magazine (*商务周刊*)* 10, no. 5 (05.03.2010): 53.
[276] No. 5 Document (2002), Part 3, §13.

subvert unbundling requirements and interfere with the emergence of a level competitive playing field.

3.4.1 Slow implementation progress and SGCC's expansion in the grid equipment manufacturing segment

The early years after the 2002 reform saw little progress in auxiliary asset unbundling despite several reiterations of the decision by the State Council, notably as part of the previously mentioned 2007 document which explicitly reaffirmed the No. 5 Document's reform agenda for the 11th Five-Year Plan period.[277] While numerous new private and state-owned entrants appeared in grid equipment manufacturing, the State Grid Corporation refused to withdraw from the auxiliary grid segment as its direct participation allowed it, as the largest buyer of grid-related equipment and construction services, to retain the related profits – which unlike the core grid segments were not affected by administrative pricing controls – within its own enterprise group.[278] In late 2007, following the most recent demands voiced by the State Council, several ministries initiated a new unbundling attempt that even included a financing plan through which the grid companies were ensured that they would be compensated for costs incurred during the separation of assets.[279] Instead of following orders to retreat from auxiliary fields, SGCC asserted that a centralised and unified handling of equipment maintenance was essential for the stability and security of the electricity supply, especially during emergencies, and that China needed a strong unified grid equipment manufacturer that would be able to compete on an equal footing with leading foreign suppliers so as to break the "monopolistic position of foreign oligarchs".[280]

Over the years, the grid company further strengthened its position in the grid equipment manufacturing segment by using subsidiary firms to acquire a multitude of independent engineering companies which had entered the segment in the wake of the

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277 Electricity System Reform Working Group (电力体制改革工作小组), "Opinions on carrying out a deepening of electricity system reforms during the 11th Five-Year Plan period" (关于"十一五"深化电力体制改革的实施意见), State Council General Office Document No. 19 [2007], 06.04.2007, Section 1, Part 1.

278 "SGCC indirectly purchases secondary industry assets - Accused of subverting power reforms" (国家电网收购迂回辅业资产 被指有悖电力改革), 21st Century Business Herald, 21.07.2009; "Special Report: China's other power struggle," Reuters, 16.10.2012.

279 Government fund-raising was supposed to raise RMB18.7 billion. See "China's power sector reform short circuits," Caijing, 16.04.2008; "How to Power Waffle," Caixin, 16.03.2010.

280 "China's power sector reform short circuits," Caijing, 16.04.2008; Wang, Qiang (王强), "State Grid Empire" (国网帝国), *Business Watch Magazine (*商务周刊*)* 10, no. 5 (05.03.2010): 50, 53.

No. 5 Document.[281] In mid-2009, the State Grid Equipment Co. (国网设备公司) purchased the Pinggao Group (平高集团), a leading state-owned producer of high-voltage electrical switches, from a municipal state asset commission in Henan Province. Soon after, the SGCC-owned China Electric Power Research Institute (CEPRI, 中国电力科学研究院) acquired a controlling stake in the Henan-based Xuji Group (许继集团), a leading manufacturer of power transmission and relay protection instruments.[282] The Henan provincial government willingly agreed to both takeovers as it correctly anticipated that the two companies would be able to sell vast amounts of grid equipment directly to their new parent firm while strengthening the provincial economy and increasing tax revenues.[283] By 2010, after several other acquisitions CEPRI alone owned a controlling stake in 17 of the 37 industry-relevant science and technology firms at the time.[284]

A second SGCC-owned research centre used for expansionary purposes was the Nanjing-based State Grid Electric Power Research Institute (SGEPRI, 国网电力科学研究院). By 2009, SGEPRI, in conjunction with its subsidiary Nari Group Corporation (南瑞集团), had acquired over ten equipment suppliers in the provinces of Jiangsu and Anhui, turning the city of Nanjing into an SGCC-dominated hub for grid equipment manufacturing.[285] The vast ambition of SGCC's research institutes, as well as their importance for SGCC's expansion plans, was demonstrated by figures given during a 2009 interview by a CEPRI executive, who stated that his institute's revenue target for 2009 was RMB10 billion and that the institute was aiming for a five-fold increase by 2014. SGEPRI's chairman similarly proclaimed that within the same timeframe his institute aimed to become an internationally leading centre for industry research and a world-class producer of high-tech products.[286] While the research institutes were the only 'non-core' assets that SGCC had been formally allowed to retain, it is not without irony that they were now transformed into huge holding companies for all sorts of assets in business areas that were nominally off-limits to the grid company. From

[281] "How to Power Waffle," Caixin, 16.03.2010; "State Grid's Xuji Takeover Completes," Caixin, 02.06.2010.
[282] "SGCC indirectly purchases secondary industry assets - Accused of subverting power reforms" (国家电网收购迂回辅业资产 被指有悖电力改革), 21st Century Business Herald, 21.07.2009; "State Grid Takes Control of XJ Electric," Caijing, 23.06.2010.
[283] Interview with a smart grid researcher at the State Grid Energy Research Institute and an enterprise strategy consultant at the State Grid Energy Research Institute, Beijing, 26.09.2013.
[284] Wang, Qiang (王强), "State Grid Empire" (国网帝国), *Business Watch Magazine (*商务周刊*)* 10, no. 5 (05.03.2010): 50.
[285] Ibid., p. 49.
[286] "SGCC indirectly purchases secondary industry assets - Accused of subverting power reforms" (国家电网收购迂回辅业资产 被指有悖电力改革), 21st Century Business Herald, 21.07.2009.

SERC's perspective, it had been a core mistake at the beginning of the reform process to allow the grid company to keep these research institutes which was compounded by not monitoring closely enough what exactly they were used for.[287]

This series of acquisitions, in particular the takeovers of the Xuji and Pinggao Groups, stirred up considerable debate and led many observers and industry experts to condemn SGCC's investments as violations of the State Council's marketisation plan as they undermined emerging competition in the grid equipment manufacturing industry. The China Machinery Industry Federation criticised SGCC as the most important purchaser of grid equipment (>70% of the market) for moving towards establishing its own internal manufacturing system in which SGCC-owned suppliers won contracts despite having a poorer track record or less expertise than their competitors and, in some cases, were awarded contracts directly with no public tendering taking place.[288] Independent manufacturers, on the other hand, found it more and more difficult to compete and as the dynamics of the whole auxiliary business shifted many of the smaller companies in the market eventually even wanted to be absorbed into the SGCC system as this had become much more profitable than staying independent.[289]

3.4.2 Political processes accompanying SGCC's acquisitions

The bureaucratic processes preceding and accompanying SGCC's acquisitions demonstrate how the grid company once more engaged in targeted venue-shopping among various central government bodies as soon as it was confronted with sectoral authorities' resistance.

Direct opposition, particularly to the crucial Xuji and Pinggao deals, was voiced by the electricity regulator SERC after the regulator had initially – and mistakenly – viewed the market share of the two newly acquired firms as too low to significantly impact the wider market for grid equipment manufacturing.[290] Disagreement with SGCC's Xuji and Pinggao acquisitions was also voiced by Zhang Guobao, at the time director of the National Energy Administration (NEA) and deputy director of the NDRC. Testifying

[287] Wang, Qiang (王强), "State Grid Empire" (国网帝国), *Business Watch Magazine (*商务周刊*)* 10, no. 5 (05.03.2010): 47.
[288] Ibid., pp. 47-50; "How to Power Waffle," Caixin, 16.03.2010.
[289] Interview with an official at the National Energy Administration, Beijing, 25.07.2013.
[290] Wang, Qiang (王强), "State Grid Empire" (国网帝国), *Business Watch Magazine (*商务周刊*)* 10, no. 5 (05.03.2010): 53.

that he had not authorised the deals and that he had argued with SGCC executives that their investment strategy violated a core principle of sectoral reforms, Zhang stated that "as soon as SGCC recognised that [he] would not approve the purchase, they went and obtained the approval through other ministries and commissions."[291] Another NEA employee, referring to the acquisitions as "gross violations of the No. 5 Document",[292] further specified that in the face of the NEA's hesitancy SGCC had requested support from the state asset administrator SASAC and the NDRC's Foreign Investment Department (发改委外资司), both of which looked favourably upon State Grid's acquisition plans and eventually outvoted the NEA's opposition.[293]

During an interview, a SASAC official gave a detailed explanation of their internal reasoning regarding the Pinggao and Xuji approvals. According to him, these two acquisitions – and only these – were authorised specifically in order to help SGCC develop a new 'ultra-high voltage' (UHV) transmission technology which the grid company had presented to SASAC as entailing opportunities for corporate growth and enhancing its international competitiveness[294] (this transmission technology would later stand at the centre of a major grid restructuring plan pursued by SGCC which will be discussed in detail in the following chapters). SASAC thought that the development of this grid technology needed industrial support and therefore decided to initiate an "incubation period" to help SGCC stimulate further technological development and build capacity "until the market is ready" to sustain such a function.[295] The approvals were also viewed as necessary to help SGCC advance with the standardisation of UHV technology, as the official specified that "we need to develop our own industrial standards [...] and if we don't give SGCC this special privilege it would become much more difficult for it to acquire the technology".[296] SGCC employees gave similar assessments of the logic behind SASAC's acquisition approvals which, as they explained, were also intended to help the grid company gain manufacturing capacity and support it during its attempt to develop the new technology into a marketable and exportable product that could be turned into one of the pillars of SGCC's corporate

[291] Zhang Guobao (张国宝), "A review and analysis of ten years of power sector reforms (Part 3) - Actions speak louder than words" (电改十年的回顾与思辨 (3) 迈出一步总比不迈要强), *China Economic Weekly* (中国经济周刊), 21.01.2013.
[292] Interview with an official at the National Energy Administration, Beijing, 25.07.2013.
[293] Ibid., 11.07.2014.
[294] Interview with an official at the State-owned Assets Supervision and Administration Commission, Beijing, 22.07.2013.
[295] Ibid.
[296] Ibid.

strategy of developing its manufacturing arm into a counterpart to world market leaders like Siemens or ABB. Although the Pinggao and Xuji acquisitions objectively violated the No. 5 Document, they explained, SASAC had approved them because it considered this would enhance SGCC's international competitiveness and strengthen its asset portfolio. Mostly concerning itself with issues of individual enterprise performance, they contended, SASAC failed to fully consider the potential impact of this decision on broader market reforms.[297] While SGCC made use of SASAC's narrowly defined perspective on enterprise competitiveness in order to further its own goals, the asset regulator's unawareness of broader reform procedures led to considerable frustration among sectoral authorities; an official from SERC remarked that the state asset administrator "does not have a deep enough understanding of the direction of power reform programs" and demanded that SASAC "should listen to and respect" the views of other regulators.[298]

In reaction to SGCC's renewed and heavily debated expansion into auxiliary business areas, in September 2010 the Electricity System Reform Working Group under the State Council drafted a new plan in which it once more required the spin-off of auxiliary assets.[299] After being ratified by the State Council in 2011, two new state-owned firms were established, the Power Construction Corporation of China (中国电力建设集团公司) and the China Energy Engineering Corporation (中国能源建设集团公司), which merged together a number of auxiliary firms hitherto owned by SGCC and China Southern Grid.[300] According to a SERC official, the restructuring represented a compromise allowing SGCC to keep a number of important subsidiaries while requiring a limited restructuring of its research institutes.[301] In the case of SGERI, it continued to define its core mission as "becoming a world-class solution provider in electrical equipment",[302] demonstrating once more just how reluctant the grid company has been to reduce its participation in this profitable business area. As SGCC maintained subsidiaries in various 'non-core' fields (see Figure 3.2) including highly market-relevant equipment manufacturers such as Xuji and Pinggao, the 2011 restructuring changed little with regard to the grid company's strong engagement in the auxiliary segment.

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297 Interview with a smart grid researcher at the State Grid Energy Research Institute and an enterprise strategy consultant at the State Grid Energy Research Institute, Beijing, 26.09.2013.
298 "How to Power Waffle," Caixin, 16.03.2010.
299 "SASAC to Require Power Grid Spin-off," Caixin, 25.02.2011.
300 "China 2 Key Power Sub-Business Groups Set up on Sep. 29," SinoCast Energy Beat, 29.09.2011.
301 "SASAC to Require Power Grid Spin-off," Caixin, 25.02.2011.
302 State Grid Energy Research Institute, http://www.sgepri.sgcc.com.cn/en/, accessed 05/2013.

Organizational Structure——Subsidiaries directly managed by SGCC

1	China Electric Power Research Institute	12	SGCC Call Center	23	State Grid XuJi Group Corporation
2	State Power Economic Research Institute	13	SGCC International Service Company	24	State Grid Pinggao Group
3	State Grid Energy Research Institute	14	NARI Group Corporation(SGCC Electric Power Research Institute)	25	Shandong Power Equipment Co., Ltd.
4	State Grid Smart Grid Research Institute	15	China Electric Power Equipment and Technology Co., Ltd.(State Grid Project Management Company)	26	State Grid Energy Conservation Service Co., Ltd.
5	State Grid Management Academy (SGCC CPC School)	16	Luneng Group Co., Ltd.(Duchengweiye Group Company)	27	State Grid Yingda International Holdings Group Ltd.
6	SGCC Advanced Training Center	17	State Grid Xin Yuan Co., Ltd.(State Grid Xin Yuan Hydropower Co., Ltd.)	28	China Power Finance Co., Ltd.
7	State Grid Institute of Technology (Youth League School)	18	State Grid International Development Limited.	29	Yingda Taihe Property Insurance Co., Ltd.
8	State Grid Operation Company	19	State Grid General Aviation Co., Ltd.	30	Yingda Taihe Life Insurance Co., Ltd.
9	State Grid DC Engineering Construction Company	20	State Grid Materials Supply Co., Ltd.	31	Yingda Chang'an Insurance Brokers Co., Ltd.
10	State Grid AC Engineering Construction Company	21	State Grid Zhongxing Co., Ltd.	32	Yingda International Trust Co., Ltd.
11	State Grid Information & Telecommunication Technology Company	22	Yingda Media Investment Group Co., Ltd.	33	Yingda Security Corporation Ltd.

Figure 3.2 SGCC's subsidiaries
Source: State Grid Corporation, *Corporate Social Responsibility Report 2014*, Beijing, 2014, p. 7.

3.4.3 Section conclusion

In line with the preceding sections on the attempted implementation of unbundling steps inherent in the State Council's market building plan, this section demonstrated how SGCC circumvented the repeatedly reiterated requirement to withdraw from the auxiliary grid segment, thereby disrupting the emergence of level competition between manufacturers while simultaneously sustaining its own dominant market position. This was predominantly achieved by transforming affiliated research institutes into holding companies for newly acquired equipment suppliers. Posing as covers for SGCC's re-expansion into various affiliated business areas, these institutes have maintained strong industry positions even after the compromise restructuring of 2011.

While the majority of SGCC's purchases were made unilaterally and without any government approval, the two most consequential takeovers, namely those of Pinggao and Xuji, were formally approved following targeted venue-shopping by the grid company. Similar to instances analysed in preceding sections, SGCC deliberately engaged with variances in institutional mandates among central government bodies and sought investment support from the state asset administrator SASAC and the NDRC Foreign Investment Department by presenting its expansion plans as reflections of those institutions' non-sector-specific mandates to enhance state asset value and the international competitiveness of Chinese industry. By securing the support of these two bodies based on rationales that bore no relation to otherwise contentious industry-

specific market building considerations, SGCC managed to overcome the opposition of sectoral authorities which had refused to approve the grid company's attempts to circumvent unbundling requirements.

In summary, the State Council was unable to force SGCC out of the auxiliary segment while the grid company not only managed to avoid full asset unbundling but also to re-develop a dominant market position in grid equipment manufacturing. Given clashing reform preferences, SGCC ultimately agreed to a compromise whereby it had to give up some of its auxiliary assets but at the same time successfully secured its dominance in the manufacturing segment at the expense of independent competitors.

3.5 SGCC's vision of maintaining large integrated energy groups

Given the context of a gridlocked marketisation campaign, SGCC's vision of its own future corporate development differed markedly from the requirements set by the State Council as it revolved mainly around the concept of sustained corporate unity while calling for enhanced government support for large integrated energy groups in China, according to the grid company's former CEO and current chairman, Liu Zhenya.

Liu contended that large energy groups such as SGCC served a function as protectors of national interests and enforcers of national energy strategies.[303] They were needed, he maintained, to function as China's vanguard in international competition and that the "international competitiveness of enterprises is [...] linked to the nation's power; it is an important manifestation of national strength and prosperity."[304] To assist large enterprise groups in fulfilling this role, Liu called on government to support domestic mergers in order to increase levels of industry concentration and economies of scale.[305] Increased vertical integration with upstream and downstream industry segments, he declared, were suitable ways to "reduc[e] costs, improv[e] the operational efficiency of the whole industry chain, and improv[e] [...] enterprise management standards and competitive advantages". Additionally, Liu advocated energy companies' diversification of business endeavours and expansions into related industry sectors such as financial

[303] Liu, 2013, p. 356.
[304] Ibid., p. 357.
[305] Ibid., p. 362.

services so as to ensure "business stability".[306] Declaring that monopoly was a "factual phenomenon" in the energy industry and that "only a monopolistic operation is suitable for a business with natural monopoly characteristics",[307] Liu insisted that in times of economic globalisation China should not overly focus on domestic challenges with monopolies but rather consider the situation of Chinese companies as they compete in international energy markets for the benefit of their country:

> Perhaps from the perspective of the domestic market, a particular energy group has a monopoly position and strong market influence, but from the perspective of the international energy market, it is just one of many market players participating in the international competition for energy. In order to enhance our competitiveness in the international energy market, and better protect our national energy security, we must accelerate the development of China's large energy groups, and never ignore international competitive factors and never limit them on account of their domestic monopoly positions.[308]

Instead, Liu called on the administration to devise "innovative regulatory systems" in order to "target monopolistic behaviour rather than the monopolistic market position of the enterprises".[309] Bypassing all of the criticism that had been levelled against SGCC's dominant domestic industry position and its circumvention of unbundling requirements, Liu placed domestic reform quarrels in an international context, attempting to utilise sentiments of economic nationalism to seek endorsement for his argument that it was in the interest of the Chinese nation as a whole to support large energy groups like SGCC during their domestic expansion in order to ensure greater international competitiveness. Most importantly, however, Liu's line of argument turned the entire rationale that originally formed the foundation of the attempted marketisation reforms on its head. Whereas the motives underlying the No. 5 Document were to increase efficiency, competitiveness and the ability of government to target monopolistic behaviour by eroding the monopolistic market position of SGCC's predecessor, the SPCC, Liu argued that the only viable option to make the industry efficient and competitive was to expand and further deepen SGCC's monopolistic market position.[310] Liu thereby used some of the very same arguments inherent to the No. 5 Document in order to make diametrically opposite reform suggestions, suggestions which will be discussed in more detail in the following chapter.

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[306] Ibid., pp. 362-363.
[307] Ibid., p. 366.
[308] Ibid., pp. 366-367.
[309] Ibid., p. 367.
[310] Ibid., p. 363.

3.6 Chapter conclusions

Discussion of empirical findings

As 'Part A' of the empirical sections in this dissertation, this chapter investigated the State Grid Corporation's influence on the implementation of sectoral policy in the electricity industry. Focusing on implementation processes following the State Council's 2002 market building agenda, SGCC's responses to four different asset unbundling requirements were analysed by (a) scrutinising its attempts to maintain an engagement in the unbundled electricity generation sector, (b) investigating its struggles against grid regionalisation and (c) the separation of its transmission and distribution assets, and (d) examining its strategies to retain a dominant position in auxiliary grid businesses. In all these surveyed settings SGCC was found to have engaged in decisive and autonomous attempts to block or reverse vertical and horizontal asset break-up which coincided with marked slowdowns or lengthy/permanent interruptions of the implementation process. Overall, the State Council encountered great difficulty in trying to implement policy against SGCC's will, as its ability to steer sectoral reforms was severely limited by the grid company's ability to counteract its moves.

Having originated from a vertically integrated industry environment, the primary goal pursued by the grid company was to as far as possible maintain its monopolistic status across the different industry segments. This became particularly evident through its obstruction of attempts to challenge its unified control over the transmission, distribution and retail segments as well as its subversion of grid regionalisation endeavours, which resulted in the grid company managing to sustain its position as the sole connection between power generators and end users across most of the country. Additionally, SGCC worked towards market dominance in adjacent settings which had been formally subjected to competition. This was observable during both SGCC's unauthorised explorations into the power generation segment where it utilised its position as transmission monopolist in order to 'outcompete' other power generation companies, and its ventures into the highly profitable grid equipment manufacturing segment where it eventually dominated competition after acquiring a critical mass of previously independent manufacturers and concealing them within the structures of its affiliated research institutes.

Overall, given the impossibility of sustaining a fully integrated industry monopoly, the findings presented in this chapter suggest that SGCC's persistent interference with the

implementation of sectoral policy was mainly aimed at combining the perpetuation of monopoly across the different grid segments with market dominance or at least a form of preferential engagement in adjacent nominally competitive segments. Mechanisms of resistance applied by the grid company to achieve these goals can be summarised under the following headings.

- *'Obstruction and/or strategic misuse of pilot projects'*, i.e. openly refusing to cooperate with unbundling pilot projects or utilising pilot projects to feign cooperation while pursuing market dominance in adjacent competitive segments;
- *'Distorting investment behaviour'*, i.e. conducting autonomous and often unapproved investments across industry sub-segments which distorted emerging competition in the grid company's own favour; and
- *'Manipulation of internal asset structures'*, i.e. unilaterally reshaping the structure of assets that it was allowed to 'temporarily' retain, with the purpose of preventing further unbundling or reversing asset losses that had already occurred.

Simultaneously, there was evidence of notable albeit overall not very successful government opposition to SGCC's behaviour and continued programmatic support of the No. 5 Document's sectoral market building agenda by the State Council which consistently pushed for the application of the different unbundling steps while trying to induce the development of regionalised wholesale and retail competition. In response to SGCC's stalling of the marketisation process, in 2007 the State Council issued a policy document which fully confirmed the original reform path and vowed to "unswervingly push forward" the goals inherent in the original market building plan.[311] Furthermore, in 2012 Prime Minister Wen Jiabao once more publicly emphasised the need to break up monopoly structures in the electricity industry.[312] In 2013 and 2014, interviewees from both the NEA and SASAC insisted that the No. 5 Document still had legal character, that market reforms were still viewed as necessary, and that the final objective was still the establishment of market competition in the wholesale, retail, and auxiliary segments. Both interviewees stated that a core reason why reforms had not progressed as intended was that the State Grid Corporation was very powerful and refused to be split up. The NEA interviewee emphasised that it was very difficult to progress with new policies against SGCC's interests because even the top levels of government found it hard to

311 Electricity System Reform Working Group (电力体制改革工作小组), "Opinions on carrying out a deepening of electricity system reforms during the 11th Five-Year Plan period" (关于"十一五"深化电力体制改革的实施意见), State Council General Office Document No. 19 [2007], 06.04.2007, Section 1, Part 2.
312 "Special Report: China's other power struggle," Reuters, 16.10.2012.

persuade the grid company to change its behaviour and it was equally difficult to seize its existing power and authority. As "national priorities were hijacked by commercial priorities", he noted, striking a functional balance of interests had become more and more difficult which formed an "obstacle to the implementation of policies which most people think are the right ones".[313]

While sectoral policy preferences within central government remained stable over time, there were also a number of instances in which central government bodies granted their support to grid company investment attempts that violated existing unbundling requirements. Notable examples were the NDRC's and SASAC's approvals of the grid company's continued presence in the electricity generation segment via the ownership of the Xinyuan Holding, the state asset administrator's support for a reintegration of China's grid assets via SGCC's attempted reacquisition of the China Southern Grid Corporation, and SASAC's and the NDRC Foreign Investment Department's approval of the grid company's purchase of highly market relevant grid equipment manufacturers. All of these instances of government support were preceded by targeted venue-shopping during which the grid company presented its acquisition plans as furthering the specialised agencies' non-sector-specific mandates, most importantly SASAC's mandate to enhance the value of state assets and to further the international competitiveness of state firms. There was little evidence to suggest that SASAC opposed sectoral marketisation or that it consciously aimed to assist SGCC to re-integrate and re-monopolise the electricity industry. Rather, SGCC intentionally played on SASAC's cross-sectorally applicable institutional mandate and successfully persuaded the state asset administrator to grant support to projects presented as supporting SASAC's mandates but primarily designed to circumvent the sectoral marketisation policy that the grid company disagreed with.

While SGCC's own sectoral objectives and the logic of their pursuit as summarised above were comparatively unambiguous, the drivers underlying these objectives remain less clear. Although going beyond the scope of the research question addressed in this thesis, a number of observations were made that may facilitate further research in this regard. One important factor, as discussed in Chapter 2, is the formal incentive structure under which central SOEs such as SGCC operate, especially the guidelines

[313] Interview with an official at the State-owned Assets Supervision and Administration Commission, Beijing, 22.07.2013; Interview with an official at the National Energy Administration, Beijing, 25.07.2013 and 11.07.2014.

according to which SASAC assesses SOE executives' managerial ability and determines both their salary levels and further career prospects: the primary benchmark for all of these is commercial success. It is therefore not inconceivable that SGCC's behaviour was at least partially driven by its top executives' concerns regarding their own career development which may have induced them to counteract sectoral policy that they perceived as threatening to their firm's performance.

Another important factor concerns the more direct private gains which corporate executives may make by opposing monopoly break-up and maximising both market dominance and firm revenue in partially marketised industry segments. The evidence presented demonstrates that SGCC's actions in response to market building involved distinct attempts at illegal privatisation both in the power generation and retail segments, while the eventually established dominance over the grid equipment manufacturing segments allowed the grid company to legally privatise profits via procurement contracts with its own partially stock market-listed manufacturing subsidiaries. However, as these subsidiaries' precise ownership structures are rather opaque, the extent to which grid company executives might have personally profited from these arrangements remains speculative.

A third possible explanatory factor to consider revolves around the grid company's historical legacy, i.e. its successorship to a fully integrated industrial and administrative monopoly which until 1997 had combined both industry operation and administration. Although the corporatisation steps discussed in Chapter 2 formally separated both sets of functions, in many cases administrative ranks and personnel structures survived the structural reorganisation which probably at least partially explains the grid company's tendency to involve itself in administrative matters and to interfere with government decisions while primarily following its own corporate goals.

Concluding remarks

As a result of the political struggle between state industry and central government over the application of the State Council's market building agenda, reform-related structural change in the industry almost came to a standstill during the first half of the 2000s. However, although the grid company's opposition to policy preferences showed its ability to frustrate the implementation of central government's sectoral policy initiatives and prevent the desired outcomes of each unbundling requirement, it failed to achieve

substantial formal changes to those initiatives as it was neither able to fully reverse already taken unbundling steps nor to permanently disperse the pressure to unbundle. Also, while the grid company more or less openly opposed sectoral market building endeavours, it was never in a position to openly attack the principle of marketisation as such. On several occasions SGCC manoeuvred central government into compromises that temporarily enabled the grid company to maintain its controlling position over large parts of the industry, but the basic tenets of the No. 5 Document remained on the State Council's reform agenda.

As for the realm of policy implementation, the results of Part A tentatively call into question perspectives that presuppose active and effective policy guidance by central government over China's strategic industries. Findings from the electricity supply sector suggest that central government needs to be acutely aware of the policy preferences of large central SOEs such as SGCC in order to successfully implement major policy changes, as these firms possess the ability to critically interfere with the implementation of policy that they disagree with. While generally supporting the SOE-centred literature's emphasis on the policy influence of large state firms – particularly the hitherto only tentatively demonstrated observation that SOEs can 'play off' different government bodies against each other as reported, for example, by Xu (2012) or Tsai (2014) – the findings of Part A also show that there are distinct limits to this influence, which these authors tend to overlook. SGCC's opposition led sectoral reforms into a state of general gridlock, but its obstructive behaviour alone was not enough to bring about substantial alterations in the overall reform trajectory.

PART B: Analysis of SGCC's influence on sectoral policy-making

Complementing the analysis of the State Grid Corporation's influence during the implementation of sectoral policy in Part A, Part B of this dissertation (consisting of Chapters 4 to 6) will examine the grid company's influence during phases of sectoral policy formulation and decision-making. It will do so by following the emergence and gradual application of a new sectoral reform agenda which appeared in the mid-2000s when marketisation reforms had lost much of their initial vigour and which, contrary to the 2002 regional market building agenda, aimed at the development of an *integrated non-competitive nationally unified electricity supply system*. Driven entirely by the State Grid Corporation, as will be argued, this new agenda was centred on proposed large-scale infrastructure developments in the form of an ultra-high voltage (UHV) transmission grid. It suggested *technological* solutions to many of the same problems that the market building agenda had aimed to solve through the introduction of regionalised competition (i.e. regarding industrial efficiency, environmental impact, price, service quality etc.), albeit following a reform logic that instead strongly furthered the grid company's sectoral goals of solidifying its cross-regional monopoly over the different grid segments and permanently combining it with sustained market dominance in the nominally competitive and comparatively profitable grid equipment manufacturing segment. A strong empirical focus will be placed on the State Grid Corporation's actions (as observed) and intent (whenever it was clearly stated or possible to infer with reasonable confidence) during processes that were crucial to this new agenda's development and application. In order to avoid confirmation bias and spurious conclusions, congruence tests were applied by repeatedly inquiring about the presence or absence of government leadership or support underlying these development steps.

Chapter 4 will examine the logic inherent to the new sectoral agenda as well as its relationship to existing sectoral policy. Chapters 5 and 6 will subsequently trace a series of specific implementation attempts and related political conflicts in order to understand both the drivers behind this agenda and the dynamics of government-state firm interplay accompanying it. Chapter 5, more specifically, will demonstrate how

SGCC gained government approval for crucial groundwork related to its contentious sectoral restructuring agenda by presenting it as a contribution to cross-sectoral policy on 'indigenous innovation' and industrial competitiveness championed by the State Council. This 'synchronisation' tactic, i.e. argumentatively matching the portrayal of pursued sectoral policy and corporate development plans with more abstract policy objectives pursued by central government, will be presented as an important mechanism via which SGCC, as a central SOE, has been able to influence sectoral policy according to its own preferences.

Chapter 6 will then trace a number of UHV-related project evaluation procedures in which the grid company, based on sector-specific lines of argument and via engagement with the relevant sectoral authorities, attempted to achieve a broader practical application of its restructuring plan. It will be shown that, in a setting in which the previous 'synchronisation' with cross-sectoral policy no longer applied, the grid company now encountered substantial resistance from sectoral authorities to the same types of projects that had previously been looked upon favourably by the State Council based on 'synchronised' reasoning. In conclusion, it will be suggested that the presence or absence of 'synchronisation' with stated central government macro-goals in SGCC's portrayal of its sectoral restructuring plan was an important determinant of the level of success of the grid company's practical implementation attempts. It will be argued that SGCC applied this 'synchronisation' strategy deliberately in order to play off different levels of policy against each other, circumvent critical sectoral reform debates and by-pass sectoral policy requirements by gathering support based on different policy pretexts.

4 The emergence of a new sectoral reform agenda – SGCC's ultra-high voltage (UHV) grid development plan as an attempted reversal of regionalised electricity marketisation

4.1 Introduction

As marketisation reforms came almost to a standstill by the mid-2000s, the State Grid Corporation responded to the emerging political void in the sectoral policy sphere by gradually introducing its own plans for sectoral development in an attempt to proactively shape the policy environment it operated in. Building on the State Council's regionalised marketisation and unbundling endeavours, the grid company devised a reform agenda that suggested technological and infrastructure-based solutions to very similar issues that the No. 5 Document had targeted through the introduction of market incentives. These included increases in industrial efficiency and service quality, as well as decreases in economic and environmental costs. However, whereas the State Council's reform plan had been built around asset break-up and regionalised competition, SGCC's proposal contrarily aimed at the creation of an *integrated non-competitive nationally unified electricity supply system*, emphasising sectoral and regional integration while largely negating the necessity of enhancing levels of competition in order to arrive at the stated reform goals.

At the centre of SGCC's sectoral restructuring ideas, which will be introduced in this chapter, stood the proposed nationwide construction of an ultra-high voltage (UHV) electricity transmission infrastructure in the form of a grid 'superstructure' that was to synchronise provincial and regional grids in the most industrialised and developed parts of China into a single cross-regional synchronous grid operated centrally by SGCC itself. After explaining the functional logic of this restructuring plan, the basic economic, environmental and grid security-related arguments used to advocate it in political debates will be presented. In a further step, SGCC's early attempts to introduce its UHV-based reform plan into the policy arena will be traced, followed by an overview of critical counter-perspectives expressed by industry experts who contradicted the grid company's claims regarding the alleged benefits of UHV construction for China's

electricity supply system.[314] The voicing of opposition, it will be shown, led to immediate retaliation by the grid company which tried to keep these experts' opinions out of official deliberations. The chapter concludes with a brief discussion of the inferences that the nature of SGCC's reform plan and the pursuit of its practical application allow for our understanding of the grid company's engagement with central government over sectoral policy matters.

4.2 SGCC's '1 Ultra, 4 Large' plan and the 'Three China' Grid

SGCC's UHV-based strategy for a "transformation of China's energy mode"[315] has been commonly referred to as the '1 Ultra, 4 Large' (1U4L; 一特四大) plan as it combined the proposed construction of a nationally integrated ultra-high voltage electricity grid (the "1 Ultra") with the envisioned establishment of a number of large regional bases focusing on coal, hydro, nuclear or renewable based electricity generation (the "4 Large"). The core idea of 1U4L was to concentrate China's generation capacity in the country's periphery, far away from the overpopulated and increasingly polluted load centres in central and eastern China, and to create regional power generation hubs according to the naturally determined spread of resource endowments. The electricity generated in these hubs was then to be transmitted to China's demand centres via ultra-high voltage electricity transmission lines, which were argued to be necessary for transferring very high loads over such long distances.[316]

According to SGCC's plan, coal-fired power generation, which supplies the large majority of China's electricity demand (63% in 2013),[317] was to be clustered in the north and west of the country where coal resources abound, thereby alleviating the necessity

[314] It should be noted that it is not the aim of this or the following chapters to judge the relative suitability of the different reform approaches for addressing China's broader energy challenges.
[315] "State Grid: '2012 China Energy Man of the Year' Liu Zhenya Speaks at the Award Ceremony & China Electric Power and Energy Symposium," Hong Kong Government News, 17.05.2012.
[316] "Liu Zhenya: UHV transmission is the only way for China's electricity development" (刘振亚：特高压输电是中国电力发展的必由之路), People's Daily Online (人民网), 28.11.2006. Other relevant publications by Liu Zhenya on the topic of UHV include: Liu Zhenya (刘振亚), *The Ultra-high voltage electricity grid (*特高压电网*)*, (Beijing: China Electric Power Publishing House, 2005); Liu Zhenya, ed., *Q&A regarding knowledge on ultra-high voltage transmission (*特高压输电知识问答*)*, (Beijing: China Electric Power Publishing House, 2006); Liu Zhenya, ed., *A collection of research results on UHV-AC transmission technology (*特高压交流输电技术研究成果专辑*)*, (Beijing: China Electric Power Publishing House, 2009).
[317] The data on China's installed electricity capacity in this paragraph was taken from U.S. Energy Information Administration, "China. International energy data and analysis," 14.05.2015, p. 29.

of physically transporting coal across China to power plants located in the vicinity of load centres.[318] SGCC furthermore advocated the large-scale expansion of hydropower generation in China's water-rich south-west (currently the second most important power source, supplying 22% of China's electricity demand), as well as the development of nuclear power bases (1%) along the eastern coastline which lacked the resources of other areas.[319] The generation of electricity from renewable energy sources (wind, solar and biomass, excluding hydropower) currently at 8% was also to be expanded and concentrated in large wind power bases in the plains of northern China and coastal regions, while solar power bases were suggested to be built in the Gobi desert and in more central/northern provinces such as Inner Mongolia and Shanxi.[320] By transmitting the electricity produced along the periphery to the main centres of power demand a centrally coordinated pattern of large-scale electricity flows from north to south and from west to east China was to emerge (see Figure 4.1 and Figure 4.2).[321]

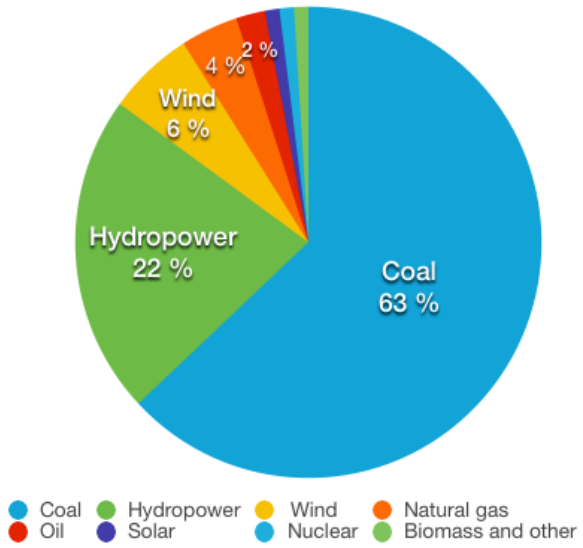

Figure 4.1 China's installed electricity capacity share by fuel (late 2013)
Source: U.S. Energy Information Administration, "China. International energy data and analysis," 14.05.2015, p. 29.

[318] Liu, 2013, p. 67.
[319] Ibid., pp. 67, 105.
[320] Ibid., pp. 110, 115.
[321] Ibid., pp. 166, 169.

Figure 4.2 Map of China's future electricity flows as envisioned by SGCC
Source: Liu, 2013, p. 166.

Both Liu Zhenya and Shu Yinbiao, SGCC's vice president at the time, argued that new ultra-high voltage transmission infrastructure needed to be built to fulfil this task as the existing grids were not capable of handling this kind of large-scale electricity transfer.[322] More precisely, Liu and Shu advocated the application of two separate types of UHV transmission. Due to their technical nature, direct current 800kV UHV (UHV-DC; 直流特高压) transmission lines were to be used to supply electricity at high capacity over thousands of kilometres into China's regional grid networks in the receiving areas without, however, being synchronous parts of those networks.[323] Citing grid security necessities, SGCC asserted that in order to safely receive electricity at such high capacity and then disperse it across larger areas to load centres in the east and centre of the country an alternating current 1000kV UHV (UHV-AC; 交流特高压) transmission grid needed to be constructed, which unlike the UHV-DC lines feeding into it was to be characterised by flexible grid access and would accommodate flexible consumption

[322] "China to launch experimental project of UHV grids," Xinhua News Agency, 19.06.2006; "Liu Zhenya: UHV transmission is the only way for China's electricity development" (刘振亚：特高压输电是中国电力发展的必由之路), People's Daily Online (人民网), 28.11.2006.
[323] Lantau Group, "China's UHV Highway Revisited," China Focus Newsletter (April 2013), p. 4; Liu Zhenya, 2013, pp. 169, 178.

patterns.[324] According to SGCC's plan, three of the receiving hitherto independent regional grids, namely the Central China (华中), East China (华东) and North China Grids (华北; together referred to as 三华 or the "Three China" grid) which extend across the most industrialised and economically most important areas under SGCC operation, were to be unified into one huge synchronous grid by constructing a 1000kV UHV-AC network as a superstructure on top of the existing high-voltage grid infrastructure (see Figure 4.3 and Figure 4.4).[325]

Figure 4.3 The "Three China" synchronous UHV-AC grid region envisioned by SGCC
Source: Author's visualisation of material presented in this section.

In this scheme, UHV-AC was envisioned as the main grid framework which would be supplied with electricity from distant power generation bases via UHV-DC lines, including the possibility of eventually initiating large-scale electricity imports from neighbouring countries.[326]

[324] Ibid.
[325] Liu, 2013, p. 169.
[326] Ibid., p. 178.

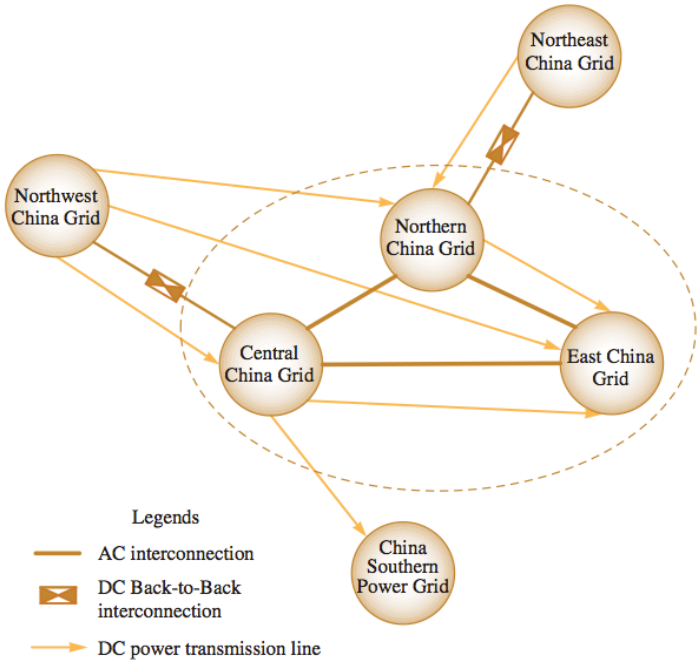

Figure 4.4 UHV-AC interconnection and UHV-DC transmission among China's regional grids as planned by SGCC
Source: Liu, 2013, p. 169.

Furthermore, SGCC argued that both UHV-AC and UHV-DC were inseparable and indispensable to creating a "structurally and functionally sound and intelligent platform for energy allocation".[327] After first emphasising via its 'Strong UHV-AC, strong UHV-DC' (强交强直) slogan that both types of UHV technology needed to be developed simultaneously, SGCC began to argumentatively tie them together even more aggressively by arguing that without UHV-AC, UHV-DC could not be constructed at all (不交不直).[328] In this way, all core aspects of the 1U4L initiative were argumentatively fused together by creating the idea of an unquestionable conceptual and technological interdependence. SGCC claimed to be able to vastly improve China's energy allocation system by means of these new technological capabilities, but only if central government agreed to completely overhaul the structure of the electricity industry in favour of a centralisation of grid infrastructure as laid out by the grid company. This was

[327] Ibid., p. 66.
[328] "Liu Zhenya Gives Mid-Year Working Report: SGCC Focuses on Eight Aspects in Second Half Year" (SGCC press release), China Business News, 25.07.2011; "'State Grid Empire' 'cut apart': How four large regional grid companies became hollow shells overnight" ("国网帝国" "削藩": 四大区域电网公司一夜间成为空壳公司), Sina Blog, 14.05.2011, http://blog.sina.com.cn/s/blog_667242870100qus0.html, accessed 03/2016.

summarised by an SGCC employee during an interview: "If you have UHV you have a connected grid; and under these circumstances you need united SGCC management."[329]

4.3 Introduction to SGCC's pro-UHV arguments

SGCC promoted its UHV strategy along several lines of reasoning, asserting that it could "effectively resolve the Chinese energy sector's glaring problems in terms of supply security, utilisation efficiency, resource allocation, environmental constraints and technological innovation".[330] As such, SGCC's argumentative presentation of its restructuring plan showed considerable overlap with the goals that had also been pursued via the State Council's No. 5 Document, such as a more efficient resource allocation at lower economic and environmental costs. SGCC's approach, however, emphasised an entirely different route to arrive at those goals, one that involved centralisation instead of regionalisation and integration across industry segments instead of asset unbundling.

4.3.1 Economic and environmental arguments

Economic arguments made by SGCC in favour of its UHV plan concerned both the methods and costs of resource allocation in the electricity industry given the uneven regional distribution of energy resources and electricity demand in China. In order to bridge the existing mismatch, China's electricity supply system has for a long time relied on large-scale coal transports via railway from coal-mining areas to power plants within the reach of the regional grids in the centre and east of the country. SGCC pointed out that an 'over-reliance' on coal transports had intensified China's struggle to meet the constantly rising demand for electricity.[331] The company's chairman, Liu Zhenya, argued that coal transport accounted for half of China's domestic cargo transports and that railway bottlenecks repeatedly caused coal supply shortfalls in inland power plants, ultimately causing or further intensifying power supply shortages in parts of the country. Inter-relatedly, Liu stated that the long-distance transmission capacity under China's

[329] Interview with a smart grid researcher at the State Grid Energy Research Institute, Beijing, 08.11.2012.
[330] Liu Zhenya, 2013, p. 66.
[331] "State Grid outlines plans," Power in Asia, 07.12.2006.

current grid structure was insufficient to meet current demand and therefore unable to ease the pressure placed on the electricity supply industry through its reliance on long-distance coal transports. Increasing the scope of long-distance electricity allocation via UHV transmission was consequently presented as the most promising way to counter this "structural irrationality of energy transportation."[332]

A second set of economic arguments employed by SGCC centred on the claim that UHV transmission would ease cost pressure on thermal coal and subsequently on electricity retail prices; according to SGCC figures roughly 50% of the cost of thermal coal used in power generation in East China was attributable to transport costs.[333] Similarly, 1000kV UHV-AC lines were argued to possess a much more favourable cost structure than conventional 500kV high-voltage lines and to require only three-quarters of the investment costs, while their transmission capacity was claimed to be four to five times higher.[334] Lu Yanchang, the director-general of the SGCC-affiliated Chinese Society for Electrical Engineering,[335] further argued that UHV-AC lines were able to cover three times the distance while incurring only 25 to 40% of the electricity losses usually associated with 500kV lines and required 60% less land.[336] Liu Xinfang (刘心放) of SGCC's External Affairs Division even considered a 75% decrease in transmission losses as compared to 500kV lines possible.[337] With regard to electricity price developments, SGCC argued that "UHV will not only not lead to higher electricity consumer prices, it is on the contrary beneficial for lowering electricity prices", as transmitting thermal and hydro power from the periphery to the centre and the east would be even cheaper than the local on-grid prices for thermal power in load centres.[338] The investment sums required for UHV development, as explained by

[332] Liu, 2013, pp. 36, 50, 58, 67.
[333] Liu, 2013, p. 141; Interview with a senior engineer/top-level advisor, State Grid Energy Research Institute, Beijing, 08.11.2012; "China moves ahead with economical ultra-high voltage transmission lines," Xinhua News Agency China Economic Information Service, 09.02.2009.
[334] "Liu Zhenya: UHV transmission is the only way for China's electricity development" (刘振亚：特高压输电是中国电力发展的必由之路), People's Daily Online (人民网), 28.11.2006; Liu Zhenya, 2013, p. 140.
[335] "China moves ahead with economical ultra-high voltage transmission lines," Xinhua News Agency China Economic Information Service, 09.02.2009; CSEE website: http://www.csee.net.cn/home.aspx?PageId=7f4c9667-74da-430b-89e8-e04e01feed27 (03.04.2014).
[336] Ibid.
[337] "SGCC's 600 billion Yuan UHV project referred to as strengthening monopoly" (国家电网 6 千亿元特高压项目被指巩固垄断), Nanfang Web (南方报网), 07.07.2009.
[338] "SGCC: The UHV-AC network can maintain nuclear safety in the East China grid" (国家电网：特高压交流电网可保华东核电安全), People's Daily Online, 14.05.2013.

SGCC's vice-chairman Shu Yinbiao, would originate from state bank loans and bond sales, as well as the grid company's own capital.[339]

Finally, from an environmental standpoint, SGCC emphasised 1U4L's potential benefits regarding pollution control. Beginning around 2006, Liu Zhenya asserted that by following the 1U4L plan, clean energy from the periphery could be supplied to eastern China and the pollution associated with long-distance coal transport could be reduced. Furthermore, by locally concentrating power generation, the pollution emitted from power plants (thermal, in particular) could be moved out of urban centres in densely populated parts of the country and curbed overall through a more concentrated management.[340]

In an attempt to increase the grid company's argumentative leverage and gain additional political legitimacy, Liu Zhenya furthermore argued that the expansion of in situ power generation would have the positive economic side effect of "boosting the economic and social development in the western region" and helping to implement China's Western Development Programme,[341] a regional development agenda headed by the State Council that aimed to narrow the wealth gap between China's less developed western provinces and the more developed coastal provinces.[342]

4.3.2 Safety/security arguments

A second type of argument used by SGCC portrayed UHV transmission as an opportunity for grid safety improvements or, alternatively, in terms of a threat to supply security in case of non-approval by central government. As part of an early outline of the company's UHV plans, in November 2006 Liu Zhenya stated that, due to a lack of long-term investment in previous years grid development had not reached the level required to match increases in electricity demand at the time. This, he insisted, had brought about a "very weak grid structure", making the "risk of blackouts covering

339 "State Grid to spend RMB 600 bln on UHV power lines by 2020," China Knowledge Press, 25.05.2009.
340 "Liu Zhenya: UHV transmission is the only way for China's electricity development" (刘振亚：特高压输电是中国电力发展的必由之路), People's Daily Online (人民网), 28.11.2006.
341 Liu Zhenya, 2013, pp. 82, 154; "Liu Zhenya: UHV transmission is the only way for China's electricity development" (刘振亚：特高压输电是中国电力发展的必由之路), People's Daily Online (人民网), 28.11.2006.
342 State Council, "Circular of the State Council Concerning Several Policies on Carrying out the Development of China's Vast Western Regions," Document No. 33 [2000], 26.10.2000.

large areas [...] very real".[343] Furthermore, only a UHV infrastructure would be able to cope with the huge expected increases in installed generation capacity planned until 2020.[344] Resorting to similarly alarmist arguments, in the summer of 2011 SGCC's deputy general manager, Shuai Junqing, warned against looming supply shortages in central and coastal areas and predicted that shortages would grow considerably in the coming years "if planned high-capacity long-distance power transmission lines can't be completed on time". He pointed out that China's north-eastern and north-western regions were likely to produce a power supply surplus which would suffice to almost entirely mitigate shortages in the centre and along the coast, but for this exchange to take place the construction of UHV infrastructure was required.[345] Messages indicating the urgency of swift UHV development were also spread by the general managers of some of SGCC's provincial subsidiaries. Meng Qingqiang (孟庆强), general manager of SGCC's Chongqing Electric Power Company claimed in the national media that speeding up the construction of Chongqing's UHV link was a "necessity for reversing the city's chronic power shortage situation and a guarantee for the sustainable development of Chongqing's power industry".[346] The general manager of SGCC's Shanghai Electric Power Company, Feng Jun (冯军), on the other hand was quoted emphasising the importance of constructing a "stable East China backbone grid structure in order to meet the future development needs of Shanghai's power grid, [...] to strengthen power supply capabilities and to prevent the possibility of large accidents".[347]

Finally, SGCC emphasised UHV technology's declared potential to mitigate the impact of disruptive external factors on China's power supply, particularly due to the supply route diversification inherent in the 1U4L strategy which would "effectively enhance the ability of the energy transport system to withstand the impact of natural disasters, with significant implications for improving the safety and security of electricity supply in the eastern and central regions"[348]. It also pointed out that a higher interconnectedness of

[343] "State Grid outlines plans," Power in Asia, 07.12.2006.
[344] "Liu Zhenya: UHV transmission is the only way for China's electricity development" (刘振亚：特高压输电是中国电力发展的必由之路), People's Daily Online (人民网), 28.11.2006.
[345] "Power play just drama?," South China Morning Post, 14.06.2011.
[346] "General Manager of Chongqing Electric Power Co. proposes to speed up the construction of UHV lines to Chongqing" (重庆电力总经理：建议加快入渝特高压建设), Caijing, 04.03.2014.
[347] "SGCC representative recommends to quickly approve Huainan-Shanghai UHV line" (国网代表：建议尽快核准淮南-上海特高压), Caijing, 04.03.2014.
[348] "SGCC: The UHV-AC network can maintain nuclear safety in the East China grid" (国家电网：特高压交流电网可保华东核电安全), People's Daily Online, 14.05.2013; Liu Zhenya, 2013, p. 152.

the grid would allow regional and local grids to assist each other in times of need and would therefore help to prevent widespread electricity outages.[349]

Employing these different arguments, SGCC attempted to feed its 1U4L agenda into the political arena, as will be discussed in the following section.

4.4 The origin of the UHV agenda and its introduction into the political arena

Research and development efforts in the field of high-voltage technology had been conducted in China since 1986, supported by the seventh, eighth and tenth Five-Year Plans.[350] UHV technology as such was therefore not entirely new and had already been experimented with in other countries in the second half of the 20th century. The idea of a widespread commercial application, however, was unprecedented, as was SGCC's idea of utilising UHV and its technical characteristics to formulate a response to the unbundling requirements of the No. 5 Document. According to Wu Jingru (吴敬儒), an engineer with a background in UHV research who in 2003 participated in early consultations with SGCC about the possibility of UHV development in China, both of these ideas were intimately linked to the figure of Liu Zhenya. While SGCC's CEO at the time, Zhao Xizheng (赵希正), displayed a fairly neutral attitude towards UHV, Liu as second-in-command showed a very strong interest in the technology and ordered the drafting of a plan for a nationally unified UHV-AC grid as soon as he assumed the position of SGCC's CEO in 2004.[351]

In late 2004 then, UHV in its modern configuration for the first time officially appeared in the field of vision of national policy makers when Liu Zhenya suggested to NDRC leaders during a field visit that UHV transmission would be the best way to solve bottlenecks in China's power supply. The director of the NDRC at the time, Ma Kai (马凯), was quoted in news reports as stating that the technology "should be researched

[349] "Four questions regarding UHV: Safety and economic feasibility are still being called into doubt" (四问特高压：安全性与经济性仍遭质疑), People's Daily Online (人民网), 29.04.2014.
[350] "High-Voltage Grids May Revive Power Monopoly," Caijing, 19.09.2005.
[351] "Many old experts oppose the "Three China Interconnected Grid" UHV-AC plan" (多位老专家反对交流特高压"三华联网"规划), Century Weekly (新世纪), 25.04.2011.

and considered within the electricity plan".[352] Subsequently, during a November 2004 SGCC Party Leadership Group meeting Liu Zhenya demanded that national-level grid planning research and construction should be "actively carried forward".[353] The following month SGCC made its first public suggestions to interconnect and synchronise the North and Central China regional grids to speed up a country-wide interconnection of regional grids through UHV-AC and UHV-DC technology, a concept that would soon after also include the East China grid to complete SGCC's vision of a synchronous "Three China" UHV-AC grid. Around the same time, SGCC established an internal UHV Electricity Grid Construction Leading Group (特高压电网工程领导小组) and reported to Vice-Prime Minister Huang Ju (黄菊) the "necessity, urgency and feasibility" of building a UHV grid.[354] In January and February 2005, SGCC then supplied the main supervisory bodies NDRC, SERC and SASAC with its first internally conducted "Technical and economic feasibility study on UHV power transmission", in which it concluded that due to the country's vastness, fast economic development and rapidly rising electricity demand, China needed to regroup its electricity supply structure around UHV-AC technology by following the principles of "sending electricity from West to East, interconnecting supply in the North and the South, and establishing a nationwide integrated grid" (西电东送、南北互供、全国联网).[355]

This series of events demonstrates that the idea of forming a nationally unified electricity grid by connecting regional grids through UHV technology originated within SGCC, and that the grid company sought government approval for early stage research work on UHV technology with the intention of applying it in such a way so as to permanently bind together and synchronise China's most important regional grids. In its pursuit of approvals for further UHV development work, SGCC received the support of Vice-Prime Minister Zeng Peiyan (曾培炎), who prior to joining the State Council (2003-2008) had acted as the deputy director of the construction committee (1998-2000) overseeing the famous 'Three Gorges' project, the previous mega-construction project in China's electricity industry.[356] On various occasions from March 2005

[352] "UHV: A historical choice - A record of events surrounding the development of China's UHV electricity grid" (特高压：历史的抉择--我国发展特高压电网纪实), People's Daily Online (人民网), 16.01.2007.
[353] "Record of major events surrounding UHV (2004-2007) (特高压大事记盘点(2004 年-2007 年)), North Star Electric Power News Network (北极星电力新闻网), 26.02.2009.
[354] Ibid.
[355] Ibid.
[356] China Vitae, Biography of Zeng Peiyan, http://www.chinavitae.com/biography/Zeng_Peiyan|317, accessed 07/2015.

onwards, Zeng recommended the launch of UHV pilot projects as soon as possible[357] in order to "actively explore" UHV transmission technology and it is evident that he has assisted SGCC in introducing its grid development agenda into the central-level policy arena.[358] Supportive statements regarding the construction of pilot projects were also made by Vice-Prime Minister Huang Ju.[359]

SGCC's efforts were rewarded by the eventual granting of approval for further research work by the NDRC, the primary approval body for large state investment projects. However, while SGCC from the very beginning pushed for the eventual nationwide construction of UHV infrastructure, official government support for SGCC's plans was exclusively limited to encouraging technological development and did not include any mention of a wider application of UHV technology within China's grid system.[360] This difference in outlook is supported by a subtle but important semantic issue in communications between SGCC and the State Council which first appeared in 2005 and gave insight into the dynamic of both sides' approach to UHV development. While State Council documents officially referred to the SGCC's planned pilot projects as "test projects" (试验工程), which in government terms means open-ended experiments, the grid company consistently used the term "demonstration projects" (示范工程) which is used for undertakings which have already been designated for an extended and continuous application. As both sides insisted on their respective labels, a compromise emerged whereby the term "test demonstration project" (试验示范工程) was agreed.[361] This little quarrel over the exact nomenclature of the pilot project made it very clear that SGCC pushed for a swift and far-reaching application of the technology while the State Council at the time viewed it as nothing more than a technological experiment.

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357 "High-Voltage Grids May Revive Power Monopoly," Caijing, 19.09.2005.
358 "Record of major events surrounding UHV (2004-2007)" (特高压大事记盘点(2004 年-2007 年)), North Star Electric Power News Network (北极星电力新闻网), 26.02.2009; "High-Voltage Grids May Revive Power Monopoly," Caijing, 19.09.2005; Liu Zhenya, 2013, p. 171.
359 "Record of major events surrounding UHV (2004-2007)" (特高压大事记盘点(2004 年-2007 年)), North Star Electric Power News Network (北极星电力新闻网), 26.02.2009.
360 National Development and Reform Commission, "Notification on early stage research work regarding the development of 1000kV AC and 800kV DC power transmission technology" (关于开展百万伏级交流、±80 万伏级直流输电技术前期研究工作的通知), Document No. 282 [2005].
361 "China's UHV transmission project called into question - 23 old experts present an opposing petition" (我国特高压输电工程遭质疑 23 名老专家上书反对), Century Weekly (新世纪), 25.04.2011; "Jolts, Volts and High Wire Acts," Caixin, 27.04.2011.

4.5 The emergence of opposition against the 1U4L strategy among industry experts and former officials

In May 2005, SGCC began drawing up plans for the construction of a UHV-AC pilot project.[362] As the plans for this project were made public, opposition to SGCC's grid development strategy began to form. Contrary to the grid company's own position, a number of outspoken current and former government officials and industry experts characterised UHV technology as highly uneconomical and a significant threat to grid stability. Importantly, given the structural nature of the 1U4L strategy, they considered the development of UHV infrastructure and particularly the planned synchronous inter-regional UHV-AC grid to be a major political challenge by which SGCC aimed to strengthen its centralised control at the expense of regional grids and regional electricity markets. The following paragraphs will briefly discuss these economic, technological and political counter arguments in order to shed light on the ways in which both SGCC and its opponents attempted to establish a dominant position in political debate.

4.5.1 Political/structural counter-arguments against UHV

Responding to the centralised outlook on industry management, the planned synchronisation of regional grids and the strengthened integration across all grid levels inherent to SGCC's 1U4L plan, a number of industry experts proclaimed that SGCC's main goal was to weaken the foundation of the original marketisation plan contained in the No. 5 Document. One of the first figures in public discourse to emphasise this point was Yang Mingzhou (杨名舟), an official at the State Electricity Regulatory Commission. Yang warned that the application of UHV technology as envisaged by SGCC violated the spirit of the No. 5 Document and posed an imminent threat to the structure of China's regional grid networks. While regional market building pilot projects had strongly encouraged electricity transfers between the different provinces within regional grids, he argued, SGCC from the outset focused mainly on increasing power transfers among regional grids themselves so as to increase their mutual reliance on each other instead of fostering their autonomy, UHV being the pinnacle of this endeavour. Yang predicted that if UHV – synchronous UHV-AC in particular – were

362 "China Making Efforts in Ultra-high-voltage Power Transmission," SinoCast China Business News, 02.05.2005; "Record of major events surrounding UHV (2004-2007)" (特高压大事记盘点(2004 年-2007 年)), North Star Electric Power News Network (北极星电力新闻网), 26.02.2009.

granted approval and a nationwide unified grid was to come into existence, the development of independent regional grids as the foundation for the emergence of regionalised retail competition as envisioned by the No. 5 Document would be permanently blocked, both structurally and technologically.[363] A UHV-AC grid, he maintained, would add a "technological protective layer" to SGCC's grid monopoly, largely shifting the task of power transmission to the UHV system while essentially altering the purpose of regional grids from transmission among provinces to a form of intermediary distribution. As such, Yang argued, constructing a UHV-AC superstructure would not only make regional market building impossible but also add an additional layer of complexity to the idea of separating the grid company's transmission and distribution assets, which had been another prominent item on the agenda of the No. 5 Document and an equally threatening prospect for SGCC (see Chapter 3).[364] UHV would therefore strengthen both SGCC's role as a centralised grid operator across grid regions and its "dual monopoly" in purchasing and selling electricity.[365]

SGCC responded to this interpretation of its agenda by stating that UHV construction was simply a matter of much-needed investment in grid infrastructure and had nothing to do with broader electricity reforms.[366] Liu Xinfang (刘心放) of SGCC's External Affairs Division even suggested that by connecting regional grids UHV would actually *promote* the development of regional markets, although he failed to explain how.[367] SGCC employees expressed in interviews that UHV development would weaken regional grid independence but, they argued, the increased interconnectivity ultimately offered greater reliability of supply for those regions.[368]

Unconvinced by SGCC's standpoint, critics insisted throughout the debate that the grid company's goal was to cause regional grid companies to collapse and thus secure a

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363 "Electric power expert petitions State Council - opposes SGCC's UHV construction" (电力专家上书国务院 反对国家电网建设特高压), Shanghai Securities News (上海证券报), 28.11.2006; "SGCC's UHV construction referred to as monopolistic" (国家电网建"特高压"被指垄断), Nanfang Web (南方网), 27.11.2006.

364 "'Electric power activist' bombards SGCC's monopoly" ("电力斗士"炮轰国家电网垄断), Eastday (东方网), 12.11.2006; "Yang Mingzhou: A few major problems with the reform of the electric power industry system" (杨名舟：电力工业体制改革的若干重大问题), Study Times (学习时报), 20.12.2005. [Petition written by Yang Mingzhou (SERC) to the State Council].

365 "High-level dispute about the risks of UHV arises again" (特高压风险高争议再起), People's Daily Online (人民网), 24.02.2014.

366 "Electric power expert petitions State Council - opposes SGCC's UHV construction" (电力专家上书国务院 反对国家电网建设特高压), Shanghai Securities News (上海证券报), 28.11.2006.

367 "SGCC's 600 billion Yuan UHV project referred to as strengthening monopoly" (国家电网 6 千亿元特高压项目被指巩固垄断), Nanfang Web (南方报网), 07.07.2009.

368 Interview with a smart grid researcher at the State Grid Energy Research Institute and an enterprise strategy consultant at the State Grid Energy Research Institute, Beijing, 26.09.2013.

highly concentrated grid management system which would be very difficult to challenge again in the future. Industry experts claimed that "the driving force behind the push to unify China's grid system is not the market, but SGC[C], which appears to be moving to strengthen its distribution monopoly."[369] Meng Dingzhong (蒙定中), a senior engineer at the former Ministry of Electric Power, concluded that SGCC's pursuit of UHV-AC development was part of the grid company's more general plan to exert control over the electric power system and to expand the boundaries of its business. Providing an interpretation of the structural rationale behind UHV, Meng explained that "if the grid is operated regionally in the future, there would be no reason for State Grid to exist. [But] if they connect the whole country and State Grid manages the national grid, then State Grid will always exist. This is a monopoly. It's not about technology, and it's not about science."[370]

4.5.2 Grid security-related counter-arguments

A second criticism made by non-SGCC-affiliated industry experts concerned the issue of grid security under a UHV transmission system. A central figure in expert opposition on these grounds was Meng Dingzhong, the aforementioned senior engineer in the former Ministry of Electric Power and a member of the International Committee on Large Electric Systems (CIGRE) who is considered a leading authority on electricity transmission systems. Contrary to SGCC's position that only a nationally unified grid would allow for a secure operation of China's electricity supply, Meng argued that a UHV-AC based synchronisation of the Central, East and North China regional grids was an unnecessary – and even dangerous – intervention in China's grid structure, as it created the risk that an accident in one regional grid could cause frequency or voltage problems that would immediately spread to all the others which, in the case of SGCC's proposed pyramid-like 'Three China' grid structure, would involve most of the country's centres of power demand. Meng pointed out that the most devastating blackouts across the world in the past decades had almost exclusively occurred in large and regionally interconnected AC-network structures and that China had not witnessed a single such incident in the past thirty years precisely because of its multi-layered and decentralised structure of distinct regional grids. Based on this rationale, Meng

[369] "Disconnect for China's Smart Grid Plans," Caixin, 20.02.2010.
[370] "Industry Experience Stands Up to State Grid," Caixin, 27.04.2011; "Jolts, Volts and High Wire Acts," Caixin, 27.04.2011.

advocated strengthening the existing grid structure by utilising regular high-voltage DC lines for both long-distance transmission and asynchronous interconnections between otherwise autonomous regional grids, as electricity flows between grids were much easier to control in this way.[371]

SGCC's CEO Liu Zhenya tended to respond to grid security-related doubts with further alarmism and by pointing towards underinvestment in China's "weak" grid structure.[372] A slightly different perspective, however, was given by an engineer from one of SGCC's research institutes who did not see China's grid structure at high risk of widespread blackouts, but rather emphasised the necessity of utilising UHV technology in order to enhance *future* grid security.

> Most people think in terms of real-time security, but in 2020 there will be huge demand for long-distance power transfers and the current grid will not be able to support this. UHV is a strategic choice in the light of future demand. The price for this is short-term insecurity. Currently the network is very secure and there are no big power outages, but if you want to build a UHV system [to meet future demand], it is inevitable that you will have to disturb the current structure and to temporarily introduce higher risk. It is a choice that needs to be made: do we want long-term security through UHV in spite of temporary insecurity, or do we want no temporary disturbances but long-term risks?[373]

4.5.3 Economic counter-arguments

From an economic perspective, critics of SGCC's UHV agenda called into question the grid company's assertion that employing UHV transmission technology was a more efficient and less costly mode of energy transportation compared to further developing China's existing 500kV high-voltage grid structure and/or expanding long-distance transport of thermal coal. Contrary to SGCC's claims, industry experts and former officials argued that 1000kV UHV-AC transmission was, in fact, much less economical than conventional transmission systems.[374] SERC's Yang Mingzhou, for instance, pointed out in his 2005 petition to the State Council that in 2004 only about 5% of

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371 "Meng Dingzhong: DC power transmission can meet all requirements" (蒙定中：直流输电完全可以满足要求), Daily Economic News (每日经济新闻), 20.05.2014; "Industry Experience Stands Up to State Grid," Caixin, 27.04.2011.

372 "Liu Zhenya: UHV transmission is the only way for China's electricity development" (刘振亚：特高压输电是中国电力发展的必由之路), People's Daily Online (人民网), 28.11.2006.

373 Interview with a smart grid researcher at the State Grid Energy Research Institute, Beijing, 08.11.2012.

374 "SGCC's UHV construction referred to as monopolistic" (国家电网建"特高压"被指垄断), Nanfang Web (南方网), 27.11.2006.

nationally generated electricity was actually transferred across regional boundaries. Although the existing 500kV grids were in need of further investment he considered the conventional technology capable of sustaining the expected increases in regional transfers while referring to UHV infrastructure with its much higher investment necessities – which were to be funded to a large extent via state bank loans[375] – as a huge waste of state funds.[376] The critics furthermore warned that higher transmission costs under UHV in conjunction with SGCC's "dual monopoly" in transmission and distribution would lead to a substantial increase in retail prices that would be very difficult to monitor and regulate.[377]

Regarding the question of resource allocation methods, it was argued that an expansion of China's railway system and of the existing 500kV grid would fully suffice to meet the demands in load centres located in southern and eastern provinces.[378] Meng Dingzhong, a former official in the Ministry of Electric Power, and Wu Jingrui, former head of the planning department in the Ministry of Water Resources and former vice president of the Chinese State Energy Investment Corporation, both asserted that long-distance electricity transmission via UHV might end up costing three times as much as further developing the conventional rail-based system of transporting coal to power plants located near urban hubs.[379] Finally, critics argued that international comparison also spoke against progressing with UHV technology. While China was the first country to consider UHV-AC transmission for commercial operation, during the second half of the 20th century other countries such as the former Soviet Union, Japan, Italy and the United States had already experimented with and subsequently abandoned the technology in favour of regular long-distance high-voltage DC transmission due to cost and safety considerations.[380]

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375 "State Grid to spend RMB 600 bln on UHV power lines by 2020," China Knowledge Press, 25.05.2009; Interview with an employee from the Enterprise Strategy Research Institute, State Grid Energy Research Institute, Beijing, 11.07.2014.

376 "Yang Mingzhou: A few major problems with the reform of the electric power industry system" (杨名舟：电力工业体制改革的若干重大问题), Study Times (学习时报), 20.12.2005. [Petition written by Yang Mingzhou (SERC) to the State Council].

377 "Four questions regarding UHV: Safety and economic feasibility are still being called into doubt" (四问特高压：安全性与经济性仍遭质疑), People's Daily Online (人民网), 29.04.2014.

378 "SGCC's UHV construction referred to as monopolistic" (国家电网建"特高压"被指垄断), Nanfang Web (南方网), 27.11.2006.

379 "Jolts, Volts and High Wire Acts," Caixin, 27.04.2011.

380 "Industry Experience Stands Up to State Grid," Caixin, 27.04.2011; "Jolts, Volts and High Wire Acts," Caixin, 27.04.2011.

4.5.4 Environmental counter-arguments

While SGCC representatives tended to emphasise the potential environmental advantages of UHV technology with regard to efficiency gains, grid access for clean energy and general pollution control, industry experts voiced their doubts about some of the grid company's assertions. Zeng Dewen (曾德文), a retired deputy director of the Electric Power Planning and Engineering Institute, asserted that the '1 Ultra, 4 Large' strategy was predominantly aimed at realising the '1 Ultra' in form of an interconnected UHV grid, and that the "unscientific and unsafe" idea of creating large energy bases was mainly used as an excuse to achieve just that.[381] The different energy bases, he argued, contributed very little to solving environmental challenges and actually even intensified some of them. SGCC's plan, for instance, to concentrate thermal power generation along the periphery would not solve China's air pollution problem as it would only export the issue to the north-west of the country, meaning that the measure was not in accordance with the state's policies on emissions reductions. Other critics, such as Chen Wangxiang (陈望祥), a former consultant to the Electricity System Reform Working Group, pointed to the problem that thermal power generation required tremendous amounts of water and China's north-west was already suffering from drought and desertification.[382] UHV development, he predicted, would cause further drought and environmental dismay in those regions.[383]

Similarly, SGCC's plans to construct large hydropower, nuclear and renewable energy bases were heavily criticised. Ding Gongyang, former head of the planning division at the Electric Power Planning & Engineering Institute (EPPEI), one of China's most important assessment institutions of grid construction, stated that hydropower resources in the south-west were, in fact, limited and connecting those provinces to a 'Three China' UHV-AC grid would lead to severe electricity shortages in the region.[384] Zeng Dewen further criticised SGCC's focus on developing "priority areas for nuclear construction along the coast, while cautiously studying the prospects of inland nuclear

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381 "High-Voltage Grids May Revive Power Monopoly," Caijing, 19.09.2005; "SGCC's UHV construction referred to as monopolistic" (国家电网建"特高压"被指垄断), Nanfang Web (南方网), 27.11.2006.
382 Ibid.
383 Data is from 2005, water shortages may be more severe by now. See "High-Voltage Grids May Revive Power Monopoly," Caijing, 19.09.2005.
384 Ding Gongyang (丁功杨), "Constructing the Ya'an-Wuhan 1000kV AC transmission project is absolutely unnecessary - Communication materials regarding a series of questions concerning the construction of the Ya'an-Wuhan UHV transmission project (Part 5)" (建设雅安至武汉的 1000 千伏交流输电工程完全是没有必要的--关于雅安~武汉交流特高压输电工程建设问题系列交流材料(五)), Article published on Zeng Dewen's industry blog, *Caixin Net*, 22.08.2014.

construction", as he argued that if SGCC shifted its priority towards developing nuclear projects inland there would be much less need for inter-regional electricity transmission in the first place. Finally, with regard to SGCC's claims that UHV was necessary to connect large renewable energy bases with distant load centres, Zeng pointed out that in most countries renewable energy was developed in a very distributed manner and that the generated electricity was consumed on the spot, which was much more economical, reliable and environmentally friendly than transmitting it over long distances.[385]

4.5.5 Summary

To demonstrate the contentious nature of SGCC's '1U4L' grid development plan, this section introduced the main counter-arguments expressed by a number of prominent industry experts and former government officials. According to these debate participants, UHV development had a number of significant drawbacks, especially regarding its economic feasibility, effect on grid stability and security, and environmental impact. The most heavily criticised issue, however, was that the 1U4L plan was built on the premise of deepening sectoral re-integration, both horizontally across grid regions and vertically across the different layers of grid infrastructure which, according to these experts, would not only undermine the State Council's market building attempts but would also reinforce SGCC's grip over industry workings.

As will be discussed in the following section, these experts' voices remained almost unheard during the early stages of UHV development, as they lacked formal participation in official policy debates and SGCC did everything in its power to keep their views out of official documentation.

[385] Zeng, Dewen (曾德文), "The '1 Ultra, 4 Large' concept from [Liu Zhenya's] book 'Electricity and Energy in China' is based on violations of science, severe waste, huge carbon emissions and it conceals the severe risk of large power outages" (《中国电力与能源》书中的"一特四大"违反科学、严重浪费、碳排突、并为重大停电埋下致命隐患), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 24.07.2012.

4.6 SGCC's silencing of criticism in official political consultations over UHV pilot projects

Although the critical industry experts and retired officials were very vocal in their disapproval of SGCC's 1U4L plan, they were not part of policy-making circles and were therefore confined to expressing their opinions through articles or petitions to government leaders. In late May 2005, Jiang Zhaozu (蒋兆祖), formerly a department head at the NDRC's predecessor, the State Development Planning Commission, as well as a recent advisor to SGCC on UHV matters, wrote a report critical of both the technology and SGCC's construction plans which he addressed to Prime Minister Wen Jiabao, requesting a meeting between grid technology experts and the government in order to "let the leaders understand the true situation". His report argued that SGCC's UHV plan had no foundation in China's energy and electricity planning documents, had not undergone the legally required rigorous assessment by intermediary consulting institutions and that therefore no basis existed for an impartial government decision regarding the construction of the pilot projects which the grid company was pushing for.[386]

In response to Jiang's petition, the prime minister asked the NDRC to organise a discussion forum, which was held in June 2005 in the coastal town of Beidaihe. While the forum mainly consisted of SGCC presentations of its own positive evidence regarding UHV-AC's feasibility,[387] it also gave participants the opportunity to voice their opinions of the planned construction of a UHV-AC pilot project which was to connect the North and Central China regional grids. According to Jiang, there was a clear division of opinions between SGCC-affiliated supporters who fully endorsed the grid company's arguments, a moderate group (members remained unspecified) who supported the construction of a pilot project on a much smaller scale to control expenses, and opponents, including the group of critical former officials and industry experts, who argued that building a UHV-AC network was wildly uneconomical and involved severe security threats.[388]

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386 "Many old experts oppose the "Three China Interconnected Grid" UHV-AC plan" (多位老专家反对交流特高压"三华联网"规划), Century Weekly (新世纪), 25.04.2011.
387 "UHV: A historical choice - A record of events surrounding the development of China's UHV electricity grid" (特高压：历史的抉择--我国发展特高压电网纪实), People's Daily Online (人民网), 16.01.2007.
388 "China's UHV transmission project called into question - 23 old experts present an opposing petition" (我国特高压输电工程遭质疑 23 名老专家上书反对), Century Weekly (新世纪), 25.04.2011; "Jolts, Volts and High Wire Acts," Caixin, 27.04.2011.

During and after the forum, SGCC made several attempts to silence any criticism of its UHV agenda. One speaker, grid technology expert Meng Dingzhong, reported in a news interview that he had been approached by one of SGCC's vice general managers who had offered him a consultancy position at SGCC declaring that "the most urgent issue for us to solve at the moment is the nationwide UHV-AC network; it would be best if you supported this cause and no longer opposed it." Meng stated that he rejected the offer and continued to deliver his planned critical speech which, he claimed, led to his repeated exclusion from later symposia due to SGCC's intervention. Other opposing voices also found themselves gradually marginalised and pushed out of conferences and meetings related to UHV feasibility demonstrations.[389]

The grid company's attempts to silence critics also included interference with the discussion forum's follow-up reports. The minutes in which the differences of opinion among participants were documented never reached their intended recipients at the State Council, and a feasibility report that SGCC submitted to the NDRC in September 2005 as a basis for approval considerations regarding the UHV-AC pilot project only listed fully supportive opinions while excluding all others.[390] Emphasising the consistency with which SGCC tried to block the dissemination of critical information, Jiang Zhaozu described how he personally, with the support of Prime Minister Wen Jiabao, had held seminars on questions surrounding UHV-AC technology and how the subsequent reports to the central government were also either obstructed or altered by SGCC. Jiang furthermore asserted that the grid company had banned all critical debate on the UHV plan within its own company realm while pressuring industry publications (such as the *China Power News Network* (中国电力新闻网) which had a long pre-reform affiliation with SGCC's organisational predecessor) to report in a supportive fashion.[391]

The different episodes surrounding the 2005 Beidaihe forum showed that SGCC did everything within its power to prevent critical opinions and information from being recorded in official documentation and considered during approval procedures. This further demonstrates that SGCC itself was the main driver of the 1U4L agenda and that it was intent on swiftly gaining construction approvals, irrespective of increasingly critical opinions among external industry experts and former government officials with

[389] "Many old experts oppose the "Three China Interconnected Grid" UHV-AC plan" (多位老专家反对交流特高压"三华联网"规划), Century Weekly (新世纪), 25.04.2011.
[390] Ibid.
[391] "Industry Experience Stands Up to State Grid," Caixin, 27.04.2011; "Many old experts oppose the "Three China Interconnected Grid" UHV-AC plan" (多位老专家反对交流特高压"三华联网"规划), Century Weekly (新世纪), 25.04.2011.

a background in electricity sector administration and irrespective of warnings regarding the systemic risk to China's electricity supply system associated with the restructuring plan.

4.7 Chapter conclusions

This chapter discussed the emergence in the mid-2000s of a grand restructuring plan for China's electricity industry as suggested by the State Grid Corporation in response to the State Council's marketisation and unbundling agenda. Referred to as the '1 Ultra, 4 Large' (1U4L) strategy, SGCC's reform plan aimed for the construction of a nation-wide ultra-high voltage (UHV) transmission grid, an infrastructural mega-project that was to alter the functional logic of China's electricity supply by connecting large regional power generation hubs with load centres across the country and synchronising large parts of the country's grid structure.

The pursuit of the 1U4L agenda marked a distinct change in SGCC's political strategy, which initially had been almost entirely based on defensive measures against the implementation of unbundling requirements listed in the No. 5 Document. Beginning in the mid-2000s, the grid company's political strategy became more forward-looking as it attempted to shift the immediate focus of sectoral reform debates away from the politically charged topic of monopoly break-up while pulling the larger outcome-related issues which had also driven the introduction of the No. 5 Document back into the centre of attention, i.e. supporting the growth and development of the power sector, increasing supply security and reliability while satisfying growing power demand and enhancing the efficiency of resource allocation while lowering economic and environmental costs, among others.[392] However, whereas the No. 5 Document had aimed to resolve these sectoral challenges in a more indirect fashion by relying on monopoly break-up and the introduction of market mechanisms, SGCC's own plan claimed to offer immediately applicable *technological* solutions to many of the same issues. At the same time, all alleged outcome-related advantages of this restructuring plan were tied to increases in industry integration and centralisation. Without challenging the No. 5 Document directly, SGCC implicitly demoted the unbundling of industry

[392] No. 5 Document (2002), Part 2, §4.

segments and reliance on market competition to the status of one potential route among many, while making it pale in comparison with the spectacular sounding potential outcomes presented in the 1U4L plan.

The argumentative 'synchronisation'[393] with the *goals* underlying the State Council's No. 5 Document, i.e. the appeasement of government by emphasising overlap between its own policy suggestions and cherry-picked aspects of already existing policy, allowed SGCC to publish a sufficiently legitimate alternative reform plan that suggested a vastly different *route* towards those goals while further obstructing change that it viewed as unfavourable to its industry position. Unlike the constant head-on collisions over policy implementation witnessed in Part A, which in a 'defensive' way were very successful but failed to change the existing policy setting, argumentatively matching – i.e. 'synchronising' – the portrayal of pursued sectoral development plans with more abstract policy objectives pursued by central government allowed SGCC to engage with the contents of existing sectoral policy while trying to push the overall sectoral reform trajectory in a direction that corresponded more closely with its own policy preferences.

As SGCC 'synchronised' with central government by depicting its UHV-based reform plan as a catch-all solution to numerous national and sectoral policy challenges previously outlined by the State Council, a small number of retired officials and industry experts began to highlight economic and grid security risks, as well as the systemic threat to regional market building inherent in SGCC's reform plan. These experts tried to draw central government's attention to these matters, but due to their limited access to policy-making circles it was difficult for them to feed their critical opinions into the policy sphere. There is also evidence that SGCC tried to silence its critics and that it obstructed their participation in policy-relevant discussion forums, which further reveals the nature of SGCC's role as the foremost advocate of this restructuring plan. In the light of growing criticism at industry level, SGCC continued to push for the construction of UHV pilot projects while trying to organise broader government support for its sectoral reform plan. As the following chapter will argue, the grid company primarily did so by once more relying on a 'synchronisation' approach during which it presented its sectoral restructuring plan as a corporate contribution to the State Council's cross-sectoral policy in the field of science and technology, more specifically

[393] This *argumentative* 'synchronisation' stands in no relation to the *technical* synchronisation, i.e. synchronous interconnection, between regional grids pursued by SGCC as part of the '1U4L' plan.

to its calls for independent R&D efforts, 'indigenous innovation', and enhanced international competitiveness among domestic industrial firms.

5 'Synchronisation' over cross-sectoral R&D policy and early progress in UHV development

Building on the previous chapter which gave an overview of SGCC's '1 Ultra, 4 Large' (1U4L) development agenda and analysed the logic underlying its introduction into the policy arena, this chapter will trace the first series of attempts by the grid company to practically apply this agenda in the electricity supply industry. In line with the conclusions of the previous chapter, it will argue that SGCC gained government approval for UHV pilot projects and several other development steps primarily through the application of 'synchronisation' tactics, in this case by presenting its technology-based sectoral restructuring plan as a contribution to the implementation of new *cross-sectoral* policies through which the State Council aimed to strengthen the innovative capacity and international competitiveness of Chinese industry.

The first part of this chapter will examine the political proceedings surrounding these UHV construction pilot projects. It will contend that the State Council's approval for these projects primarily resulted from government's agreement to support the grid company in its research and development (R&D) endeavours based on cross-sectoral policy guidelines, while the ultimate impact of the 1U4L agenda on the existing sectoral policy framework appeared to have been left largely unconsidered. The ensuing debates between the grid company and industry experts regarding the interpretation of the semi-successful pilot project outcomes will then be examined, showing the grid company's attempts to further downplay the growing criticism and minimise its appearance in official deliberations while driving all attention towards the 'synchrony' between UHV development and select cross-sectoral policy.

The second part of this chapter will demonstrate how SGCC, using the same 'synchronisation' approach, gained government backing for a number of further crucial UHV development steps. Additional emphasis will be placed on SGCC's successful attempts to gain approval for an expansion of its nominally illicit involvement in the grid equipment manufacturing segment (partially discussed in Chapter 3), which allowed the grid company to a) position itself as the main financial beneficiary of any further UHV construction and b) utilise the resulting high localisation rates in grid equipment manufacturing as argumentative leverage for its claims that it was, indeed, furthering indigenous innovation and the competitiveness of Chinese industry. Finally, SGCC's

'synchronisation'-based endeavours to place itself in charge of national-level standardisation bodies and gain official backing for its emerging UHV-based internationalisation strategy will be analysed.

Overall, this chapter provides further insight into how and under which conditions the grid company was able to promote its goal of creating an integrated industry structure which would allow it to permanently combine its cross-regional monopoly over the different downstream segments with sustained market dominance in adjacent competitive and financially lucrative industry segments.

5.1 Government approval of the first UHV 'test demonstration' lines

In the aftermath of the 2005 UHV forum in Beidaihe and SGCC's successful attempt to eliminate critical opinions from official deliberations, the grid company presented a further feasibility study pertaining to the construction of UHV pilot projects to the NDRC, which then passed on the material to the State Council for further consideration. After both Vice-Prime Minister Zeng Peiyan and Prime Minister Wen Jiabao had given their consent in April 2006, NDRC Vice-Director Zhang Guobao requested the NDRC Energy Bureau to issue the formal approval document for a UHV-AC 'test demonstration' project,[394] which was published by the NDRC in early August 2006.[395] Construction works began immediately and were completed in January 2009, when the Jindongnan-Nanyang-Jingmen (晋东南 - 南阳 - 荆门) UHV-AC pilot project connecting the North China Grid with the Central China Grid entered commercial operation.[396] In a similarly swift fashion, the NDRC authorised the first two UHV-DC 'test demonstration' projects for the transmission of hydropower from the south-western province of Sichuan into the East China Grid, namely between

[394] "Record of major events surrounding UHV (2004-2007)" (特高压大事记盘点 (2004 年-2007 年)), North Star Electric Power News Network (北极星电力新闻网), 26.02.2009.
[395] National Development and Reform Commission Energy Bureau, "Official reply regarding the approval of the Jindongnan-Jingmen UHV-AC test demonstration construction project" (关于晋东南至荆门特高压交流试验示范工程项目核准的批复), Document No. 1585 [2006]; "China to launch experimental project of UHV grids," Xinhua News Agency, 19.06.2006; "Two more UHV Power Transmission Lines to Be Built," SinoCast China Business News, 04.08.2006.
[396] "China lays foundation for first experimental project of UHV grids," Xinhua News Agency China Economic Information Service, 21.08.2006; "China moves ahead with economical ultra-high voltage transmission lines," Xinhua News Agency, China Economic Information Service, 09.02.2009.

Xiangjiaba and Shanghai (四川向家坝 - 上海 UHV-DC; approved in April 2007, operated since July 2010),[397] and between Jinping and southern Jiangsu Province (Jinping-Sunan 四川锦屏 - 江苏苏南 UHV-DC; approved in November 2008, operated since 2012) (see Figure 5.1).[398]

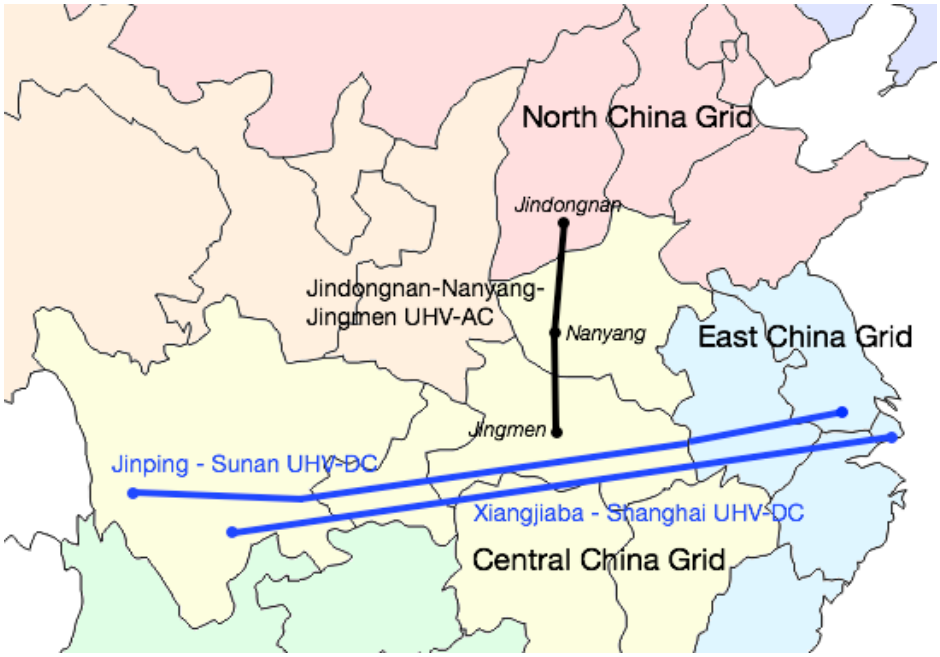

Figure 5.1 The UHV-AC and UHV-DC 'test demonstration' lines
Source: Author's visualisation of material presented in this section.

The general setting in which these approvals took place was rather contradictory given that the State Council in April 2007 had almost simultaneously published a comprehensive reaffirmation of the No. 5 Document's regional competitive market-building agenda which SGCC's restructuring plans stood in stark contrast to (as discussed in Chapter 3).[399] Considering the available evidence, the pilot project approvals are arguably best explained by the authorities' limited consideration and understanding of the centralising and integrating function of UHV infrastructure, the

[397] "China to Build 800KV Power Transmission Project," SinoCast China Business News, 21.12.2007; "Record of major events surrounding UHV (2004-2007)" (特高压大事记盘点 (2004 年-2007 年)), North Star Electric Power News Network (北极星电力新闻网), 26.02.2009; "China starts running 3rd ultra-high-voltage power line," Reuters, 09.07.2010.
[398] "China moves ahead with economical ultra-high voltage transmission lines," Xinhua News Agency, China Economic Information Service, 09.02.2009; "State Grid plans UHV power lines," China Daily, 19.01.2009.
[399] Electricity System Reform Working Group (电力体制改革工作小组), "Opinions on carrying out a deepening of electricity system reforms during the 11th Five-Year Plan period" (关于"十一五"深化电力体制改革的实施意见), State Council General Office Document No. 19 [2007], 06.04.2007.

pressure to reach a compromise in the light of SGCC's strong ambitions and, most importantly, the generally supportive attitude towards R&D endeavours pursued by central SOEs.

Lack of information among government leaders and SGCC's partial independence in grid planning

In hindsight, government sources have expressed with certainty that the 1U4L plan was SGCC's direct response to the risks inherent in the No. 5 Document of it being dissolved into regional entities and becoming politically and economically insignificant. An official from the state asset regulator SASAC stated during a 2013 interview that "[b]uilding UHV was originally proposed by SGCC as they did not want to be broken up along regional lines".[400] An NEA official furthermore specified that "a core reason behind SGCC's push for UHV technology was to counter grid regionalisation. In 2002 they lost huge assets to the China Southern Grid Corporation [see Chapter 3] and they did not want something like this to happen again. This is one of SGCC's strategies to increase their size and strength".[401] During the early stages of UHV development, however, SGCC was essentially the sole supplier to government of UHV-related information and largely succeeded in keeping critical opinions out of official deliberations. The few non-SGCC-affiliated specialists who made it into the state media – and who insisted that UHV development presented a substantial challenge to regionalised marketisation reforms – were mainly retired industry experts and former government officials whose actual influence on decision-making at the time must be viewed as minimal at best. Asked about the policy impact of these retired officials, an employee from within the SGCC system stated that they were "only experts" and that their impact on policy was very small.[402] Similarly, the NEA official quoted above explained that "these experts do not have the same administrative rank as SGCC, so there is not much dialogue. It would have been very difficult for the opinions of these old experts to influence the decision-making process."[403] Consequently, it is questionable how well-informed decision-makers within the NDRC and the State Council actually were when they signed off early stage R&D work and the first UHV

[400] Interview with an official at the State-owned Assets Supervision and Administration Commission, Beijing, 22.07.2013.
[401] Interview with an official at the National Energy Administration, Beijing, 25.07.2013.
[402] Interview with an employee from the Enterprise Strategy Research Institute, State Grid Energy Research Institute, Beijing, 11.07.2014.
[403] Interview with an official at the National Energy Administration, Beijing, 11.07.2014.

pilot projects, and whether they were fully aware of the structural consequences that widely applied UHV technology would have on both the logic of electricity supply and the regional competitive market building plans of the No. 5 Document. This interpretation is supported by a statement by Chen Wangxiang, a former consultant to the Electricity System Reform Working Group and a participant in the NDRC's approval deliberations, who reported that the NDRC meetings did not establish anything substantial about the advantages or disadvantages of UHV projects; they were "just 20 to 30 people giving their opinions".[404]

In addition, central government at the time may have struggled to fully control SGCC's ambitions in the realm of grid planning. In 2009, an official from the electricity regulator SERC indicated that SGCC had been vigorously developing its UHV plans and that it was impossible for the regulator to counter its intentions of consolidating its monopolistic position.[405] The deputy director of the NDRC's Energy Research Institute, Li Junfeng (李俊峰), furthermore asserted that "SGC[C] handles most investment and planning, and it may be difficult for state level planners to get involved in the short term".[406] This was particularly the case as the grid company's investment plans were viewed very favourably by large state-owned banks such as the Bank of China who were "very happy to give loans to SGCC" which they perceived as very low risk.[407] Similarly, an NEA official maintained in an interview that "UHV was SGCC's idea. They had the money, so they could simply start developing these projects. Governmental permission was secondary."[408] And indeed, while the early 'test demonstration' projects all received government approval, none of them had been listed in the 11th Five-Year Plan (2006-2010) or gone through the full evaluation procedure that was formally required for projects of their size, despite the fact that the predicted investments made UHV development as such the most expensive project in the history of China's electricity industry.[409]

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404 "Electric power expert petitions State Council - opposes SGCC's UHV construction" (电力专家上书国务院 反对国家电网建设特高压), Shanghai Securities News (上海证券报), 28.11.2006

405 "SGCCs 600 billion Yuan UHV project referred to as strengthening monopoly" (国家电网 6 千亿元特高压项目被指巩固垄断), Nanfang Web (南方报网), 07.07.2009.

406 "Disconnect for China's Smart Grid Plans," Caixin, 20.02.2010.

407 Interview with an employee from the Enterprise Strategy Research Institute, State Grid Energy Research Institute, Beijing, 11.07.2014.

408 Interview with an official at the National Energy Administration, Beijing, 25.07.2013.

409 "Ultra-high voltage state engineering project deadlock unresolved" (特高压国家工程僵局待解), 21st Century Business Herald (21 世纪经济报道), 26.12.2013; "Yang Mingzhou: A few major problems with the reform of the electric power industry system" (杨名舟：电力工业体制改革的若干重大问题), Study Times (学

While these perspectives do not fully illuminate the exact series of events that led to the approvals of UHV pilot projects, they do give an indication of the general setting in which they took place and suggest that limited information among government coupled with SGCC's strong role in overall grid investment planning may have played contributing roles.

Government support for SGCC's R&D endeavours

Without necessarily supporting SGCC's UHV agenda in its full-scale application and probably not fully aware of its potential consequences for the functional logic of electricity supply, central government did hold a favourable stance on 'indigenous innovation', especially when carried out by central-level SOEs. In a speech given in 2006, the state president and CCP General Secretary Hu Jintao emphasised that core technologies in industries that touched upon the lifelines of the national economy and the security of the state could not be purchased and needed to be developed by relying on autonomous innovation, calling upon Chinese industry to participate in R&D endeavours in order to increase independent innovative capacity.[410] Shortly after, the state asset regulator SASAC also ordered central SOEs to devise indigenous innovation strategies.[411]

SGCC's CEO Liu Zhenya immediately responded to Hu Jintao's and SASAC's instructions by arguing in a speech that UHV technology strongly increased the innovative capacity of the electricity sector and the development of China's grid equipment manufacturing industry. He furthermore claimed that constructing a UHV-AC grid was creating huge market demand for UHV-AC and UHV-DC equipment that was bringing new development space to the equipment manufacturing sector and substantial opportunities for Chinese manufacturers to grow in an otherwise highly competitive market.[412] Similarly, Liu insisted that the development of UHV grids since 2005 had been "a concrete manifestation of the power sector carrying out the Scientific Outlook on Development [...] under the strong support of the National Development

习时报), 20.12.2005; "'Electric power activist' bombards SGCC's monopoly" ("电力斗士"炮轰国家电网垄断), Eastday (东方网), 12.11.2006.

410 "UHV: A historical choice - A record of events surrounding the development of China's UHV electricity grid" (特高压：历史的抉择--我国发展特高压电网纪实), People's Daily Online (人民网), 16.01.2007.

411 James McGregor, "China's Drive for 'Indigenous Innovation'. A Web of Industrial Policies," U.S. Chamber of Commerce, Global Regulatory Cooperation Project (2011), p. 17-18.

412 "Liu Zhenya: UHV transmission is the only way for China's electricity development" (刘振亚：特高压输电是中国电力发展的必由之路), People's Daily Online (人民网), 28.11.2006.

and Reform Commission, the National Energy Administration and the Ministry of Science and Technology".[413] As such, Liu portrayed UHV as the perfect match for central government's desires regarding indigenous innovation led by central SOEs, and he invoked political slogans such as the 'Scientific Outlook on Development' – the vague catchphrase used by the Hu-Wen administration as the headline for its approach to economic development – in order to gain the support of political leaders. This argumentative approach omitted all references to the actual sectoral meaning of the 1U4L agenda or its countervailing impact on regionalised market building and instead focused solely on pitching the technology itself to the political leadership by emphasising its alleged market potential and presenting it as evidence of SGCC's dutiful obedience to government's calls for enhanced R&D endeavours.

And indeed, all obtainable early stage pro-UHV statements by government officials, such as those by Vice-Prime Ministers Huang Ju and Zeng Peiyan who were cited earlier, were based entirely on the notion that UHV *as a technology* deserved government support.[414] Not a single one of these statements went beyond purely technological considerations, indicating whether or to what extent UHV should actually be utilised in China's grid structure or showing that system-relevant questions associated with UHV technology had even been considered. When asked about the reasons underlying government approvals of the 'test demonstration' projects, even an employee of the SGCC-affiliated SGERI Enterprise Strategy Research Institute answered that they were first and foremost linked to the government's inclination to support technological innovation.[415] The available sources therefore suggest that government support for UHV pilot projects was primarily based on the notion of granting support for R&D attempts by a large central SOE following broader 'indigenous innovation' considerations, a line of reasoning which SGCC itself had supplied during its calls for approval. At the same time, there was no evidence that the questions of whether and to what degree functional UHV grids should actually be constructed and utilised in China or how such infrastructural developments would relate to existing regional market building policy had featured in official policy discourse around this time.

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413 Liu, 2013, p. 171.
414 "Record of major events surrounding UHV (2004-2007)" (特高压大事记盘点(2004 年-2007 年)), North Star Electric Power News Network (北极星电力新闻网), 26.02.2009.
415 Interview with an employee from the Enterprise Strategy Research Institute, State Grid Energy Research Institute, Beijing, 11.07.2014.

5.2 Disputes over the interpretation of pilot project outcomes

Once the Jindongnan-Nanyang-Jingmen UHV-AC 'test demonstration' project connecting Shanxi and Hubei Provinces via Henan Province had entered operation in early 2009, the dispute between SGCC and external industry experts intensified as a struggle ensued over how to interpret the outcome of the pilot project. SGCC claimed that the project was an "all-round success" while industry experts concluded that the test results were highly unfavourable and called into question the technical and economic feasibility of the UHV agenda.[416]

The first issue that emerged concerned regional electricity transfers. While SGCC had constructed the pilot project to demonstrate its ability to better transmit coal power from Shanxi Province in the North China Grid to Hubei Province in the Central China Grid, it soon became clear that the area surrounding the coal power base in Shanxi was itself in need of additional supply. Zhang Yuying, a former deputy chief engineer at the Central China Electricity Management Bureau stated in 2011 that the Shanxi region "technically lacks excess capacity to send south" so that in winter "power from central China is carried north to alleviate the shortage [in Shanxi]". As an ironic result of this reversed interchange, central China itself periodically suffered from undersupply.[417] A similar problem existed in the province of Inner Mongolia which had been earmarked by SGCC as a core electricity exporter but which witnessed such steep increases in local demand that it became difficult to envision how it should act as a major exporter within the 1U4L system.[418]

A second question that became increasingly pressing concerned the cost structure of UHV-AC.[419] Comparing the UHV-AC pilot project with the conventional high-voltage DC transmission line connecting the Three Gorges Dam hydropower plant and the Guangdong provincial grid in southern China, observers pointed out that the conventional line was not only 44% longer, but that its total transmission capacity was also 50% higher and that on average it transmitted 80% more electricity. [420]

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416 "Many old experts oppose the "Three China Interconnected Grid" UHV-AC plan" (多位老专家反对交流特高压"三华联网"规划), Century Weekly (新世纪), 25.04.2011.
417 "Jolts, Volts and High Wire Acts," Caixin, 27.04.2011.
418 Lantau Group, "UHV. Slow progress but momentum is building," China Focus Newsletter (May 2014), p. 6.
419 "China moves ahead with economical ultra-high voltage transmission lines," Xinhua News Agency, China Economic Information Service, 09.02.2009.
420 "Jolts, Volts and High Wire Acts," Caixin, 27.04.2011.

Supplementing these claims, transmission technology expert Meng Dingzhong calculated that the construction costs for one 1000kV UHV-AC line of RMB15 million/km were more than twice as high as the RMB7 million/km required for constructing *two* 500kV lines with the same overall transmission capacity and comparable corridor width. Unlike conventional DC lines, UHV-AC lines furthermore required transformer substations every 250 to 300km, each adding about RMB2-3 billion to total construction costs. Based on these calculations, Meng concluded that UHV-AC was economically far inferior to conventional transmission systems.[421]

A third contentious issue was that the pilot project's maximum transmission capacity of 2.8 million kW fell significantly short of the 4-5 million kW advertised by SGCC.[422] Wang Zhonghong, a professor of electrical engineering at Tsinghua University, utilised these technical issues to criticise the "impracticality of SGCC's goal to unify control of power grids in northern and central China by using UHV".[423] In early 2011, SGCC itself conceded that the pilot project generally only operated at 1-1.5 million kW while the vice-CEO of SGCC's Shanxi Electric Power Company, Pan Xiubao (番秀宝), later confirmed in a news interview that its transmission capacity was not significantly higher than that of any regular 500kV line.[424]

As critics became more vocal in the aftermath of the UHV-AC pilot project, SGCC once more did its best to cover up project-related difficulties and to keep critical voices out of official documentation. A telling example was reported by Zeng Dewen (曾德文), a retired deputy director of the Electric Power Planning and Engineering Institute who was part of an inspection team commissioned by the NDRC to examine the pilot project in mid-2009. Zeng explained how, much to the dismay of State Grid executives, inspectors "objectively reported some issues" which resulted in an almost year long delay until the inspection report could be finalised as no compromise was found between both sides over basic requirements set by the inspectors. Moreover, a follow-

421 "Meng Dingzhong: DC power transmission can meet all requirements" (蒙定中：直流输电完全可以满足要求), Daily Economic News (每日经济新闻), 20.05.2014
422 "State Grid's systematic lockout" (国网的系统性锁定), third annex to the lead article "State Grid Empire" (国网帝国), Business Watch Magazine (商务周刊), 05.03.2010.
423 "Disconnect for China's Smart Grid Plans," Caixin, 20.02.2010.
424 Zeng Dewen (曾德文), "The lies are collapsing on their own" (谎言不攻自破), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 09.11.2012; "Jolts, Volts and High Wire Acts," Caixin, 27.04.2011.

up meeting that was supposed to be held in order to reach a conclusion on the final report never took place, leading Zeng to conclude that "they just had us sign off".[425]

In order to publicise their concerns, Zeng and other observers resorted to giving media interviews and writing critical articles, although even this option was dwindling as SGCC pressured specialised industry publications such as *China Electric Power News* (中国电力报) into no longer publishing dissenting opinions on UHV. Other newspapers such as the *China Energy News* (中国能源报) and the *China Economic Herald* (中国经济导报) reportedly were also pressured by the grid company, the latter in 2010 even being visited by one of SGCC's vice general managers who tried to convince the editors not to publish critical articles.[426] As not all news outlets followed SGCC's campaign, critical opinions did reach the general public, but due to the experts' insufficient administrative rank and the lack of a system through which relevant 'outside' information could be absorbed into policy processes, critical expert opinions did not have any noticeable effect on official decision-making, at least not at this stage of UHV development.[427]

5.3 Localisation, standardisation and internationalisation of grid equipment manufacturing as vehicles for persuading government of the merits of UHV transmission

While industry-level criticism of the questionable trial outcomes continued to rise, SGCC attempted to add political legitimacy to its 1U4L agenda and further enhance levels of support within central government by strengthening the argumentative linkages between UHV development and State Council macro-policies which encouraged advances in R&D and improvements in state firm competitiveness in domestic and international markets. At the core of SGCC's emerging argumentative approach, it will be shown, lay the assertion that SGCC had become a driver of indigenous innovation in a technological field which would propel China's development as a whole and boost its international competitiveness and reputation, if only the grid company's broader restructuring plan received sufficient administrative support. The

[425] "Jolts, Volts and High Wire Acts," Caixin, 27.04.2011.
[426] "Many old experts oppose the 'Three China Interconnected Grid' UHV-AC plan" (多位老专家反对交流特高压"三华联网"规划), Century Weekly (新世纪), 25.04.2011.
[427] Interview with an official at the National Energy Administration, Beijing, 11.07.2014.

main argumentative vehicles employed were promises to strengthen Chinese industry by offering high degrees of localisation in equipment manufacturing in conjunction with vows to build and sustain international technological dominance in the grid equipment field based on control over technical standards and the declared export potential of UHV technology. These pledges to government, it will be argued, were used as lures for increased political support, supplemented by the invocation of an 'us vs. them' narrative about China's position in the international economy.

5.3.1 The localisation of equipment manufacturing

During and after the construction of the UHV-AC and UHV-DC pilot projects, SGCC consistently made a point of emphasising the very high levels of domestic content, which according to the grid company reached 90% and 70%, respectively.[428] Liu Zehong, senior director for UHV construction at SGCC disclosed that the grid company's procurement intentionally prioritised domestic products and that core components used in both projects had been "independently developed, designed, and manufactured by Chinese companies" which had reached "the leading level around the world".[429] Presenting its localisation efforts, SGCC stated that more than one hundred domestic companies were partaking in the manufacture and supply of UHV equipment.[430] Furthermore, even though Liu Zhenya insisted that open tenders were being held for the supply of equipment and materials,[431] nearly all of the UHV-related contracts (worth several billion RMB) had been won by domestic SOEs, leading foreign competitors to complain about being shut out of the market[432] and SGCC to proudly declare that it had broken "the long-term monopoly of multinational companies in the international market".[433] A similar perspective was given in an SGCC press release from 2011 which proclaimed that "the construction of [a] Strong and Smart Grid has begun to change from 'made in China' to 'led by China' in terms of technological

[428] Liu, 2013, p. 325.
[429] "China Localizes 76% Ultra-high Voltage Equipment Production," SinoCast China Business News, 10.11.2008.
[430] "China becomes world leader in UHV power technology," Asia News Monitor, 16.04.2009.
[431] "China State Grid Corporation continue to stay loyal to local manufacturers for smart grid," Power Insider Asia, 15.11.2012.
[432] "In China, local smart grid equipment suppliers trump foreign names," Reuters, 12.11.2012.
[433] "China Enters a Golden Era of Developing UHV," SGCC press release, 16.05.2014.

innovation".[434] Commenting on SGCC's research and development endeavours, Tang Guangfu, a director within SGCC's division for smart grid research, concluded that "[n]ow equipment was not just made in China, but created by China. And the country is now leading in the industry instead of learning from other countries".[435]

The claim of purely indigenous innovation stood on shaky ground, however, as numerous sources have indicated that much of the high-voltage technology on which SGCC's technology was based had been transferred from foreign firms such as Siemens, Toshiba and Mitsubishi via joint ventures during other power sector related projects such as the Three Gorges Dam,[436] while several core components used in the pilot projects were fully foreign products.[437] Parts of the more recent UHV developments were also rooted in technology used in the Soviet Union and Japan during earlier UHV experiments, leading SGCC's deputy chief engineer Wu Yusheng to rationalise SGCC's claim, saying "Yes, the Russians and Japanese might have the technology. But the most advanced core technologies cannot be bought. [...] Besides, we have our own conditions and technological requirements that are different from others. Therefore, we must rely on our own efforts for independent innovation".[438]

'Synchronisation' with macro-policies on R&D and 'indigenous innovation'

Irrespective of how high the ratio of truly indigenous innovation may have been, it appears certain that domestic companies found themselves in a strongly advantageous position during the sourcing for UHV projects and that its localisation efforts were utilised by SGCC as a way to convince central government of the high utility of supporting not only UHV-related R&D work, but also the eventual construction of a UHV grid under SGCC leadership.

Firstly, in attempts to increase political legitimacy and administrative backing, SGCC portrayed its grid development plan in a way that closely corresponded to existing non-sector-specific macro policies issued by the State Council. The policy invoked most

434 "Achievements on Strong and Smart Grids Released" (SGCC press release), China Business News, 09.03.2011.
435 "China Ready for Large-Scale Construction of UHV," RIA Oreanda-News, 30.10.2013.
436 "China State Grid Corporation continue to stay loyal to local manufacturers for smart grid," Power Insider Asia, 15.11.2012; "In China, local smart grid equipment suppliers trump foreign names," Reuters, 12.11.2012.
437 "Self-developed UHV transmission units ready for production," China Daily, 25.12.2012; "Jolts, Volts and High Wire Acts," Caixin, 27.04.2011.
438 "China moves ahead with economical ultra-high voltage transmission lines," Xinhua News Agency, China Economic Information Service, 09.02.2009.

often was the 'National Outline for Medium- and Long-Term Science and Technology Development (2006-2020)', with which the State Council had aimed to initiate stronger efforts at 'indigenous innovation' (自主创新) to move China into a leading position in science-based industry by 2020, improve its status from being the 'workbench of the world' towards being a centre of technological innovation[439], and ultimately give rise to the "great renaissance of the Chinese nation".[440] During the initial presentation of the 'National Outline' Prime Minister Wen Jiabao was quoted as saying that "[w]e fundamentally have to rely on two main drivers, one, to persist in the promotion of opening and reform, and two, rely on the progress of science and technology and the strengths of innovation."[441] Liu Zhenya repeatedly referenced the ideas underlying the State Council's science and technology development policy in his lines of argument and strongly played on the notion that the development and application of UHV and smart grid technology was SGCC's contribution towards applying the 'National Outline' in the electricity industry. In an SGCC press release from 2011, in an attempt to garner legitimacy he even – falsely – claimed that developing a UHV grid had been "a major decision by China's State Council", adding that the "UHV AC demonstration project is State Grid's implementation of this policy, as well as a project in carrying out the concept of scientific development, transforming the development mode of [the] power grid and serving the nation's financial and social development."[442]

Secondly, connecting with existing sentiments of economic nationalism in the political and public spheres, SGCC portrayed its development of a UHV grid as part of a national struggle for world dominance in grid technology. In a poorly edited press release, Liu explained that the UHV pilot project was "a leading project to secure the frontier position in the World's [*sic*] power grid technology, to serve the construction of an innovative-oriented [*sic*] country and to boost domestic production of power equipments [*sic*]". SGCC, he promised, would push forward the construction of a UHV grid in order to make an "even greater contribution to China's economical and social

[439] State Council, "National Outline for Medium- and Long-Term Science and Technology Development (2006-2020)," Document No. 44 [2005]; State Council, "Notification of a Number of Supporting Policies for Implementing the National Medium- and Long-Term Science and Technology Development Plan (2006-2020)," Document No. 6 [2006], 07.02.2006.
[440] State Council, "National Outline for Medium- and Long-Term Science and Technology Development (2006-2020)," Document No. 44 [2005], quoted after the translation in McGregor, 2011, p. 4.
[441] Wen Jiabao quoted by McGregor, 2011, pp. 4, 13.
[442] "State Grid's UHV Project Wins China Industry Award" (SGCC press release), China Business News, 18.05.2011.

growth under the support of the Party Central Committee and State Council."[443] With regard to the development of smart grid technology, which SGCC was also pursuing and which it had begun to argumentatively tie together with UHV development under the heading of a 'Strong and Smart Grid', Liu emphasised that this was an opportunity for China to catch up on an international level. Given that smart grid technology was still at an early stage internationally, China was "at the same starting line as the developed countries". SGCC's grid development agenda therefore posed "a good leapfrog opportunity to secure a commanding position in international grid technologies."[444] According to Liu, it was "imperative that China seizes this opportunity to accelerate its development", improve its technological expertise and increase its global competitiveness in related industries.[445] In order to do so, he implied, all government needed to do was to follow SGCC's blueprint for power sector restructuring.

The beneficiaries of localised UHV and smart grid development

The main beneficiaries of high localisation rates in UHV equipment manufacturing, it should be noted, were SGCC's own subsidiary enterprises. As explained in Chapter 3, the State Council's attempts to unbundle grid assets and operations from auxiliary businesses such as equipment manufacturing, grid construction and maintenance had largely failed as SGCC had managed to establish a dominant market position in these nominally competitive fields. As established, the main reason for SGCC's sustained control over these industry segments was that the state-asset regulator SASAC and the NDRC's Foreign Investment Department had allowed SGCC to acquire manufacturing companies that they deemed crucial to the grid company's attempt at bringing UHV technology to a marketable level, both domestically and potentially also in foreign markets. Even though these investments grossly violated the No. 5 Document, SASAC authorised them following its intrinsic institutional mandate because of SGCC's assurances that it would be a very profitable endeavour and a good addition to its asset portfolio.[446]

[443] Ibid.
[444] Liu, 2013, p. 195.
[445] Ibid., p. 69.
[446] Interview with an official at the State-owned Assets Supervision and Administration Commission, Beijing, 22.07.2013; Interview with an official at the National Energy Administration, Beijing, 11.07.2014.

While UHV development had begun as the technological core of SGCC's anti-regionalisation and anti-unbundling strategy, it was now on the verge of also becoming a major source of revenue for the grid company. Every UHV line that was approved or that would be approved later translated into tremendous orders for SGCC's subsidiary equipment manufacturers which held significant market shares for many of the necessary components. The equipment manufacturing business must therefore be understood as the main avenue for SGCC to financially profit from UHV construction. The comparatively short Jindongnan-Nanyang-Jingmen UHV-AC pilot project, for instance, involved initial investment of RMB 6 billion, 60% of which (RMB 3.6 billion) was invested in equipment at a 90% localisation rate; this amounted to approximately RMB 3.2 billion in domestic equipment investment for a single UHV project, a large share of which was paid to SGCC subsidiaries.[447] Similar calculations are in order for the much longer UHV-DC pilot projects that had already been constructed, as well as for all UHV projects that SGCC was pushing for in the aftermath.

Two companies that benefited in particular from these projects were Pinggao Electric, a leading producer of UHV-AC components, and Xuji Electric, which specialised in UHV-DC equipment.[448] Both companies had been SGCC's main acquisition targets in the controversial 2009/2010 deal supported by SASAC and were eventually listed on the stock market. Taking as a starting point SGCC's own forecast of RMB 270 billion in UHV-AC investments for the period of the 12th Five-Year Plan (2011-2015), Pinggao Electric alone would have expected to receive RMB 2.5 billion of annual orders given its market share of about 40% for crucial UHV-AC components which constituted about 12% of the total UHV-AC investment sum.[449] Similar calculations applied to Xuji Electric, which shared most of the UHV-DC equipment market with only one other serious competitor, China XD Electric (中国西电).[450] Other SGCC subsidiaries that profited from UHV development were Tianwei Baobian Electric (天威保变) with its strong market share for high-end transformers and the Nari Group Corporation (南瑞集

447 "State power grid plans to invest 270 billion yuan in smart grid construction during the 12th Five-Year Plan period" (国电网规划"十二五"投资 2700 亿元建设智能电网), *Modern Electric Technology (*现代电子技术*)* 22 (2010): 93.

448 "Li Keqiang: Smog can be managed through cross-regional electricity transmission - UHV to pick up speed in 2014" (李克强：跨区送电可治雾霾 2014 特高压大提速), AAStocks News Agency (大智慧阿思达克通讯社), 17.02.2014.

449 "SGCC's 12th Five-Year Plan for UHV investment officially launched" (国家电网十二五特高压投资规划出台), Shanghai Securities News, 13.08.2010; "Henan Pinggao Electric Wins CNY375mn Projects," SinoCast Energy Beat, 31.10.2013.

450 "Plan for three UHV-DC transmission lines without objection: Xuji Electric Co. to be major beneficiary" (3 条直流特高压方案无异议：许继电气成主要受益者), Caijing, 19.02.2014.

团公司) as a key player in smart grid equipment.[451] Finally, in order to further strengthen its position in UHV and smart grid equipment manufacturing, SGCC in June 2011 founded a Smart Grid Research Institute which was to build up RMB 3 billion in assets and more than RMB 3.5 billion in sales revenues by 2015.[452] Whether the procurement of costly grid equipment and construction services from auxiliary companies under SGCC's own control only served to increase revenues for the corporation or whether the partial privatisation of profits via stock-market listings also personally benefitted grid company executives remains a matter of speculation as the precise distribution of shares in these firms is unclear.

5.3.2 The setting of technical standards and the prospect of international competitiveness

Seeking administrative support by insisting that UHV and smart grid would allow for huge advances in the competitiveness of China's equipment manufacturing sector was a strategy that found similar application in the field of standard setting. Not only did SGCC insist that it was beneficial to the country's development as a whole to turn its own grid technology into a worldwide standard, it also declared it a matter of national pride to undermine the developed countries' "absolute control of the field of international energy standards"[453] and to break the "monopoly of foreign oligarchs"[454] in electrical equipment manufacturing.

According to Shu Yinbiao, SGCC's vice-president at the time, "UHV and smart grid are at the core of international market competition [...]. As a government-owned enterprise shouldering historic missions, SGCC has fully realised that we could not follow the old ways of importing foreign technologies and equipments, or by equal adoption and revision of foreign standards."[455] Consequently, SGCC began engaging with standard setting endeavours during the construction phase of the UHV-AC pilot project which resulted in the 2008 recommendation of its 1000kV UHV-AC voltage as the

451 "China State Grid Corporation continue to stay loyal to local manufacturers for smart grid," Power Insider Asia, 15.11.2012; "SGCC clarifies that construction on new UHV-DC lines will not start before second quarter" (国网明确直流特高压新线最快二季度开工), Caijing, 28.02.2014.
452 "Smart Grid Research Institute of State Grid Founded" (SGCC press release), China Business News, 23.06.2011.
453 Liu, 2013, p. 354.
454 Wang Qiang (王强), "State Grid Empire" (国网帝国), *Business Watch Magazine (*商务周刊*)* 10, no. 5 (05.03.2010): 50.
455 "Exclusive Interview: Executive Vice President of State Grid Corporation of China (SGCC) Shu Yinbiao," *China Standardization* (August 2012), p. 4.

international standard voltage by two leading international bodies for electricity grid standard setting, the International Electrotechnical Commission (IEC) and the 'Conference International des Grands Reseaux Electriques' (CIGRE).[456] This, according to Shu Yinbiao, "changed the traditional practice, which was [the] direct translation or quoting of foreign standards. It signifies a breakthrough in [the] standardisation field of China."[457] Similarly, SGCC has been trying to advance its position in standard setting for smart grid technology. Wang Yimin, the director of SGCC's Smart Grid Department, disclosed in 2010 that SGCC would "urge the government to integrate the Smart Grid project with the national development strategy. This will help us have a bigger say in the international Smart Grid market and play a lead role in setting industry standards".[458] Wang furthermore revealed that SGCC aimed to utilise the standardisation route in order to perpetuate its dominance in smart grid construction and equipment manufacturing via its subsidiary companies.[459] To this purpose, SGCC instigated the establishment of national and industry level standardisation committees which, according to Shu Yinbiao, in order to "meet the needs of grid construction and market development" opened their offices within the SGCC compound in Beijing.[460] Several SGCC managers were also placed in leading positions of these national standard committees and of a 'Standardization Work Leading Group' which was established within the grid company in order to "provide coordination, harmonization, and guidance for standardization work".[461]

After having taken over the relevant national standardisation bodies, SGCC continued to celebrate a series of successes in national and international standard setting for UHV and smart grid technology.[462] Irrespectively, some observers have been very critical of the grid company's conduct in the standardisation field. Lu Feng (路风), a professor of government at Peking University and an expert on Chinese science and technology policy, has described the corporate advances in national standard setting as emblematic of a broader trajectory that has left government trailing behind corporate interests.

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456 Liu, 2013, p. 355.
457 "Exclusive Interview: Executive Vice President of State Grid Corporation of China (SGCC) Shu Yinbiao," *China Standardization* (August 2012), p. 6.
458 "China's top power grid company makes bid to lead the smart grid revolution in the country," Optical Networks Daily, 02.07.2010.
459 Ibid.
460 "Exclusive Interview: Executive Vice President of State Grid Corporation of China (SGCC) Shu Yinbiao," *China Standardization* (August 2012), p. 8.
461 Ibid., p. 11.
462 "China becomes leader for UHV standardization," China Economic Review, 28.09.2011; "SGCC President Talked with Visiting IEC National Committee," RIA Oreanda-News, 16.05.2013; "SGCC Chairman Talks with IEC President," RIA Oreanda-News, 06.06.2013.

Specifically mentioning SGCC, Lu contended that the central government's lack of expertise and information had left it unable to produce its own judgement, having no other choice but to let large SOEs take the lead and to allow company standards to be turned into national standards.[463]

5.3.3 "Enterprise standardisation – international standardisation – enterprise globalisation"

Adding to its successful efforts to elevate company standards for UHV technology into national and international standards and localise content under the auspices of its own subsidiary firms, SGCC attempted to further increase levels of government support for UHV development by emphasising that the technology would allow for successful corporate internationalisation and strengthen the international standing of Chinese industry more generally.

As in earlier instances, SGCC directly engaged with existing macro-policy in order to claim legitimacy for its sector-specific corporate strategy. The grid company particularly built on the State Council's 'Going Global'/'Going Out' (走出去) initiative which under the support of numerous ministries and agencies including the NDRC, Ministry of Commerce (MOFCOM) and the state-asset regulator SASAC had encouraged China's SOEs to globalise and to enter foreign markets, preferably while also exporting Chinese technology.[464] In this vein, SGCC again insisted that upgrading its internal company standards to the level of international standards was benefitting the country's overall competitiveness in the energy technology field and that it was also a vital step in its own corporate internationalisation process which Liu Zhenya summarised under the slogan "Enterprise standardisation – international standardisation – enterprise globalisation".[465] Accordingly, Liu called on government to "actively encourage domestic energy enterprises to take part in international competition and cooperation in the energy field, provide support, standards and guidance to the energy enterprises that 'go global'"[466]. Similarly, while debating the interconnection of standard setting and corporate

[463] "The state must take back all public authority held by enterprises under administrative monopoly" (国家必须把存在于行政性垄断企业中的公共权力收回来), Expert interview with Prof. Lu Feng, School of Government, Peking University, Business Watch Magazine (商务周刊), 05.03.2010.
[464] Liu, 2013, p. 346. For further background information on the internationalisation efforts of Chinese firms, see Nolan, 2001; Nolan and Zhang, 2003.
[465] Ibid., p. 351.
[466] Ibid., p. 346.

internationalisation, the grid company's vice-president Shu Yinbiao contended that "[w]ithout its own standards or participation in international standardization, we could only say SGCC is a large company, but not a strong one, let alone [one that is able] to effectively implement the 'go global' strategy."[467] Shu's statement provides a further example of how references to overarching State Council policies were used to pressure government into giving its support to UHV development, both with regard to attempted foreign market entry and also domestically, particularly since his statement not only contained a 'go global' reference but also invoked the State Council's so-called 'Grow large and strong' (做大做强) strategy which, in practise mainly championed by SASAC (see Chapter 2), urged central SOEs to transform into both domestically and internationally competitive companies.[468]

Rhetorically building on these cross-sectorally applicable State Council initiatives, SGCC was particularly successful in gaining the backing of MOFCOM which had been approached by SGCC in a bid for support during its internationalisation efforts and which willingly promised its assistance. After a meeting with Shu Yinbiao, a ministry spokeswoman stated that it was the basic duty of MOFCOM's Overseas Counsellor to help "outstanding Chinese enterprises" such as SGCC in their efforts to "actively participate in international competition to enhance the overall strength and influence of Chinese enterprises". She furthermore declared that the ministry supported "the two sides' closer links and cooperation [in order] to jointly promote the overseas operations of the State Grid Corporation for new progress".[469]

Having secured central government support for its internationalisation efforts, the grid company intensified its attempts at exporting its transmission technology even though the practical application of UHV transmission in China had yet to progress beyond the pilot stage. While SGCC tried its best to convince government that its technologies were "at the core of international market competition"[470] and that it should therefore receive full administrative support for its UHV development agenda, there was, in fact, no international market at all for UHV equipment around 2010 as all other countries that had experimented with the technology in the past had subsequently abandoned it.

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[467] "Exclusive Interview: Executive Vice President of State Grid Corporation of China (SGCC) Shu Yinbiao," *China Standardization* (August 2012), p. 5.
[468] Naughton, 2007, p. 2. For more a more detailed discussion of the 'large enterprise strategy' see Nolan, 2001; Nolan and Zhang, 2003; Sutherland, 2003; Eaton, 2013a.
[469] "Deputy President of the SGCC Shu Yinbiao meets with MOFCOM," SGCC press release, 26.09.2012.
[470] "Exclusive Interview: Executive Vice President of State Grid Corporation of China (SGCC) Shu Yinbiao," *China Standardization* (August 2012), p. 4.

However, successes in international standardisation coupled with central government support ultimately helped the grid company progress with its export endeavours. Particularly telling in this regard were SGCC's ventures to export UHV technology to Brazil starting in late 2010 when it placed a bid for a hydropower project, aiming to utilise UHV-DC technology to connect it with distant load centres.[471] Although no final agreement had been reached at the time, in April 2011 SGCC spokesmen announced that Brazil would adopt the company's UHV-DC technology to transmit electricity from the Belo Monte Dam in the Amazon River Basin over 2500km to Rio de Janeiro in a project jointly conducted between SGCC and Eletrobras.[472] Following the involvement of leading government officials on both sides a contract was signed in mid 2014 and construction began in mid 2015, allowing SGCC to use its unexpected international bidding success as political ammunition domestically by labelling it as "China's big breakthrough in the 'Going Global' strategy for its UHV technologies".[473] UHV technology, SGCC now argued, was its contribution to the 'Going Out' of Chinese industrial enterprises, its implementation of the wish of China's highest political institutions to not only create but also to export indigenous innovation.

5.4 Chapter conclusions

This chapter demonstrated how SGCC gained central government support for further UHV development by presenting core aspects of its sectoral restructuring initiative as extensions and applications of existing macro-policies that demanded 'indigenous innovation' and increases in the international competitiveness of Chinese industry. At the centre of the grid company's argumentative approach stood the claim that it had become a driving force for indigenous innovation in a technological area that would enable China to take up a leadership role in international competition, and that all that was needed for this to materialise was enhanced government support for UHV development and the 1U4L plan more generally. By argumentatively matching (i.e.

[471] "State Grid Pushes a Brazilian Power Gambit," Caixin, 19.11.2010.
[472] "Brazil to use China's UHV power transmission technologies in hydroelectric dam project," Xinhua News Agency China Economic Information Service, 13.04.2011.
[473] "Cooperation Agreement on Brazil's Belo Monte Hydropower UHV Transmission Project Signed between SGCC and Eletrobras," SGCC press release, 22.07.2014; "Li Keqiang and Rousseff Unveiled the Groundbreaking Ceremony of Brazil's Belo Monte Hydropower UHV Transmission Project," SGCC press release, 21.05.2015.

'synchronising') the portrayal of its own desired sectoral policy and corporate development plans with more abstract policy objectives pursued by central government, SGCC borrowed political legitimacy and successfully garnered support from different central government bodies for crucial development work underlying its sectoral restructuring plan; this, however, was first and foremost aimed at challenging existing sectoral policy in form of the No. 5 Document's marketisation and unbundling agenda, thereby playing off strategic central government decisions at the sectoral and cross-sectoral levels against each other.

The grid company's most notable success in this regard led to the construction of UHV pilot projects which were approved after SGCC had convinced the State Council that the technology – as a case of 'indigenous innovation' by a central state firm – was worthy of support. While the trial outcomes were suboptimal, SGCC appeared to have successfully dominated the political debate about their interpretation due to its involvement in the drafting of assessment reports, applying pressure on the media and silencing critics. SGCC continued to apply similar argumentative strategies in the following years while trying to enhance the attractiveness of UHV development to government. In response to its insistence that UHV would improve its own asset portfolio as well as the international competitiveness of China's grid equipment manufacturing industry as a whole, the state asset supervisor SASAC and the NDRC's Foreign Investment Department, following their respective institutional mandates, granted support for investments in the nominally unbundled grid equipment manufacturing segment. The resulting high localisation rate in UHV manufacturing was then presented by SGCC as evidence of its contributions to 'indigenous innovation' while at the same time allowing the grid company to turn itself into the main financial beneficiary of further UHV development. Similar dynamics were observed in the field of standard setting where government tolerated SGCC's establishment of national-level standardisation bodies within the company sphere, a step which SGCC had portrayed as vital to enhancing China's national economic strength and ending the 'monopoly of foreign oligarchs', and which ultimately allowed the grid company to elevate its company standards to the level of national and even international standards. Finally, after repeatedly invoking the State Council's 'Going Global' initiative, SGCC gained the support of the Ministry of Commerce and of the State Council itself during attempts to export UHV technology as part of its internationalisation strategy which was at least

partially, if not predominantly, targeted at enhancing its domestic standing and collecting arguments for developing a UHV grid within China.

In conclusion, all of the 'cooperative' examples discussed in this chapter had in common that they a) were initiated exclusively by SGCC, b) addressed important macro-level policy goals and cross-sectoral policies championed by the State Council which aimed at increasing the innovative capacity and international competitiveness of Chinese industry, and c) simultaneously contained very explicit overlap between central government's cross-sectoral ambitions and SGCC's sectoral policy preferences while d) being part of a reform plan pursued by SGCC that was geared towards undermining and replacing unfavourable sectoral market-building policy. In some of these cases, SGCC supplemented its 'synchronisation' endeavours with targeted venue-shopping among central government bodies, similar to its interactions with the authorities while trying to circumvent the unbundling requirements of the No. 5 Document (see Chapter 3). Taking advantage of the co-existence of not always clearly coordinated mandates, the grid company successfully persuaded different government bodies to support parts of its cause based on argumentative linkages that were carefully adapted to match their respective mandates.

Despite the substantial sectoral importance of the matters discussed in this chapter, the related political discussions hardly ever touched upon UHV's relevance vis-à-vis existing sectoral policy or the potential impact of UHV technology on the functional logic of the domestic electricity supply. Government support was exclusively directed towards assisting with technological development and supporting indigenous innovation by SOEs in line with existing cross-sectoral policy, which suggests that SGCC's 'synchronisation' approach actually succeeded. All of the steps portrayed here were instrumental in the grid company bringing UHV technology closer to a fully marketable level, achieving and sustaining dominant market positions in lucrative auxiliary industries which were technically off-limits for the grid company but would allow for substantial financial gains, and gaining political momentum during the struggle over further domestic grid planning as a self-declared practitioner of the State Council's 'indigenous innovation' and 'going global' strategies.

However, the rather indirect nature of SGCC's attempts to shape the policy setting that it operated in again hints at the limits of the grid company's ability to challenge existing policy and shape sectoral decision-making. During both the introduction of its

restructuring plan into the policy arena (see Chapter 4) and its attempts to gain government support for the initial application of UHV technology in China's electricity industry SGCC refrained from direct attacks on existing sectoral policy; instead it resorted to elaborate strategies to circumvent policy by appeasing government and portraying its own sectoral reform suggestions as being closely aligned with government's cross-sectoral policy preferences. SGCC's chosen strategy therefore tentatively suggests that central SOEs are not in a position to simply access policy-making circles and request changes in policy, but that they are ultimately forced to tactically engage with existing policy in order to get their voices heard and increase the likelihood of beneficial or at least tolerable policy output and outcomes.

In this way, SGCC steadily circled in on its main objective which continued to be the further centralisation and integration of China's electricity supply industry under its own leadership through the construction of a cross-regional synchronous 'Three China' UHV-AC grid linked to large peripheral electricity generation bases via UHV-DC transmission. As the following chapter will demonstrate, the cooperative interplay between SGCC and central government over 'synchronisable' macro-topics such as indigenous innovation or international competitiveness did not extend to the grid company's attempts to actually construct the 'Three China' grid, as contentious sectoral policy questions returned to the centre of debates.

6 The politics of grid planning and clashes over UHV approvals (2010-2014)

Unlike the generally cooperative interplay between SGCC and central government regarding aspects of UHV development that related to cross-sectoral policy matters, substantial government opposition to the grid company's reform plan was present in many fields with immediate sectoral relevance, i.e. matters which related to the actual sectoral application of SGCC's restructuring plan. While the grid company's suggestions of developing large regional power generation bases and employing the method of long-distance transmission as such were eventually looked upon favourably, the plan to develop the cross-regional synchronous 'Three China' UHV-AC grid – the technological core of SGCC's reform plan, the R&D foundation of which had been strongly supported thus far – was met with caution and scepticism by the State Council and particularly by the National Energy Administration (NEA), the main sectoral supervisory body for the electricity industry.

The years following 2011 saw a serious dispute between the grid company and central government, particularly the NEA, over the sectoral 12th Five-Year Plan (2011-2015) for electricity grid development. It centred on the questions of whether or to what extent the synchronous cross-regional UHV-AC grid should be developed and how interconnected China's regional grids should be, as well as how integrated and centralised its overall electricity supply structure should be. During this dispute, as will be shown in the first part of this chapter, the NEA prevented the grid company's internal grid development plan from being accepted as an official national-level plan for future grid development. During the same timeframe, the NEA and NDRC also approved two UHV-AC projects (in 2011 and 2013), an apparent contradiction that will be explored in the second part of this chapter, followed by an analysis of ongoing clashes between SGCC and sectoral regulators during the assessment and evaluation procedures related to two additional and particularly controversial transmission lines.

As such, the core concern of this chapter will be to analyse disputes between SGCC and central government bodies over the practical application of UHV in China's grid system during which sometimes one side prevailed and sometimes the other, but which ultimately tended to lead to administrative deadlock. In contrast to the conclusions of the previous chapter that SGCC managed to gain government support by

'synchronising' crucial parts of its sectoral restructuring plan with cross-sectoral policy on industrial R&D, this chapter will demonstrate that the grid company encountered severe difficulties in progressing with its agenda as soon as robust argumentative linkages to existing cross-sectoral policy were absent and as soon as industry-specific considerations began to re-emerge during its engagement with sectoral authorities.

It should be noted that a considerable proportion of the empirical material used for this chapter was supplied by Zeng Dewen (曾德文), a retired deputy director of the Electric Power Planning and Engineering Institute, who personally participated in many assessments held by the different stakeholders, including numerous meetings regarding the particular UHV-AC projects discussed in the second part of the chapter. Zeng was called upon by the Chinese Academy of Engineering, China's leading science and technology institution, to write a report concerning his observations during the approval procedures, which he later published in a series of articles. As such, Zeng was the only close observer of the approval procedures who openly shared his insight, barring a small number of news articles published in 2014 which make it possible to cross-reference the general trajectory of Zeng's statements, but not every detail. Nevertheless, given Zeng's reputation of independence and reliability in industry and journalistic circles, as well as his fact-oriented reporting, his accounts were used as the main empirical source for parts of this chapter.

6.1 Conflicts over the 12th Five-Year Plan for grid development

The following section will examine conflicts between SGCC and central government regarding the contents and development trajectories inherent in the most important state-level planning documents for electricity grid construction and development. In a first step, SGCC's internal company-level grid plan will be examined and compared with relevant sections in China's overall 12th Five-Year Plan (2011-2015) in order to showcase important discrepancies in development goals between the grid company and the State Council. Secondly, the contentious interaction between SGCC and the NEA during the process of devising a sector-specific national-level 12th Five-Year Plan for the electricity grid will be investigated.

6.1.1 Discrepancies between firm-level and national-level 12th Five-Year Plans

Conflicts between SGCC and central government over the 12th Five-Year Plan for grid development surfaced around 2010, when SGCC unilaterally declared that the UHV pilot projects had now passed government's final examinations and that UHV as such was now moving on from the "demonstration phase" (示范阶段) to the "comprehensive construction phase" (全面建设阶段).[474] Building on its internal UHV construction plans first publicised in 2009,[475] in August 2010 SGCC issued its firm-level 12th Five-Year Plan in which it laid out an ambitious grid construction outlook for the years 2011-2015. By the end of this period, SGCC aimed to have completed the basic structure of the 'Three China' UHV-AC grid synchronising the Central, North and East China regional grids while simultaneously developing 15 UHV-DC projects to match the pace of the proposed expansion of peripheral power generation bases and projected increase in demand for large-scale electricity transmission.[476] With planned investments totalling RMB 270 billion for UHV alone, SGCC announced that it would build a "Three vertical, three horizontal, one loop" UHV-AC grid structure (三纵三横一环网) which was to directly incorporate northern coal bases as well as south-western hydropower bases:[477] this was to be supplemented by a UHV-AC project tying together most of the provincial grids within the regional East China Grid under a 'Yangtze-Delta UHV Double-loop Grid' (长三角特高压双环网) covering some of China's most developed and industrialised coastal provinces and municipalities (see Figure 6.1).[478]

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474 "State power grid plans to invest 270 billion yuan in smart grid construction during the 12th Five-Year Plan period" (国电网规划"十二五"投资 2700 亿元建设智能电网), *Modern Electric Technology (*现代电子技术*)* 22 (2010): 93.

475 "State Grid to spend RMB 600 bln on UHV power lines by 2020," China Knowledge Press, 25.05.2009; "First UHV line put into operation - A 'two vertical, two horizontal' pattern emerges" (首条特高压线投入运营 "两纵两横" 格局显现), Nanfang Web (南方报网), 25.02.2009.

476 Liu, 2013, p. 179.

477 "State power grid plans to invest 270 billion yuan in smart grid construction during the 12th Five-Year Plan period" (国电网规划 "十二五" 投资 2700 亿元建设智能电网), *Modern Electric Technology (*现代电子技术*)* 22 (2010): 93.

478 "SGCC's 12th Five-Year Plan for UHV investment officially launched" (国家电网十二五特高压投资规划出台), Shanghai Securities News, 13.08.2010; "China grid eyes building 2 new UHV power lines this yr," Reuters, 13.08.2010.

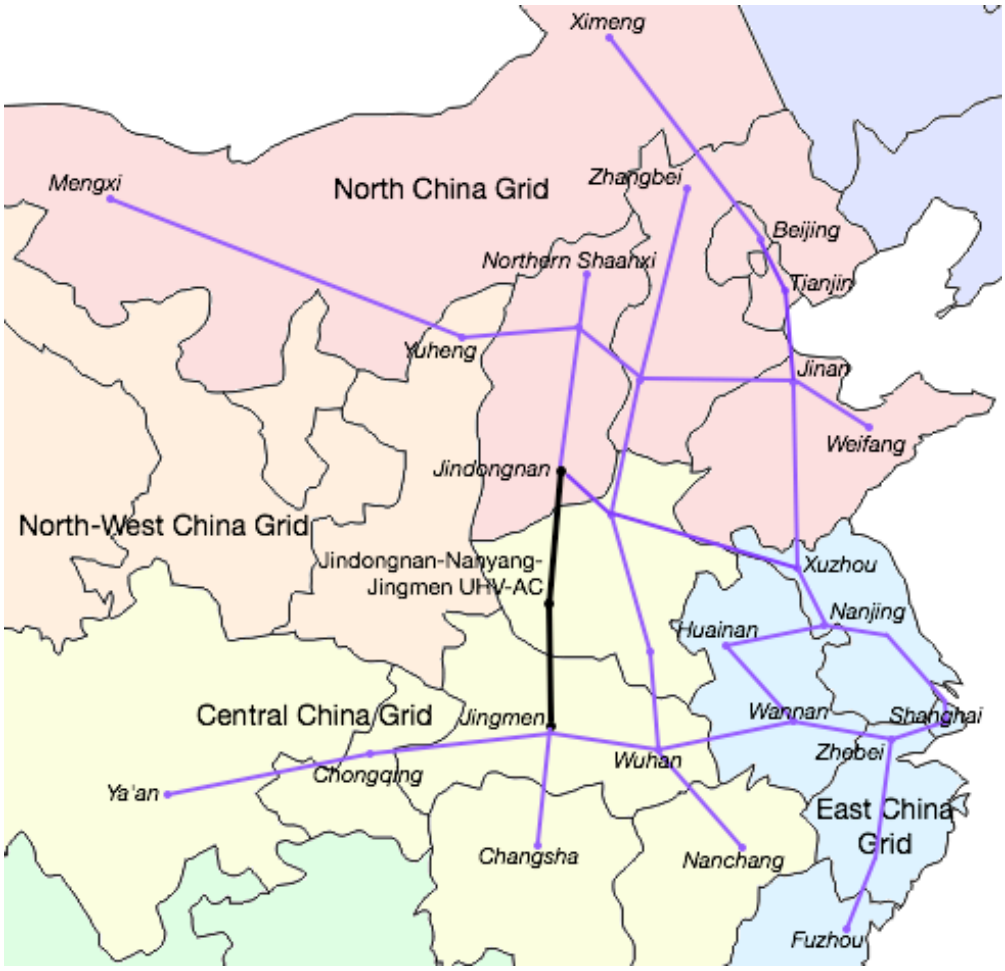

Figure 6.1 SGCC's "Three vertical, three horizontal, one loop" UHV-AC construction plan
Source: Author's visualisation of material presented in this section.

While the sector-specific national-level Five-Year Plan was still being prepared, the publication of the overall national-level 12th Five-Year Plan in March 2011 was celebrated by SGCC as a big success as a number of ideas that had originated within the grid company had also been included in the document.[479] Among other aspects, the plan called for an "optimization of the layout of energy development" based on the construction of five national energy bases together with the development of nuclear power along the eastern coast and areas of central China.[480] The document furthermore included the idea of enhancing long-distance transmission, calling for the "accelerat[ion of] the construction of outward power supply projects from large coal power,

[479] "SGCC: UHV has already been included in the 12th Five-Year Plan" (国家电网公司："特高压"已被列入"十二五"规划), North Star Electric Power News Network (北极星电力新闻网), 17.03.2011.
[480] "Outline of the 12th Five-Year-Plan for economic and societal development in the People's Republic of China" (translated by the Delegation of the European Union in China), published by the British Chamber of Commerce in China, Beijing (March 2011), Chapter 11, Section 2.

hydropower and wind power bases, and creat[ion of] some cross-regional power transmission channels using advanced technologies" and to "carry out trials of intelligent power grid construction".[481] Even UHV transmission itself was mentioned, although where SGCC's version of the grid plan included a substantial number of specific grid projects that the grid company wanted to construct, the national-level plan was vaguer, stating only that the government would "[...] accelerate the construction of a modern power grid system, further expand the scale of west-to-east power transmission, improve regional core power grids, and develop advanced large-capacity, high-efficiency and long-distance power transmission technologies such as UHV and others".[482]

The fact that the general trajectory of SGCC's 1U4L plan was represented in the most important national-level economic planning document published in the PRC speaks to the substantial influence that the grid company wielded with regard to industry planning; sadly, however, no sources were available to illuminate the exact processes through which SGCC's ideas found their way into the document. At the same time, while the wording may initially appear as a general endorsement of the 1U4L plan, the precise phrasing with regard to grid development actually indicates how sceptical and undecided government was about this matter. The Five-Year Plan only stated that UHV *technology* should be developed, but not that a UHV grid should be constructed, echoing the earlier semantic battle over the 'test demonstration' projects (see Chapter 4). Some observers interpreted this choice of wording as a compromise so that any future decisions regarding UHV, and particularly UHV-AC development, would have a foundation in the planning document, irrespective of whether it was approved or not.[483] Similarly, Ding Daoqi (丁道齐), a former vice director of the State Electricity Dispatch Communications Centre (国家电力调度通信中心), pointed out that the "advanced large-capacity, high-efficiency and long-distance power transmission technologies" mentioned in the plan gave no indication as to whether UHV-AC or the much less controversial UHV-DC was being referred to, and that the plan's demand for the "strengthening of

[481] Ibid., Chapter 11, Section 6.

[482] "Outline of the 12th Five-Year-Plan for economic and societal development in the People's Republic of China" (中华人民共和国国民经济和社会发展第十二个五年规划纲要), published by Xinhua News Agency, 16.03.2011, Chapter 11, Section 3 (author's own translation). The original text reads as follows: "[...]加快现代电网体系建设，进一步扩大西电东送规模，完善区域主干电网，发展特高压等大容量、高效率、远距离先进输电技术[...]".

[483] Zeng Dewen (曾德文), "SGCC's UHV-AC dream shattered, dream of an interconnected "Three China" grid will not be achieved" (国网梦碎交流特高压，"三华"联网恐成"南柯一梦"), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 12.10.2012.

regional core electricity grids" (完善区域主干电网) was ultimately to be understood as a government veto to the cross-regional 'Three China' grid.[484]

Given the discrepancies between firm-level and national-level outlooks on grid development, contentious interactions between SGCC and sectoral authorities ensued over the industry-level specification of the vague guidelines provided by the overall 12th Five-Year Plan document. Sectoral authorities were faced with the decision of whether to utilise the internal grid company plans and adapt them into national-level plans or to devise entirely new plans altogether, a decision that needed to be made in the face of constant pressure from industry in the form of SGCC and its subsidiaries.[485]

6.1.2 Confrontation over the compilation of the national-level 12th Five-Year Plan for electricity grid development

In preparation for the 12th Five-Year Grid Plan, the National Energy Administration (NEA) in September 2011 tasked the Electric Power Planning and Engineering Institute (EPPEI, 电力规划设计总院), a standardisation institution representing government ministries and commissions while exercising administrative functions in sectoral planning, to devise a national strategy for grid development. For this particular purpose a new body was created under EPPEI, the State Electricity Planning Research Centre (SEPRC, 国家电力规划研究中心), which in conjunction with external experts formed a Planning Work Group (规划工作组).[486] Throughout 2012 and under the guidance and supervision of the NEA's Electricity Grid Division, this Planning Work Group developed a first draft of a national grid plan. After much deliberation and expert consultation, three reports with recommendations for the general grid structure emerged that were then assessed by a number of academics.[487] According to news

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484 Ding Daoqi (丁道齐), "The 1000kV UHV-AC grid is a big step back for China's electricity grid development - UHV-AC is a parasite living off the high-voltage grid" (1000 千伏交流特高压电网是中国电网发展的大倒退 -- 交流特高压电网是寄生在超高压电网上的怪胎), article published on Zeng Dewen's industry blog, *Caixin Net*, 01.03.2014.

485 "Ultra-high voltage state engineering project deadlock unresolved" (特高压国家工程僵局待解), 21st Century Business Herald (21 世纪经济报道), 26.12.2013.

486 Electric Power Planning & Engineering Institute (EPPEI), "Company introduction" (企业简介), http://www.eppei.com/PartNodeDetail.aspx?PartNodeID=57, accessed 04/2015; "State Electricity Planning Research Centre officially launched" (国家电力规划研究中心正式启动), National Energy Administration press release, 30.01.2012, http://www.nea.gov.cn/2012-01/30/c_131381850.htm, accessed 04/2015.

487 Zeng Dewen (曾德文), "Electricity development calls for a scientific plan, this era awaits electricity development under the rule of law - Offering suggestions for the Electricity Plan under the 13th Five-Year Plan, Part 1" (电力发展呼唤科学规划 时代期盼法治电力 --为"十三五"电力规划建言献策 (之一)), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 19.01.2015.

sources, the overall conclusion of these internal reports was that constructing a cross-regional UHV-AC grid was unnecessary, and that not building it would save RMB 300-400 billion while simultaneously preserving a low risk of large-scale blackouts.[488] In September 2012, the Planning Work Group reported back to the NEA's Electricity Department, whose director emphasised that the findings provided "forceful technological support for the state's scientific decision-making" and that SGCC's 'Three China' UHV-AC grid was "not the only proposed plan".[489]

On the basis of these recommendations, in January 2013 the NEA published a document in which it provided different proposals for cross-provincial electricity supply, requiring both SGCC and the China Southern Grid Corporation (CSGC) to conduct comparative studies of how those proposals would apply in their respective regions and develop implementation plans for the different scenarios.[490] This series of events confirmed that the NEA at the time had a very cautious attitude towards UHV-AC construction; while SGCC's favoured development plan was part of the deliberation process the planning work involved a number of different scenarios which the NEA wanted the grid companies to incorporate into their own planning work. The NEA's vigilant attitude was shared by the NDRC; an SGCC employee in a 2012 interview stated that both institutions at the time were hesitant to approve further UHV-AC constructions for grid security reasons.[491]

The China Southern Grid Corporation immediately complied with the NEA's requests and soon after provided its 'CSGC 2013-2020 Planning Research Report' in which it compared different approaches to accommodating high ratios of outward electricity supply in some of the provinces within its grid region. While UHV-AC was considered as one of the options, it scored the lowest from both a technical and economic perspective. Based on CSGC's research, the NEA then published the 'CSGC Development Plan (2013-2020)', which adopted CSGC's suggested strategy of relying predominantly on conventional 500kV high-voltage lines and a small number of much

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[488] Zeng Dewen (曾德文), "SGCC's UHV-AC dream shattered, dream of an interconnected "Three China" grid will not be achieved" (国网梦碎交流特高压，"三华" 联网恐成 "南柯一梦"), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 12.10.2012.

[489] Zeng Dewen (曾德文), "Electricity development calls for a scientific plan, this era awaits electricity development under the rule of law - Offering suggestions for the Electricity Plan under the 13th Five-Year Plan, Part 1" (电力发展呼唤科学规划 时代期盼法治电力 -- 为"十三五"电力规划建言献策 (之一)), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 19.01.2015.

[490] National Energy Administration, "NEA notification on the launching of research work regarding a main grid structure proposal for the national electricity grid plan" (国家能源局关于抓紧开展全国电网规划主网架方案研究工作的通知), Document No. 15 [2013].

[491] Interview with a smart grid researcher at the State Grid Energy Research Institute, Beijing, 08.11.2012.

less controversial and consequential UHV-DC lines. In order to safeguard the region against widespread blackouts, the plan even considered breaking up the regional grid operated by CSGC into two or three smaller grid entities.[492] This development strategy was in many ways the opposite of what the State Grid Corporation had been pushing for over the previous years under its 1U4L agenda.

Unsurprisingly, SGCC's own response to the NEA's requests was very different, as it refused to implement the requested technical and economic comparisons between different development approaches for its grid area and instead insisted that the 'Three China' UHV-AC plan was the only viable option.[493] In May 2013, after a delay of over a year, SGCC then officially passed its 'Special 12th Five-Year Plan' to the NEA. However, it was never officially published as the NEA refused to yield to the grid company's demand to accept its internal company plan as the state-level Five-Year Plan for grid development.[494] At the same time, without SGCC's cooperation it was also impossible for the NEA to launch an external expert assessment of the 'Three China' grid plan as the only solution agreeable to the grid company. As the NEA's 'administrative power' (执政力) did not allow it to push forward the drafting process under these circumstances, all procedures came to a standstill and the matter "was settled by leaving it unsettled".[495] In January 2014, the State Council ratified the overall 12th Five-Year Plan for the energy sector and a series of sub-sectoral documents, but neither the plan for the electricity sector nor the more specific grid plan were among them.[496] Even the national grid planning report initially commissioned by the NEA and supplied by the above-

[492] Zeng Dewen (曾德文), "This is not just a bad dream - Reflections on the problems that have been revealed during the assessment of the Huainan-Nanjing-Shanghai UHV-AC transmission project" (这不仅仅是一次梦魇 -- 从淮南～南京～上海交流特高压输变电工程项目评估所暴露问题出发的思考), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 24.11.2013.
[493] Zeng Dewen (曾德文), "Electricity development calls for a scientific plan, this era awaits electricity development under the rule of law - Offering suggestions for the Electricity Plan under the 13th Five-Year Plan, Part 1" (电力发展呼唤科学规划 时代期盼法治电力 -- 为"十三五"电力规划建言献策 (之一)), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 19.01.2015.
[494] Interview with an employee from the Enterprise Strategy Research Institute, State Grid Energy Research Institute, Beijing, 11.07.2014; "Ultra-high voltage state engineering project deadlock unresolved" (特高压国家工程僵局待解), 21st Century Business Herald (21 世纪经济报道), 26.12.2013.
[495] Zeng Dewen (曾德文), "Electricity development calls for a scientific plan, this era awaits electricity development under the rule of law - Offering suggestions for the Electricity Plan under the 13th Five-Year Plan, Part 1" (电力发展呼唤科学规划 时代期盼法治电力 -- 为"十三五"电力规划建言献策 (之一)), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 19.01.2015.
[496] "Ultra-high voltage state engineering project deadlock unresolved" (特高压国家工程僵局待解), 21st Century Business Herald (21 世纪经济报道), 26.12.2013.

mentioned Planning Work Group was never fully published because its recommendations did not match SGCC's demands.[497]

According to the available sources, the main reason why the 12th Five-Year grid plan was never published was that the NEA did not agree with SGCC's insistence on the construction of a 'Three China' UHV-AC grid. The NEA's own grid planning preferences at the time were clearly visible during the drafting of the China Southern Grid Corporation's regional grid plan which not only did not involve UHV-AC transmission but also demonstrated the sectoral authorities' distrust of large synchronous grid structures. It is also noteworthy that the NEA made a point of consulting an external institution, EPPEI, in order to access expertise on grid development that was not directly supplied by SGCC itself. This was one of many instances to follow in which the NEA called for external support in battles with SGCC over policy-relevant information and interpretations, as will be seen in the following sections. Most importantly, this section illustrated how clashing policy preferences between sectoral authorities and SGCC regarding pivotal industry-level planning decisions led to complete deadlock between both sides. The NEA, on the one hand, was unable to fully rein in SGCC's attempts to transform its corporate agenda into national-level policy, and given their equal administrative ranks it was also not in a position to simply block the grid company's main development ideas.[498] SGCC's refusal to supply accurate and pertinent data to the NEA effectively thwarted any possibility of the NEA creating an industry plan that did not feature UHV-AC as the sole grid development option but rather as one option among others. At the same time, SGCC also failed to integrate the very core of its 1U4L plan – the synchronous 'Three China' UHV-AC grid – into the overall national 12th Five-Year Plan or its sectoral specification documents, the consequence being political stalemate in which neither side managed to prevail.

This grid planning episode was the start of an evolving battle between SGCC and the NEA (as well as a multitude of external institutions and industry experts) over information, expertise and notions of objectivity in assessing the necessity and feasibility of UHV-AC construction and its impact on both the electricity supply system

[497] Zeng Dewen (曾德文), "Electricity development calls for a scientific plan, this era awaits electricity development under the rule of law - Offering suggestions for the Electricity Plan under the 13th Five-Year Plan, Part 1" (电力发展呼唤科学规划 时代期盼法治电力 -- 为"十三五"电力规划建言献策 (之一)), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 19.01.2015.
[498] Interview with an official at the National Energy Administration, Beijing, 11.07.2014.

and the economy at large. The conflict between the two sides became particularly evident during the evaluation procedures for the individual UHV-AC lines that SGCC had been lobbying for. Some of these procedures will be analysed in the following second part of this chapter.

6.2 Negotiations over UHV-AC approvals

The absence of a formal national-level grid plan meant that there was no clear development framework for government to refer to when assessing project approval requests from industry. Some observers have argued that the lack of such a plan, which would usually have given guidance to all parties involved, created more space and opportunities for SGCC to influence national power grid development.[499] Others have contended that the situation actually made it more difficult for the grid company to place further UHV construction projects on the agenda.[500] However, the fact is that during this lengthy struggle over the drafting of a national-level grid plan throughout which the NEA prevented SGCC's model of a 'Three China' UHV-AC grid from becoming the frame of reference for the future direction of China's overall grid development, the NDRC and the NEA unexpectedly approved the construction of two UHV-AC lines both of which were sections of the UHV-AC loop construction project in the East China Grid which SGCC had been pursuing. Unfortunately, very few sources exist with regard to these two seemingly highly contradictory approvals; however, the little available empirical material will be interpreted as conclusively as possible.

In a further step, with the use of more comprehensive empirics, the interaction between SGCC, government bodies and various consulting institutions during the evaluation and assessment stages of two further prominent UHV-AC projects will be examined. Due to their strategic importance for overall grid development, both of these projects were

[499] Zeng Dewen (曾德文), "Electricity development calls for a scientific plan, this era awaits electricity development under the rule of law - Offering suggestions for the Electricity Plan under the 13th Five-Year Plan, Part 1" (电力发展呼唤科学规划 时代期盼法治电力 -- 为"十三五"电力规划建言献策 (之一)), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 19.01.2015.

[500] "Ultra-high voltage state engineering project deadlock unresolved" (特高压国家工程僵局待解), 21st Century Business Herald (21 世纪经济报道), 26.12.2013; Zeng Dewen (曾德文), "SGCC's UHV-AC dream shattered, dream of an interconnected "Three China" grid will not be achieved" (国网梦碎交流特高压，"三华" 联网恐成 "南柯一梦"), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 12.10.2012.

surrounded by strong political controversy and therefore provide rare insight into the logic of struggles over authority and expertise between grid company and government institutions.

6.2.1 The curious approvals of further UHV-AC lines in the midst of conflicts over grid planning (2011-2013)

In the middle of ongoing clashes between SGCC and the NEA over the inclusion of UHV-AC construction in the national grid development plan two very unexpected project approvals took place. The first of these occurred in September 2011 and involved the southern section of the 'Yangtze-Delta UHV-AC Double-loop' project between Huainan (southern Anhui Province), Zhebei (northern Zhejiang Province) and the municipality of Shanghai (淮南 - 浙北 - 上海); it had originally been listed in SGCC's internal 12th Five-Year Plan and, once completed, was to synchronise three of the five provincial grids within the East China Grid region (see Figure 6.2). This transmission line was suddenly approved by the NDRC while the project was still undergoing formal evaluation and while the NEA was simultaneously holding a discussion forum on national electricity flow patterns and the national Five-Year Plan strategy, which demonstrates the uncoordinated circumstances of this decision.[501] Similarly, just as the NDRC employed a state-owned consulting firm, the China International Engineering Consulting Corporation (CIECC, 中国国际工程咨询公司), to further evaluate the construction of the 'double loop' grid structure, both NDRC and NEA leaders, on their very last day in office before the central government turnover of March 2013, abruptly approved an additional UHV-AC line between Zhebei (northern Zhejiang Province) and the city of Fuzhou (浙北 - 福州) which was to link Fujian Province to the previously approved southern part of the loop structure which was already under construction (see Figure 6.2).[502] This second approval was even more surprising given that from 2006/2007 onward a regional power transmission plan had been developed

[501] "China's 2nd UHV AC Power Line Approved by NDRC," SinoCast Energy Beat, 29.09.2011; "China to Break Ground on Second Ultra-high Voltage power Transmission line," China Today, 05.12.2011; Zeng Dewen (曾德文), "Electricity development calls for a scientific plan, this era awaits electricity development under the rule of law - Offering suggestions for the Electricity Plan under the 13th Five-Year Plan, Part 1" (电力发展呼唤科学规划 时代期盼法治电力 -- 为 "十三五" 电力规划建言献策 (之一)), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 19.01.2015.

[502] Zeng Dewen (曾德文), "Electricity development calls for a scientific plan, this era awaits electricity development under the rule of law - Offering suggestions for the Electricity Plan under the 13th Five-Year Plan, Part 1" (电力发展呼唤科学规划 时代期盼法治电力 -- 为 "十三五" 电力规划建言献策 (之一)), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 19.01.2015.

and passed by government in which it was decided to strengthen this exact grid linkage based on conventional high-voltage transmission. However, as SGCC had insisted on a UHV-AC solution which the government at the time was reluctant to approve, long delays regarding this transmission route ensued which were only resolved with the unexpected 2013 UHV approval.[503]

Just like the earlier 'test demonstration' projects, neither of the two newly authorised UHV-AC transmission lines went through the full official approval procedures or were externally evaluated, which was abnormal for projects of this magnitude.[504] Following formal procedures, SGCC's project plan should have been passed on to a design institute which would have sent the design to the Electric Power Planning and Engineering Institute (EPPEI; 电力规划设计总院) for evaluation. After passing EPPEI's evaluation, the design should have then been delivered to the NDRC and the NEA, from where it should have been forwarded to a third party for assessment, usually the above-mentioned CIECC. Only after all these different steps would the NEA and the NDRC then approve it (or not) – and if the investment required exceeded a pre-set sum an additional final approval by the State Council would have been required.[505]

[503] Zeng Dewen (曾德文), "A warning for electricity construction against falling into the trap of the 'Three China' UHV-AC grid (警惕电网建设误入形成 "三华" 交流特高压电网的歧途), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 08.02.2012.
[504] "Ultra-high voltage state engineering project deadlock unresolved" (特高压国家工程僵局待解), 21st Century Business Herald (21 世纪经济报道), 26.12.2013; "SGCC: The UHV-AC network can maintain nuclear safety in the East China grid" (国家电网：特高压交流电网可保华东核电安全), People's Daily Online, 14.05.2013; "Four questions regarding UHV: Safety and economic feasibility are still being called into doubt" (四问特高压：安全性与经济性仍遭质疑), People's Daily Online (人民网), 29.04.2014.
[505] "Four questions regarding UHV: Safety and economic feasibility are still being called into doubt" (四问特高压：安全性与经济性仍遭质疑), People's Daily Online (人民网), 29.04.2014; Interview with an official at the National Energy Administration, Beijing, 11.07.2014.

Figure 6.2 UHV-AC project approvals in the East China Grid (2011-2013)
Author's visualisation of material presented in this section.

In response to allegations that it had engineered a shortcut through the formal approval procedure, SGCC argued that all lines had undergone feasibility studies, all levels of government had issued supporting documents and that SGCC itself had requested an EPPEI evaluation which had given a positive result. Furthermore, the grid company insisted that it was not necessary to involve another third party with a further assessment because the 'test demonstration' project had already been in stable operation for a number of years which was sufficient proof of UHV's feasibility.[506]

A tentative attempt at explaining the UHV-AC approvals in 2011 and 2013

Very little empirical detail exists that would provide insight into the exact background to these approvals, and none of the interviewees asked about these episodes were able to clarify matters, not even those from the NEA itself. Explanations based on the

[506] "Four questions regarding UHV: Safety and economic feasibility are still being called into doubt" (四问特高压：安全性与经济性仍遭质疑), People's Daily Online (人民网), 29.04.2014.

government's intention to provide R&D support no longer applied as these projects were not classified as 'test demonstration' projects. The alternative explanation of a lack of technical understanding within government can also be ruled out, at least for the 2013 approval, as the security risks that experts had long associated with UHV-AC were now well-known within the State Council, especially after a widespread and widely reported blackout had occurred in India in 2012 across a number of connected conventional AC-grids.[507] A more likely yet empirically unverifiable explanation is that these approvals were part of a compromise agreement between SGCC and the NEA/NDRC. This interpretation is supported by the fact that neither of the two approved transmission lines traversed regional grid boundaries, but rather deepened the linkages among different provincial grids which already belonged to the same regional grid. In this way, both sides maintained their positions: SGCC was able construct further UHV-AC projects that featured prominently in its 'Three China' grid plan but no further synchronous interconnections between regional grids occurred as a result of this, which had been the most controversial issue within government yet also the most important aspect of SGCC's restructuring plan. The interpretation of the approvals as power struggle-based compromises is further supported by the statement of an employee of the enterprise strategy division in the State Grid Energy Research Institute: "if one side does not grant its approval, SGCC has many other methods at its disposal to make the next higher authority apply pressure, for instance through contacts in the State Council or through personal relationships."[508] This means that these approvals should not be over-interpreted as comprehensive government support for the full underlying agenda, especially as they evidently did not reflect the State Council's, as well as the NDRC's and NEA's, generally sceptical stance on the issue.

While it remains unclear why these specific approvals were granted, this episode further strengthens the impression that the NEA's factual authority vis-à-vis large SOEs in the energy sphere is limited. Not only did the NEA have difficulties communicating and implementing its highly conservative stance on UHV-AC during the formal planning process, it also failed to translate its position into the authorisation procedures for specific UHV-AC projects, possibly due to a necessary compromise. Furthermore, the

[507] Zeng Dewen (曾德文), "SGCC's UHV-AC dream shattered, dream of an interconnected "Three China" grid will not be achieved" (国网梦碎交流特高压，"三华" 联网恐成"南柯一梦"), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 12.10.2012.
[508] Interview with an employee from the Enterprise Strategy Research Institute, State Grid Energy Research Institute, Beijing, 11.07.2014.

chaotic circumstances in which these approvals were granted show that there was no coordinated government leadership on the matter of grid planning at this time, so any notion that government may have been driving UHV development or supporting it based on a clear agenda must be rejected. The relevant sectoral supervisory bodies found themselves in a thoroughly passive position with very limited participation in agenda-setting as they only engaged with the issues placed before them by SGCC. While NEA and NDRC were certainly not entirely powerless in this political exchange (as will become clear in the following sections) it appeared as if they had to tolerate the grid company's political manoeuvring to a certain extent and to occasionally agree to compromises.

6.2.2 The evaluation and assessment of the Huainan-Nanjing-Shanghai UHV-AC transmission project

A particularly insightful series of interactions between SGCC and sectoral authorities regarding UHV-AC approvals occurred during the evaluation and assessment of the Huainan-Nanjing-Shanghai UHV-AC transmission project (淮南 - 南京 - 上海). This project proposal concerned the missing northern section of the UHV-AC loop construction which was emerging in the East China Grid after the Huainan-Zhebei-Shanghai (2011) and Zhebei-Fuzhou (2013) lines had already been approved. It was therefore set to complete the first fully synchronous intra-regional UHV-AC grid of SGCC's 'Three China' grid plan (see Figure 6.3).

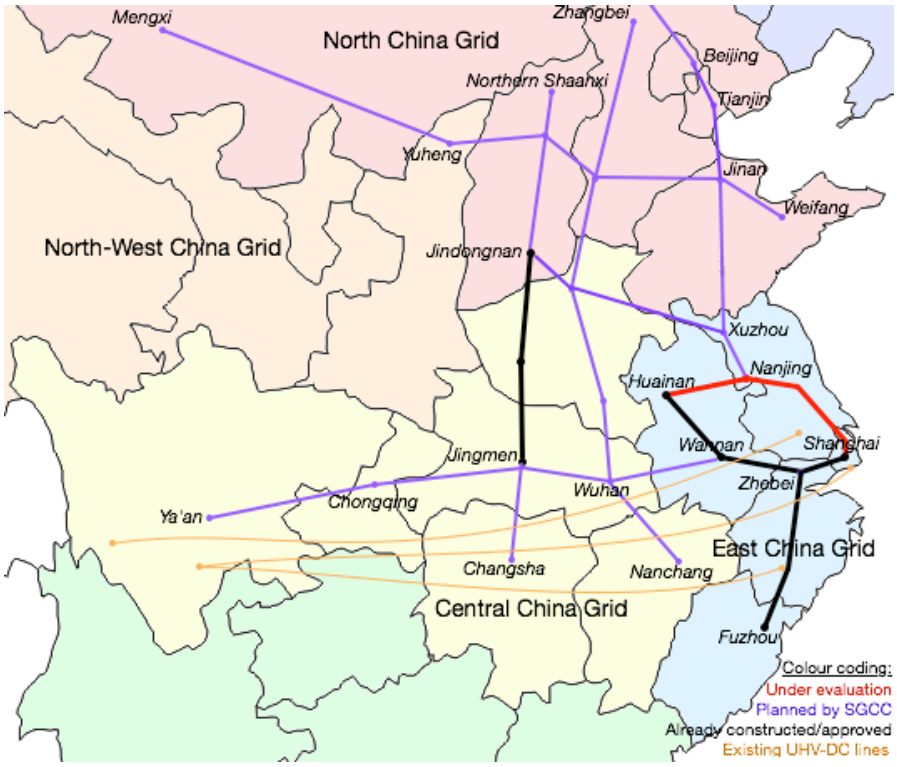

Figure 6.3 The emerging UHV-AC 'Loop' construction in the East China Grid
Source: Author's visualisation of material presented in this section.

Arguments for and against the Huainan-Nanjing-Shanghai UHV-AC line

The main issue of contention surrounding this project was whether the existing 500kV structure in the East China Grid was sufficient given the growing electricity demand in the region and whether it would be able to support large-scale UHV-DC electricity inflows from other regional grids.[509] This issue arose partly because by this time a total of three cross-regional UHV-DC lines – which due to their asynchronous nature had been much less contentious than UHV-AC – had been approved, all of which were set to feed hydropower from China's south-west into the East China Grid (see Figure 6.3).[510] Naturally, SGCC argued that the construction of a synchronous UHV-AC grid in the recipient grid region was indispensable. The head of the State Grid Energy Research Institute, Zhang Yunzhou (张运洲), claimed that the existing conventional grid structure was insufficient from a security standpoint and that only an upgrade to UHV-AC infrastructure would support shifting currents in cross-regional supply as well as any

[509] "Ultra-high voltage state engineering project deadlock unresolved" (特高压国家工程僵局待解), 21st Century Business Herald (21 世纪经济报道), 26.12.2013.
[510] These three 800kV UHV-DC lines were the Xiangjiaba-Shanghai (向家坝 - 上海) 'test demonstration' project, as well as the Jinping-Sunan (锦屏 - 苏南) and Xiluodu-Zhejiang (溪洛渡 - 浙江) projects.

shocks on a larger scale.[511] Feng Jun (冯军), general manager of SGCC's Shanghai Electric Power Company, similarly recommended the approval of the Huainan-Nanjing-Shanghai line and construction of the Yangtze Delta loop project as quickly as possible, arguing that this was vital in order to meet the development needs of Shanghai's power grid, increase the allocation of clean energy and resources to the East China Grid as a whole, and prevent the possibility of large accidents.[512]

Industry experts such as Wang Zhonghong (王仲鸿) of Tsinghua University, on the other hand, pointed out that Anhui Province as the starting point of both the northern and southern part of the loop project in 2012 was already a net importer of thermal power and would therefore have no surplus electricity to send onward to other provinces in the region.[513] Tan Yongcai (谭永才), a former engineer at the Northeast Electricity Institute (东北电力院), furthermore maintained that electricity exchanges between the five provinces in the East China Grid were very limited and that optimising the existing 500kV grid infrastructure would easily suffice to support Anhui's future needs. Adding to the questionable feasibility of the UHV project were its unnecessarily high investment and land resource requirements, making it a "waste of capital and resources, only to let citizens pay the bill".[514]

Administrative struggles over assessment opinions

The approval procedures for this controversial project began with a feasibility study conducted by SGCC with which it was once more supposed to demonstrate the necessity of constructing UHV-AC based on technical comparisons with other grid technologies.[515] During the second half of 2012, SGCC had engaged the China Power Engineering Consulting Group Co. (CPECC; 中国电力工程顾问集团有限公司) for this

511 "Ultra-high voltage state engineering project deadlock unresolved" (特高压国家工程僵局待解), 21st Century Business Herald (21 世纪经济报道), 26.12.2013.
512 "SGCC representative recommends to quickly approve Huainan-Shanghai UHV line" (国网代表：建议尽快核准淮南-上海特高压), Caijing, 04.03.2014.
513 "Ultra-high voltage state engineering project deadlock unresolved" (特高压国家工程僵局待解), 21st Century Business Herald (21 世纪经济报道), 26.12.2013.
514 Tan Yongcai (谭永才), "High investments, zero benefits, and negative capacities in the Huainan-Nanjing-Shanghai UHV-AC engineering project" (高投入、零效益、负能量的淮南--南京--上海交流特高压工程-曾德文-财新博客), *Energy Reflections (*能源思考*)* 85 (January 2014).
515 Zeng Dewen (曾德文), "SGCC's UHV-AC dream shattered, dream of an interconnected "Three China" grid will not be achieved" (国网梦碎交流特高压，"三华" 联网恐成 "南柯一梦"), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 12.10.2012.

purpose;[516] CPECC was a state-owned consulting firm that belonged to the grid company's vertically integrated predecessor, the State Power Corporation, and in 2011 became part of the China Energy Construction Group, a large central-level state firm administered by SASAC. Focusing entirely on consulting and evaluation services linked to electricity projects and specialising in consulting related to UHV power transmission, CPECC is deeply reliant on large state-owned corporate clients such as SGCC and has a rather obvious business interest in furthering SGCC's UHV agenda.[517] Given this background, it is not surprising that CPECC produced a feasibility study of SGCC's planned Huainan-Nanjing-Shanghai UHV-AC line that fully supported the project. Zeng Dewen, who again took part in the project assessment deliberations, published parts of the feasibility reports which he described as "little more than a technical manual for SGCC's UHV construction plan".[518] Failing to include any of the requested comparisons between alternative approaches to grid restructuring, CPECC's reports also lacked any reference to overarching state planning documents as would have been customary and instead phrased all of its recommendations in direct reference to SGCC's own grid development plans, in this case the 'SGCC 2008 General Plan' (国家电网总体规划设计 2008 年版). Design principles for the project, for instance, were simply set as "meet the requirements of the SGCC General Plan" and "use the SGCC General Plan as a guide [...] and comply with SGCC's electricity flow and UHV grid development arrangements". The introduction to one of the reports read:

> Following SGCC's UHV electricity grid plan for the 12th Five-Year Plan period, the UHV-AC grid will take the shape of a backbone grid with 'two horizontal and two vertical' lines. The North, East, and Central China grids will be connected via UHV-AC, thereby forming the 'Three China' synchronous grid. In the East China grid a UHV loop construction will be completed, of which the Huainan-Nanjing-Shanghai 1000kV UHV-AC transmission project will form an important part.[519]

Based on this one-sided feasibility study prepared by CPECC the grid company proceeded to apply to the NDRC for authorisation. However, the NDRC also received

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[516] "Ultra-high voltage state engineering project deadlock unresolved" (特高压国家工程僵局待解), 21st Century Business Herald (21 世纪经济报道), 26.12.2013.
[517] China Power Engineering Consulting Group, "Company profile", http://www.cpecc.net/internet/SitePages/ENWeb/Pages/AboutCPECC.aspx, accessed 08/2015; "China 2 Key Power Sub-Business Groups Set up on Sep. 29," SinoCast Energy Beat, 29.09.2011.
[518] Zeng Dewen (曾德文), "This is not just a bad dream - Reflections on the problems that have been revealed during the assessment of the Huainan-Nanjing-Shanghai UHV-AC transmission project" (这不仅仅是一次梦魇--从淮南～南京～上海交流特高压输变电工程项目评估所暴露问题出发的思考), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 24.11.2013.
[519] Ibid.

a number of critical letters from industry experts urging it to reject the project which, according to a *People's Daily* article, caused the NDRC for the very first time to make use of the possibility of further external evaluations by tasking the China International Engineering Consulting Corporation (CIECC), another state-owned consulting firm, with a further assessment.[520] Throughout 2013, CIECC then conducted on-site investigations of the already operational UHV-AC pilot project as well as a macro-economic study of the East China region. But although, according to Zeng Dewen, CIECC had made every attempt to keep its assessment objective and fair it lacked reliable technical information on the project to use as a basis for its assessment. The reports supplied by SGCC for this purpose included substantial calculation errors, were full of contradictions and contained large gaps regarding important geographical and technical data. This seriously impacted the assessment, as did the grid company's repeated failure to provide additional material requested by the assessment experts. SGCC, Zeng concluded, had "adopted a careless attitude which is only passively responsive to the authorities, and it only followed the [assessment] process for the sake of keeping up with formal proceedings and for trying to force the authorities to approve the start of construction work."[521]

In late October 2013, CIECC called an assessment meeting on the Huainan-Nanjing-Shanghai project in Beijing, bringing together industry experts and representatives from a number of ministries, SGCC and EPPEI, as well as provincial Development and Reform Commissions.[522] The expert group assembled by CIECC originally consisted of 25 people, but for reasons unknown only 19 participants signed the 'expert opinions'. Of the 14 experts that voted in favour of the project, 8 belonged directly to the SGCC system (7 of whom were employed by SGCC) and, of the remaining 6 favourable votes, 3 came from EPPEI which also shared close business interests with SGCC. Four of the missing signatories were employed by the China Southern Grid Corporation and, as a matter of speculation, would have also not been likely to vote against SGCC's plan as the southern grid's own status as an independent regional grid was not affected by it.

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[520] "Four questions regarding UHV: Safety and economic feasibility are still being called into doubt" (四问特高压：安全性与经济性仍遭质疑), People's Daily Online (人民网), 29.04.2014.

[521] Zeng Dewen (曾德文), "This is not just a bad dream - Reflections on the problems that have been revealed during the assessment of the Huainan-Nanjing-Shanghai UHV-AC transmission project" (这不仅仅是一次梦魇--从淮南～南京～上海交流特高压输变电工程项目评估所暴露问题出发的思考), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 24.11.2013.

[522] "CIECC calls in meeting on the Huainan-Nanjing-Shanghai UHV-AC a project" (中咨公司召开淮南~南京~上海特高压交流输变电工), China Electricity Grid News Network (中国电网新闻网), 29.10.2013.

The five opposing votes, once more, were cast by retired industry experts.[523] Despite the majority vote in favour of the project, in November 2013 CIECC refused to recommend an approval because of the continued disagreement by some of the experts on the panel, leading to further delays in the assessment procedures. In response, SGCC protested that there were more than fifty consulting firms like CIECC and that more than one company should participate in the assessment "to increase objectivity, transparency and fairness".[524]

Before discussing the extant material, the evaluation and assessment process of a second controversial UHV-AC project will be presented. Both series of events will then be jointly analysed before concluding this chapter.

6.2.3 The evaluation and assessment of the Ya'an-Wuhan UHV-AC transmission project

A further example of struggles over authority and expertise during UHV-AC evaluation and assessment procedures concerned an SGCC project dating from 2009 which involved the transmission of hydropower from Ya'an in Sichuan Province throughout the Central China Grid, all the way to Wannan (Anhui Province) in the East China Grid (四川雅安－皖南) (see Figure 6.4). Sichuan, with its rich hydropower resources, had long been eyed as a source of clean energy, but earlier state-level plans had rather focused on transmitting the province's surplus hydropower to the neighbouring municipality of Chongqing and other nearby provinces within the Central China Grid via additional regular high-voltage connections.[525] SGCC opposed this solution and instead insisted on a cross-regional UHV-AC connection through which the two major regional grids were to be synchronised into one unified grid spanning a huge landmass, and effectively allowing SGCC to complete almost two thirds of its 'Three China' grid plan. Given the security-related reservations among sectoral authorities regarding cross-regional UHV-AC lines and the synchronisation of regional grids as such, initial approval submissions made little progress, leading SGCC to grudgingly change the destination of the

[523] "Ultra-high voltage state engineering project deadlock unresolved" (特高压国家工程僵局待解), 21st Century Business Herald (21 世纪经济报道), 26.12.2013.
[524] Ibid.
[525] Zeng Dewen (曾德文), "A warning for electricity construction against falling into the trap of the 'Three China' UHV-AC grid (警惕电网建设误入形成 "三华" 交流特高压电网的歧途), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 08.02.2012.

transmission project to Wuhan in Hubei Province (四川雅安 - 湖北武汉).[526] Although this alteration meant that the reach of the planned Ya'an-Wuhan project was confined to the Central China Grid region, overall it still created a basic UHV-AC structure within the region that could easily be connected to the neighbouring East China Grid at a later date.

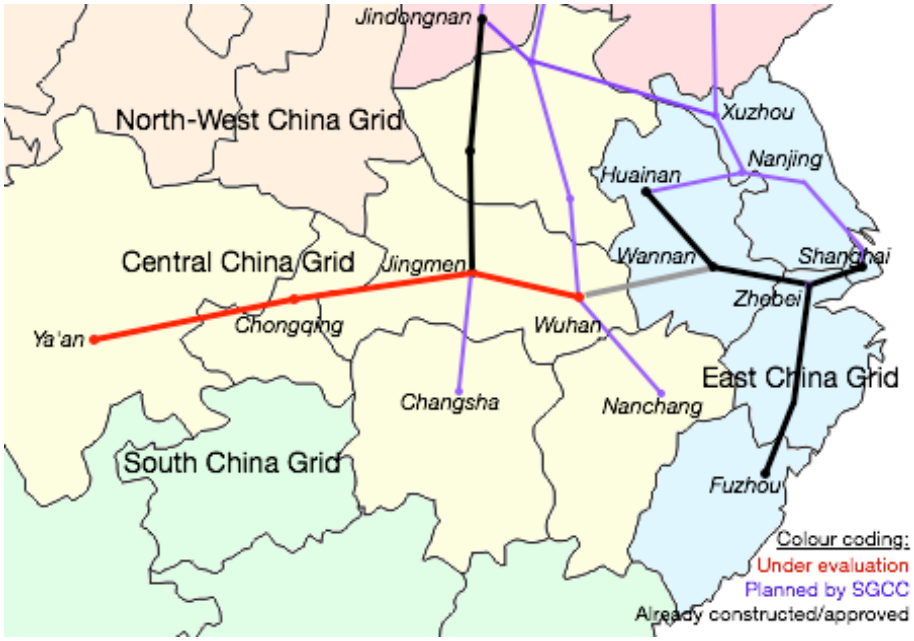

Figure 6.4 The assessment of the Ya'an-Wuhan UHV-AC project in the Central China Grid
Source: Author's visualisation of material presented in this section.

Based on arguments similar to those presented in earlier sections, SGCC argued that the Ya'an-Wuhan project was vital to securing China's electricity supply and improving environmental management throughout all connected provincial grids. Critics, on the other hand, questioned the project's economic feasibility and technical necessity, as well as its impact on grid security, maintaining that hydropower resources in China's south-west were insufficient in the long run and that a synchronous UHV-AC link with its

[526] Zeng Dewen (曾德文), "The whole story about the evaluations, assessments and consultations surrounding the Ya'an-Wuhan UHV-AC electricity transmission project - Communication materials regarding a series of questions concerning the construction of the Ya'an-Wuhan UHV transmission project (Part 1)" (雅安至武汉交流特高压输电工程评审、评估、咨询事件始末--关于雅安~武汉交流特高压输电工程建设问题系列交流材料(一)), article published on Zeng Dewen's industry blog, *Caixin Net* (财新网), 24.08.2014.

constant inflow requirement would cause severe shortages in the region.[527] The grid company countered by suggesting that supply shortages could be averted by constructing two additional asynchronous UHV-DC lines which would supply Sichuan and Chongqing with electricity from the distant north-western province of Xinjiang.[528] The critics' response, on the other hand, was that such a long detour was superfluous and the current hydropower surplus should rather be supplied directly to Chongqing, as had been planned in the original government blueprints.[529]

Administrative struggles over assessment opinions

Given these different perspectives, an administrative scramble ensued which began when SGCC engaged the Electric Power Planning and Engineering Institute (EPPEI) to conduct an evaluation of a feasibility study on the Ya'an-Wuhan line which the grid company itself had carried out earlier.[530] EPPEI accepted the mandate and subsequently testified to "very positive assessment results", emphasising in an internal conference held with the grid company that SGCC's groundwork for the project provided a "firm basis for a smooth launch".[531] According to Zeng Dewen, who again participated in the following NEA-held consultation meetings, EPPEI's unpublished evaluation was once more essentially a copy of SGCC's internal UHV plan. Neglecting to address questions regarding project necessity or provide substantive economic or technical comparisons between different transmission methods, EPPEI had come to the conclusion that the grid company's suggested construction design was entirely feasible while even quoting a number of factual errors and faulty calculations that had been included in SGCC's

527 Ding Gongyang (丁功杨), "Constructing the Ya'an-Wuhan 1000kV AC transmission project is absolutely unnecessary - Communication materials regarding a series of questions concerning the construction of the Ya'an-Wuhan UHV transmission project (Part 5)" (建设雅安至武汉的 1000 千伏交流输电工程完全是没有必要的--关于雅安~武汉交流特高压输电工程建设问题系列交流材料(五)), Article published on Zeng Dewen's industry blog, *Caixin Net*, 22.08.2014.

528 The two proposed UHV-DC lines were to connect Zhundong-Chengdu (准东 - 成都) and Northern Hami-Chongqing (哈密北 - 重庆).
"General Manager of Chongqing Electric Power Co. proposes to speed up the construction of UHV lines to Chongqing" (重庆电力总经理：建议加快入渝特高压建设), Caijing, 04.03.2014; Lantau Group, "UHV. Slow progress but momentum is building," China Focus Newsletter (May 2014), p. 5.

529 Zeng Dewen (曾德文), "A warning for electricity construction against falling into the trap of the 'Three China' UHV-AC grid (警惕电网建设误入形成 "三华" 交流特高压电网的歧途), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 08.02.2012.

530 "Two UHV power transmission lines are about to be passed, Ya'an line to go through second evaluation" (两条特高压输电通道将放行 雅安线路二度评估), Economic Observer Online (经济观察网), 19.07.2014.

531 "EPPEI organizes conference on the launch of the Ya'an-Wuhan UHV-AC project geological report assessment" (电规总院组织召开雅安--武汉特高压交流线路工程地质报告评审会议), Electric Power Planning & Engineering Institute, 02.09.2013,
http://www.eppei.com/WebDetail.aspx?PartNodeId=106&ArticleID=2062, accessed 04/2015.

original feasibility study.[532] While EPPEI's own nominal mandate was to support government in its grid planning, it appears that the institute may have found itself suffering a conflict of interest after being hired by the grid company. Its historical background as a former organisational part of SGCC's predecessor, the State Power Corporation (SPCC), as well as its 2011 merger with a number of former State Grid subsidiaries under the newly established China Energy Engineering Group Co. (中国能建) show that EPPEI had a distinctly administrative background and function while at the same time being firmly rooted in the corporatised side of the industry, which may help to explain its uncritical reiteration of the grid company's stance.[533]

Following the completion of EPPEI's supportive evaluation in November 2012, SGCC sent a series of urgent approval requests to the NDRC over the course of several months. In response, the NDRC again sought out an additional third-party opinion, this time by the China International Engineering Consulting Corporation (CIECC; the state-owned consulting firm which had negatively assessed the Huainan-Nanjing-Shanghai UHV-AC project as discussed in the previous section): CIECC was tasked with reviewing EPPEI's evaluation and organising approval assessments.[534] Unlike EPPEI, CIECC had no immediate historical linkages to the SGCC system and was not exclusively tied to evaluating electricity projects,[535] which, in this instance, arguably gave it slightly more independence from industry stakeholders.

During CIECC's first assessment meeting in 2013, a vote on the Ya'an-Wuhan project was held among the 22 participating experts, 14 of which endorsed the project with 6 opposing votes and 2 abstentions. Of the 22 experts on the voting panel, 13 were employed either directly by SGCC or by work units closely linked to the grid company

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532 Zeng, Dewen (曾德文). "Statement delivered in writing at the 'consultation meeting' on the 'Ya'an-Wuhan UHV-AC electricity transmission construction project' held by the Chinese Academy of Engineering - Section 1 - Communication materials regarding a series of questions concerning the construction of the Ya'an-Wuhan UHV transmission project (Part 2)" (在中国工程院《"雅安至武汉交流特高压输变电工程"咨询会议》上的书面发言材料（之一）关于雅安~武汉交流特高压输电工程建设问题系列交流材料（二)), article published on Zeng Dewen's industry blog. *Caixin Net (*财新网*)*, 19.08.2014.

533 Electric Power Planning & Engineering Institute (EPPEI), "Company introduction" (企业简介), http://www.eppei.com/PartNodeDetail.aspx?PartNodeID=57, accessed 04/2015; China Energy Engineering Group Co., "Corporate Profile," http://en.ceec.net.cn/col/col131/index.html, accessed 04/2015.

534 "Two UHV power transmission lines are about to be passed, Ya'an line to go through second evaluation" (两条特高压输电通道将放行 雅安线路二度评估), Economic Observer Online (经济观察网), 19.07.2014; Zeng Dewen (曾德文), "The whole story about the evaluations, assessments and consultations surrounding the Ya'an-Wuhan UHV-AC electricity transmission project - Communication materials (Part 1)" (雅安至武汉交流特高压输电工程评审、评估、咨询事件始末--关于雅安~武汉交流特高压输电工程建设问题系列交流材料(一)), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 24.08.2014.

535 China International Engineering Consulting Corporation, "Company Profile," http://english.ciecc.com.cn/col/col429/index.html, accessed 04/2015.

via common business interests. The six opposing votes, on the other hand, once more came from retired industry experts who supported an asynchronous DC transmission solution within the Central China Grid and a regular high-voltage link to Chongqing. Despite the vote outcome, CIECC – as in the case of the Huainan-Nanjing-Shanghai project – did not recommend an approval but instead called for a second round of assessments in December 2013, much to the dismay of SGCC which criticised the consulting firm for "not adopt[ing] the opinions of the great majority of evaluation experts".[536]

The *People's Daily* reported that in preparing for the second assessment meeting CIECC was "even more careful with the selection of its expert panel" and that many changes were made to the attendance list until the very last moment; the result was that 13 out of 22 experts voted in favour of the projects while 9 opposed them.[537] Despite two rounds of assessment with two strong majority votes in favour of the project, CIECC again sided with the opposing minority and in January 2014 delivered its 'authorisation evaluation report' to the NDRC in which it recommended 'due to technical and economic considerations' that the project be rejected.[538] The consulting firm proposed, instead, a solution in which the existing regular high-voltage connection between the provincial grids of Sichuan and Chongqing would be strengthened and an additional UHV-DC line would be constructed between Ya'an and the East China Grid to transmit Sichuan's hydropower both to Chongqing in the Central China Grid and to the East China Grid.[539] This proposed solution actually conformed with SGCC's core 'sales' argument of allocating hydropower between both major regional grids, but it rejected

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536 Zeng Dewen (曾德文), "Statement delivered in writing at the 'consultation meeting' on the 'Ya'an-Wuhan UHV-AC electricity transmission construction project' held by the Chinese Academy of Engineering - Section 2 - Communication materials regarding a series of questions concerning the construction of the Ya'an-Wuhan UHV transmission project (Part 3)" (在中国工程院《"雅安至武汉交流特高压输变电工程"咨询会议》上的书面发言材料（之二）关于雅安~武汉交流特高压输电工程建设问题系列交流材料（三)), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 24.08.2014.

537 "Four questions regarding UHV: Safety and economic feasibility are still being called into doubt" (四问特高压：安全性与经济性仍遭质疑), People's Daily Online (人民网), 29.04.2014.

538 "Two UHV power transmission lines are about to be passed, Ya'an line to go through second evaluation" (两条特高压输电通道将放行 雅安线路二度评估), Economic Observer Online (经济观察网), 19.07.2014; Zeng Dewen (曾德文), "The whole story about the evaluations, assessments and consultations surrounding the Ya'an-Wuhan UHV-AC electricity transmission project - Communication materials (Part 1)" (雅安至武汉交流特高压输电工程评审、评估、咨询事件始末--关于雅安~武汉交流特高压输电工程建设问题系列交流材料(一)), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 24.08.2014.

539 Zeng, Dewen (曾德文). "Statement delivered in writing at the 'consultation meeting' on the 'Ya'an-Wuhan UHV-AC electricity transmission construction project' held by the Chinese Academy of Engineering - Section 1 - Communication materials regarding a series of questions concerning the construction of the Ya'an-Wuhan UHV transmission project (Part 2)" (在中国工程院《"雅安至武汉交流特高压输变电工程"咨询会议》上的书面发言材料（之一）关于雅安~武汉交流特高压输电工程建设问题系列交流材料(二)), article published on Zeng Dewen's industry blog. *Caixin Net (*财新网*)*, 19.08.2014.

any UHV-AC-based synchronisation as demanded by the grid company. In response to CIECC's verdict, in April 2014 the grid company sent a report to the NEA titled 'State Grid Corporation report concerning the fastest possible approval of the Ya'an-Wuhan UHV-AC electricity transmission project and regarding the circumstances of assessments' in which it criticised CIECC's negative assessment report, claiming that it "lacked any foundation" and demanding that it "should not become a factor restricting the authorisation of the [UHV-AC] project". SGCC also requested that the NEA "should not evaluate the Ya'an-Wuhan UHV-AC project again and grant its approval as quickly as possible".[540]

According to Zeng Dewen, in light of EPPEI's strongly supportive evaluation, CIECC's strongly opposing assessment and the grid company's vehement interventions, the NDRC and NEA (as the relevant approval bodies) found themselves in a position whereby they were "not able to approve the project even if they wanted to and not able to abandon it either" (欲批无据、欲罢不能). Struggling to reconcile the two diametrically opposite positions, in March 2014 the NEA approached the Chinese Academy of Engineering (中国工程院), the country's leading science and technology institution, to compare the two perspectives and to act as an arbiter.[541] The Academy accepted the consultation inquiry and held three consecutive assessment meetings on the project in July and August 2014, first in the form of a briefing between Academy members and industry experts that were not affiliated to any of the conflict parties, and later by also inviting CIECC, EPPEI and the grid company to the table. The official deliberations for these meetings were partially based on Zeng Dewen's written statements which were used as an important source of information for this section.[542] However, at the time of writing no final verdict on the matter has emerged as the overall approval procedures encountered further delays.

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[540] State Grid Corporation, "State Grid Corporation report concerning the fastest possible approval of the Ya'an-Wuhan UHV-AC electricity transmission project and regarding the circumstances of assessments" (国家电网公司关于尽快核准雅安~武汉特高压交流输变电工程及有关评估情况的报告), Development Document No. 503 [2014], 30.04.2014.

[541] Zeng Dewen (曾德文), "The whole story about the evaluations, assessments and consultations surrounding the Ya'an-Wuhan UHV-AC electricity transmission project - Communication materials (Part 1)" (雅安至武汉交流特高压输电工程评审、评估、咨询事件始末--关于雅安~武汉交流特高压输电工程建设问题系列交流材料(一)), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 24.08.2014.

[542] "Two UHV power transmission lines are about to be passed, Ya'an line to go through second evaluation" (两条特高压输电通道将放行 雅安线路二度评估), Economic Observer Online (经济观察网), 19.07.2014.

6.2.4 Analysis of negotiations over UHV-AC approvals

SGCC's interactions with the National Energy Administration during the evaluation and assessment procedures surrounding the Huainan-Nanjing-Shanghai and Ya'an-Wuhan UHV-AC projects demonstrated how the grid company attempted to further the practical application of its grid development plan and struggled to gain approval for these projects in administrative confrontations with sectoral authorities.

During these clashes, SGCC derived considerable influence over the course of the assessment procedures through its stranglehold over technical information. Despite repeated prompts by the NEA and the assessment panels the grid company refused to supply critical data, especially regarding simulations of technical and economic comparisons between UHV and other transmission methods within its grid area. Furthermore, the feasibility reports that it did supply and the evaluation reports that it engaged consulting firms such as EPPEI to draw up were little more than reiterations of its company-level grid development plans and as such were of very little use for structured assessments. SGCC also appeared to be in a position to partially influence the choice of participants in assessment procedures which in both cases included an absolute majority of experts that had direct or indirect employment relations with the grid company.

Of particular interest is how intermediary state-owned consulting institutions were utilised in disputes over expertise. Overall, SGCC's access to these evaluation bodies appeared to have been as immediate as that of the NEA, as it displayed the ability to shape the contents of numerous evaluation reports which provided the official basis for approval procedures. EPPEI, for instance, seemed to be strongly dependent on the goodwill of both state firms and sectoral authorities and appeared to draft its reports based on the requirements set by whichever side approached them first. During clashes over the 12th Five-Year Plan, EPPEI had been hired by the NEA and in September 2012 came to the conclusion that building a UHV-AC grid was not necessary, while in the case of the Ya'an-Wuhan UHV-AC project only two months later it was hired by the grid company and supported the construction so comprehensively that it did not even bother to fully rephrase SGCC's own feasibility study that it had used as a blueprint for its evaluation report. CPECC, another important intermediary institution, was organisationally just as interwoven with the corporate side of the electricity sector, but in addition had an even stronger interest in furthering SGCC's grid development agenda

due to its business focus on UHV-related consulting work. The only participating consulting institution that the grid company apparently did not have close enough linkages to in order to dominate its decision-making was CIECC, which during both project assessments was engaged by the NEA to deliver additional assessments and in both cases delivered negative verdicts, despite the previous majority votes in favour of the projects.

Despite SGCC's expertise-based influence on the evaluation and assessment process, results for the grid company remained meagre as the NEA repeatedly delayed approval procedures and insisted on further assessments. The NEA's own contributions to the approval procedures, however, were mostly limited to its resorting to formal proceedings which were codified and therefore not as readily disputable by the grid company. Also, the NEA appeared to have used this as a deliberate strategy to impede approval procedures and bring in opinions of critical experts as support for its own limited standing vis-à-vis SGCC. As a result, there was a strong increase in the influence of industry experts and former government officials who stood outside the SGCC system. After their warnings against the risks of UHV-AC had been largely ignored by government over the course of many years, these experts' critical opinions were now made part of the formal assessment procedures by the NEA in order to build a counter-balance to SGCC's dominance of opinion.

These findings regarding 'battles of expertise' between SGCC and sectoral authorities during UHV-related decision-making are substantiated by interview data that indicates a more general informational mismatch between the two sides. Although research related to the electricity industry in China is conducted by a variety of public and private institutions, SGCC-affiliated research bodies are the only ones consistently able to access reliable grid data.[543] According to an employee of one of the grid company's research institutes, external and independent researchers are usually not granted access to this data and similar limitations apply to databases compiled by the other large state-owned energy companies. Although central government also has its own industry-related research capacity, government research tends to be conducted with a policy focus and by researchers with social science backgrounds. Technical research, such as the research required to assess the feasibility of large transmission projects, is almost entirely produced within the SGCC company sphere which gives the grid company an

[543] Interview with a smart grid researcher at the State Grid Energy Research Institute, Beijing, 20.07.2012, 08.11.2012.

influential position regarding the interpretation and dispersion of policy-relevant knowledge. Furthermore, according to this employee, SGCC's research institutes deliberately provide government with advice that primarily aims to ensure that the grid company profits from policy, while sectoral authorities encounter immense difficulties accessing independent consulting services.[544] An employee of the National Energy Administration partially confirmed these statements, maintaining that the SGCC-affiliated institutes "provide [the NEA] with industry research which is always shaped by their own commercial interests."[545]

While its advantages in the field of expertise allowed SGCC to interfere with UHV-related evaluation and assessment proceedings, as demonstrated in this chapter, they did not enable it to simply sidestep the sectoral authorities. Rather, the NEA's insistence on its procedural prerogative as a counterweight to the grid company's informational advantages resulted in prolonged approval delays and extended phases of administrative deadlock.

6.3 Chapter conclusions

This chapter showed how the fate of SGCC's restructuring plan changed during attempts to advance with a broader sectoral application of UHV technology as the grid company now encountered substantial government resistance regarding the same types of projects that had previously been looked upon favourably through the lens of cross-sectoral R&D policy. As demonstrated in the previous chapter, SGCC had been able to tactically align itself with the latter by portraying the 1U4L agenda in terms of furthering 'indigenous innovation' and overall industrial competitiveness, but its linkages at the industry level were considerably weaker. Although the grid company had invested tremendous effort in presenting its 1U4L plan as a more direct technological solution to many of the same macro-issues that had been targeted by the State Council via the No. 5 Document's sectoral marketisation agenda, it now came under much closer scrutiny as part of sectoral deliberations. In the absence of convincing 'synchronisation' with State Council macro-goals it became very difficult for the grid company to progress with its restructuring plan.

[544] Ibid.
[545] Interview with an official at the National Energy Administration, Beijing, 25.07.2013.

Empirically, this chapter analysed the administrative struggle that emerged between SGCC and the National Energy Administration regarding the drafting of national-level grid plans as well as the evaluation and assessment procedures pertaining to a number of crucial UHV-AC transmission projects. The first part of this chapter gave insight into how SGCC attempted to influence government's grid planning procedures. Based on a narrative of energy development necessities that was largely supplied by the grid company itself, parts of the basic logic of the 1U4L plan (i.e. the construction of regional energy bases and the concept of long-distance electricity transmission) were indeed included in the State Council's overall 12th Five-Year Plan (2011-2015) but the core of SGCC's agenda – the construction of a 'Three China' UHV-AC grid – was left out. Throughout its negotiations with the NEA over the more specific 12th Five-Year Plan for electricity grid development, SGCC tried to make up for the lost ground by pushing for its internal grid development plan to be converted into national-level policy. The NEA prevented this, but was unable to produce an alternative plan due to SGCC's opposition. As a consequence, a sectoral Five-Year Plan for this timeframe was never agreed and planning procedures entered deadlock.

The second part of the chapter analysed the evaluation and assessment procedures surrounding four different UHV-AC projects in the absence of a sectoral Five-Year Plan, showing how SGCC entered into direct confrontation with sectoral regulators while demanding project approvals based on sector-specific reasoning. Between 2011 and early 2014, a situation reminiscent of a compromise evolved in which the NEA refused to accept UHV-AC as part of the sectoral Five-Year Plan while still approving two comparatively short intra-regional transmission projects. This allowed SGCC to begin construction on its 'Yangtze-Delta UHV-AC Loop' within the East China Grid while limiting the overall sectoral impact of SGCC's restructuring plan. Both approvals were granted in nebulous circumstances and were not accompanied by any broader statements of purpose or overall support for this grid development agenda that would have indicated significant changes in sectoral reform preferences within central government. The obvious hastiness and lack of coordination among responsible government bodies furthermore suggests that the approvals were not part of a broader government agenda supporting UHV-AC.

After the two completed approvals, two further project evaluation and assessment procedures were analysed where, again, the NEA obstructed SGCC's attempts to synchronise the Central and East China regional grids and complete the synchronisation

of provincial grids within these two grid regions. The NEA's opposition coincided with aggressive administrative manoeuvring on the part of SGCC, whose high administrative rank allowed it to engage with sectoral authorities on an equal footing. The grid company's main courses of action during these interactions included a) entering into ongoing 'battles of expertise' with the NEA, mainly via its direct access to important intermediaries such as sectoral consulting and evaluation firms which were used as proxies by both sides; b) utilising its strong control over industry information and expertise to withhold policy-relevant information and supply biased reports which formed the sole available data foundation for official assessments; c) seemingly influencing the list of participants in approval procedures to ensure voting majorities, and d) repeatedly raising objections to the NEA's decisions and refusing to cooperate during assessments when its interests were threatened. Applying these strategies, SGCC was able to partially shape the course of bureaucratic processes during both grid planning and project assessments, although this only helped the grid company to a rather limited extent and tended to lead to situations in which both sides kept each other more or less in check.

Particularly interesting in this regard were both sides' ongoing attempts to outdo each other in terms of expertise so as to get 'objectivity' on their side. Rather than being able to simply rely on political connections or on its administrative rank, SGCC actually had to participate in political debate and provide convincing arguments in order to protect and further its interests. Similarly, when addressing the grid company's demands the NEA also had to engage on an argumentative level instead of being able to dismiss project ideas outright, even those considered unfeasible by evaluators. In fact, entering into battles of expertise with the grid company and resorting to protocol in order to extend project assessment procedures appeared to be the main available option for the NEA to actually resist the pressure applied by SGCC. In doing so, the NEA relied heavily on the expertise provided by a number of external industry experts and retired government officials whose arguments had previously been largely overlooked, but who had now been granted formal participation in bureaucratic processes, most probably in order to provide a counter-balance to SGCC's provision of one-sided industry expertise. Together with the assessments of the China International Engineering Consulting Corporation (CIECC), these experts' critical analyses challenged SGCC's argumentative prerogative and its claims regarding UHV-AC's efficiency, economic/environmental costs and grid security profile, thereby slowly undermining

the grid company's tactical 'synchronisation' with the policy goals inherent in the No. 5 Document on which it had based its original introduction of its 1U4L plan into the policy arena (see Chapter 4). Under these circumstances of dwindling 'synchronisation' with the industry-level macro-goals pursued by the State Council and given the inapplicability of its previously successful 'synchronisation' with cross-sectoral R&D policy (see Chapter 5), SGCC experienced substantial difficulties in further applying its agenda as it was unable to dissolve or bypass the NEA's opposition; the NEA, on the other hand, was unable to rein in SGCC's persistent challenges or remove its project suggestions from the agenda.

6.4 PART B Epilogue regarding the analysis of SGCC's influence on sectoral policy-making

The three chapters in Part B of this study showed empirically how SGCC placed its own industry reform plan on the political agenda (Chapter 4), managed to gain administrative support for R&D endeavours and the construction of pilot projects (Chapter 5) and struggled against the refusal of sectoral authorities to approve a full sectoral application of its 1U4L plan (Chapter 6).

As such, Part B of this study has revealed a number of important observations regarding the configuration of interplay between SGCC and central government during the emergence of the new sectoral reform plan. It was shown that a) the 1U4L plan as such originated within SGCC, that its inherent logic presented a distinct and intentional challenge to existing sectoral policy, and that all attempts at applying it in practice were initiated solely by the grid company; b) no conclusive evidence for clear central government leadership accompanying any of these steps was detected, as government almost exclusively reacted to SGCC's advances rather than taking proactive steps of its own; c) there was systematic evidence of government support for aspects of the restructuring plan that were portrayed by the grid company as being beneficial to the implementation of already existing sectoral macro-goals or cross-sectoral policy, portrayals which in most cases were disputed by external industry experts and d) there was equally systematic evidence of government opposition to the overall sectoral application of SGCC's restructuring plan.

So, despite distinct differences regarding stated sectoral policy preferences, there were numerous instances in which government showed tolerance or even support for aspects of SGCC's grid restructuring agenda which presented an indirect yet fundamental challenge to existing sectoral policy on competitive regional market building. A large majority of these supportive instances coincided with strong attempts by the grid company to tactically 'synchronise' the portrayal of its restructuring plan with macro goals pursued by the State Council. For example, SGCC introduced its 1U4L plan into the policy arena by 'synchronising' with the overarching *goals* inherent in the No. 5 Document while presenting an entirely different *route* towards those goals. Furthermore, the grid company successfully demanded government support for the construction of early UHV pilot projects and numerous related and sectorally contentious pursuits by consistently invoking cross-sectoral State Council policy regarding 'indigenous innovation' and insisting that the 1U4L plan would greatly enhance the international competitiveness of Chinese industry. Finally, the grid company gained government support for a number of contentious investments which openly violated the unbundling requirements of the No. 5 Document but helped it progress with UHV development by 'synchronising' itself with the intrinsic institutional mandates of different government bodies and engaging in targeted venue-shopping among them.

While these 'synchronisation' attempts generally led to supportive responses from different parts of government and allowed SGCC to progress with different aspects of its UHV-based agenda, the cooperative interplay ended abruptly when these argumentative macro-linkages were weakened or absent, as was the case during the grid planning-related administrative clashes between the grid company and the NEA over the expected sectoral effects of applied UHV-AC technology. In the absence of such suitable macro-alignments, SGCC resorted to head-on confrontation with sectoral authorities, but the resulting administrative 'tug-of-war' rarely allowed for significant advances and mostly led to prolonged periods of deadlock.

In conclusion, an important determinant for the extent of grid company influence on the sectoral policy environment appears to have been whether it managed to 'synchronise' the portrayal of its own sectoral plans with government-sanctioned macro-goals. Given that the 1U4L plan from the outset was aimed at challenging existing sectoral market building policy and asset unbundling requirements, it appears that SGCC has been applying this 'synchronisation' strategy in a deliberate manner, attempting to utilise variances between different levels of policy in order to circumvent

critical sectoral reform debates, by-pass sectoral policy requirements by gathering support based on higher-level policy pretexts and thereby influence the sectoral policy environment according to its own preferences. As well as challenging existing sectoral policy that was perceived as a threat to its organisational unity, the main goal pursued by the grid company via this 'synchronisation' mechanism appeared to be the establishment of a setting that would allow it to permanently combine its cross-regional monopoly position across the transmission, distribution and retail segments with reliable and persistent market dominance in lucrative and nominally competitive auxiliary segments so as to maximise economic results at the firm level (as argued in the Chapter 3 conclusions). The 1U4L plan brought together both of these pursuits as it combined enhanced vertical and horizontal integration of grid assets and operations with a technological core that offered substantial commercial opportunities to the grid company due to its control over leading equipment manufacturers and technological standards.

It appears that the application of this 'synchronisation' strategy has indeed been working in the grid company's favour and that it has been an effective mechanism for engaging with the policy environment in which it operated, especially in comparison with the confrontational bureaucratic manoeuvring observed during grid planning procedures which required tremendous effort but did not yield very high rewards. SGCC's most significant progress during the advancement and practical application of its sectoral reform plan appeared to have resulted from deliberately 'synchronising' with macro-level/cross-sectoral policy in order to overcome sector-specific reservations to its restructuring plan. Falling 'out of sync' with these macro-goals, on the other hand, coincided with an immediate increase in difficulties for the grid company at the sectoral level.

When considered together (Part B with its focus on SGCC's role during the emergence of a new sectoral policy agenda and Part A with its evidence of SGCC's obstruction of crucial unbundling steps that formed the core of the 2002 market building agenda), the two parts of this study suggest that the grid company was able to shape processes of policy formulation and implementation in China's electricity supply industry in a way which calls into question the validity of the dominant government-centred perspectives on how economic policy is formulated and applied in China's strategic industries. At the same time, Parts A and B also showed that SGCC's influence was not nearly as overwhelming as the SOE-centred literature would have expected it to be as the grid

company repeatedly encountered severe sectoral opposition that it was unable to overcome despite utilising its direct access to policy-making processes and high administrative rank/political connections or, indeed, applying political pressure based on these features. In combination, Parts A and B suggest that the way in which action and intent on the part of SGCC mattered in terms of the implementation and formulation of sectoral policy in a 'most likely' case for both streams of the literature has followed a particular pattern which has been briefly outlined above. Some parts of this pattern, namely central state firms' engagements with differences in mandates among central government bodies and with broader state goals, have been noted by a small number of authors within the SOE-centred literature (such as Downs (2008b), Chen (2010) and Xu (2012)). These engagements' actual effects, however, were inconclusively demonstrated due to these authors' omission of comparative angles, their reliance on very small numbers of anecdotal examples and their general failure to provide insight into the processes via which they occurred and were linked to policy results. Moreover, these authors mainly interpreted their observations as evidence of central state firms' extreme strength vis-à-vis weak administrative bodies while furthermore overlooking the distinct limitations to state firms' policy influence and the bi-directional logic of interplay between firms and regulators, as well as the factors that affect this logic – all of which throughout Parts A and B appeared to be of the utmost importance for understanding policy output and outcomes.

In the following and final Part C, the suggested 'synchronisation'-based pattern of interaction between central government and SGCC will be re-tested against a later series of empirical processes from the electricity supply industry. If this pattern continues to apply, it may be viewed as a tentative qualifier for the dominant perspectives on both sides of the literature regarding the balance of government guidance and central SOEs' influence on central-level policy processes in China's strategic industries, as well as for the different perspectives regarding the mechanisms through/conditions under which said influence occurs.

PART C: Re-testing findings

7 Tracing SGCC's 'synchronisation cycle'

In Part C of this study, the combined findings from Parts A and B about how, under which conditions, and to what extent SGCC – based on both actions and intent – has been able to shape central-level processes of policy formulation and implementation in the electricity supply industry are re-tested across a number of later empirical sequences originating from the same industry case. A series of before-after comparisons will be applied in order to examine the validity of the findings that resulted from the application of process tracing and the congruence method throughout previous chapters.

As argued in the preceding chapter on grid planning, in the absence of suitable 'synchronisation' with macro-level policy SGCC encountered substantial sectoral opposition to the practical application of its industry restructuring plan and the construction of a UHV transmission network. Part C of this dissertation consists of one long final chapter which will illustrate in three 'before-after' steps how SGCC a) successfully overcame sectoral opposition by 're-synchronising' its grid planning suggestions with cross-sectoral policy, this time in the environmental field; b) was forced back into sectoral policy gridlock once the new cross-sectoral 'synchronisation' dissolved again; and c) in response again tried to find new ways to 're-synchronise' so as to bypass or at least reduce the impact of these new hindrances on its restructuring endeavours. This series of events which took place over a comparatively short period (mostly between mid-2014 and mid-2015) demonstrates the systematic nature of SGCC's 'synchronisation' strategy. By illustrating a full 'synchronisation cycle', this chapter outlines the effects of both successful 'synchronisation' and 'falling out of sync' on the implementation progress of SGCC's sectoral reform agenda while allowing for a number of inferences regarding factors that affect the applicability and shape the effect of this mechanism.

7.1 Breaking up the grid planning deadlock

This first section will demonstrate how SGCC tactically 're-synchronised' the portrayal of its '1 Ultra, 4 Large' (1U4L) plan with cross-sectoral central government policy preferences in order to overcome sectoral deadlock in political negotiations. In response to the difficulties it encountered at the sectoral level during the clashes over grid planning and project approvals, the grid company adapted the presentation of its restructuring plan in accordance with the cross-sectoral policy shifts that were occurring simultaneously. These shifts were driven by a major anti-air pollution plan published by the State Council that lent itself to a new 'synchronisation' attempt and allowed the grid company to move its own sectoral policy suggestions from a disadvantageous framework of assessment to another, more advantageous one. By once more tactically 'synchronising' its claims with cross-sectoral central government policy preferences, it will be argued, SGCC managed to shape the way in which the new macro-policy was applied during sectoral decision-making, ultimately leading to several new and very swift UHV-AC project approvals despite the tense sectoral struggles over grid planning which had peaked only weeks before.

7.1.1 SGCC's 'synchronisation' with cross-sectoral policy on air pollution control

As discussed in the previous chapter, the most controversial topics of political debate during the repeated confrontations between SGCC and sectoral authorities over grid planning and UHV project approvals concerned questions regarding the economic feasibility of the grid company's 1U4L plan and its probable impact on overall grid security. SGCC insisted that the construction of a UHV-AC grid would have major advantages in both areas, while external industry experts and evaluation bodies working with the NEA argued the opposite. Other alleged advantages on which the grid company had initially rested its case included claimed benefits regarding the control of environmental pollution based on the idea of moving air polluting thermal power plants to China's periphery, far away from urban centres. Over the years and together with generally rising environmental awareness in Chinese politics, the grid company also began to emphasise potential efficiency gains and enhanced grid access for renewable energy as components of its grid restructuring plan.

While pollution control was always on the list of arguments used by SGCC to lobby for its agenda, it was initially not emphasised any more than any of the other multiple alleged advantages, as can be seen from Liu Zhenya's 2006 landmark speech on UHV transmission in which the topic appears only very briefly and as one of many.[546] During the recurring clashes between NEA and SGCC over UHV project assessments between 2010 and 2013 the topic was hardly addressed at all, whether as part of the grid company's portrayal of its projects or during the assessments driven by the NEA. As China's air pollution problems intensified and it emerged that the State Council was working on a new policy guideline to counter this increasingly pressing issue, SGCC immediately seized the opportunity to rebalance its argumentative strategy by placing the topic of pollution control at the very top of its agenda while promoting its 1U4L plan to central government and the wider public. After the State Council published its 'Action Plan for the Prevention and Control of Air Pollution'[547] in September 2013, SGCC began to almost exclusively present its agenda in reference to air pollution concerns,[548] referring to the 1U4L strategy as "the inevitable, and possibly the only choice" for mitigating China's smog problem.[549] In the following sections, both SGCC's engagement with the State Council's anti-pollution plan as well as its impact on the fate of the 1U4L plan will be analysed.

7.1.2 The State Council's 'Action Plan' against air pollution

Published in September 2013, the State Council's *Action Plan for the Prevention and Control of Air Pollution* revolved around the specification of air pollution reduction targets, according to which the concentration levels of fine particles (PM2.5) in the air of all larger cities were to drop by a minimum of 10% by 2017 as compared to 2012 levels. For the large metropolitan area encompassing Beijing, Tianjin and the province of Hebei the requirement was set at 25%, and for the Yangtze and Pearl River deltas at 20% and 15%, respectively.[550] In order to reach these targets, the 'Action Plan'

546 "Liu Zhenya: UHV transmission is the only way for China's electricity development" (刘振亚：特高压输电是中国电力发展的必由之路), People's Daily Online (人民网), 28.11.2006.
547 State Council, "Action Plan for the Prevention and Control of Air Pollution" (大气污染防治行动计划), Document No. 37 [2013], 10.09.2013.
548 "Controversy underlying the 'effective strategy against air pollution', SGCC promoting UHV with grand words" ("治霾良方"背后存争议 国网高调推动特高压), People's Daily Online (人民网), 17.03.2014.
549 Liu, 2013, p. 69.
550 State Council, "Action Plan for the Prevention and Control of Air Pollution" (大气污染防治行动计划), Document No. 37 [2013], 10.09.2013.

demanded a general push towards renewable energy and called for a decrease in coal consumption in eastern and southern areas; it listed numerous measures by which these changes should be achieved, including, among several others, the vaguely phrased possibility of "progressively increasing the proportion of electricity received from outside" (通过逐步提高接受外输电比例).[551] While the mention of long-distance transmission indicated increased backing for the concept as such, there remained intense political controversy regarding the specific types of transmission systems that should be used (i.e. regular high-voltage or UHV, as demanded by SGCC) and the question of whether synchronous interconnections between the separate regional grids should be constructed (i.e. whether a cross-regional UHV-AC grid should be built) or whether connections should remain asynchronous on the basis of DC technology.[552] In light of these disputes, and just as in the 12th Five-Year Plan published in 2011, the State Council included a broad reference to long-distance transmission as one possible development trajectory but omitted any reference to UHV technology.

When the Action Plan was disseminated to relevant central government institutions including the National Energy Administration, the State Grid Planning Centre (国家电网计划中心) immediately stepped forward and proposed a plan centred on the construction of four new UHV-AC lines, three of which were to synchronise the six provinces and municipalities that together formed the North China Grid and also encompassed Beijing, Tianjin and Hebei Province – the major urban hub which the Action Plan had identified as the most urgent target for anti-air pollution measures. Supplemented by another four UHV-DC lines which were to transmit electricity among the North, North-West and East China grids, the fourth and final suggested UHV-AC project was the still unapproved and highly contentious northern section of the Yangtze-Delta UHV-AC loop project over which SGCC and the NEA had been fighting for several years (see Chapter 6). According to the State Grid Planning Centre's vice-director Zhang Zhengling (张正陵), this plan was presented to the NEA in September 2013, immediately after the State Council Action Plan had been published.[553]

A number of important aspects of SGCC's reaction to this cross-sectoral policy shift should be noted, particularly the grid company's autonomous interpretation that the

[551] Ibid., Part 3, §8.
[552] "Meng Dingzhong: DC power transmission can meet all requirements" (蒙定中：直流输电完全可以满足要求), Daily Economic News (每日经济新闻), 20.05.2014
[553] "China plans to construct twelve cross regional power lines to control smog - to enter operation before 2017" (中国规划建设 12 条治霾跨区送电通道 2017 年前发挥作用), Caijing, 26.02.2014.

Action Plan's intentionally vague phrasing on long-distance transmission referred to UHV-AC and UHV-DC grid development, thereby determining the basis for subsequent negotiations over specific projects. Furthermore, in response the grid company only suggested transmission projects that were very close regional matches with the State Council's requirements of focusing on the urban area surrounding Beijing and the Yangtze River delta. Finally, all of the suggested projects had already been pursued by the grid company since at least 2009 and had formed core components of its internal 12th Five-Year Plan. As such, they had been at the centre of the assessment and evaluation struggles several years before the State Council even started drafting its anti-air pollution document.[554] These were not new projects quickly conceived by SGCC in order to comply with the State Council's requirements, but already existing project blueprints that the grid company had, for a long time, been struggling to realise against the scepticism of sectoral authorities and which were now recycled under a different guise in order to appeal to the State Council as a higher authority. By presenting these pre-existing sector-specific projects as perfect matches for the cross-sectoral Action Plan, the grid company aggressively pushed the boundaries of what had hitherto been politically possible at the sectoral level.

7.1.3 The NEA's sectoral application of the State Council 'Action Plan'

One month after the State Council's Action Plan, in October 2013 the NEA published a work plan which required the State Electricity Planning Research Centre (SEPRC, 国家电力规划研究中心) to devise a research report on how to apply the new cross-sectoral anti-air pollution policy in the grid segment. Significantly, the appendix of this work plan listed twelve specific transmission corridors as research targets which included the exact routes pushed for by SGCC.[555] While the precise political processes through which SGCC's route suggestions found their way into the NEA document remain unclear, it is

[554] "First UHV line put into operation - A 'two vertical, two horizontal' pattern emerges" (首条特高压线投入运营 "两纵两横" 格局显现), Nanfang Web (南方报网), 25.02.2009; "State power grid plans to invest 270 billion yuan in smart grid construction during the 12th Five-Year Plan period" (国电网规划 "十二五" 投资2700 亿元建设智能电网), *Modern Electric Technology (*现代电子技术*)* 22 (2010): 93; "SGCC's 12th Five-Year Plan for UHV investment officially launched" (国家电网十二五特高压投资规划出台), Shanghai Securities News, 13.08.2010.

[555] National Energy Administration, "Letter about entrusting research work regarding the launch of the electricity grid implementation programme as part of the implementation of the Action Plan for the Prevention and Control of Air Pollution" (关于委托开展落实大气污染防治行动计划电网实施方案研究的函), Document No. 406 [2013].

highly unlikely that this document represented an actual shift of opinions regarding UHV-AC within the NEA, as can be seen from the phrasing of the document itself. Firstly, the document instructed SEPRC to conduct its research "on the basis of existing national electricity grid plans", which, as a matter of fact, did not include any official support for the construction of UHV infrastructure and which, in the case of the most recent version, was facing complete deadlock at the time due to clashes of opinion between NEA and SGCC (see Chapter 6). Secondly, the document omitted any specifications regarding transmission methods and voltage levels, referring to the projects neutrally as "electricity transmission channels" (输电通道).[556]

Moreover, the document was published at a time when the NEA had just blocked UHV-AC from officially becoming the basis of future national-level grid planning and was still in the midst of strenuous negotiations with SGCC over various project evaluations and assessments. The list of transmission corridors in the document's appendix even included the exact route of the controversial northern section of the Yangtze-Delta loop which the China International Engineering Consulting Corporation (CIECC), a state-owned project assessment firm, on behalf of the NEA, was about to block due to security concerns (also see Chapter 6). Although the NEA did not specify this project as UHV-AC in its list, it was the only missing section in an already emerging UHV-AC grid in the East China region, so naturally only a UHV-AC specification made sense in these circumstances. While the exact processes underlying the publication of this document remain unclear, the general political setting and concurrent clashes with SGCC over some of the exact same projects, as well as the phrasing of the document itself, give the impression that it was issued under pressure from both the State Council (in order to quickly submit targeted sectoral solutions to the air pollution problem) and from SGCC (which had publicly advertised UHV-based project plans that perfectly matched the State Council's requirements about which the NEA itself, however, remained highly sceptical). The political urgency underlying the matter and the pressure under which the NEA found itself appears to have facilitated SGCC's attempts to influence the official sectoral response to the new macro-policy.

In its work plan, the NEA subsequently employed the above-mentioned State Electricity Planning Research Centre (SEPRC) to conduct follow-up research work on the listed transmission corridors, which was to include a forecast of expected practical

[556] Ibid.

effects. The SEPRC had originally been established in September 2011 for grid planning assistance purposes under the Electric Power Planning and Engineering Institute (EPPEI, 电力规划设计总院),[557] the evaluation institution that, qua regulations, played a crucial role in almost all project approval processes in the electricity sector and which sustained very close ties with SGCC. Just how close its working relationship with the grid company was could be deduced from one of EPPEI's 2015 press releases which summarised a meeting that took place between its vice chairman, Xie Qiuye (谢秋野), and the director of the grid company's UHV-DC Department, Liu Zehong (刘泽洪), in which Xie was quoted as saying that EPPEI would "as always continue to support SGCC's work", while Liu maintained that "SGCC and EPPEI have always been and will continue to be cooperative partners", even asserting that their "mutual existence depends on each other".[558]

Given EPPEI's and the grid company's self-stated mutual dependence, it is no surprise that the SEPRC, as an EPPEI subsidiary, in January 2014 supplied the NEA with a *Research Demonstration Report* in which it recommended the construction of four UHV-AC projects, five UHV-DC projects and three conventional 500kV high voltage lines involving investments of over RMB 200 billion: this exactly matched the pattern originally suggested by SGCC and was in full accordance with the grid company's 'Three China' grid plan.[559] According to a synopsis published in the media, the report contents mostly repeated and summarised SGCC's original application materials while emphasising that SGCC's transmission plan fulfilled the "requirements of the overall national grid pattern" and expounding on the "general plan to link up the North China electricity transmission channels" with the prospect of forming a "UHV network". At the same time, the report presented the four UHV-AC projects and UHV technology as a suitable infrastructural response to the Action Plan against air pollution, but without

[557] National Energy Administration, "State Electricity Planning Research Centre officially launched" (国家电力规划研究中心正式启动), 30.01.2012, http://www.nea.gov.cn/2012-01/30/c_131381850.htm, accessed 04/2015.
[558] "Xie Qiuye meets with the director of SGCC's UHV-DC department Liu Zehong and his delegation" (谢秋野会见国家电网公司直流部主任刘泽洪一行), Electric Power Planning & Engineering Institute (press release), 02.02.2015, http://www.eppei.com/WebDetail.aspx?PartNodeId=106&ArticleID=3854 (accessed on 01.04.2015).
[559] "NEA about to authorize 12 new transmission lines - UHV-AC to be passed" (传国家能源局将批复 12 条输电通道 放行交流特高压), Sina Web, 12.05.2014; "SGCC's eight large UHV projects approved - grid link-up in northern China is looking hopeful" (国网八大特高压获准 华北联网有望), 21st Century Business Herald Online (21 世纪网), 13.05.2014.

providing any indication of how exactly the building of these transmission lines related to the air pollution reduction targets set by the State Council.[560]

After receiving SEPRC's evaluation report, the NEA engaged the sectorally less entangled and therefore arguably more independent China International Engineering Consulting Corporation (CIECC) for an additional assessment, just as it had done during earlier approval processes regarding UHV-AC project assessments.[561]

7.1.4 The 2014 'Two Meetings' as SGCC's platform for strengthening its 'synchronisation' with anti-smog policy

While the CIECC's assessment of SEPRC's *Research Demonstration Report* was still pending, SGCC sought out opportunities to further implant its environmental pro-UHV arguments into the broader political debate. One such opportunity presented itself in March 2014 in the form of the plenary sessions of the National People's Congress (NPC) and the National Committee of the Chinese People's Political Consultative Conference (CPPCC), commonly referred to as the 'Two Meetings' (两会). The 'Two Meetings' is when the two bodies, on an annual basis, discuss and then approve political decisions that tend to have already been made within the State Council and the Communist Party. While the decisions made during the 'Two Meetings' are usually more or less scripted, the associated discussions that take place tend to attract a lot of publicity and media attention and also provide the opportunity to spread policy-relevant messages among a large number of high-ranking officials.

Consequently, on the opening day of the 'Two Meetings' in March 2014, SGCC placed articles in both the *People's Daily* and the *People's Political Consultative Daily* (人民政协报), the news organ associated with the CPPCC, in which the grid company chairman Liu Zhenya (himself a member of the CPPCC's Standing Committee) explained the numerous ways in which UHV could help to solve China's air pollution problem. Listing all of SGCC's environmental pro-UHV arguments (as briefly analysed in Chapter 4), Liu also claimed that by constructing a UHV grid in accordance with the

[560] "The claim that UHV-AC is suitable for smog control lacks a scientific basis" (交流特高压治雾霾缺乏科学依据), Dongfang Daily (东方早报), 27.03.2014.
[561] "Assessment conference on the 'Research demonstration report on key electricity transmission channels under the Action Plan for the Prevention and Control of Air Pollution' opened in Beijing" (《大气污染防治行动计划重点输电通道研究论证报告》评估会在京召开), Electric Power Planning & Engineering Institute (press release), 06.01.2014, http://www.eppei.com/WebDetail.aspx?PartNodeId=106&ArticleID=2738, accessed on 04/2015.

1U4L strategy, PM2.5 pollution in eastern and central China could be lowered by 12% by 2015 and 28% by 2020, both as compared to 2010 levels. "By relying on the UHV grid and by forming an energy utilisation structure centred around electricity and focussed on clean energy", Liu asserted, "we can solve China's air pollution problem at its source".[562] The following day, similar statements were made by two of SGCC's top managers in their dual function as NPC delegates. Meng Qingqiang (孟庆强), general manager of SGCC's grid subsidiary in the central government-administered municipality of Chongqing, stated that speeding up the construction of Chongqing's UHV link (the strongly contested Ya'an-Wuhan UHV-AC line; see Chapter 6) would effectively relieve the city's "daily growing environmental pressure", as it would allow a reduction in Chongqing's coal usage and substantially lower its emission of pollutants.[563] The general manager of SGCC's grid subsidiary in Shanghai, Feng Jun (冯军), added that a speedy construction of the UHV-AC grid in the east (referring to the equally contested Huainan-Nanjing-Shanghai UHV-AC project, i.e. the final missing northern section of the Yangtze Delta loop construction) would improve the allocation of clean energy to Shanghai as well as the East China Grid as a whole and thereby provide "forceful support" during the process of solving the air pollution problem.[564] According to the *People's Daily*, SGCC chairman Liu Zhenya on several occasions also personally intervened in discussion forums during the 'Two Meetings', demanding that nationwide UHV and smart grid construction should be accelerated. Giving "high sounding speeches" at a CPPCC forum, Liu announced that SGCC was now aiming to expand the UHV-AC grid from the previously targeted "Three vertical, three horizontal, one loop" setting into a "Five vertical, five horizontal" grid structure, supplemented by now 27 planned UHV-DC projects, proclaiming that "constructing UHV can open up a completely new approach to smog control".[565]

This series of statements can be interpreted as targeting a number of different objectives. By linking UHV's alleged benefits for smog control to the State Council's action plan against air pollution, SGCC aimed to gain further political legitimacy for its

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[562] "SGCC's Liu Zhenya: Develop the UHV electricity grid, break the smog dilemma" (国家电网刘振亚:发展特高压电网 破解雾霾困局), People's Daily Online (人民网), 03.03.2014; "Four questions regarding UHV: Safety and economic feasibility are still being called into doubt" (四问特高压：安全性与经济性仍遭质疑), People's Daily Online (人民网), 29.04.2014.

[563] "General Manager of Chongqing Electric Power Co. proposes to speed up the construction of UHV lines to Chongqing" (重庆电力总经理：建议加快入渝特高压建设), Caijing, 04.03.2014.

[564] "SGCC representative recommends to quickly approve Huainan-Shanghai UHV line" (国网代表：建议尽快核准淮南-上海特高压), Caijing, 04.03.2014.

[565] "Controversy underlying the 'effective strategy against air pollution', SGCC promoting UHV with grand words" ("治霾良方" 背后存争议 国网高调推动特高压), People's Daily Online (人民网), 17.03.2014.

agenda, just as it had done in previous instances with regard to other cross-sectoral central government policies. In particular, the reference to specific and highly ambitious air pollution reduction targets in Liu Zhenya's news article must be read as an attempt to present the construction of the 'Three China' UHV-AC grid as a practical and immediately applicable option for implementing the State Council's generally rather vague anti-air pollution policy. As such, the very mixture of specificity in goals and vagueness regarding the possible routes towards achieving those goals inherent in the action plan appears to have facilitated SGCC's political engagement with it.

Also, the time and place for SGCC's public assertions were well chosen for two reasons. Firstly, smog levels in northern China and especially in Beijing, where the 'Two Meetings' were taking place, had been exceedingly high in previous weeks which allowed the grid company to jump on the bandwagon of public outrage over persisting 'off the charts' smog levels and what was widely perceived as insufficient countermeasures by government.[566] Secondly, the statements were made by the SGCC chairman and other top managers in their dual roles as CPPCC and NPC delegates during the annual 'Two Meetings', which is when the media focus on political macro issues tends to be at its highest. With its statements, SGCC further increased the already considerable pressure on government to more effectively counter air pollution while at the same time conveniently offering an 'in-house' solution in the form of new UHV-AC lines. The timing of these statements was very likely an important factor determining the applicability and subsequent effect of the 'synchronisation' mechanism.

7.1.5 Growing support for UHV among top officials

Following the grid company's growing argumentative emphasis on the claimed environmental merits of further UHV construction since the publication of the State Council's Action Plan in late 2013, a number of high-ranking government officials began to speak in favour of SGCC's agenda, including Fu Zhifang (付志方), a former alternate member of the CCP Central Committee and now a leading official in the CCP Provincial Committee of Hebei, the smog-ridden province surrounding the municipality of Beijing. Fu, who had a history of working closely with SGCC's Liu Zhenya,[567]

[566] "Beijing raises pollution alert as smog lingers," China Daily, 21.02.2014; "Beijing Pollution: How Bad Does It Have to Get for a Red Alert," China Realtime Blog, Wall Street Journal, 26.02.2014.
[567] "Liu Zhenya holds talks with Hebei Province's vice-governor Fu Zhifang" (刘振亚与河北省常务副省长付志方举行会谈), SGCC press release, 12.03.2010, http://www.sgcc.com.cn/shouye/tbxw/219115.shtml,

suggested that "on the basis of an ultra-high voltage grid through which north-west China could be connected with the Centre and the East, pollution from thermal coal-based power generation in Beijing, Tianjin and Hebei Province can be strongly alleviated."[568] Another influential ally was found in Zhang Guobao (张国宝), who between 2008 and 2011 had been the director of the National Energy Administration but during whose tenure not a single new UHV-AC project and only one meagre UHV-DC project had been approved. In a 2013 television interview, in which he disclosed that the dispute regarding UHV "had not been settled", Zhang now stated that he believed that the government had "full confidence" in the technology which would "help government efforts to [...] reduce environmental pressures along the industrialised eastern coast".[569] During the 'Two Meetings' in March 2014, Zhang proceeded to argue that since China now had the largest installed power generation capacity in the world, it was "extremely necessary" to develop UHV. "Based on my own personal viewpoint", he stated, "I support the development of a UHV grid in China".[570] Although Zhang's term as director of the NEA had ended in 2011, he continued to act as a member of the Communist Party Group within the NEA and retained vice-ministerial rank within the NDRC,[571] making him an influential figure in the realm of energy policy and probably one of SGCC's most distinguished allies within central government at the time even though very few connections between SGCC's interests, Zhang's actions and final industry outcomes were visible.

In the wake of SGCC's modified environmental reasoning, even a number of politicians at the very highest level of the State Council for the first time publicly stated their support for UHV construction as a practical measure against air pollution. In November 2013, the vice-prime minister and deputy director of the State Energy Commission under the State Council, Zhang Gaoli (张高丽) (ranked seventh out of seven members in the Politburo Standing Committee, the CCP's highest decision-making body), was quoted as saying that UHV would contribute to solving the smog

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accessed 09/2014; "Provincial leaders hold talks with heads of the State Grid Corporation - Zhou Benshun, Fu Zhifang and Liu Zhenya participate" (省领导与国家电网公司负责人举行会谈 周本顺付志方刘振亚出席), Hebei Daily (河北日报), 19.06.2014.

568 "Committee member Fu Zhifang: Speed up the construction of the UHV grid" (付志方委员：加快特高压电网建设), People's Daily Online (人民网), 12.03.2014; "Controversy underlying the 'effective strategy against air pollution', SGCC promoting UHV with grand words" ("治霾良方"背后存争议 国网高调推动特高压), People's Daily Online (人民网), 17.03.2014.

569 "China grid says half of $100 bln high-voltage network under way," Reuters, 21.08.2013.

570 "Zhang Guobao: It is extremely necessary for China to develop a UHV grid" (张国宝：中国发展特高压电网非常必要), People's Daily Online (人民网), 24.03.2014.

571 China Vitae, Biography of Zhang Guobao, http://www.chinavitae.com/biography/Zhang_Guobao|4103, accessed 08.09.2015.

problem and that it would also help to even out the regional imbalances between resource endowments and energy demand.[572] Then, in February 2014, Prime Minister Li Keqiang who is, of course, ranked second in the Politburo Standing Committee (after the CCP General Secretary and State President Xi Jinping) and who furthermore acts as the director of the State Energy Commission, in a speech during a State Council executive meeting referred to cross-regional long-distance power transfers as the "main measure" against China's air pollution problem, calling for the construction of "a number of transmission lines sending electricity from west to east using both UHV and conventional transmission technology".[573] In April 2014, the prime minister gave a similarly supportive statement, which SGCC in a celebratory press release declared to have "ended the argument of whether to construct UHV. The answer is YES and MORE."[574] Although Li's statements did not allow for inferences regarding his perspective on the issue of constructing a synchronous UHV-AC grid, together with the other statements made by top officials during this time frame, they did suggest that SGCC's argumentative linkage between UHV transmission and air pollution control had had an effect on the way in which the grid company's infrastructural agenda was viewed at the highest levels of government.

7.1.6 Positive project assessments and a series of UHV approvals

In a political environment that had grown increasingly supportive of SGCC's 1U4L plan and in which a range of very influential government officials were now convinced that UHV transmission was indeed a suitable measure for combating air pollution, the state-owned consulting firm China International Engineering Consulting Corporation (CIECC) in May 2014 on behalf of the NEA concluded its assessment of the *Research Demonstration Report* which had been prepared by the State Electricity Planning Research Centre (SEPRC) in full conformity with the grid company's own original project recommendations. Unlike earlier assessments over the course of the previous six months in which CIECC had repeatedly interfered with UHV-AC projects on the basis of inconclusive supporting materials regarding technical and economic issues, it now

[572] "Li Keqiang: Smog can be managed through cross-regional electricity transmission - UHV to pick up speed in 2014" (李克强：跨区送电可治雾霾 2014 特高压大提速), AAStocks News Agency (大智慧阿思达克通讯社), 17.02.2014.
[573] Ibid.; "NEA about to authorize 12 new transmission lines - UHV-AC to be passed" (传国家能源局将批复 12 条输电通道 放行交流特高压), Sina Web, 12.05.2014.
[574] "China Enters a Golden Era of Developing UHV," SGCC press release, 16.05.2014.

declared the *Research Demonstration Report* to be feasible. This positive verdict even included the Huainan-Nanjing-Shanghai UHV-AC line, the northern section of the Yangtze Delta loop project in the East China Grid which CIECC itself had blocked only a few months earlier on the basis of unresolved security risks – and for which apparently no additional supporting material had since been supplied that could have reasonably altered CIECC's previous judgement.[575] In a press release titled "China Enters a Golden Era of Developing UHV", SGCC interpreted the positive assessment as proof that "constructing UHV has become a consensus."[576]

Accompanied by endorsements from top-level politicians and preceded by CIECC's supporting assessment, the NEA now entered the final approval procedures.[577] Over the course of the following year and, seemingly, without any further administrative problems, all of the four proposed UHV-AC transmission lines and two of the five proposed UHV-DC projects were approved. The first of these approvals took place in May 2014 and encompassed the Huainan-Nanjing-Shanghai UHV-AC project,[578] which the grid company had been pushing for since 2010[579] using a differently weighted argumentative approach and which, in pre-Action Plan assessments, had stirred up much controversy and strong opposition (see Chapter 6). With this last missing link, SGCC had now achieved its first objective of synchronising all provincial grids within the East China Grid via its UHV-AC loop construct.[580]

In further steps, three UHV-AC projects were authorised for construction which, once completed, will connect all six provinces and municipalities in the North China grid

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575 "SGCC's eight large UHV projects approved - grid link-up in northern China is looking hopeful" (国网八大特高压获准 华北联网有望), 21st Century Business Herald Online (21 世纪网), 13.05.2014.
576 "China Enters a Golden Era of Developing UHV," SGCC press release, 16.05.2014.
577 National Energy Administration, Electricity Department, "Notification about accelerating and carrying forward the construction of 12 key electricity transmission channels as part of the Action Plan for the Prevention and Control of Air Pollution" (关于加快推进大气污染防治活动计划 12 条重点输电通道建设的通知), Document No. 212 [2014], 16.05.2014.
578 "'Northern half loop' UHV-AC project gains approval amidst controversy" ("北半环" 特高压争议中获批), China Industry and Electrical Appliance Net (中国工业电器网), 08.05.2014; "SGCC's Four AC and Four DC UHV Projects Listed in the Action Plan for Air Pollution Prevention and Control," SGCC press release, 15.05.2014.
579 "State power grid plans to invest 270 billion yuan in smart grid construction during the 12th Five-Year Plan period" (国电网规划 "十二五" 投资 2700 亿元建设智能电网), *Modern Electric Technology (*现代电子技术*)* 22 (2010): 93.
580 The three UHV-AC lines in the East China Grid are: Huainan-Zhebei-Shanghai (淮南 – 浙北 – 上海), i.e. the southern half of the "loop"; Huainan-Nanjing-Shanghai (淮南 – 南京 – 上海), i.e. the northern half of the "loop"; Zhebei-Fuzhou (浙北 – 福州). They connect the provinces and municipalities of Anhui, Jiangsu, Shanghai, Zhejiang, and Fujian.
See "China's 2nd UHV AC Power Line Approved by NDRC," SinoCast Energy Beat, 29.09.2011; "Power Delivery Project from Anhui to East China Crosses the Huaihe River," Transmission & Distribution World, 22.02.2013; "Construction begins on 1000kV Huainan-Nanjing-Shanghai UHV-AC project" (1000 千伏淮南-南京-上海特高压交流工程开工建设), Anhui News (安徽新闻), 04.11.2014.

region and with which the grid company had now received approval for the internal synchronisation of two out of the three major grid regions which it sought to subsequently combine into its overarching 'Three China' grid (see Figure 7.1).

The first of these three projects to be approved in July 2014 was the Ximeng-Jinan UHV-AC line (内蒙锡盟 - 北京东 - 天津 - 山东济南) which will vertically connect Inner Mongolia, Beijing, Tianjin and Shandong Province.[581] This line was originally planned to reach all the way into Jiangsu Province in the East China Grid, but according to a media source this suggestion by the grid company was objected to by the NEA which argued that the current electricity demand in the eastern region did not necessitate a cross-regional grid link. Given the substantial pressure to present countermeasures to the smog problem and the constant pressure from SGCC, the NEA therefore conceded the approval of a shorter route while still preventing a synchronous interconnection between the two major grid regions; this further showcases that the NEA continued to be very cautious of UHV-AC technology despite this series of approvals.[582]

[581] "1000kV Ximeng-Shandong UHV-AC project obtains permission to start construction" (锡盟--山东1000 千伏特高压工程获准开建), Worker's Daily (工人日报), 25.07.2014.
[582] "Is 'rectifying the reputation' of UHV-AC too much weight for the NEA to bear?" ("正名"交流特高压，能源局不可承受之重?), Huaxia Energy Net (华夏能源网), 19.05.2014.

Figure 7.1 UHV-AC approvals in the North and East China grids (2014/2015)
Source: Author's visualisation of material presented in this section

The second line in the North China Grid was approved in January 2015 and will merge horizontally with the first line, connecting western Inner Mongolia with the city of Tianjin via Shanxi Province and Beijing (Mengxi-Tianjin South UHV-AC; 内蒙蒙西 - 山西晋北 - 北京西 - 天津南).[583] The third and final project in the North China Grid was approved in May 2015 (Yuheng-Weifang UHV-AC; 陕北榆横 - 山西晋中 - 河北石家庄 - 山东潍坊). Originating in Shaanxi Province and passing horizontally through the provinces of Shanxi and Hebei before reaching Shandong, this transmission line will complete the interconnection of all provincial grids in the North China region.[584]

[583] "The first UHV project of 2015 has gained approval: Mengxi to Tianjin South" (2015 年首条特高压工程获核准：蒙西至天津南), China Securities Net (中国证券网), 22.01.2015.
[584] "Yuheng-Weifang 1000kV UHV-AC transmission construction project authorization reply issued" (榆横～潍坊 1000 千伏特高压交流输变电工程项目核准批复下发), North Star Smart Grid Online (北极星智能电网在线), 07.05.2015; "Yuheng-Weifang 1000kV UHV project obtains state approval" (榆横-潍坊 1000 千伏特高压工程获得国家核准), People's Daily Online (人民网), 11.05.2015.

Of the three UHV-AC projects in the North China Grid, the Mengxi-Tianjin South line most clearly demonstrates the impact of SGCC's smog control rhetoric on approval procedures. The Mengxi energy base in Inner Mongolia had for years supplied electricity to other parts of the North China Grid via conventional high-voltage lines, and in 2011 an expansion of these conventional lines had already undergone government-driven feasibility studies and entered the first design stages before SGCC refused to further cooperate on the project unless the construction of a UHV-AC line leading out of Mengxi was also authorised.[585] Once SGCC had shifted its argumentative strategy to match the State Council's anti-air pollution requirements, this previously deadlocked UHV project was approved without much ado. SGCC's decision to strategically modify and weight its arguments so as to create overlap with the new State Council's Action Plan appears to have been the main mechanism through which this type of change had become possible.

7.1.7 Section conclusion

This section showed how SGCC argumentatively 'synchronised' with cross-sectoral policy in the environmental field in order to circumvent sectoral-level opposition to its grid development plans. Cross-sectoral policy change calling for economy-wide environmental adjustments to mitigate air pollution provided SGCC with the opportunity to present its existing UHV agenda as a solution to national environmental challenges, and the empirics presented in this section suggest that the grid company's subsequent modification in the portrayal of its already existing UHV project blueprints ultimately brought about a series of approvals for important transmission projects which had still been blocked by the NEA at the sectoral level shortly before due to strong security concerns. Once SGCC's cross-sectoral linkages had superseded critical sectoral debates and once its agenda was portrayed in a way that convinced top officials in the State Council that the grid company was furthering the goal of environmental macro-policy aimed at mitigating air pollution, the NEA's ability to interfere with or even question SGCC's agenda based on sectoral reasoning diminished rapidly. By

[585] "'State Grid Empire' 'cut apart': How four large regional grid companies became hollow shells overnight" ("国网帝国" "削藩": 四大区域电网公司一夜间成为空壳公司), Sina Blog, 14.05.2011, http://blog.sina.com.cn/s/blog_667242870100qus0.html, accessed 03/2016; Zeng Dewen (曾德文), "A warning for electricity construction against falling into the trap of the 'Three China' UHV-AC grid (警惕电网建设误入形成 "三华" 交流特高压电网的歧途), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 08.02.2012.

'synchronising' with cross-sectoral policy, SGCC was able to evade cumbersome sectoral contests of expertise and push through a significant part of its grid development plan despite sectoral resistance.

Important factors that appear to have facilitated SGCC's successful application of the 'synchronisation' mechanism were related to the *timing* of its political response, the *political urgency* of the issue at stake and, arguably, also the particular *level of specificity* inherent in the macro-policy to which the grid company attached its lines of argument. As the sectoral authorities found themselves under immense pressure to present industry-level solutions to the increasingly urgent air pollution crisis, the grid company was able to immediately offer concrete suggestions on how to implement the new State Council policy. Furthermore, the anti-air pollution plan appeared particularly suited to a 'synchronisation' attempt as it combined very specific sectoral targets for air pollution reduction with vaguely phrased potential routes for achieving those targets, thereby offering clear outcome-related indicators to address while leaving ample space for the grid company to argumentatively place its suggestions within the presented confines.

The following two sections will demonstrate a) how SGCC's latest 'synchronisation' with cross-sectoral policy was challenged as sectoral concerns re-surfaced in political debate and, as a result, government's support for UHV-AC came to an abrupt standstill, and b) how the grid company responded to this challenge by feverishly searching for new ways to 'synchronise' its agenda with cross-sectoral policy as a means of circumventing its new opposition.

7.2 The renewed dissolution of cross-sectoral 'synchronisation'

While SGCC had succeeded in moving past sectoral opposition to gain approval for the construction of a series of high-profile UHV projects, the underlying sectoral struggle had only been circumvented, not resolved, and thus continued to simmer in the background. This section shows how sectoral opposition flared up again, triggered by the grid security-related outcries of critical industry experts who were brought into the official deliberation process on grid planning, thus eroding SGCC's new cross-sectoral policy linkage and once more placing the debate on UHV-AC in the context of sectoral

concerns. On the basis of these sectoral concerns, top-level policymakers and, in turn, also the NEA eventually paused further authorisations and initiated an entirely new round of very basic assessments regarding all facets of UHV-AC technology and its application. As soon as SGCC's previously successful 'synchronisation' with cross-sectoral policy collapsed, it will be shown, top-level government support was withdrawn and the grid company found itself back in sectoral-level deadlock.

7.2.1 The emergence of counter-arguments to SGCC's linkage between UHV and air pollution control

The 'Two Meetings' of the NPC and the CPPCC in March 2014 had provided the grid company with an excellent opportunity to further publicise its environmental pro-UHV arguments, but the heightened public attention surrounding air pollution control and UHV's alleged contributions to it also caused experts and industry observers to scrutinise the validity of the grid company's claims closely. Beginning around March 2014, a number of critical articles were published in state-owned news outlets such as the *People's Daily* in which industry analysts deemed it highly questionable whether the large-scale construction of UHV infrastructure was really an effective strategy for air pollution control. Lin Boqiang (林伯强), one of China's leading academic observers of the energy industry, agreed that UHV might indirectly help to provide smog relief if it was combined with limitations on thermal power generation in the most strongly affected regions. At the same time, he argued that existing environmental problems would simply be transferred to China's northern and western regions where thermal power generation would be drastically scaled up and that atmospheric circulation could still distribute the pollutants across the entire country. Given that the already operational UHV transmission projects had achieved neither the technical nor economic efficiency levels proclaimed by SGCC (see Chapter 5), Lin concluded that other measures were generally better suited to addressing air pollution and that UHV should be last on the list.[586] Wang Zhixuan (王志轩), general secretary of the China Electricity Council (中电联), shared a similar view, stating that the main causes of air pollution in China were linked to problems in the general energy structure and the widespread burning of coal which, he argued, could not simply be solved by 'substituting coal for electricity', as was

[586] "Controversy underlying the 'effective strategy against air pollution', SGCC promoting UHV with grand words" ("治霾良方"背后存争议 国网高调推动特高压), People's Daily Online (人民网), 17.03.2014.

cryptically propounded by SGCC.[587] Given that overall emissions of pollutants were still on the rise and would continue to be so even if SGCC's suggested smog relief strategy were adopted as this ultimately rested on the expansion of large-scale regional thermal power bases, other observers remarked that the essence of the air pollution problem would remain unchanged and questioned whether constructing more UHV lines would even improve the overall air quality at all.[588] Additionally, critics pointed out that the high losses of electricity incurred during UHV transmission as compared to conventional high-voltage transmission made it very doubtful whether the alleged environmental gains of UHV would even be able to balance out the additional line losses.[589] Finally, industry expert and former official Zeng Dewen argued that while UHV-DC as the asynchronous and more economical variant of UHV-based long-distance transmission might at least have some merit as a measure against air pollution, the synchronisation of regional grids via UHV-AC demanded by SGCC was entirely superfluous as conventional intra-regional high-voltage AC lines supported by UHV-DC could achieve the same outcomes at lower economic cost and without the systemic risk. Hinting at the corporate interests at stake in this issue, Zeng advised that the SGCC Planning Centre, which had devised the grid company's UHV-based response to the State Council's Action Plan against air pollution, "needed to keep in mind the state's benefit and the people's benefit".[590]

7.2.2 The impact of renewed expert criticism on the fate of UHV-AC

After being quoted in influential state-owned news organs such as the *People's Daily*, the increasingly vehement critical voices which had already contributed to the emergence of substantial obstacles for the grid company during earlier UHV-AC project assessments held by the NEA were now also granted participation in the national-level meetings of the Chinese People's Political Consultative Conference (CPPCC). In May 2014, the CPPCC held a discussion forum titled "Develop UHV electricity transmission, optimise

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587 Ibid.

588 "SGCC's eight large UHV projects approved - grid link-up in northern China is looking hopeful" (国网八大特高压获准 华北联网有望), 21st Century Business Herald Online (21 世纪网), 13.05.2014.

589 "Four questions regarding UHV: Safety and economic feasibility are still being called into doubt" (四问特高压：安全性与经济性仍遭质疑), People's Daily Online (人民网), 29.04.2014.

590 Zeng Dewen (曾德文), "Serious technical and economic problems exist with the North China UHV-AC grid framework" (华北电网交流特高压网架方案存在严重的技术经济问题), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 13.02.2014; "The claim that UHV-AC is suitable for smog control lacks a scientific basis" (交流特高压治雾霾缺乏科学依据), Dongfang Daily (东方早报), 27.03.2014.

electrical power patterns" to which the critical industry experts were invited and which they used as a platform to speak up against UHV-AC while disseminating their environmental, economic and grid security-related counter-arguments among an audience of distinguished officials.[591] The intervention by external industry experts prior to and during this discussion forum sparked heated altercations among high-profile forum participants about the fate of UHV-AC and ultimately led to a spectacular confrontation between grid company executives and top officials.

The guiding speech during the discussion forum was given by CPPCC chairman Yu Zhengsheng (于正声), who is also a member of the Politburo Standing Committee and ranks fourth in command within the entire Communist Party. In his address, Yu stated that long-distance power transmission as such was inevitable and that no further debates would be held about the merits of asynchronous UHV-DC transmission, while adding that strong differences of opinion persisted with regard to synchronous UHV-AC's transmission capacity, economic efficiency, preferable scope of application and associated security concerns. Regarding those differences of opinion, which hitherto had been almost exclusively addressed by the small group of retired industry experts, Yu, in the presence of SGCC's top executives, posed a series of highly contentious questions. He first asked whether it would be problematic to forgo UHV-AC entirely and to place more emphasis on UHV-DC transmission so as to construct "strong DC and weak AC" transmission (强直弱交; i.e. UHV-DC feeding into conventional high-voltage AC grids). In doing so, he challenged the alleged inseparability of UHV-AC and UHV-DC which had been a core component of the chain argument used by the grid company to tie together different parts of its reform agenda while presenting it to central government as an advantageous bundle of technological upgrades. Yu concluded that if such a division were indeed possible, *no* further UHV-AC should be built, adding that this question touched upon national security as well as national development trajectories and therefore needed to be solved promptly. Secondly, addressing another counter-argument which had originally been presented by the group of industry experts, Yu questioned whether UHV-AC was actually more economical than the regular high-voltage AC transmission which was already being used across China's grid structure. If UHV-AC was more expensive, he inquired, why should it be built? Finally, he asked, if UHV-AC construction were to continue, "what about the

[591] "What did the CPPCC say about 'UHV'?" (关于"特高压"政协座谈会都说了些啥?), Wusuobuneng Energy News (无所不能), 19.05.2014.

security of the synchronous 'Three China' grid"?[592] Following these questions, Yu stated that "collective research and scientific proof" was necessary, calling upon the NEA to organise further demonstrations and assessments regarding UHV-AC development.[593]

The NEA's vice director Wang Yumin (王禹民), who also spoke at the discussion forum, immediately responded to Yu Zhengsheng's appeal. On the one hand, he vowed to "actively support UHV as an important long-distance high-capacity transmission method" (as phrased by top leaders such as Prime Minister Li Keqiang during the preceding 'supportive' phase) and that the construction of UHV transmission should be "scientifically carried forward" in accordance with the already finalised recent approvals following the publication of the State Council's Action Plan for pollution control. On the other hand, Wang agreed that further assessments of issues pertaining to the synchronous 'Three China' grid were necessary, the main risk being widespread and uncontrollable blackouts across large grid areas. A decision on whether or not to continue constructing the 'Three China' grid, Wang stated, could only be made on the basis of further assessments regarding grid security.[594]

As top-level officials began to suggest that the further development of SGCC's core grid restructuring project ought to be suspended until further notice, the grid company's new CEO Shu Yinbiao (in office since May 2013), according to a meeting summary published by a number of attending experts, angrily intervened by asking rhetorically:

> While discussing UHV-AC and UHV-DC, is it really necessary to try and differentiate which is good and which is not? If so, I could also ask whether men are better or whether women are better! Would things work out if there were only men or only women? How can UHV-AC and UHV-DC even be compared? UHV-AC and UHV-DC must be developed in a coordinated manner, just like the relationship between men and women must take a harmonised form.[595]

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[592] Ding Daoqi (丁道齐), Wang Zhonghong (王仲鸿), Zeng Dewen (曾德文) and Meng Dingzhong (蒙定中). "Recording the truth about the CPPCC's statement 'Develop UHV electricity transmission, optimise the structure of the electricity system' - The false opinions fabricated by SGCC persist during and after the Conference..." (全国政协《"发展特高压输电，优化电力布局"双周协商座谈会》记实--国网公司发展交流特高压电网的错误舆论在会上、会下继续...), article published on Zeng Dewen's industry blog, *Caixin Net*, 19.06.2014; "What did the CPPCC say about 'UHV'?" (关于"特高压"政协座谈会都说了些啥?), Wusuobuneng Energy News (无所不能), 19.05.2014.

[593] "CPPCC symposium exposes: Proponents and opponents of UHV-AC for the first time 'directly crossed swords'" (全国政协座谈会曝光：交流特高压正反方首次"正面交锋"), Caijing Online (财经网), 19.05.2014.

[594] Ibid.; "What did the CPPCC say about 'UHV'?" (关于"特高压"政协座谈会都说了些啥?), Wusuobuneng Energy News (无所不能), 19.05.2014.

[595] Ding Daoqi (丁道齐) et al., *Caixin Net*, 19.06.2014.

While Shu's nonsensical comparison failed to address any of Yu Zhengsheng's questions, it did indicate that SGCC's top executives were becoming very nervous about losing their argumentative prerogative regarding grid development trajectories. In its own news organ, the *State Grid News* (国家电网报), SGCC subsequently glossed over all controversy by the simple means of not reporting any of the criticism voiced during the discussion forum. Censoring the opinions of a Politburo Standing Committee member, the grid company even omitted Yu Zhengsheng's guiding speech, claiming instead that "a wide consensus regarding all aspects of UHV has taken shape" and that all experts in attendance had praised UHV-AC as well as the 'Three China' grid.[596]

The probing comments on SGCC's reform agenda on the part of top-level central government officials witnessed in this episode were unprecedented. In the midst of SGCC's very successful attempt to secure approvals for further UHV-AC transmission projects by constructing argumentative linkages between its sectoral restructuring plan and the State Council's cross-sectoral Action Plan for smog control, the grid company suddenly found itself confronted with severe sector-specific criticism by top leaders who were now citing experts' arguments related to potential security threats and economic risks associated with UHV-AC technology. The experts' persistence and top officials' support for their participation in important discussion forums halted SGCC's run of success in latching on to cross-sectoral environmental policy to push through new transmission projects: the controversy surrounding UHV-AC was pulled back down to the sectoral level and into an argumentative realm that was much more difficult for SGCC to control than the macro-debate about smog control, which, in its first transposition to the electricity industry, had been mainly shaped by the grid company itself.

The cross-sectoral debate which had been highly advantageous for the grid company and the much more adverse sectoral dispute about potential security risks now arguably for the first time simultaneously had the full attention of top leaders. Previously, SGCC had been very successful at playing off different levels of government against each other and keeping debates separate by silencing opposing experts, addressing their arguments with elaborate counterpoints that were difficult to independently verify, manipulating reports to the State Council and repeatedly amending its portrayals of the 1U4L plan in attempts to guide broader political awareness at the top away from

[596] *State Grid News* 1931 (19.05.2014), as quoted by Ding Daoqi (丁道齐) et al., *Caixin Net*, 19.06.2014.

inconvenient sectoral debates and towards more opportune discussions about macro-issues championed by the State Council which it claimed to be contributing to. The effectiveness of this approach was now reaching its limits. Overall, SGCC had largely managed to rid itself of previous debates about deepening monopoly structures and the questionable economic nature of UHV-AC, but the grid security issue in particular was now back on the agenda and causing top officials to question whether any further UHV-AC projects should be constructed at all, thereby posing an enormous threat to the grid company's development plans.

7.2.3 The NEA's U-turn on UHV-AC

Following Yu Zhengsheng's call for additional assessments, in December 2014 the NEA published a new policy document in which it declared that "for a long time, there has been a dispute about questions regarding the wide-spread application of 1000kV UHV-AC technology, which to a certain level has restricted the healthy and sustainable development of China's electricity industry".[597] In order to "fully demonstrate the necessity, security and economic feasibility of using UHV-AC technology", the document charged various institutions with conducting an entirely new round of research while "upholding the principle of 'seeking the truth from facts' [...], so as to provide valuable consultation for the state's scientific decision-making regarding electricity grid development".[598] While the NEA was still in the midst of finalising the approvals of the four UHV-AC projects that had been authorised with broad government backing in response to the State Council's anti-air pollution plan, any further approvals were now officially made dependent on the outcome of this renewed research enquiry.[599]

The new requirement for very basic additional research work concerning UHV-AC technology was an enormous setback for the grid company. However, although the research has not yet been completed at the time of writing, a close analysis shows that the precise setup of the prescribed research work contained a number of compromises that are likely to limit the objectivity of the overall endeavour. Especially notable in this

[597] National Energy Administration, General Department, "Letter about entrusting research tasks regarding the development of UHV-AC" (国家能源局综合司关于委托开展特高压交流课题研究的函), Document No. 994 [2014], 16.12.2014.
[598] Ibid
[599] Ibid.

regard are the particular combinations of institutions chosen to carry out the investigations. Research on important topics such as "Nationwide electricity flows", the "Sustainability of West-to-East electricity transfers", and a "Nationally unified grid computation platform", for instance, was to be conducted by a consortium headed by the State Electricity Planning Research Centre (SEPRC),[600] a subsidiary of the Electric Power Planning and Engineering Institute (EPPEI) which was one of the core sectoral evaluation bodies and a default participant in project evaluations. Both SEPRC and its parent organisation are deeply intertwined with SGCC in terms of business interests and also have a history of strongly supporting SGCC's grid development endeavours (see previous section in this chapter and also Chapter 6). Furthermore, the research reports that SEPRC was now asked to supply as part of the overall re-evaluation of UHV-AC were to be devised under the participation not only of well-known domestic universities and the China Electricity Council, but also of the China Southern Grid Corporation as well as SGCC itself.[601]

Other crucial research tasks which touched upon the core issue of grid synchronisation and encompassed comparisons between UHV-DC, UHV-AC and conventional high-voltage technology were to be carried out by the very same entities as above, albeit in a non-cooperative fashion where each entity was to supply a separate research report. These topics included "'Strong DC, weak AC' research" (i.e. the combined application of UHV-DC and conventional AC technology as suggested by CPPCC Chairman Yu Zhengsheng), the "Analysis of accidents in large power grids domestically and abroad", "Research on the security of the 'Three China' grid" and an "Economic comparison between UHV and conventional high-voltage grids".[602] Being able to compare separate reports regarding these topics will place the NEA in a slightly more powerful position, although given the close working relationships between SEPRC and the two grid companies it still appears unlikely that this will prevent cooperation between the different entities and equally unlikely that any of these entities will veto SGCC's plans.

Finally, of particular note were the small number of research tasks in which SGCC was not listed to participate at all. Arguably the most important and contentious of these was "Research on the rational scope of China's synchronous grids" (我国同步电网合理规模研究). This research topic, which essentially summarised the core issue over which

600 Ibid.
601 Ibid.
602 Ibid.

NEA and State Grid had been fighting for years, was the only one that was assigned to a group of well-known domestic universities for separate evaluation and was not given to any sectoral entities, whether from industry or the several sectoral planning and consulting institutions.[603] While this indicates the particular importance of this issue, it is also emblematic of the NEA's ongoing struggle to receive policy-relevant industry information that was not biased in favour of the grid company. It remains to be seen how conclusive the requested academic reports will be as even the universities, which may be viewed as the most impartial participants in this new round of research, will very likely be unable to provide objective expertise if SGCC refuses to supply relevant and accurate data, as during earlier NEA attempts to assess the feasibility of UHV-AC. Overall, the chances that the new round of research will lead to conclusive outcomes that will allow for a clear verdict for or against the construction of a synchronous 'Three China' UHV-AC grid do not seem very high as further decision-making will almost certainly continue to be subject to a conflict over the interpretation of industry information of questionable accuracy.

7.2.4 Section conclusion

While the previous section showed how SGCC's tactical 'synchronisation' with the State Council's anti-air pollution policy allowed the grid company to bypass sectoral resistance and forced the NEA to yield to its project suggestions, this section demonstrated that as soon as these new cross-sectoral linkages began to be overridden by pressing issues of sectoral relevance the progress the grid company was making in implementing 1U4L came to a standstill. With dwindling cross-sectoral synchronisation, SGCC was forced to take its claims back to the sectoral level and into very heated and cumbersome technical arguments about the advantages and disadvantages of different types of grid structures and technologies.

This section substantiated earlier findings regarding the importance of the *expertise* factor in sectoral conflicts which were now re-emerging. Although SGCC undoubtedly had tremendous advantages over the central government bodies in the information realm, the sectoral authorities showed the ability to bring in external expertise as a counterbalance. The inclusion of critical external industry experts during the CPPCC meeting in 2014 had immediate impact, as their participation in political debates at the

[603] Ibid.

highest levels brought about a shift in perspectives among top leaders which ultimately allowed the NEA to re-engage in its previously interrupted assessment work on UHV technology. The top officials' demands for further assessments at the CPPCC meeting were based entirely on arguments that these experts had emphasised for a whole decade (i.e. economic and security issues surrounding UHV-AC) and that the NEA had in recent years integrated into its sectoral decision-making where it had already led to significant setbacks for the grid company. Most recently, SGCC had been able to successfully circumvent these obstacles by matching the portrayal of its 1U4L plan with top leaders' intense focus on the issue of air pollution, but as soon as this cross-sectorally grounded line of argument lost traction in political debate the grid company found itself back in sectoral deadlock.

The fact that the majority of the external experts who triggered this renewed shift belonged to the same small group of retirees without administrative rank also reconfirms just how limited the availability of non-SGCC-infused expertise was (and is) for the sectoral authorities. This is not to argue that the experts brought in by the NEA did not also have their own biases, but at least they offered perspectives that were not entirely driven by grid company interests and that therefore placed SGCC under pressure to prove more comprehensively the validity of its arguments. A further important example of the NEA's resorting to external expertise as a way to challenge the grid company's informational and interpretational prerogative was given by the engagement of universities that were asked to separately – and explicitly without the participation of the grid company – supply assessment opinions regarding the risks and opportunities of synchronising China's regional grids, although the outcomes of this new round of assessments were still anticipated at the time of writing.

The onset of the extensive re-evaluation of UHV-AC technology immediately after a series of UHV-AC projects had been approved provided a strong challenge to SGCC's 1U4L plan. At the same time, it should be remembered that the conceptual basis on which essentially all deliberations between SGCC and government institutions were taking place at this point had been supplied in its entirety by the grid company. SGCC itself had provided the conceptual foundation underlying most of the sectoral restructuring measures that had taken place since about 2009. Regardless of the outcome of the new re-assessments, crucial components of the 1U4L plan such as regional energy bases, UHV-DC and regionally separate UHV-AC grids to a large extent already exist or are currently being constructed. The core issue which remains to be

settled is whether the emerging regional UHV-AC grids will ultimately be connected into a single cross-regional 'Three China' UHV-AC grid, which naturally remains a highly important question for the grid company. However, even if the 'Three China' grid interconnection ultimately fails to be fully authorised, the grid patterns that have emerged since the mid-2000s and that are emerging at the time of writing already represent a compromise solution in which SGCC, after both effortless (argumentatively) 'synchronised' and cumbersome 'non-synchronised' phases of deliberations with central government, has achieved the implementation of a very large portion of its sectoral development plan while over the course of more than a decade preventing the practical application of substantial market reforms – including all of the grid-specific asset unbundling requirements and the emergence of regionalised competition.

Despite these very objective successes that it had already achieved, the grid company immediately reacted to the new grid development challenges that it was facing. As the following final section in this chapter will demonstrate, it did so by a) suggesting a double-edged 'compromise' to calm down the heated sectoral debate, while b) feverishly searching for new ways to argumentatively 'synchronise' 1U4L with other cross-sectoral policies in order to overcome its new sectoral obstacles, exactly as it had done in numerous earlier instances.

7.3 A compromise to buy time – and new cross-sectoral 'synchronisation' attempts

Despite the significant set-back suffered due to the disintegration of its cross-sectoral 'synchronisation' and the NEA's subsequent insistence on a new round of basic assessments, implementing the 1U4L plan remained SGCC's top priority. The grid company found itself in a situation where it simultaneously encountered resistance from sectoral and cross-sectoral authorities over a conflated mixture of sectoral concerns (grid security and economic feasibility) and cross-sectoral concerns (smog control, national security and development trajectories), which it responded to in two steps. Firstly, attempting to pacify the chaotic debate, SGCC yielded its position concerning the grid interconnection issue, suggesting a compromise solution whereby three *separate* regional UHV-AC grids would be constructed instead of one cross-regional 'Three

China' grid, a 'compromise' that, however, appeared to be mainly geared towards achieving grid interconnection via a detour. Secondly, trying to regain argumentative dominance, the grid company attempted to reconfigure the disrupted argumentative linkages between 1U4L and cross-sectoral policy by placing a renewed emphasis on grid-centred development ideas for the energy sector at large; it had been developing these ideas in the background and now attempted to 'synchronise' them with other macro-level policy issues that were currently trending in policy circles. These steps will be discussed in the following sections before concluding both this chapter as well as the empirical part of this dissertation.

7.3.1 SGCC's suggestion of a grid development 'compromise'

Faced with renewed criticism and doubt regarding UHV-AC, in June 2014 (i.e. immediately after the disastrous CPPCC meeting during which further UHV-AC construction had been called into question) SGCC put forward a grid development suggestion which, on the surface, abandoned the idea of a cross-regional 'Three China' UHV-AC grid and instead entailed upgrading existing high-voltage transmission *within* the three large grid regions into separate regional UHV-AC grids.[604] While separate regional UHV-AC grids had already been approved and were emerging in the East and North China grids, the grid company now suggested that an analogous structure in the Central China Grid should be built. In this way, the grid company addressed the growing worries over potential security threats posed by a cross-regional interconnected grid while keeping an avenue open for the continuation of UHV-AC construction as such.

A number of experts pointed out the problematic nature of SGCC's 'compromise' suggestion. Ding Gongyang (丁功杨), a respected authority in the field of grid technology and planning, had contended for years that synchronous intra-regional UHV-AC grids posed the very same type of security risks for provincial grids as a cross-regional UHV-AC grid would pose for the different regional grids.[605] These risks, he and

[604] Guo Xiangrong (郭象容) and Tan Yongcai (谭永才), "We cannot allow lies to conceal the facts - Exposing the lie that having mid-way access points is an advantage of UHV-AC" (不能让谎言掩盖真相--揭穿中间落点是交流特高压优点的谎言), article published on Zeng Dewen's industry blog, *Caixin Net*, 30.06.2014.

[605] Zeng Dewen (曾德文), "SGCC's UHV-AC dream shattered, dream of an interconnected "Three China" grid will not be achieved" (国网梦碎交流特高压，"三华"联网恐成"南柯一梦"), article published on Zeng Dewen's industry blog, *Caixin Net (*财新网*)*, 12.10.2012.

Wang Zhonghong (王仲鸿) of Tsinghua University argued, were especially pertinent within the East China Grid where a general lack of surplus electricity made cross-provincial transfers within the region via UHV-AC completely unnecessary and a huge waste of investment. Additionally, Ding warned that the predictable scarcity of surplus electricity could eventually be used by SGCC as a justification for connecting and synchronising the East China UHV-AC grid with neighbouring UHV-AC grids at a later date in order to 'alleviate supply shortages'.[606]

Telling information about the nature of SGCC's compromise suggestion can be derived from the company's grid investment plan for 2015. While SGCC had dropped all project suggestions that would have led to an immediate synchronisation of the North and East China regional grids from its investment plan, it included blueprints for new UHV-AC projects that would instead bring the two regional grids as close to each other as possible without actually connecting them. Firstly, it suggested a U-shaped structure within Shandong Province on the southern fringes of the North China region as well as an adjacent ∩-shaped line in Jiangsu Province on the northern fringes of the East China region (see Figure 7.2).[607] The routes were to run in immediate proximity to each other along the border of the two grid regions, the distance between the two closest substations amounting to barely 80km. Given the tremendous distances SGCC generally aimed to cover via UHV-AC and that the main purpose of UHV-AC technology was to enable the construction of large interconnected grids, the planned routes indicate that SGCC's 'compromise' was more akin to a detour towards eventual cross-regional interconnection at a later point.

606 "Ultra-high voltage state engineering project deadlock unresolved" (特高压国家工程僵局待解), 21st Century Business Herald (21 世纪经济报道), 26.12.2013.

607 Route envisioned in Shandong Province: Jinan-Zaozhuang-Linyi-Weifang UHV-AC (济南 - 枣庄 - 临沂 - 潍坊). Route envisioned in Jiangsu Province: Nanjing-Xuzhou-Lianyungang-Taizhou UHV-AC (南京 - 徐州 - 连云港 - 泰州).
"SGCC plans to invest RMB420 billion in 2015 - UHV construction strongly exceeds expectations" (国网 2015 年计划投资 4202 亿 特高压建设大超预期), Shanghai Securities News (上海证券报), 16.01.2015; "SGCC to spend RMB420 billion to construct '6 AC and 8 DC' transmission lines" (国家电网 4202 亿建"六交八直"线路), CNPC Online, 19.01.2015.

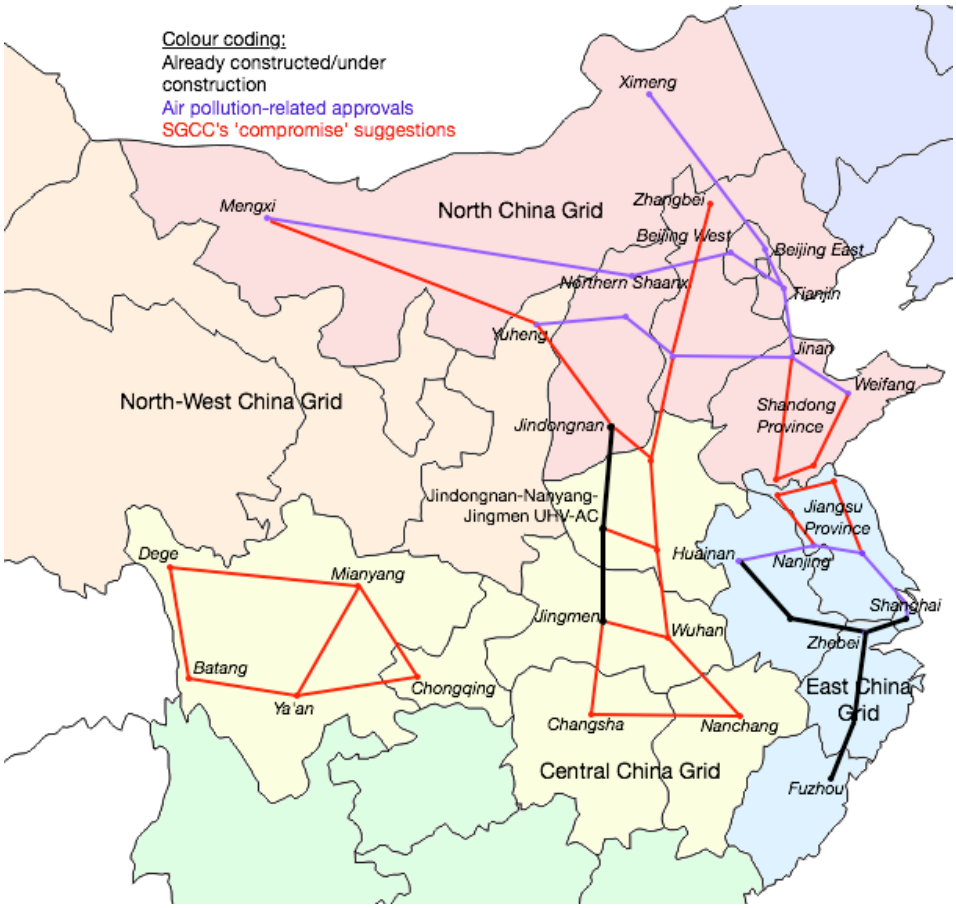

Figure 7.2 SGCC's 2015 'compromise' suggestions for UHV-AC grid development
Source: Author's visualisation of material presented in this section.

A similarly suspicious suggestion emerged as part of SGCC's development plans for the Central China Grid. Not even a month after the NEA had mandated the large round of UHV-AC re-assessments, SGCC published its intention to construct a number of new mega-projects within, as well as beyond, the Central China Grid.[608] While no longer listing the Ya'an-Wuhan line which was stuck in administrative deadlock (see Chapter 6), SGCC instead planned to extend the already operational Jindongnan-Nanyang-Jingmen (晋东南 - 南阳 - 荆门) UHV-AC 'test demonstration' project which reaches into the North China Grid, albeit not far enough to connect with the newly emerging UHV-AC structure within the northern grid region. A north-south extension of this line between Mengxi/Inner Mongolia and Changsha/Hubei was to alleviate this shortcoming. Moreover, SGCC listed a second perpendicular north-south axis which would also connect the Central and North China grids a little further to the east between Zhangbei/Hebei and Nanchang/Jiangxi, supplemented by four shorter

[608] Ibid.

horizontal segments that would link the two major vertical lines.[609] Finally, SGCC proposed to build a large ⓘ-shaped UHV-AC loop connecting hydropower bases in western Sichuan Province with the municipality of Chongqing, for which the grid company aimed to complete a feasibility study during 2015 (see Figure 7.2).[610]

Together, these projects would form a comprehensive regional UHV-AC grid in the Central China Grid region, including two solid interconnections with the North China Grid, which supports the notion that SGCC's 'compromise' proposal was little more than a thinly disguised continuation of its original grid development strategy. Although the grid company had publicly backed away from its demands regarding a cross-regional 'Three China' UHV-AC grid, its 2015 grid investment plan strongly indicated that it was still pursuing a cross-regional interconnection as its final goal.

7.3.2 SGCC's renewed attempts at cross-sectoral 'synchronisation'

In addition to its attempts at pacifying the intense sectoral debate about UHV-AC via its 'compromise' suggestion, SGCC immediately began searching for new argumentative linkages between 1U4L and cross-sectoral policy that would help shift the focus of debates away from the prevailing security concerns and give new momentum to its sectoral agenda. Further showcasing the systematic nature of SGCC's cross-sectoral 'synchronisation' strategy as a means for overcoming sectoral opposition, this section will briefly outline three 'grand ideas' that the grid company argumentatively connected and utilised in political debates specifically for this purpose. The ideational foundation for this new argumentative approach was formed by the prediction of a 'Third Industrial Revolution' (第三次工业革命) which SGCC had made public references to since late 2013 and based on which it now presented a new grid development concept under the heading of a 'Global Energy Internet', at the core of which, however, remained the familiar 1U4L strategy. A political entry point for pursuing a practical

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[609] The second north-south axis was planned between Zhangbei/Hebei (河北张北) and Nanchang/Jiangxi (江西南昌). The four connecting segments were the following: Jingmen/Hubei to Wuhan/Hubei (湖北荆门 - 湖北武汉), Changsha/Hunan to Nanchang/Jiangxi (湖南长沙 - 江西南昌), Jindongnan/Shanxi to Yubei/Henan (山西晋东南 - 河南豫北), Nanyang/Henan-Zhumadian/Henan (河南南阳 - 河南驻马店).

[610] The loop was planned to connect the cities of Batang, Ya'an, Chongqing, Mianyang, and Dege (巴塘 - 雅安 - 重庆 - 绵阳 - 德格 - 巴塘) in a circular fashion, including a north-south cross-section between Ya'an and Mianyang (雅安 - 绵阳).
The entire paragraph is based on: "SGCC plans to invest RMB420 billion in 2015 - UHV construction strongly exceeds expectations" (国网 2015 年计划投资 4202 亿 特高压建设大超预期), Shanghai Securities News (上海证券报), 16.01.2015.

application of this 'Global Energy Internet' plan was then provided by a recent addition to China's foreign economic policy, the so-called 'One Belt, One Road' strategy.

The 'Third Industrial Revolution'

SGCC's renewed attempt at 'synchronising' its 1U4L plan with cross-sectoral policy was built on an ideational foundation provided by the work of the American economic and social theorist Jeremy Rifkin. In his book, *The Third Industrial Revolution* (2011), which was publicly praised by Prime Minister Li Keqiang,[611] Rifkin proposed that imminent shifts in the energy field would soon lead to radical global economic change. This 'third industrial revolution', he argued, would be characterised by five 'pillars': 1) a shift to renewable energy; 2) the growth of distributed renewable power generation across the world; 3) the growing importance of energy storage technologies; 4) the utilisation of "Internet technology to transform the power grid of every continent into an energy internet that acts just like the Internet"; and 5) the transition to electric vehicles that can "buy and sell green electricity on a smart, continental, interactive power grid".[612] Without going into further detail regarding the contents of the book itself, suffice it to say that SGCC recognised and utilised the opportunity provided by Rifkin's visions of the future to amend the portrayal of its grid development agenda accordingly.

In December 2013, just as SGCC's public portrayal of UHV as the ultimate solution to China's smog problem was becoming accepted, the grid company's chairman Liu Zhenya gave a speech to the CCP's Central Committee in which he engaged with Rifkin's ideas.[613] In his speech, 'Smart Grid and the Third Industrial Revolution', Liu presented to China's top leaders a version of Rifkin's development concept that was deeply interwoven with the 1U4L plan and its smart grid extension which since 2009 SGCC had presented under the heading of a 'Strong and Smart Grid'.[614] Liu argued that energy transformations had always been the fundamental driving force of industrial

611 "China's New Leaders Burnish Image by Revealing Personal Details," Bloomberg Business, 24.12.2012.
612 Jeremy Rifkin, *The Third Industrial Revolution. How Lateral Power is Transforming Energy, the Economy, and the World* (London: Palgrave Macmillan, 2011). Summary published under: http://www.thethirdindustrialrevolution.com, accessed 09/2015.
613 "Smart grid and the third industrial revolution" (智能电网与第三次工业革命), SGCC chairman Liu Zhenya's speech to the 3rd plenary session of the 18th CCP Central Committee, Science and Technology Daily, 05.12.2013.
614 "China's State Grid Corp Plans To Build 'Smart Grid' By 2020," Dow Jones International News, 21.05.2009; "China gets smart on power supply," Shanghai Daily, 01.06.2009; "China's State Grid unveils detailed smart grid plan," Reuters, 29.06.2010.

revolutions and industrial development and that currently a new type of energy transformation was occurring in which unprecedented increases in electricity demand were triggering numerous technological breakthroughs in the renewable energy and smart grid realm which were sustaining and promoting a 'third industrial revolution'. This new "smart grid stage", Liu asserted, was based on new energy technology, distributed power generation technology, large-scale energy storage technology, and super-long distance (read "UHV-DC") and large scope (read "UHV-AC") transmission technology. These technologies, Liu concluded, provided the foundation for the opportunity to develop a "strong grid framework-based, extensively interconnected, highly intelligent and interactive 'smart internet'".[615]

Emphasising the successes of the United Kingdom and the United States during the first two industrial revolutions, Liu argued that "whoever seized the opportunity during phases of energy transformations to establish competitive superiority found himself in a position of invincibility". It was now up to the Central Committee to "adjust to the development currents, to seize the historical opportunity, to speed up the construction of a smart grid, and to firmly occupy the heights of the new round of energy transformations."[616] Liu maintained that China already possessed all the necessary technological components to build a smart grid, but that the country needed to "comply with the development patterns of rising grid voltage levels, the growing scope of grid interconnectivity, and increasingly high allocation capacity" in order to use the smart grid as the guiding industry tool during the third industrial revolution. In an elaborate chain argument Liu then explained that developing UHV was a necessary foundation for the smart grid, its focal point being the synchronous 'Three China' UHV-AC grid.[617]

With this final argumentative twist Liu essentially portrayed further UHV-AC development as an imperative first step for China's ascendency to global economic dominance, a perspective which also shone through in his final remarks in which he underlined the uniqueness of the current opportunity for the Chinese nation as a whole:

> Whether we are able to firmly grasp the historical opportunity of the third industrial revolution will to a large extent decide China's future position in global competition. The major difference in comparison to

[615] "Smart grid and the third industrial revolution" (智能电网与第三次工业革命), SGCC chairman Liu Zhenya's speech to the 3rd plenary session of the 18th CCP Central Committee, Science and Technology Daily, 05.12.2013.
[616] Ibid.
[617] Ibid.

> the last two industrial revolutions is that that China is already on the road to a grand rejuvenation. China's new energy and smart grid development are already at the global forefront and place the country in an advantageous position during this new round of energy transformation. [...] Opportunities are fleeting! The energy and electricity industry must consciously follow history and accelerate the development of a smart grid in order to consolidate and expand China's already emerging superiority in the smart grid domain, and in order to contribute to the Chinese Dream of a grand rejuvenation of the Chinese people.[618]

This December 2013 speech was given at a time where SGCC's linkages between UHV development and cross-sectoral environmental policy were beginning to prove successful. As the anti-smog campaign took over public and political consciousness, Liu's economically nationalistic spin on Rifkin's 'Third Industrial Revolution' – with which the grid company pursued the very same goals as with the anti-smog campaign, namely government approval of 1U4L and particularly the 'Three China' grid – temporarily disappeared from the headlines. However, in early 2015, just as SGCC was running into difficulties because of the NEA's decision to completely re-evaluate UHV-AC technology and its 'synchronisation' with anti-air pollution policy was starting to lose political traction, variants on this earlier theme suddenly re-appeared.

The 'Global Energy Internet'

Slowly toning down its pollution-related pro-UHV arguments (relatively speaking), in early 2015 SGCC began to once more strongly emphasise the linkages between Rifkin's ideas and its own 1U4L and 'Strong and Smart Grid' initiatives. In particular, the addition of UHV technology to Rifkin's idea of an 'Energy Internet' was portrayed as SGCC's blueprint for implementing the 'Energy Internet' on a global scale. UHV and "energy internet technology", the grid company now claimed, formed inseparable foundations for the emergence of a "Global Energy Internet" (全球能源互联网), a vision in which different regional 'energy internets' across the world – all regionally synchronised via UHV-AC and supported by smart grid technology – would be connected via UHV-DC in order to "globally share renewable energy".[619]

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618 Ibid.

619 "UHV and energy internet technology jointly constitute the Global Energy Internet" (特高压、能源互联网技术共同构成全球能源互联网), North Star Electric Power News Network (北极星电力新闻网), 08.04.2015.

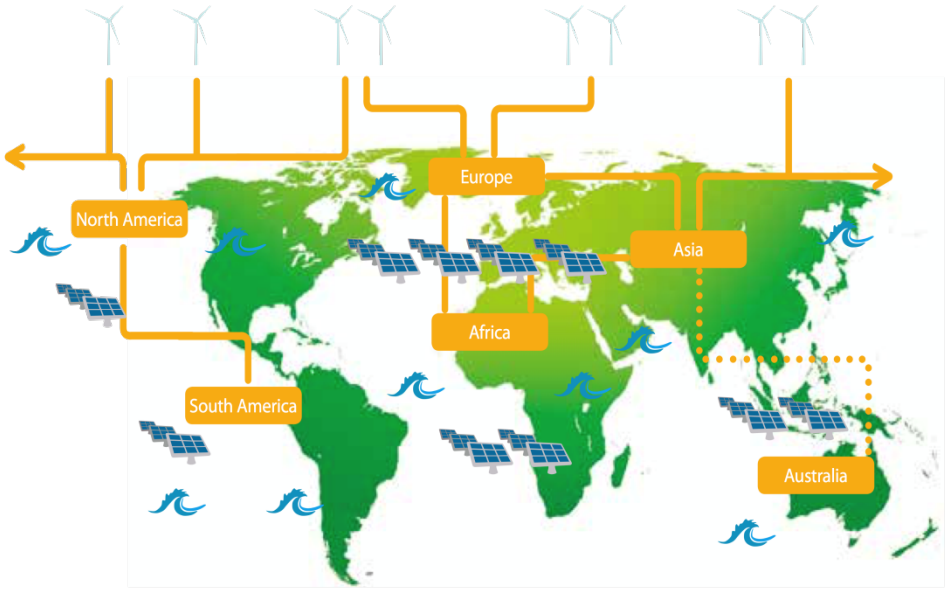

Figure 7.3 The 'Global Energy Internet' as envisioned by SGCC
Source: State Grid Corporation, *Corporate Social Responsibility Report 2014*, Beijing, 2014, p. 74.

While the medium-term focus was to be on the interconnection of domestic grids, by 2050 energy bases in different countries and continents were to be linked together in three stages of grid interconnection – cross-national, inter-continental and worldwide – so as to globally transmit and distribute clean electricity to wherever it was needed across all voltage levels and based entirely on SGCC's technology and standards. Liu's grand vision (fully laid out in his 2015 book *The Global Energy Internet*[620]) even included the transmission of wind power from the Arctic regions and solar power from the equatorial (一极一道) to load centres across the globe via long-distance UHV transmission, leading some news outlets to draw literary comparisons with the science fiction genre.[621]

While the idea of a 'Global Energy Internet' was evolving, it was lacking not only in practical but also in political applicability as the only real linkage to existing policy debates remained Prime Minister Li Keqiang's 2012 endorsement of Rifkin's book. This situation changed rapidly as new developments in China's foreign economic policy

[620] Liu, *The Global Energy Internet (*全球能源互联网*)* (Beijing: China Electric Power Publishing House, 2015).
[621] "The 'Global Energy Internet' looks very good but is still faced with three large difficulties" ("全球能源互联网"看上去很美：仍面临三大难题), North Star Electric Power News Network (北极星电力新闻网), 15.04.2015; "SGCC actively serves the 'One Belt, One Road' strategy" (国家电网公司积极服务"一带一路"战略), State Grid News (国家电网报), 13.04.2015; "China's $50 Trillion Plan for a Global Energy Grid," The Diplomat, 01.04.2016.

provided an opportunity for the grid company to once more engage in a 'synchronisation' attempt.

Synchronising the 'Global Energy Internet' concept with the central government's 'One Belt, One Road' strategy

In late 2014, just as the NEA was about to publicise its decision to require a whole new round of evaluations regarding UHV-AC technology, a new foreign economic policy strategy initiated by State President Xi Jinping began to dominate the headlines. This strategy was comprised of two components, referred to as the 'New Silk Road Economic Belt' (新丝绸之路经济带) and the 'Maritime Silk Road of the 21st Century' (21世纪海上丝绸之路) respectively and commonly abbreviated as 'One Belt, One Road' (一带一路). The purpose of this new strategy was manifold, but can be summarised as being geared towards strengthening economic ties with neighbouring countries via large infrastructure projects in order to further regional economic development while securing lucrative contracts for state firms in the process.[622] Other incentives which were not publicly stated plausibly also included strengthening China's economic and political influence in the wider region. With regard to the energy sphere more specifically, NEA director Wu Xinxiong in a November 2014 interview stated that the motivation of 'One Belt, One Road' was to safeguard energy supply diversification and supply security in the Asia-Pacific region, devise mechanisms to keep energy prices steady and construct an overall regional security mechanism. The NEA, it became known, fully supported deepening energy interlinkages with Central and South Asia, yet while there was constant talk of constructing more oil and gas pipelines, electricity transmission lines and different kinds of transportation infrastructure, there was no mention whatsoever by government officials of UHV construction in this context.[623]

This gap was once more filled by SGCC. In his 2013 book, *Electric Power and Energy in China*, Liu Zhenya had already pointed out the potential of UHV transmission to establish international power grid linkages, allowing China to enhance its electricity

622 "'One Belt, One Road' goes hand in hand with APEC, China's energy silk road 'going out' strategy is intensifying" ("一带一路"携手 APEC 中国能源丝绸之路"走出去"战略升级), North Star Electric Power News Network (北极星电力新闻网), 05.11.2014; "Energy interconnection and intercommunication: 'One Belt, One Road' is leveraging infrastructure investment" (能源互联互通："一带一路"撬动基建投资), 21st Century Business Herald (21 世纪经济报道), 10.11.2014.

623 "Energy interconnection and intercommunication: 'One Belt, One Road' is leveraging infrastructure investment" (能源互联互通："一带一路"撬动基建投资), 21st Century Business Herald (21 世纪经济报道), 10.11.2014.

supply security by tapping into the hydropower and coal resources of neighbouring countries and even achieve grid interconnections between China's western-most provinces, Central Asian and, perhaps, even European countries to "form electric power channels and networks that will traverse the Eurasian landmass".[624] In its January 2015 grid investment plan the grid company now took up these earlier ideas and stated that it aimed to initiate early-stage development work for four major international transmission lines (two of which were planned as UHV-DC and two as conventional high-voltage lines) connecting different parts of China with Russia, Mongolia, Kazakhstan and Pakistan, all explicitly based on the idea of "constructing a Global Energy Internet".[625] Furthermore, when in April 2015 the state assets regulator, SASAC, officially instructed central state firms to participate in the 'One Belt, One Road' strategy through the construction of infrastructure and the export of Chinese manufacturing, technology, standards and management, SGCC took this general encouragement as a premise for claiming in a series of enthusiastic press releases that its idea of a UHV-based 'Global Energy Internet' was, in fact, the grid company's called-for contribution to successfully implementing the state's new regional foreign policy; that it was, indeed, "actively serving the 'One Belt, One Road' strategy".[626] As its newly discovered linkages to trending macro-policy showed the first signs of real political applicability, SGCC also began to adopt the language of the new policy it was now trying to 'synchronise' itself with by formulating the concept of a UHV-based 'Electricity Silk Road' (电力丝绸之路) which it vowed to construct as a constituent of the Global Energy Internet.[627]

It remains too early to tell whether SGCC's renewed application of its previously highly successful strategy to challenge sectoral opposition by tactically linking itself to cross-sectoral policy will ultimately assist the grid company in attaining the grid development results it has been working towards. There have, however, been some early signs that its ideas have already been taken up by the top leadership. In October 2015, President Xi Jinping was quoted in an SGCC press release as having proposed that the United

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624 Liu, 2013, p. 71.
625 "SGCC to spend RMB420 billion to construct '6 AC and 8 DC' transmission lines" (国家电网 4202 亿建"六交八直"线路), CNPC Online, 19.01.2015.
626 "SGCC actively serves the "One Belt, One Road" strategy" (国家电网公司积极服务"一带一路"战略), State Grid News (国家电网报), 13.04.2015; "SGCC to implement 'One Belt, One Road' by constructing a Global Energy Internet - 10 stocks about to dig gold" (国家电网落实一带一路构建全球能源互联网 掘金 10 股), China Capital and Securities Net (中国资本证券网), 10.04.2015.
627 "SGCC's 'One Belt, One Road' UHV blueprint: RMB 200 billion worth of investments expected within the borders of Xinjiang" (国家电网"一带一路"特高压蓝图：光新疆境内就投两千亿), North Star Electric Power News Network (北极星电力新闻网), 14.04.2015.

Nations Sustainable Development Summit discuss the establishment of a Global Energy Internet in order "to facilitate efforts to meet the global power demand with clean and green alternatives".[628] SGCC itself also did everything in its power to further enhance the political applicability of the new macro-linkage. In March 2016, the 'Global Energy Internet Development Cooperation Organisation' (全球能源互联网发展合作组织) was founded in Beijing with the participation of State Grid and a number of important domestic and international market players in the fields of grid and telecommunications technology such as Huawei, ABB and Siemens.[629] By April 2016, the grid company had furthermore independently signed related memoranda of understanding with the Russian grid company OAO Rosseti, the Korea Electric Power Corporation and the Japanese telecommunication and internet corporation SoftBank Group.[630] Moreover, a policy document published by the NEA in February 2016 outlining plans for the construction of an "energy internet" (能源互联网) suggests that SGCC's reasoning had already begun to impact sectoral policy-making, although while this document contained several ideas originally spearheaded by the grid company it noticeably omitted any mention of the UHV question.[631] The mere fact, however, that when SGCC encountered opposition it immediately resorted to its trusted 'synchronisation' strategy demonstrates the systematic nature of this mechanism's application in the pursuit of political gain, exactly as witnessed during numerous earlier episodes.

7.4 Chapter conclusions

This final empirical chapter demonstrated that SGCC's attempts to 'synchronise' with select cross-sectoral policy in order to overcome sectoral opposition to the application of its policy preferences followed systematic patterns that repeated themselves over

[628] "It's about Time to Construct Global 'Electricity High-speed Network'," SGCC press release, 13.10.2015.
[629] "Global Energy Internet Development Cooperation Organisation established in Beijing" (全球能源互联网发展合作组织在京成立), China Council for the Promotion of International Trade (中国国际贸易促进委员会), 31.03.2016, http://www.ccpit.org/Contents/Channel_3699/2016/0331/603204/content_603204.htm, accessed 04/2016.
[630] "China proposes $50tn global renewable energy network," RT Business, 01.04.2016.
[631] National Development and Reform Commission, National Energy Administration, and Ministry of Industry and Information Technology, "Guiding opinions regarding the advancement of 'Internet +' intelligent energy development" (关于推进"互联网+"智慧能源发展的指导意见), Document No. 392 [2016], 29.02.2016.

time and across issue areas. It also provided additional evidence that the presence or absence of 'synchronisation' had profound effects on SGCC's ability to shape sectoral decision-making.

The first section examined how SGCC, in response to strong sectoral opposition, 'synchronised' the portrayal of its industry restructuring plan with cross-sectoral anti-air pollution policy which led to a series of UHV-AC approvals on the grounds of environmental arguments – approvals which had been blocked by sectoral authorities only months earlier based on grid security concerns. Cross-sectoral 'synchronisation', it was shown, allowed the grid company to bypass sectoral resistance and shape sectoral decision-making according to its own preferences. The second section demonstrated that as soon as the grid company's newly devised argumentative linkages to cross-sectoral policy disintegrated, SGCC's progress in implementing the 1U4L plan came to a sudden standstill as renewed sectoral gridlock emerged. In the absence of functional cross-sectoral 'synchronisation', the grid company found itself back in heated sector-specific debates about different facets of its proposed industry restructuring plan. This ultimately led to a whole new round of very basic assessments and the suspension of further UHV-AC approvals which strongly threatened the overall success of the grid company's broader corporate development strategy. Finally, the third section explored SGCC's attempts to once more regain the argumentative high ground by pacifying the political debate via a semi-credible 'compromise' suggestion for grid development while simultaneously testing the suitability of several new 'grand ideas' as the foundation for a 're-synchronisation' with cross-sectoral policy and testing their political applicability for overcoming the new sectoral resistance that it was facing.

These findings supported the conclusions from Parts A and B of this study that a) SGCC's actions and intent have had a substantial effect on sectoral processes of both policy formulation and implementation and b) this effect followed a particular pattern regarding the mechanisms, conditions and effects of SOE influence on sectoral policy. This pattern, which allows for a number of inferences with regard to the balance of power between central SOEs and central government concerning policy-making in China's strategic industries, will be spelled out in the following conclusion chapter.

8 Conclusion

Synopsis of the dissertation project

Building on empirical evidence from China's electricity supply industry, this dissertation engaged with prominent studies on the political economy of that country's industrial reforms which emphasise central government's sustained control over 'strategic' sectors of the economy as a core pillar of China's overall approach to economic governance (e.g. Pearson, 2005, 2007; Hsueh, 2011; Heilmann and Shih, 2013; Eaton, 2013; Li, 2015). Among these authors, there is a widely-shared perspective of strict central government leadership as well as active and effective government guidance underlying policy and development trajectories in these 'strategic' industries. The nature of this guidance has been interpreted differently by different authors, e.g. by Hsueh (2011) as being based on central government's 'strategic value' considerations of different industries, which take shape in a manner that is "insulated from domestic political pressures" and which central government applies by "interven[ing] in strategic sectors and issue areas when it sees fit without having to face political retaliation or opposition" [632]; by Pearson (2005, 2007) with her explanatory focus on central government's different political and economic 'imperatives' which supposedly guide sectoral policy trajectories; and by Heilmann and Shih (2013) who emphasise shifts in ideas about economic governance within central government as the immediate determinant of how the centre engages with and shapes the functional logic of strategic parts of the country's economy. Despite the notable differences between these accounts, they share as a commonality their near-exclusive focus on central government's policy preferences as the core determinant for the macro-policy and industry-specific policy settings and, ultimately, the operational logic inherent in China's strategic industries.[633]

In this dissertation, these government-centred accounts with their shared notion of deliberate and effective government leadership of strategic segments of China's economy were contrasted with perspectives that view the policy preferences of state-owned industry as crucial determinants of how sectoral policy in some of the country's

[632] Hsueh, 2011, p. 269.

[633] Heilmann and Shih (2013) focus on cross-sectoral policy and its subsequent application at the industry level, while Hsueh (2011) and Pearson (2005, 2007) mostly discuss industry-specific economic governance approaches in strategic industries.

most strategically relevant industries is formulated and applied. Large central-level state firms with a particular focus on the wider energy realm, these authors assert, tend to have a dominant influence on sectoral policy processes due to their high administrative rank, formal and informal political connections, superior sectoral knowledge, and substantial political and financial autonomy (e.g. Downs, 2008a, 2008b; Xu, 2008, 2012; Chen, 2010; Tsai, 2013; Zhang, 2015). Central government's sectoral oversight, on the other hand, is viewed as lacking in effectiveness, while its role in sectoral policy processes is perceived by some as being reduced to endorsing 'after the fact' projects and policies drawn up by state firms based primarily on those firms' own corporate interests (Xu, 2008).

The two perspectives were brought together by using empirical material from China's electricity supply industry – an industry setting characteristic of a 'most likely' case for dominant government-centred perspectives – in order to test the explanatory value of counterclaims made by SOE-centred studies regarding state firms' dominant influence over the formulation and implementation of sectoral policy, a factor which has been neglected in many widely-read accounts of the politics of China's industrial reforms. As China's electricity supply sector has witnessed a considerable shift in sectoral development trajectories since the turn of the millennium, first aiming at *unbundled competitive regional market building* in electricity supply and later emphasising the development of an *integrated non-competitive nationally unified supply system*, this industry setting presented a suitable environment for tracing the contentious political processes underlying this shift and, in particular, the effects of state industry's action and intent as part of these processes.

The dissertation was structured in three parts. Part A attempted to explain the outcomes of central government's attempts to implement sectoral policy for China's electricity supply, using the State Council's 2002 marketisation agenda for the electricity industry as the core example. Part B focused on the drivers underlying the mid-2000s emergence of a new sectoral reform agenda that contained a reform route that in many ways ran counter to the original marketisation agenda. Building on claims made by the SOE-centred literature, it was assessed via the application of process tracing whether mechanisms existed through which large state firms, given both action and intent, were able to shape these different stages of the policy process, while the congruence method was applied to examine whether findings were equally well or better explicable via the premises underlying government-centred accounts. While Part A demonstrated

mechanisms through which state industry was able to effectively obstruct the implementation of 'unfavourable' market building policy in spite of government opposition, the combined findings derived from Parts A and B suggest the prevalence of a 'synchronisation' mechanism (discussed in detail further below) through which state industry actively shaped the formulation of sectoral policy decisions according to its own preferences. To ensure the validity of this conclusion, this suggested mechanism of state firm policy influence was re-tested in Part C of this study against additional empirical material from the same industry case through a series of 'before-after' comparisons which further provided a number of factors that determine this mechanism's applicability and effects.

Summary of empirical findings and their relevance

The systematic analysis of political processes underlying the shift in sectoral reform trajectories in China's electricity supply industry allowed for a number of important conclusions.

Central government and the State Grid Corporation of China (SGCC) as the structurally most relevant industry player were reliably at odds with each other regarding the question of how to shape the future of the electricity industry. While central government's sectoral policy preferences (more specifically those preferences voiced by the State Council) consistently included a focus on regional grid development and the introduction of retail competition, SGCC engaged in very effective countermeasures to avoid the materialisation of both of those goals (as shown in Part A of the empirical section). Furthermore, there was ample evidence of SGCC's intense and often successful political manoeuvring to undermine existing sectoral policy and gradually replace it with a different reform plan, one rooted in its own sectoral policy preferences which were mainly geared towards maintaining and further deepening its own structural integrity across industry sub-sectors while limiting the role of competition in the industry, as well as towards establishing a nationally unified, integrated and synchronous grid system under its own corporate leadership (Parts B and C).

Many of SGCC's actions under this particular interest setting were answered with government opposition, particularly by sectoral authorities, based on existing sectoral policy. This sometimes succeeded in curtailing SGCC's advances but was repeatedly circumvented by the grid company based on its utilisation of uncoordinated

variance/overlap between central government policy at different levels of abstraction. Based both on its actions and intent, SGCC, since its establishment in 2002, was found to have had a substantial effect on the way in which sectoral policy in China's electricity supply industry was formulated and applied; this was highly consequential for the evolution of the operational logic of the industry as such, while the witnessed shifts in sectoral policy trajectories were not equally well explained by changes in central government's sectoral policy preferences.

The dynamics underlying the changes in sectoral policy trajectories in China's electricity supply industry call into question the otherwise rarely challenged notion of central government's active and effective guidance via policy and administrative control over the country's strategic industries, as propagated by various government-centred accounts which were insufficiently able to explain their own 'most likely' case. Although it will require further research to determine the extent to which these findings may apply in other industry settings, the logic of the uncovered mechanisms of SGCC's policy influence suggests that sectoral policy in the strategic parts of China's economy is not necessarily an exclusive product of central government's policy preferences. The emergence and application of sectoral policy in the 'commanding heights' of China's economy may instead be better explained through patterns of contentious interactions and repeated tactical 'synchronisation' of reform agendas between large state firms and central government in which state industry's 'bottom-up' influence is often equally, and occasionally more, important than central government's 'top-down' influence. At the same time, while SOE-centred accounts have been generally correct about paying close attention to the political behaviour of large state firms, they appear to have overestimated their policy impact while suggesting mechanisms of influence that only partially matched the findings in this dissertation.

Before the relevance of these findings for the literature is discussed further, the following section will integrate the conclusions from all three empirical parts of this dissertation into a bi-directional model of government-SOE interaction over sectoral policy in the electricity supply industry as an important case of a 'strategic' economic sector. As part of this model, the particular set of mechanisms through which SGCC as a central SOE, based on action and intent, has been able to shape the formulation and implementation of sectoral policy will be further specified, together with the conditions under which and to which effect it has been able to do so.

8.1 Central SOEs' influence on sectoral policy processes and patterns of interaction with central government as observed in the electricity supply industry

In order to specify the observed range of policy-relevant actions taken by SGCC as a large central-level SOE and their respective effects given a persistent mismatch with central government's policy preferences, the distinction should be made between *reactive* measures, defined here as measures aimed at preventing or altering the implementation of existing sectoral policy and *proactive* measures, defined as attempts at shaping the content and direction of sectoral policy itself.

8.1.1 Reactive measures against the implementation of 'unfavourable' sectoral policy

The empirical findings suggest that SGCC has been very successful at frustrating the practical application of even central government's most far-reaching sectoral policy decisions if they were perceived as incompatible with the grid company's own policy preferences. As was demonstrated in Part A of the empirical sections, SGCC persistently countered the implementation of the State Council's major sectoral marketisation plans by undermining the execution of asset unbundling requirements between industry segments (i.e. between power generation, transmission and distribution, as well as auxiliary businesses) that were essential for the establishment of competitive regional electricity markets as set out in the No. 5 Document (2002). In all four settings evidence was provided that demonstrated how the grid company blocked and partially reversed asset unbundling, thereby causing substantial slowdowns and interruptions to the policy implementation. The successful obstruction and circumvention of these unbundling steps can therefore be viewed as equivalent to the obstruction of the marketisation plan as a whole. 'Defensive' measures applied by the grid company can be broadly summarised under the following three headings:

- *Distorting investment behaviour*: SGCC repeatedly conducted autonomous and often unapproved investments across industry sub-segments through which it deliberately distorted emerging competition (particularly in electricity wholesale in different parts of the country and in the auxiliary grid business where SGCC's subsidiaries regained market dominance);

- *Obstruction and/or strategic misuse of pilot projects*: SGCC openly refused to cooperate with unbundling pilot projects (e.g. regarding direct power sales for gradual T&D unbundling) or utilised pilot projects to feign cooperation with policy requirements (e.g. by establishing allegedly private companies in the generation and retail segments while maintaining direct ownership ties so as to privatise profits); and
- *Manipulation of internal asset structures*: SGCC unilaterally reshaped the structure of assets that it had been allowed to 'temporarily' retain so as to prevent further unbundling and/or reverse asset losses that it had already incurred (e.g. hollowing out the assets of regional grid companies and undermining their operational autonomy to avoid further grid regionalisation and transforming affiliated research institutes into holding companies for grid equipment manufacturing firms so as to limit/reverse the impact of auxiliary business unbundling).

Central government actors at both State Council and sectoral level repeatedly intervened in SGCC's multi-faceted attempts to ensure its continued engagement across sub-sectoral boundaries by vetoing or reversing some of the most prominent investments and acquisitions and publicly scolding the grid company for its neglect of central policy. In 2007, the State Council issued a new policy document that openly listed the tremendous problems in executing asset unbundling and reemphasised the full validity of the policy goals inherent in the market building agenda, while in 2012 Prime Minister Wen Jiabao went on public record once more demanding the break-up of the remaining monopoly structures in the electricity sector, thereby demonstrating that central government's intentions towards sectoral reform had largely remained stable over time. However, despite the repeated interventions, SGCC's countermeasures to State Council policy brought about a marked slowdown in its implementation progress.

Simultaneously, there was also evidence of instances in which central government bodies responded in a supportive fashion to some of the grid company's obstructive measures, particularly to some of its illicit investments. All of these instances shared as commonalities that they were preceded by targeted venue-shopping during which SGCC presented its acquisition plans as furthering those particular bodies' non-sector specific mandates, leading to administrative support on the basis of the exact reasoning supplied by the grid company but with no, or very little, consideration of the resulting

sectoral impact. This finding shows that large central SOEs such as SGCC are able to utilise the variances and lack of coordination among broader political mandates between different central government institutions as a foundation for venue-shopping through which they further enhance their ability to influence or obstruct the implementation of sectoral policy.

Overall, the empirical findings suggest that central SOEs' opposing behaviour has been an important determining factor for the way in which the most far-reaching State Council policy decision for the electricity supply industry in the last two decades was applied and for its structural outcomes regarding the industry's overall functional logic. Central government experienced severe difficulties in trying to implement sectoral policy against SGCC's will, and its ability to guide reforms according to its own policy preferences was strongly curtailed by the grid company's ability to counteract and neutralise government guidance that conflicted with its own sectoral reform preferences.

8.1.2 Measures for proactively shaping the policy environment

Unlike SGCC's *reactive* defensive measures with their generally very high success rate in obstructing the implementation of unfavourable policy, the effectiveness of *proactive* measures to shape the policy environment by introducing and successively pushing for the application of its own sectoral policy agenda (as laid out in Part B of the empirical sections) followed a cyclical path. Attempts at influencing sectoral policy- and decision-making via direct contentious engagement with sectoral authorities usually led to deadlock between both sides (*'basic conflict mode'*). However, tactically synchronising its portrayal of sectoral reform suggestions with existing *cross-sectoral* policy in several crucial instances allowed SGCC to overcome sectoral-level opposition (*'synchronisation mode'*) and to thereby gradually adjust the overall reform trajectory.

'Basic conflict mode' (low effectiveness)

'Basic conflict mode' refers to the default setting of direct interactions between SGCC and central government over sectoral policy formulation and decision-making given conflicting opinions regarding sectoral policy trajectories, i.e. in this case on the one side SGCC's pursuit of new policy ensuring the sustained integration of transmission,

distribution and retail and the development of a nationwide synchronous grid vs. central government's ongoing emphasis on increased competition and sustained regionalisation on the other. During this ongoing clash of perspectives over the shape and content of sectoral policy, SGCC relied on its high administrative rank which ensured direct access to all parts of the central administration, exchanges on an equal footing with sectoral regulators, and participation in important evaluation and assessment procedures that form core components of sectoral decision-making. Notable measures applied by the grid company on this basis included its interference with sectoral bureaucratic processes of infrastructure planning via extensive 'battles of expertise', especially through a) its strong influence on intermediaries such as sectoral research, consulting and assessment firms; b) the utilisation of its stronghold over industry knowledge to deliberately withhold policy-relevant information and supply biased reports to government as the only available data foundation for official project evaluations; and c) the application of pressure on the media and attempts to silence opposition, both in official deliberations and in public debate.

Through the application of these strategies, the grid company was able to partially shape the course of bureaucratic processes, yet although the sectoral authorities encountered difficulties in fending off SGCC's political manoeuvring the grid company was only rarely able to fully overcome the authorities' procedural prerogative; and where it did, it usually appeared as part of a compromise in which approvals for some projects were conceded by the authorities while the overall impact of the grid company's sectoral agenda was contained. Confrontation between state firm and sectoral authorities in 'basic conflict mode' tended to lead to political stand-offs during which sometimes one side prevailed and sometimes the other, usually leading to a tense overall status quo in which both sides were able to thwart each other's efforts but neither was able to shape overall sectoral development trajectories without the other's support or tolerance. Overall, SGCC's attempts at proactively shaping the sectoral policy environment in 'basic conflict mode' did not have a very strong effect. SGCC was partially able to influence bureaucratic processes during clashes with sectoral regulators over prospective policy decisions, yet it was generally not influential enough to sideline and overcome opposition by sectoral authorities.

'Synchronisation mode' (high effectiveness)

The only reliable way for SGCC to bypass the sectoral bureaucratic and political obstacles characteristic of 'basic conflict mode' was through the employment of a 'synchronisation' mechanism, defined here as tactically matching its portrayal of pursued sectoral policy or corporate development plans with more abstract policy objectives pursued by central government, usually the State Council. Following this strategy, SGCC remained within cross-sectorally sanctioned boundaries while at the same time challenging existing sectoral policy. More specifically, this approach moved contentious sectoral issue matters into a different, and often more favourable, context. This allowed SGCC to claim legitimacy for its sectoral counter-reform plan and to gather support at higher administrative levels based on entirely different policy pretexts, thereby playing off central government's sectoral and cross-sectoral policy goals against each other. The repeated application of this 'synchronisation' mechanism allowed SGCC to achieve significant step-by-step progress during the practical application of its sectoral agenda. It gave rise to a series of critical junctures through which the grid company progressively altered the course of China's electricity system reforms to reflect its own policy goals, largely at the expense of central government's original market building plan.

In conclusion, whether or not SGCC as a large central SOE managed to convincingly 'synchronise' the portrayal of its sectoral reform plan with stated central government macro goals appeared to be an important determinant for more versus less successful episodes for the state firm in shaping sectoral policy according to its own preferences. Once convincing linkages with cross-sectoral policy were in place, the grid company's influence on sectoral policy showed a steep increase as compared to 'basic conflict mode'.

8.1.3 'Synchronisation' in practise

The process of establishing 'synchrony' between SGCC's sectoral policy preferences and existing cross-sectoral policy appeared to follow a logic of trial and error across different macro-level policy subjects at the same time. As high profile cross-sectoral policy changed, SGCC's *portrayal* of its sectoral reform agenda was adapted accordingly – while the agenda itself largely remained stable in terms of content. Whenever a new

subject matter that was broadly related or relatable to SGGC's reform plan caught the State Council's attention or featured prominently in new cross-sectoral policy, the grid company swiftly tested its potential for presenting its reform plan in a new light that would potentially allow for faster advances at the sectoral level. Following this logic, SGCC repeatedly and skilfully depicted its pre-existing sectoral reform ideas or particular corporate development projects as 'tailor-made' solutions for new and pressing cross-sectoral policy challenges, irrespective of existing sectoral policy and the standpoints of sectoral regulators. *All* instances in which SGCC made tangible progress with the application of its sectoral reform plan were directly tied to recently adjusted claims regarding its alleged ability to contribute to the solution of urgent cross-sectoral political problems that were currently being prioritised within the State Council. This strategy repeatedly resulted in administrative support by departments and commissions at the ministerial level or above and pressured sectoral authorities to conform regarding measures that had previously been heavily contested at the sectoral level, as was demonstrated by the following empirical examples:

- SGCC was able to place its own 'counter-reform plan' for sectoral development on the political agenda by 'synchronising' with select macro-goals inherent in the marketisation plan of the State Council's No. 5 Document and by portraying its own reform plan as the faster and more effective route towards those and several other goals, claims which were strongly disputed at the sectoral level.

- SGCC's 'synchronisation' with cross-sectoral policy aimed at furthering indigenous innovation and the international competitiveness of Chinese industry brought about State Council support for the research and development underlying the technological foundations of the grid company's sectoral reform plan, as well as for the construction of ultra-high voltage (UHV) transmission pilot projects, all despite strong sectoral controversy.

- SGCC's flexible 'synchronisation' with the cross-sectorally informed institutional mandates of different commissions and ministries (particularly via venue-shopping at SASAC, the NDRC Foreign Investment Department and MOFCOM) resulted in highly consequential investment approvals which allowed the grid company to further undermine unbundling restrictions and gain market dominance in profitable auxiliary industries (heavily disputed at the sectoral level and in immediate violation of the No. 5 Document).

- SGCC's 'synchronisation' with the State Council's cross-sectoral policy on air pollution control brought about approvals for a widespread practical application of synchronous UHV-AC technology across substantial parts of China's electricity grid, despite simultaneously occurring high-profile bureaucratic clashes between SGCC and sectoral regulators regarding the very same transmission projects and their anticipated impact on the electricity supply system.

- In order to overcome new sectoral challenges that arose after UHV construction approvals had already been granted, SGCC immediately attempted to 're-synchronise' with shifting cross-sectoral policy, this time in the realm of China's regional foreign policy ('One Belt, One Road') and via economically nationalist perspectives surrounding the concept of a 'Third Industrial Revolution'.

In all of these crucial instances, SGCC's tactical 'synchronisation' with cross-sectoral policy convinced top leaders within ministries, commissions and/or the State Council to grant their support based entirely on cross-sectoral premises and with little to no consideration of impact on existing sectoral policy. In several cases support was granted against the strongly opposing viewpoints of sectoral regulators and non-SGCC-affiliated industry experts, and despite, or even unaware of, the fact that this support ultimately facilitated the emergence of the grid company's sectoral 'counter-agenda' and further obstructed simultaneously ongoing market building endeavours. Not only did top-level support derived from the tactical 'synchronisation' with cross-sectoral policy help SGCC's sectoral agenda to gain political momentum, it also placed very effective pressure on sectoral regulators to temporarily give up any remaining opposition.

These observed dynamics help to further explain *why* 'synchronisation' tactics became the centrepiece of SGCC's political strategy. By challenging sectoral policy on the basis of more abstract macro-policy, the grid company was able to claim legitimacy during its pursuit of ends which, on the basis of existing sectoral policy, were at least partially illegitimate. This made it very difficult for critics to maintain that SGCC 'violated' policy because, following its own claims, it was simply implementing policy of a higher order, even though it did so with the specific purpose of weakening, circumventing or replacing existing sectoral policy. This approach repeatedly allowed the grid company to avoid costly confrontation with sectoral government bodies, while much of the

confrontation that did occur ultimately took place within the confines of an argumentative framework that had been prepared by the grid company itself and in which it possessed strong informational advantages. Comparatively indirect in nature, as compared to head-on confrontations with central government bodies, 'synchronisation' therefore provided the easiest and most effective way for the grid company to shape sectoral policy.

8.1.4 Factors that affected the applicability and effect of the 'synchronisation' mechanism

A number of factors were found to determine the applicability and effect of the 'synchronisation' mechanism, although claims regarding these factors' relative impact and mutual interaction will require further testing in subsequent studies.

SGCC's ability to establish and politically utilise argumentative linkages across policy levels appeared to be contingent on the underlying mechanisms of influence outlined under 'basic conflict mode', i.e. its high *administrative rank* and *privileged access to industry information*. High administrative rank ensured that the grid company's executives were able to present their suggestions for sectoral solutions to cross-sectoral policy challenges to top-level officials in the State Council and in relevant government and party committees. Furthermore, due to SGCC's control over industry data and the majority of industry research and consulting bodies, central government at all levels was heavily reliant on SGCC's willingness to cooperate on informational matters. As previously noted, the grid company repeatedly exploited its informational advantage by supplying one-sided policy suggestions, project proposals, feasibility studies and evaluation materials which reliably portrayed the alleged linkages between its own proposals and cross-sectoral policy in a positive light; these were based largely on internal company data, the factual accuracy of which was very difficult for government bodies to verify.

Just how dominant the grid company was regarding industry expertise was also demonstrated by the fact that the sectoral authorities repeatedly resorted to commissioning expertise from a small number of retired government officials and industry experts, many of them in their eighties and without administrative rank or current institutional affiliation. This group of retired experts was eventually granted full voting rights in assessment and evaluation procedures linked to some of the most far-reaching infrastructure-related decisions in China's recent history, which makes it seem

likely that engaging them was one of the few ways that the sectoral authorities could access policy-relevant perspectives that were not shaped by business dependencies. In some cases, bringing in these external experts made it possible for the sectoral authorities to at least partially challenge the grid company's general dominance of opinion by countering it with opposing perspectives and argumentatively pulling cross-sectorally 'synchronised' issue matters back down to the industry level (and back into 'basic conflict mode', as outlined above). In this vein, sectoral regulators repeatedly responded to SGCC's 'synchronisation' attempts by bringing in experts who in turn contrasted controversial aspects of the grid company's reform agenda with particularly pressing *industry-level* matters, usually by emphasising security or economic risks. The resulting 'battles of expertise' in a series of cases allowed the sectoral authorities to stall contentious decision-making procedures and in some cases led top officials at the State Council level to change their views and provide additional space for formal assessments. However, the grid company's privileged access to relevant information continued to place the sectoral authorities at a distinct disadvantage during these interactions and often required them to resort to their procedural prerogative in order to diffuse the pressure applied by SGCC.

Without its high administrative rank and control over industry expertise, SGCC would probably not have been able to make use of its 'synchronisation' strategy in the first place. At the same time, depending exclusively on its high administrative rank, superior expertise and access to top-level politicians rarely led to success in shaping the sectoral policy environment in its favour, as demonstrated through the very low effectiveness of SGCC's proactive measures in 'basic conflict mode'.

The successful application of the 'synchronisation' mechanism also appeared to be contingent on the factor of *timing*. Many of the grid company's successful 'synchronisation' attempts occurred in immediate response to shifts in top-level macro-policy and during phases where clear sectoral specifications for those macro-guidelines had yet to be established, providing the grid company with a void that it quickly filled with its own suggestions. Relying on first-mover advantage during its swift responses to changes in cross-sectoral policy allowed for substantial freedom concerning the interpretation of how cross-sectoral policy changes should be applied at the sectoral level and forced sectoral authorities to engage on an argumentative level specified by the grid company itself.

Another important factor concerned the level of *political urgency* underlying newly emerging cross-sectoral guidelines, resulting, for example, from time pressure to find solutions to the challenges at hand or from the fact that the respective guideline was personally initiated by a top leader. The more urgent it was for sectoral authorities to deliver industry-level solutions, the more leverage the grid company appeared to have in influencing official sectoral responses to top-level demands. Furthermore, the *degree of specificity/detail* inherent in the respective macro-policy also appeared to matter during the application of the 'synchronisation' mechanism. The ideal target policy for 'synchronisation' seems to have been of medium specificity, i.e. macro-policy that was not too specific in its scope and application so as to leave space for suggestions regarding more detailed sectoral specifications, but also not too broad, as this would have potentially diminished the comparative relevance of the sectoral responses presented.

As an example, the State Council 'Action Plan' against air pollution (Chapter 7) may, in hindsight, be considered a particularly suitable target for 'synchronisation' as it was of high urgency due to sharply rising public discontent over government's smog management and SGCC was able to react immediately by shifting the portrayal of its 1U4L plan. Also, the 'Action Plan' contained very specific pollution reduction goals but only vaguely phrased possibilities as to how to attain them. High urgency and medium specificity placed substantial pressure on the sectoral authorities to report back with practical suggestions for sectoral solutions, which arguably enhanced SGCC's ability to feed its own project proposals into the cross-sectoral sphere even though they were being strongly contested at the sectoral level. In contrast, a much less suitable 'synchronisation' target was provided by the State Council's 'Western Development Programme' aimed at regional economic development in China's western regions (briefly addressed in Chapter 4). Firstly, there was a substantial time-lag between the publication of this policy (2000) and SGCC's engagement with it (2006) which strongly reduced the level of political urgency as it was almost certain that there were already numerous officially sanctioned sector-specific projects in place that addressed the goals laid out in the macro-policy. Moreover, the policy was quite broad in scope as it aimed for regional development across a number of different domains, which arguably reduced the immediate relevance and applicability of SGCC's 1U4L plan as a sector-specific response. Consequently, the 'Western Development Programme' never became a useful macro-linkage for the grid company.

A final important point to take note of regarding the impact of the 'synchronisation' mechanism is its inherent *'lock-in' effect*. Decisions made by high-ranking government commissions on the basis of higher order policy were rarely – or if they were, only partially – altered after the fact, not only because they tended to entail applied infrastructural changes which were difficult to undo, but likely also because this required top-level authorities to admit that their macro-policy-driven decisions had been wrong and that they needed to be reversed based on sector-specific considerations and arguments supplied by lower level authorities. This element of path dependence allowed SGCC to successively apply various parts of its reform plan in a step-by-step manner, even if earlier instances of 'synchronisation' had dissolved in the meantime.

8.1.5 Goals and drivers of central SOE behaviour as observed in the case of SGCC

Systemisation of goals pursued by SGCC

The goals pursued by the grid company during its obstructive interventions in processes of sectoral policy implementation and its 'synchronisation'-based interference with policy formulation were manifold but may be grouped under three headings. Firstly, having emerged from a fully vertically integrated setting, SGCC did everything in its power to maintain its monopoly status in the different segments of the electricity industry and across the different grid regions. This became particularly apparent during its struggle to maintain the unity of the transmission, distribution and retail segments, as well as through its approach towards integrating the different regional and provincial grid companies under its own leadership (see Chapter 3).

As vertical re-integration over the entire electricity industry was proving to be politically unachievable, the second-best solution for SGCC was to try and strengthen its reach across the industry's sub-segments while, secondly, working towards securing a dominant market position in those settings subjected to any form of competition. This was observable during its ventures into the power generation segment where it applied different strategies to combine the commercial opportunities provided by emerging wholesale competition with its position as transmission monopolist in order to 'outcompete' the other generation companies and to partially privatise profits. Similar occurrences took place in the retail segment, while arguably the most important example of this approach transpired in the nominally unbundled grid equipment

manufacturing segment where SGCC hid the majority of its acquisitions within the corporate structures of its research institutes through which it eventually dominated competition in that field (also see Chapter 3). Unlike the 'core' grid segments, the nominally marketised auxiliary field was not bound by administrative pricing controls and therefore offered lucrative sources of revenue for the firm.

Thirdly, and relatedly, SGCC aimed to establish an industrial structure in which it could permanently combine its sustained operational monopoly over the different grid segments with reliable market dominance in adjacent 'competitive' segments. These different pursuits were finally brought together in the '1U4L' agenda which combined the maximum vertical and horizontal industry integration possible short of complete re-integration with a strong technological and financially profitable core over which SGCC had established full control due to its investments in leading equipment manufacturers and its command over technological standards (see Chapters 4-7). It was this particular combination of sustained monopoly and preferential engagement in adjacent, nominally competitive settings which appeared to be the main goal pursued by SGCC as a central SOE during its interference with the formulation and implementation of sectoral policy.

An interpretation of drivers underlying SGCC's pursuit of its corporate goals

While not strictly part of the phenomena examined in this thesis, the empirical findings presented warrant a tentative interpretation regarding the drivers underlying SGCC's pursuit of the different goals specified above. The evidence regarding these explanatory factors and their interaction is not fully conclusive, however, and further research is required in order to test them.

One likely explanation for the grid company's behaviour rests on the *formal incentive structure* for central SOEs as defined by the state-owned assets management system, more specifically by the guidelines according to which SOE managers are evaluated by SASAC (see Chapter 2). Commercial success is used here as a primary gauge of managerial ability and as an important measure according to which career development decisions for SOE managers are made by the state assets administrator. During its interactions with the grid company, SASAC – following its mandate – has focused predominantly on questions of enterprise performance and competitiveness, but at the same time has shown very little consideration for its decisions' linkages with and impact on the sectoral policy realm. SASAC's displayed lack of awareness regarding sectoral

policy as such makes it questionable as to what extent it takes the limitations that sectoral policy frameworks may place on enterprise performance into account during its managerial evaluations. Its frequent negligence of sectoral matters might indeed incentivise central SOE executives to pre-emptively mitigate the limiting impact of sectoral policy on their business operations and to make use of all available means to display to SASAC their ability to achieve good enterprise performance, irrespective of a challenging sectoral policy environment. It appears that it may at least partially be the dynamics of this evaluation system, i.e. the incentives it sets for enhancing profitability and competitiveness as well as the ways in which these measures are tied into managerial evaluations, that induce SOE leaders to primarily pursue commercial opportunities and to only secondarily respond to or even oppose sectoral policy requirements that call this pursuit into question.

Another important issue to consider for explaining SGCC's behaviour is how enhanced industry standing and increased profits matter personally for corporate executives, i.e. whether they are merely important measures of commercial success and therefore beneficial for career and salary prospects or whether and to what extent they also lead to more immediate and unregulated *private gains*. As noted above, there was evidence that some of SGCC's actions in response to market building went hand in hand with illegal privatisation attempts, particularly in power generation but also in the retail segment where marketisation pilot projects were utilised to install 'private' retailers that were, in fact, owned by grid company managers (see Chapter 3). SGCC's reclaimed dominant market share in the grid equipment manufacturing segment also created a setting which involved a – in this case, authorised – partial privatisation of profits, particularly via the procurement of UHV and smart grid equipment from publicly listed subsidiaries (see Chapters 3 and 5). However, as the exact distribution of ownership in these subsidiaries is not entirely clear, it remains a matter of speculation to what extent executives or their families might personally profit from the grid company's pursuits.

A further explanation for SGCC's aggressive involvement in sectoral policy-making lies in the grid company's *historical legacy*, i.e. in its organisational successorship to a vertically integrated industrial and administrative monopoly which, in the form of different ministerial entities until 1997, had combined both industry operation and administration. While corporatisation formally separated administrative and operational functions, personnel structures and administrative ranks partially stayed in place and probably also led to a partial survival of organisational 'habits' of attempting to steer

administrative procedures and exert control over industry structures as well as its own organisational fate (see Chapters 2 and 6). Relatedly, the *personal ambition* of SOEs' top executives, in the present industry case personified by SGCC's long-time CEO and current chairman Liu Zhenya, may offer an explanation. Liu, who has held leadership positions within the electricity sector since 1992 (in provincial electric power bureaus prior to corporatisation and in SGCC thereafter),[634] has acted as a very politically enterprising state firm executive who has displayed a strong personal drive to shape the workings of the industry: he is sometimes portrayed as an energy sector visionary, especially due to his several books in which he has presented a number of grand ideas on energy sector development. Importantly, as the size of China's state-owned firms appears to correlate with their broader political, economic and societal relevance, attempts at preserving organisational unity may also have been driven by top executives' desire to maintain and expand their personal political standing.

These different factors provide tentative indications of possible explanations for SGCC's administratively competitive behaviour, although further research will be necessary to determine their relative explanatory power and whether other important drivers exist.

8.2 The complexity of power relations between central SOEs and central government in relation to the literature

The mechanisms of state firm influence on sectoral policy in the electricity supply industry outlined in the previous section, as well as the provided insights regarding the circumstances under which this influence grows and declines, suggest that a number of constructive adaptations to existing government-centred and SOE-centred explanatory approaches may be beneficial, particularly regarding their understanding of the general logic of interplay and balance of power between central government and state industry, as well as regarding the drivers of sectoral policy and the determinants of policy change in China's strategic industries.

[634] China Vitae, Biography of Liu Zhenya, http://www.chinavitae.com/biography/Liu_Zhenya|3884, accessed 05/2013.

This dissertation's findings demonstrate the important role played by central state firms in sectoral policy processes and suggest that a bi-directional deliberative model based on contentious interactions between central government and central SOEs is best suited for explaining the emergence and implementation of sectoral policy. Exclusively government-centred perspectives (e.g. Pearson, 2005, 2007; Hsueh, 2011; Heilmann and Shih, 2013; Eaton, 2013; Li, 2015), while providing important insight into the workings of central government, have remained largely oblivious to the substantial relevance of large SOEs' participation in policy processes and the extent to which both sectoral policy output and outcomes can be influenced by the policy preferences of central state firms. SOE-centred perspectives (e.g. Downs, 2008a, 2008b; Xu, 2008, 2012; Chen, 2010; Tsai, 2013; Zhang, 2015), on the other hand, while being correct in emphasising the actions and intent of large state firms as important determinants of sectoral policy in its emergence and application, have generally overstated these firms' influence by portraying them as almost omnipotent. They have furthermore provided a skewed account of the mechanisms through which SOEs' policy influence primarily occurs while partially disregarding the fact that the extent of this influence varies following a set of particular conditions. Both sides, in their own ways, have provided slightly one-sided perspectives of China's central level politics, especially by underestimating the deliberative nature of decision-making as part of which neither the policy preferences of central government nor those of large central state firms alone, but rather their particular interplay, determine the ways in which sectoral policy emerges and the ways in which it is applied.

In contrast to basic claims made by the two camps about central government vs. state firm prerogatives in the sectoral policy realm, an essential characteristic of the interaction between central government and large central SOEs as observed and analysed in this dissertation in a 'most likely' case for functional government guidance is that *both* sides generally possess the ability to obstruct each other's pursuits in the field of sectoral policy-making and in the implementation of specific governance measures or industry projects. Given consistently clashing sectoral policy preferences, mutual blockades are standard practise, making prolonged phases of deadlock in policy processes a common occurrence. Both central government's attempts at top-down guidance without sufficient consideration of industry's stance, as well as attempts at bottom-up pressure from industry without consideration of government standpoints tend to create impasses over sectoral policy. While regularly facing each other as

opponents in the policy arena, state industry and central government ultimately depend on each other, particularly when it comes to formulating and applying functional sectoral policy. In order to shape sectoral policy according to its own preferences or progress with infrastructure development plans, industry needs formal bureaucratic support from sectoral authorities, ministries or the State Council, just as these different government entities are heavily dependent on central SOEs' willingness to cooperate, not only for the implementation of sectoral policy decisions but also to develop an accurate understanding of policy-relevant issues within the respective industry. Progression, in whichever direction, usually necessitates some form of at least temporary overlap in policy preferences.

Such overlap in policy preferences, however, is often intentionally 'fabricated' by state industrial actors utilising variance and lack of coordination between policy at different levels of abstraction in order to overcome political obstacles at the industry level. Utilising 'synchronisation' tactics and targeted venue-shopping, pre-existing and sectorally contentious policy or project blueprints tend to be – often successfully – presented to higher level authorities as ready-made solutions to newly emerging and particularly urgent cross-sectoral policy challenges, irrespective of sectoral authorities' opinions of these blueprints in the context of existing sectoral policy. What is deemed cross-sectorally important at the State Council level is thereby channelled towards a type of industrial application that may not only be questionable in terms of its contribution towards reaching the respective macro-goals, but may also undermine existing industry-level policy as well as the authority of sectoral regulators. Accordingly, many of the most consequential developments over the past years regarding the functional logic of the industry case under scrutiny in this dissertation were driven by an agenda that originated within state industry and was fed into the policy arena via the repeated application of a 'synchronisation' strategy by which existing sectoral and cross-sectoral policies were systematically played off against each other.

8.2.1 The shortcomings of exclusively 'government-centred' perspectives

This dissertation's findings concerning the determinants of sectoral policy in its emergence and application deviate considerably from those of exclusively government-centred top-down perspectives on the political economy of China's industrial reforms

such as Hsueh's (2011) focus on government's 'strategic value logic', Pearson's (2005, 2007) various political and economic 'imperatives' or Heilmann and Shih's (2013) emphasis on changes in central government's macro-ideas on economic governance. Given that this dissertation engaged with a 'most likely' case for these approaches to apply, it appears that their accuracy and analytical value could be improved if they were adapted so as to account for the significance of political interactions between central government and large state firms, as well as for these increasingly autonomous firms' intervening influence on the trajectory of sectoral policy in China's strategic industries.

By selectively focusing on the 'strategic value' of different sectors to central government, correlating it with sectoral-level policy outcomes and causally connecting both sides by assuming that central government is able to shape and steer China's strategic industries at its discretion, Hsueh (2011) under-theorises several of the factors that may interfere with the precise translation of government's policy preferences into a given industrial setting. Her perspective remains too apolitical as she overlooks the often cumbersome procedures through which important sectoral policy decisions arise and attempted implementation takes place. Although the structural outcomes observed in the case of the electricity supply industry still correspond quite well with the types of predictions Hsueh makes based on the high strategic value of that industry (i.e. the near-monopolistic dominance of state firms in downstream segments, high levels of industrial centralisation and an almost complete lack of market competition), they match for the wrong reasons. What Hsueh attributes to the alleged impact of uninhibited government leadership based entirely on sector-specific 'strategic value logic' largely turned out to be a result of state firms' obstruction of sectoral policy and their tactical engagement with the industry-level application of cross-sectoral policy, utilising mismatches among policy levels and variance in institutional mandates to pursue an agenda that in many ways contradicted and undermined central government's sectoral policy preferences, which had been aimed at a very different outcome. Ironically, industry's reform plan (targeted at less market and more centralisation) was a much closer reflection of what Hsueh proclaims as the distinctive features of central government's 'strategic value logic' in highly strategic settings than the State Council's unsuccessful competitive regional market-based reform approach. While this is certainly not to argue that central government dicta were irrelevant during these processes, they mattered in ways that differed strongly from the type of active and effective 'top-down' guidance described by Hsueh.

A comparable criticism applies to Pearson's (2005, 2007) arguments regarding central government's leadership role in strategic industries driven by different "financial/strategic and social/political imperatives"[635] and expressed via a number of applied mechanisms of government authority over these sectors. This dissertation showed that in a highly strategic industry case central government lacked the ability to implement its stated sectoral policy preferences against the will of state firms which are not fully recognised by Pearson as politically significant entities in their own right. Furthermore, the most fundamental policy and development agendas pursued by central government at the cross-sectoral level were open to strong interference by state firms when it came to applying them sectorally. Given the fundamental lack of coordination and ongoing clashes between central government bureaucracies and state industry over sectoral policy and development trajectories, Pearson's perspective of active central government guidance over China's strategic industries therefore appears difficult to uphold. As was shown, state industry regularly follows its own policy preferences which may differ drastically from those of central government, and large state firms are often very well-equipped to profit politically during these confrontations.

Heilmann and Shih's (2013) study, which posited shifts in broader economic policy ideas among central government leaders as the main determinants for the emergence of cross-sectoral policy and its subsequent application to strategic segments of the economy via sector-specific projects or policies, also invites partial criticism, although the findings presented here are mostly complementary to those of Heilmann and Shih. While this dissertation remains agnostic about the question of whether 'ideas', 'interests' or any other underlying forces ultimately determined central government's stated policy preferences,[636] it did show that the causal chain between those preferences, once formulated, and their application was fairly complex and did not entirely resemble the top-down dynamic described by Heilmann and Shih. Importantly, like Hsueh (2011) and Pearson (2005, 2007), Heilmann and Shih fail to account for the action and intent of large state firms in pursuit of their own policy preferences as an important intervening factor, which this dissertation showed to be of great significance, not only at the sectoral level which the authors mention but deliberately do not address in their study, but importantly also at the cross-sectoral level which they emphasise as the pathway through which shifts in macro-ideas within government matter across strategic

635 Pearson, 2005, pp. 313-314.
636 For a discussion of how ideas and interests relate to each other in the field of politics see John L. Campbell, "Ideas, Politics, and Public Policy," *Annual Review of Sociology* 28 (2002): 21-38.

industries. Heilmann and Shih are certainly correct in emphasising the overall importance of those macro-guidelines for the wider economy, but they overlook the fact that, in practise, they are subject to severe intervention by state industry when being applied. While the authors argue that shifts in central government's cross-sectoral policy priorities brought about numerous industry-level specifications/applications that central government had already been working on for a long time and that were "just downloaded from government servers",[637] this dissertation showed in a 'most likely' industry case that the sectoral specifications following adaptations to cross-sectoral policy for the most part originated within state industry as part of the pursuit of entirely different goals. Via a 'synchronisation' strategy, central state firms adapted their portrayals of their own pre-existing sectoral policy preferences/industry projects and tactically supplied them to government ('uploaded them to government servers', one might say) as perfect matches for shifting macro-guidelines in broadly related policy areas. State industry has been highly proficient at navigating such opportunities to 'jump on the bandwagon' and at utilising the often vague nature of central government's macro-level policy priorities for its own purposes while indirectly steering sectoral decision-making in the process.

8.2.2 The limitations of central SOEs' proactive policy influence and the shortcomings of 'SOE-centred' accounts

Despite the lack of observable active and effective central government guidance in the electricity supply industry, and in spite of state industry's capacity to subvert the successful implementation of many policy-based government orders that it disagreed with, it also became clear that state firms' own political influence is subject to distinct limitations, particularly with regard to proactively shaping sectoral policy according to its preferences. By demonstrating these limitations, this dissertation exposed important shortcomings of the SOE-centred literature which is correct in questioning government's ability to supervise large state firms, but which significantly overstates these companies' policy influence.

Xu (2008), for instance, has argued that administrative control over large state-owned firms, especially in the energy sector, was "long gone and the party and the government

[637] Heilmann and Shih, 2013, p. 15.

can no longer 'order' them what to do and what not to do".[638] Large state firms in the energy realm treated industry regulators "at best as an inconvenience and at worst as the impediment of their development", while otherwise simply ignoring them.[639] Sectoral policies, she argued accordingly, emerged based on large state firms' "accumulated actions [which] then shape the policy alternatives from which the government chooses and eventually formulates into policies". As such, Xu viewed policy as being "formulated ex-post by government's endorsement of a series of incremental and individual decisions" made by state-owned corporations in the field.[640] Xu's claims were not observable in the industry case studied in this dissertation, where it was not possible for state firms to simply ignore sectoral authorities in pursuit of policy that matched their own preferences and where bureaucratic procedures accompanying policy- and decision-making processes were much more than mere formalities. In fact, in what was earlier referred to as 'basic conflict mode', state industrial actors were generally forced to follow protocol closely while seeking formal approval from the sectoral authorities for any major industry project and reform suggestion that they aimed to realise. Moreover, approvals were generally not simply granted because state firms were powerful and industry-level oversight was weak or because industrial firms dominated sectoral or cross-sectoral authorities based on forceful persuasion. In order to *change* sectoral policy so as to follow its own preferences, central SOEs needed to tactically manoeuvre very real structural limitations set by existing policy and formal bureaucratic processes.

Furthermore, while the SOE-centred literature suggested a number of important mechanisms of SOEs' policy influence, the main avenues this dissertation determined to be significant partially differed from those claims. Most of the authors surveyed offered rather simplistic perspectives which largely consisted of emphasising central SOEs' direct access to the bureaucracy, their formal and informal contacts with government institutions/officials and their participation in policy processes.[641] They did not, however, present much systematic evidence for their claims or specify how or why 'access' translates into policy influence. Using the case of the State Grid Corporation, this dissertation showed that even exquisite formal and informal connections to the political elite – SGCC's own chairman, after all, has served as an alternate member of

[638] Xu, 2008, pp. 442, 445.
[639] Ibid., pp. 447-448.
[640] Ibid., p. 450.
[641] Argued with particular vigour by Kennedy (2005), but also by Xu (2008), Zhang (2015) and others.

the CCP's Central Committee – and immediate participation in almost all sectorally relevant policy processes on their own do not suffice to allow large central SOEs to shape policy to their liking. Instead, it was demonstrated that while levels of access to the bureaucracy remained constant, state firms' ability to shape sectoral decision-making remained highly contingent on whether or not they managed to convincingly 'synchronise' reform suggestions with cross-sectoral policy requirements and whether they emerged as winners from political disputes with sectoral authorities and industry experts (i.e. weak influence in 'basic conflict mode' vs. strong influence in 'synchronisation mode'). This finding indicates that access to decision-makers and the policy process – supplemented by superior industry expertise (briefly noted but not shown to be significant by Kennedy (2005) and Downs (2008a)) – are perhaps best understood as *foundations* for proactive policy influence which on their own, however, lack effectiveness. To gain proactive influence over industry-level policy, central SOEs ultimately need to find ways to combine their own ambitions with government's macro priorities and to argumentatively persuade top leaders that they are contributing to the solution of urgent cross-sectoral policy challenges.

In order to achieve this, state firms need to be fully aware of the macro-guidelines provided by State Council decisions through which the top leadership aims to guide overall industrial developments and to which it seemingly demands total, at least, rhetorical obedience. These macro principles effectively set the benchmark for which actions and arguments are feasible during SOEs' pursuit of their own sectoral policy preferences, and it appears essential for the firms to make a show of abiding by these guidelines, possibly due to a necessity of demonstrating (or at least credibly simulating) loyalty to the top leadership in order to not jeopardise future career prospects. At the same time, the generally non-operational nature [642] of this type of authority inadvertently provides opportunities for central state firms to claim symbolic legitimacy for the pre-existing and potentially very different goals that they were already pursuing. It is the strategic engagement with very real political limitations (i.e. the manoeuvring of variances/overlap between sectoral and cross-sectoral policy or between institutional mandates at different levels of government) which allows central SOEs to effectively influence policy that determines the operational logic of strategic industries.

[642] If top leaders take a particular interest, they are able to turn their 'non-operational' power into an 'operational' one (as shown during top officials' challenges to SGCC's arguments during the 2014 CPPCC conference), although it appears that the top leadership rarely gets involved at that level and rather attempts to set overall strategic guidelines.

As such, the nature of state firms' policy influence is much more indirect than the type of rather immediate impact evoked by the SOE-centred literature. It relies heavily on the independent political momentum of suitable macro-level policy challenges to provide a workable foundation for the portrayal of their own agendas as credible contributions to whichever cross-sectoral solution is required. In order to feed their policy preferences into the political arena and proactively shape policy, state firms ultimately need to work within the confines of and subsequently build on existing government policy. These 'indirect' yet very effective routes of policy influence have rarely been recognised as significant in the literature. While Downs (2008b), Chen (2010), and Xu (2012) correctly noted that large SOEs have engaged in this type of behaviour in order to promote their projects, they did not verify empirically whether this had any systematic and re-occurring effect. They furthermore failed to provide procedural evidence beyond a very small number of anecdotal examples while giving little insight into the underlying political logic of this type of interaction or the circumstances in which it becomes applicable. In fact, *none* of the mechanisms listed above, whether 'direct' or 'indirect' in nature, have been demonstrated empirically in any notable detail across the SOE-centred literature as introduced in the literature review, a substantial empirical gap which this research sought to remedy.

Finally, these findings also speak to the long-established yet persistently relevant perspective provided by Lieberthal's 'fragmented authoritarianism' framework, which served as a foundation for many authors with an SOE-centred focus. While Lieberthal (1988, 1992) and, particularly, Lampton (1992) strongly emphasised the importance of bargaining between bureaucratic actors (both techniques and outcomes) as a policy determinant, this dissertation showed that state firms find it difficult to bargain directly with the authorities, even when on an equal footing, and that they actually tend to *avoid* bargaining in favour of 'synchronisation' tactics so as to increase their chances of achieving favourable outcomes.

8.2.3 Concluding remarks on central government guidance and central SOEs' policy influence

In conclusion, the prevalence of state firms' 'indirect' approaches towards generating proactive sectoral policy impact highlighted the shortcomings of both SOE-centred and government-centred perspectives. The former, it was shown, has exaggerated central

SOEs' policy influence at the industry level while presenting overly simplistic and inaccurate mechanisms, while the latter has provided a distorted account of central government's guidance role underlying sectoral policy in strategic industries. In the case study conducted in this dissertation, central government's policy preferences – emphasised across the government-centred literature as the core determinant of sectoral policy in its emergence and application – were indeed important for both policy output and policy outcomes, yet in a largely non-strategic way that was shaped and exploited by state industry. State industrial actors showed the distinct ability to influence *how* central government's policy priorities matter in practise, both by blocking/undermining the application of sectoral priorities and by shaping the way in which cross-sectoral priorities are applied at the industry level. State industry, it was shown, is able to turn with central government's momentum at the macro-level while simultaneously nudging this momentum into a direction that furthers its own sectoral interests – and this has the potential to deeply affect the functional logic of entire industry segments.

The ultimate impact of this 'synchronisation' strategy – which is grounded in existing policy and dependent on suitable transformations of central government's cross-sectoral priorities that can be utilised as bandwagons – proved to be so extensive in a 'most likely' case that the notion of central government's active and effective policy guidance over China's strategic industries and their operational logic as emphasised and widely accepted across government-centred accounts of the political economy of China's industrial reforms appears difficult to uphold in its currently dominant configuration. This study rather suggested that the country's central government is limited in its ability to guide sectoral policy, both in its formulation and application. It showed that both major changes in sectoral development trajectories and grand responses to macro-level policy challenges are not necessarily a testament to central government authority and that they may equally be driven by state industrial actors based on entirely different pretexts which are more likely to reflect corporate considerations than governmental strategies for sectoral development. While further research on policy processes in other industries will be necessary, the findings from this 'most likely' case suggest that more attention needs to be paid to the intervening influence of central SOEs' attempts to shape the sectoral policy realm. The account provided in this dissertation concerning the mechanisms and conditions through/under which this influence materialises provides a foundation for such endeavours which may further reduce the uncertainty

about the often opaque nature of policy-making and regulatory proceedings in China's strategic industries.

9 Appendix

List of UHV-AC and UHV-DC transmission projects sorted by status (05/2015)

Status	Type	Project	Start province/ regional grid	End province/ regional grid	Approved	Start of operation
In operation	AC (1000kV)	Jindongnan-Nanyang-Jingmen (晋东南－南阳－荆门) [UHV-AC "test demonstration project"]	Shanxi (N)	Hubei (C)	8/06	2009
		Huainan-North Zhejiang-Shanghai (安徽淮南－浙北－上海) [southern section of the 'loop' project in the East China Grid]	Anhui (E)	Shanghai (E)	9/11	9/13
	DC (±800kV)	Xiangjiaba-Shanghai (向家坝－上海) [UHV-DC "test demonstration project"]	Sichuan (C)	Shanghai (E)	4/07	2010
		Jinping-Sunan (锦屏－苏南)	Sichuan (C)	Jiangsu (E)	11/08	2012
		Southern Hami-Zhengzhou (哈密南－郑州)	Xinjiang (NW)	Henan (C)		2014
		Xiluodu-Zhejiang (溪洛渡左岸－浙江金华)	Yunnan (S)	Zhejiang (E)	2012	2014
		Yunnan-Guangdong (云南澜沧江小湾大坝－广州) [operated by CSGC]	Yunnan (S)	Guangdong (S)		2010
		Nuozhadu-Jiangmen (普洱糯扎渡－广东江门) [operated by CSGC]	Yunnan (S)	Guangdong (S)		2013
Final approval granted/ under construction	AC (1000kV)	Zhebei-Fuzhou (浙北－福州)	Zhejiang (E)	Fujian (E)	3/13	2015
		Huainan-Nanjing-Shanghai (安徽淮南－南京－上海) [northern section of the 'Loop' project in the East China Grid]	Anhui (E)	Shanghai (E)	5/14	2016
		Ximeng-Beijing East-Tianjin-Ji'nan (锡盟－北京东－天津－济南)	Inner Mongolia (N)	Shandong (N)	7/14	2016
		Mengxi-Northern Shanxi-Beijing West-Tianjin South (蒙西－晋北－北京西－天津南)	Inner Mongolia (N)	Tianjin (N)	1/15	2016
		Yuheng-Central Shanxi-Shijiazhuang-Weifang (陕北榆横－晋中－石家庄－潍坊)	Shaanxi (NW)	Shandong (N)	5/15	2017
	DC (±800kV)	Ningdong-Zhejiang (宁东－浙江)	Ningxia (NW)	Zhejiang (E)	11/14	2016
		Northern Shanxi-Nanjing (山西晋北－江苏南京)	Shanxi (N)	Jiangsu (E)	6/15	2017
Listed in NEA plans (2013/14), not yet approved	DC (±800kV)	Shanghaimiao-Shandong (上海庙－山东)	Inner Mongolia (N)	Shandong (N)		
		Ximeng-Taizhou (锡盟－泰州)	Inner Mongolia (N)	Jiangsu (E)		
		Lijiang-Shenzhen (丽江－深圳) [to be operated by CSGC]	Yunnan (S)	Guangdong (S)		
Still being assessed	AC (1000kV)	Ya'an-Wuhan (雅安－武汉)	Sichuan (C)	Hubei (C)		
Further projects pursued by SGCC	DC (±800kV)	Jiuquan-Hengyang (酒泉－衡阳)	Gansu (NW)	Hunan (C)		
		Jinbei-Jiangsu (晋北－江苏)	Shanxi (N)	Jiangsu (E)		
	AC (1000kV)	Mengxi-Jindongnan (蒙西－晋东南), Jingmen-Changsha (荆门－长沙) [North-South extension of the operational UHV-AC pilot project]	Inner Mongolia (N)	Hunan (C), via Shaanxi, Shanxi, Henan, Hubei		

Status	Type	Project	Start province/ regional grid	End province/ regional grid	Approved	Start of operation
		Zhangbei-Nanchang (河北张北－江西南昌) [additional vertical corridor]	Hebei (N)	Jiangxi (C), via Henan and Hubei		
		Horizontal interconnections between the planned Mengxi-Changsha and Zhangbei-Nanchang corridors: Jindongnan-Yubei (山西晋东南－河南豫北), Nanyang-Zhumadian (河南南阳－河南驻马店), Jingmen-Wuhan (湖北荆门－湖北武汉), Changsha-Nanchang (湖南长沙－江西南昌)				
		Nanjing-Xuzhou-Lianyungang-Taizhou (南京－徐州－连云港－泰州) [∩-shaped line within Jiangsu province 'on top' of the northern section of the UHV AC-loop project]	Jiangsu (E)	Jiangsu (E)		
		Jinan-Zaozhuang-Linyi-Weifang (济南－枣庄－临沂－潍坊) [U-shaped line within Shandong province]	Shandong (N)	Shandong (N)		
	DC (±800kV)	Mengxi-Wuhan (蒙西－武汉)	Inner Mongolia (N)	Hubei (C)		
		Humeng-Qingzhou (呼盟－青州)	Inner Mongolia (N)	Shandong (N)		
		Zhundong-Chengdu (准东－成都)	Xinjiang (NW)	Sichuan (C)		
		Zhundong-Wannan (准东－皖南)	Xinjiang (NW)	Anhui (E)		
Feasibility studies conducted by SGCC	AC (1000kV)	Batang-Ya'an-Chongqing-Mianyang-Dege-Batang (巴塘－雅安－重庆－绵阳－德格－巴塘); Ya'an-Mianyang (雅安－绵阳) [Φ-shaped loop project linking Sichuan and Chongqing]	Sichuan (C)	Sichuan (C), via Chongqing (C)		
	DC (±800kV)	Zalute-Zhumadian (扎鲁特－驻马店)	Inner Mongolia (N)	Henan (C)		
		Yazhong-Hengyang (雅中－衡阳)	Sichuan (C)	Hunan (C)		
		Shanbei-Nanchang (陕北－南昌)	Shaanxi (NW)	Jiangxi (C)		
		Jinsha River-Ji'an (金沙江上游－吉安)	Sichuan (C)	Jiangxi (C)		
International grid connections planned by SGCC	DC	Kazakhstan-Nanyang 南阳 (±1100kV UHV-DC)	Kazakhstan	Henan (C)		
		Russia-Hebei Bazhou 霸州 (±800kV UHV-DC)	Russia	Hebei (N)		
		Mongolia-Tianjin 天津 (±660kV DC)	Mongolia	Tianjin (N)		
		Islamabad-Xinjiang Yili 新疆伊犁 (±660kV DC)	Pakistan	Xinjiang (NW)		
UHV exports	DC	Brazil (巴西美丽山)	Brazil	Brazil	7/14	2017
	AC	India (being discussed)	India	India		

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