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EPRG Working Paper 2028

Cambridge Working Paper in Economics 2091

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Keywords No.9 Document, Energy Law, power market reform

JEL Classification K32

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Publication September 2020

Financial Support EPRG; the National Natural Science foundation of China (71603232,71874121); Major projects of the National Social Science Fund of China (18ZDA111, 17ZDA065); National Key R& D Programme of China (No. 2018YFC0704400); Zhejiang Social Science Research Base Grant(16JDGH131); China Scholarship Council.

China's Energy Law Draft and the Reform of its Electricity Supply Sector

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Abstract

China is reforming its electricity supply industry under the guidance of the No.9 document published in 2015. However, such reform has not been supported by new legislation until now. China unveiled an Energy Law draft in April 2020 for public consultation. It is widely regarded as an attempt to provide a legal foundation for ongoing energy sector reforms. This paper introduces the legislative background to China's Energy Law and then identifies the weaknesses of the April 2020 Energy Law draft from the perspective of international experience. We find that although the Energy Law draft represents positive progress on the vertical unbundling and the price mechanism with respect to the competitive and natural monopoly segments of the power sector, it still does not provide adequate support for most other elements. The enacted Energy Law needs to make more explicit provision on horizontal restructuring, incentive regulation, privatization and independent regulation, while the Electricity Law should also be updated to include reference to the spot market and efficient allocation of transmission capacity as secondary legislation.

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Keywords: No.9 Document, Energy Law, power market reform

1. Introduction

China, as one of the world's largest economies and the world's biggest carbon emitter, is deeply connected with global energy markets and energy governance systems. The impacts of China's electricity generation and consumption extend far beyond its national borders, given that it represents 27% of world power generation and China's electricity sector is responsible for around 8% of global greenhouse gas emissions (Pollitt, 2020). China's prominent role in the global energy value chain and carbon emission schemes underlines the significance of understanding China's domestic energy regulations and its market development.

China is reforming its electricity supply sector under the guidance of the No.9 document of 2015 (China Communist Party and China State Council, 2015). After five years of reform, a Draft Energy Law of the People's Republic of China (hereafter referred as the Energy Law for convenience) has been published for public consultation in April 2020. Unlike other successful jurisdictions whose electricity reforms are underpinned by law, it is a tradition for China to publish a policy document first to set the scene for the reform plan and then enact or amend the relevant law to accommodate the reform plan. Due to the huge uncertainty around the course of reform, it seems to make sense to roll out a policy document without strong legal force to find out whether the reform plan is feasible. If the actual reform progresses well, it is then time for legislative work. However, the content of the current Energy Law draft still has some weaknesses in its likelihood of supporting a successful electricity reform outcome based on international experience. This paper will review these weaknesses from the perspective of modern power market reform and the low carbon transition and give relevant advice on potential improvements.

This paper contributes to two strands of literature. The first strand of research focuses on China's energy law and the shortcomings in the law and institutional systems (Yu, 2010; Qiu and Li, 2012). But this literature solely focuses on the context of the law without consideration of its implication for China's recent electricity reforms. The second strand is the burgeoning literature on China's electricity reform (Andrews-Speed and Dow, 2000; Ma and He, 2008; Xu, 2017; Zhang, et al., 2018; Li, et al., 2019; Davidson and Pérez-Arriaga, 2020). This seeks to identify the weaknesses in China's reform plans and gives some advice on improvements. But it rarely considers the legal aspects of reform. This paper tries to fill the gap between these two strands of literature.

The remainder of this paper is organized as follows. Section 2 introduces the background to the legislative progress of China's Energy Law system, compares the new draft to its previous draft published in 2007 and to China's Energy Supply and Consumption Revolution Strategy (2016-2030). Section 3 identifies weaknesses in the current Energy Law draft and gives some advice on possible improvements from the perspective of international electricity reform experience summarized in Pollitt, et al. (2017). Section 4 concludes the paper.

2. Background of the legislation of China's Energy Law

This section will introduce a summary of the Energy Law draft, the legislative history and the relationship between the Energy Law and other energy sectoral laws. Comparison of 2007 version of the Energy Law draft and the Energy Supply and Consumption Revolution Strategy (2016-2030) with the current Energy Law draft is also undertaken to demonstrate the change of priorities in the legislative progress.

2.1 Summary of the Energy Law Draft

The latest version of the Draft Energy Law[1] was published by the National Development and Reform Commission (NDRC) and the National Energy Administration (NEA) on April 3rd of 2020[2]. The legislation is motivated the new energy security strategy proposed by the China Communist Party (CCP) in 2014. The new energy strategy called for the promotion of production revolution, consumption revolution, technology revolution, institutional revolution and enhancing international cooperation[3]. The Fourth Plenary Session of the 19th Central Committee of the CCP in 2019 further called for " promoting the energy revolution and building clean, low-carbon, safe and efficient energy system ".[4] The Energy Law was drafted on these guiding principles of the ruling party. As the fundamental legislation of the energy sector, it covered areas such as strategy and planning, development and conversion, supply and consumption, the energy market, energy security, progress in science and technology, international cooperation, supervision and administration. The main contents and elements of the Energy Law are summarized in Table 1**Error! Reference source not found.**[5].

Table 1 Summary of Key points in Energy Law

Content	**Elements**	
Chapter I General	The general principles of energy development strategy.	
Chapter II Energy Strategy and Planning	Harmonization of national and regional energy development planning; inspection and reviewing of local planning implementation.	
Chapter III Energy Development and Processing Conversion	Section I General	Fuel mix optimization with low carbon generation substitution of carbon generation, environment protection.
	Section II Fossil Fuel	The general principles for fossil fuel development such as coal, oil, gas and coal-fired power generation.

[1] Article 115 gives the legal interpretation of energy:
'Energy refers to resources that produce thermal energy, mechanical energy, electrical energy, nuclear energy, and chemical energy, mainly including coal, petroleum, natural gas (including shale gas, coalbed methane, bio-natural gas, etc.), nuclear energy, hydrogen energy, and wind energy , solar energy, hydroelectric energy, biomass energy, geothermal energy, ocean energy, electricity and heat, and other resources that obtain useful energy directly or through processing and conversion.' Thus the Energy Law covers coal, gas, oil and electricity sectors.
[2] Website of China National Energy Administration: http://www.nea.gov.cn/2020-04/10/c_138963212.htm
[3] http://www.xinhuanet.com//politics/2014-06/13/c_1111139161.htm
[4] https://china.huanqiu.com/article/9CaKrnKnC4J
[5] Unofficial English translation from British Embassy in Beijing.

	Section III Non-Fossil Fuel	Renewable portfolio standard, nuclear development and security.
Chapter IV Energy Supply and Consumption	Energy infrastructure development; energy firm supply obligation; energy-saving and emission reduction obligation of customers.	
Chapter V Energy Market	Separation of monopoly and competitive business; the market development target and price mechanism for different products.	
Chapter VI Energy Security	Safety protection of energy production facilities; energy reserve management and emergency response.	
Chapter VII Progress in Science and Technology	Government support policy for science and technology innovation; talent training and public education.	
Chapter VIII International Cooperation	Foreign investment and trade; cross-border infrastructure construction; Cooperation in science and technology.	
Chapter IX Supervision and Administration	Administrative licensing and consent for construction schemes; supervision of energy supply, open-access of energy pipeline and wire.	
Chapter X Legal Liability	Legal punishment for violation of open access of energy pipeline and wire, universal supply and information disclosure obligation.	
Chapter XI Miscellaneous	Legal Interpretation of Terms; Law Effective Date.	

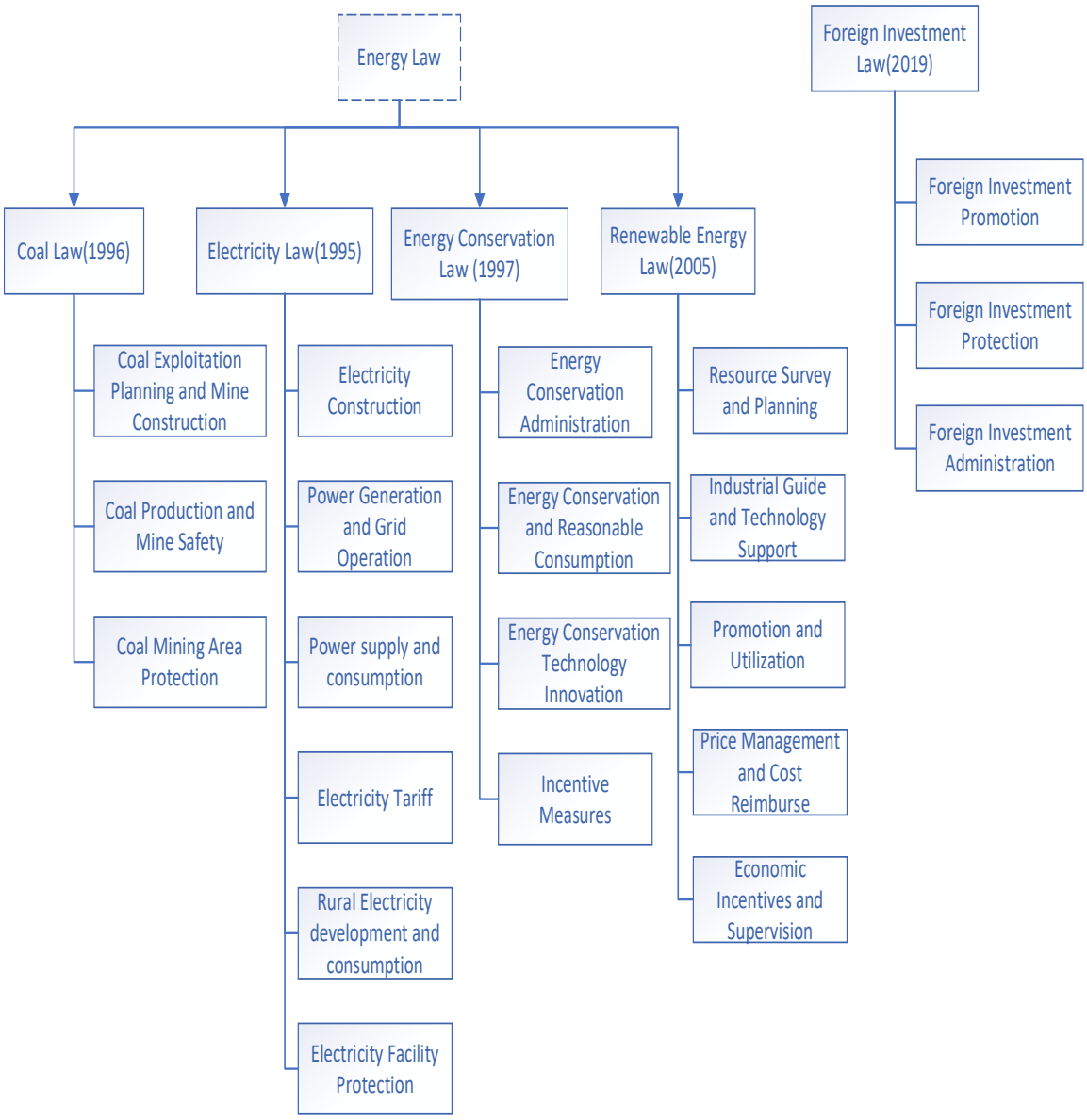
2.2 Legislative history of the Energy Law

In the planned economy era, all the energy-related activities were comprehensively regulated by administrative directives. There was no need to enact laws for governance in the energy sector. When China began its economic reform in 1978, the government started to recognize the critical role of energy law in setting the legal relationship between different energy entities. The legislative progress of China's Energy law was set in motion the 1980s. The Ministry of Energy, which was founded in 1988, decided to fill the gaps of law in the energy sector as one of its main objectives.

A special task group was commissioned under the direction of the Ministry of Energy to engage in a research project into the China Energy Law System (Wu,2009). This task force proposed that there should be an Energy Law as the leading legislation and several sector laws (for coal, oil and gas, nuclear, electricity, renewable energy, etc). The Energy Law should serve as the basic law and fundamental legislation for the whole energy system. It should guide the strategic direction of the energy sector, cover the overall issues faced by all the energy fuel sources and set legal fundamentals for the other energy sector laws. The individual energy sector laws only cover their specific energy sector and give provisions which only apply to that sector. Besides that, the provisions of these energy sector laws should not contradict the basic principles of the overall energy law. In the Chinese law system, the energy law works as the stem while the sector laws are branches (Zhang and Ye,2006).

The Ministry of Energy and Legislative Office of State Council accepted this proposal, which formed the basic structure of China Energy Law System (Ye and Wu,2006). Unfortunately, the Ministry of Energy was dismantled into the Ministry of Electricity Power and the Ministry of Coal in the 1993 government reshuffle (Luo,1993), and there was no single ministerial agency left in charge of implementing the original legislative agenda. Luckily the newly founded Ministry of Electricity Power and the Ministry of Coal picked up the legislative task and brought forward the Electricity Law and the Coal Law to a vote at the National People's Congress. These two sectoral laws were enacted in 1995 and 1996 respectively. In addition, the Energy Conservation Law was drafted by the former National Planning Commission (predecessor of NDRC – National Development and Reform Commission) and enacted in 1997. The Renewable Energy Law was drafted by the NDRC and enacted in 2005. The structure of China's Energy Law system is depicted in **Error! Reference source not found.**:

Figure 1 China's Energy Law System



The Energy Law has not been put aside with the publication of the sectoral laws. Although the Ministry of Energy no longer exists, the National Energy Affairs Leading Group chaired by Premier Wen Jiabao was set up in 2005, which also engaged in the drafting of an Energy Law. In 2007, the first version of Energy Law draft was posted online for public consultation[6]. Thousands of

[6] The public consultation website in Chinese is: http://www.gov.cn/gzdt/2007-12/04/content_824569.htm

opinions were proposed by various stakeholders. Unfortunately, there was a vast range of disagreements among academics and relevant government agencies.

For example, one of the controversies was how to describe the government's energy governance structure. China did not have a Ministry of Energy from 1992 onwards. Even the National Energy Administration (NEA) did not have full administrative authority over the entire energy sector(Lin and Purra, 2019). Administrative authority was dispersed over different ministries (e.g. National Development and Reform Commission, Ministry of Land and Natural Resource, Ministry of Environment Protection, etc) (Tan and Zhao,2016). There were disagreements on whether the government should set up a unified ministerial energy authority or keep the status quo (Lv,2014). Another disagreement was whether to set up an independent energy regulatory agency. Some thought it necessary while others thought the regulatory agency should be one branch of an energy administrative department (Lv,2014).

Confronted with so many disagreements around the Energy Law draft, the Legislative Office of the State Council found it was not an appropriate time to push the law forward. So, the legislative progress was left pending. After another round of government agency restructuring in 2013, the newly formed National Energy Administration (NEA) decided to pick up the stalled legislative progress and commissioned several research projects to solve the issue around the Energy Law. Given that the No.9 document – promoting power market reform - was published in 2015, the latest draft of the Energy Law, incorporating the content of No.9 document has now been published for open consultation.

2.3 Differences between the Draft Energy Law of 2020 and its previous version

Compared with the Draft Energy Law of 2007, the overall content of the 2020 version has been reduced from the original 15 chapters and 140 articles to 11 chapters and 117 articles. Similar to

its previous version, the 2020 Draft covers almost every aspect of energy policy, long-term planning and administration. The greatest change in content is in policy priorities. The 2007 Draft contained separate chapters on energy conservation, energy development in rural area, energy reserves and energy emergency response. These topics were high priorities at that time. The 2020 Draft breaks up the content of these chapters and places them in various chapters. The clauses on energy conservation and energy development in rural areas are dispersed throughout the whole text of the 2020 version, and a new chapter is devoted to energy security, including the conditions under which energy reserves can be used. A further feature of the 2020 Draft is the higher priority given to renewable energy, the environment and ecological protection. The 2020 version is more in line with the response to climate change, and the focus has shifted to the optimization of the energy mix prioritising non-fossil energy.[7] However, there are still some issues that need to be clarified in the 2020 version.

First of all, China has not determined to establish a ministerial department under the State Council to oversee the energy sector. Chapter II of the 2007 draft formulates the function and responsibility of a central energy administrator. As aforementioned, there were controversies about whether China should establish a unified ministerial energy authority following this. As a result, Chapter II of the 2007 draft is removed in the 2020 version with some provisions going into other chapters. There are still no clear statements about what specific government agencies should do. In other words, although it says that some issues are very important to the country and need to be done, there is no statement about who – within government - should be responsible for them.

Article 44[8] proposes the formulation of a national medium-term and long-term target for renewable energy development and utilization, and a target for the proportion of renewable

[7] See an interesting post from Philip Andrews-Speed (2020) who discusses the differences in topics between the 2007 and 2020 drafts: http://www.andrewsspeed.com/chinas-recent-energy-market-reforms-will-underperform/

[8] This article is as follows:

energy in national energy consumption. However, the article does not define priorities for different generation forms, nor does it provide specific target indicators, so these kinds of targets look hard to put into practice.

At the same time, a new chapter on energy security has been added to this draft. This chapter further clarifies issues such as energy emergency supply and energy reserves and requires measures to ensure the future emergency response capacity of the energy sector and to improve the reliability of energy supply. However, compared to the previous version, the new draft says less about energy conservation, rural energy, energy prices and taxation. This could be a signal that the government will put less emphasis on these issues in the coming years.

The relevant articles also reflect changes in the technological development of the energy sector. The focus of this draft pays much more attention to balancing the development of fossil energy and non-fossil energy. As a result, the arrangement of the chapters is more concerned with promoting non-fossil fuel energy use. Generally speaking, the content of the draft is more concise, and the responsible people stipulated in the articles are at or above the county level, which enhances the likely effect of the articles on energy activities.

2.4 Comparisons of the Draft Energy Law and related laws on electricity reform

The rounds of electricity reform in 2002[9] and 2015 are two recent milestones for China's market-oriented electricity reform. The statements in the Draft Energy Law and related laws may reflect these reform guidelines to some extent. Table 2 compares market statements in the Draft Energy

'The country takes renewable energy as a priority area for energy development, and formulates a national long-term target for aggregate renewable energy development and its proportion in primary energy consumption. The country includes the target as binding indicators in the national economic and social development plans for long-term and every year. This target will be decomposed into local government's (various provinces, autonomous regions and municipalities) plan for implementation. The energy department of the State Council, together with the relevant departments of the State Council, monitors the implementation progress of local government (various provinces, autonomous regions, and municipalities) and conducts annual assessments.'

[9] See China State Council (2002).

Law to the Energy Supply and Consumption Revolution Strategy (2016-2030) published by the NEA in 2016[10].

Table 2 Amendments about energy market reform in the Draft Energy Law[11]

Content	Energy Law Draft 2020	Energy Supply and Consumption Revolution Strategy (2016-2030)
Basic Principles of Energy Marketization	Article 14 Give play to the decisive role of the market in the allocation of resources; Form a mechanism in the competitive field where the market determines energy prices; and establishing an effective energy regulatory system; Legitimate rights and interests of investors should be protected by law.	Paragraph 3, section 2, Chapter 2. Give the market the decisive role in resource allocation; Highlight the dominant role of market players in promoting the energy revolution; improve laws and regulations in maintaining market order; promote the modernization of energy industry regulation.
Market Construction Objectives	Article 65 Promotes the construction of energy markets such as coal, electricity, oil, and natural gas; Promote the establishment of energy market trading institutions or trading platforms with complete functions, independent operations and standardized operations. Encourages the development of various effective trading methods and trading varieties.	Paragraph 1, Chapter 6 Accelerate the construction of a unified and open market system with the orderly competition; With the goal of saving, diversification and high efficiency, the state will innovate the macro-control mechanism of energy; Build a system and mechanism to encourage innovation in constructing the fast lane of energy development.
Price mechanism	Article 66 Energy prices mainly determined by factors such as the status of energy resources, market supply and demand, environmental costs, and inter-generational fairness and sustainability.	Paragraph 1, section 2, Chapter 6 The energy price mechanism determined by factors such as the scarcity of energy resources, the relationship between market supply and demand, environmental

[10] http://www.gov.cn/xinwen/2017-04/25/content_5230568.htm

[11] The text of the Draft Energy Law of 2020 is from the unofficial English translation from British Embassy in Beijing while the text of the Energy Supply and Consumption Revolution Strategy (2016-2030) is a translation by the authors of the original Chinese version, which is published on 29th December, 2016 by NDRC and NEA.

	The price of the natural monopoly link is managed by the competent price department. The authority and scope of the government to set energy prices are based on central and local pricing catalogues.	compensation costs, and inter-generational equity and sustainability. Establish a price mechanism mainly determined by the market. Strengthen the supervision of market prices both in the spot market and post event.
Price Cost Supervision and Examination	Article 67 The competent price department conducts and review energy price supervision in accordance with regulations. Energy companies should provide price cost data in accordance with the requirements of the competent price department and accept price cost supervision. The competent price department formulate and adjust energy prices.	Paragraph 2, section 2, Chapter 6 Strengthen the supervision, review government pricing costs and promote openness and transparency of pricing mechanism. Improve the government's price supervision system in some important fields. Implement and improve the linkage mechanism to ensure the basic energy demand of the people in need.
Contents of Market Construction	Article 68 Promote the development of the energy market, rationally arrange trading institutions and trading platforms, and guide the formulation of energy market setting plans and market rules.	Paragraph 2, section 1, Chapter 6 Reduce the intervention of the government in the energy market, the direct allocation in energy resources and administrative management of microeconomic activities.
Regulation of market order	Article 69 Strengthen supervision of the energy market operation order and natural monopoly links, and regulate and maintain fair competition in the energy market order.	Paragraph 2, section 1, Chapter 6 Break regional blockades and industry monopolies, strengthen market price supervision, investigate and publish the monopoly activities of market dominance and administrative power.

Compared with the Energy Supply and Consumption Revolution Strategy (2016-2020), the Draft Energy Law discusses energy markets in independent chapters, drawing on the experience of international legislation and reflecting greater generality, comprehensiveness and time-sensitivity. The purpose of the Draft Energy Law is to adjust the energy structure, promote energy development, and clarify the direction of energy market-oriented reform. The Draft Energy Law

lays the legal foundation for the energy market reform and emphasizes its dominant position in framing the future energy system. It introduces market competition and removes some restrictions on private capital. The Draft Energy Law establishes a renewable energy consumption guarantee system, which may promote the development of renewable energy to a large extent.

3. Suggestions for improvements to China's Energy Law system based on lessons from international electricity liberalization

Article 14 of the Energy Law draft sets out the basic principle that the State insists on the decisive role of the market in resource allocation and in promoting competition. Compared to the 2007 draft, one of the significant amendments of the 2020 version is adding a new chapter entitled 'Energy Market'. There are 6 articles covering market participants, market development targets and content, the price formation mechanism and price regulation. These provisions can provide legal support for power market reform. Several articles in other chapters also make provisions on renewable energy development and grid connections. This section will discuss these articles related to the 14 reform elements indicated in Pollitt et al. (2017) highlighted in bold and italic below and ask what the draft law indicates about these reform elements[12]. The numbers in bold follow the numbering in Pollitt et al. (2017). We do this because it is important to know the potential room for improvement in the Energy Law.

Because the Energy Law draft works as the leading legislation concerning the common issues in the whole energy field, many of its provisions are not specific to the electricity supply industry. Meanwhile, the Electricity Law was enacted in 1995 with provisions covering general rules on

[12] Elements 1,2,8 and 5,6 from Pollitt et al. (2017) are merged here due to similarity reasons. So the following header numbers are not consecutive.

electricity, electricity construction projects, power generation and grid operation, power supply and consumption, electricity tariffs, rural electricity development and consumption, and electricity facility protection. However there are no provisions on the power market reform. The Energy Law draft will serve as a guide for a future amendment of the Electricity Law. This section will, therefore, put forward some suggestions for a future revision of Electricity Law based on the current proposals in the Energy Law draft.

(1-2,8) vertical separation of competitive elements (generation and retail) from natural monopoly networks; sufficient horizontal restructuring of generation to create a competitive wholesale market; unbundling of regulated network charges and competitive segment charges.

Differing minimal efficient size in each segment of the electricity sector justifies the separation of competitive elements from natural monopoly business and the creation of a competitive wholesale generation market. The EU directives (1996, 2003 and 2009) proposed various kinds of unbundling of network businesses from the vertically integrated firm with ownership unbundling preferred in the European single electricity market (Pollitt, 2008). Many individual European states also require investor-owned utilities to divest their generation assets (Pollitt, 2019). To create a competitive wholesale market, there should be a sufficient number of generators so that none of them can persistently set the market price. The duopolists in the early wholesale market of England and Wales, who enjoyed substantial market power, impeded market efficiency (Green and Newbery, 1992).

After vertical unbundling, prices for wholesale and final retail charges can be competitively determined, while distribution and transmission charges continue to be regulated. The introduction of incentive regulation involving RPI-X regulation of the revenue of network companies has resulted in very significant improvements in the efficiency of operation (Jamasb and Pollitt, 2007).

This first element is echoed in Article 64 '*Natural monopoly businesses and competitive businesses in the energy sector should be operated separately…*'.

For the electricity sector, more specific provision may include separation of the retail business from the distribution business of the grid company. Before the issuing of the No.9 document in 2015, China's two main Grid companies had 98% of the customers in the retail market (Liu, et al., 2019). If retail competition is opened up, the incumbent network-retailers could cross-subsidize their retail business from their regulated network cost allowances. That may impede future retail competition. Since retailing and distribution are two different kinds of business, there is no need to continue with an integrated business model. **The Energy Law has set up a good principle dealing with the boundary between competition and monopoly elements of the electricity sector, but this needs further clarification, especially for the electricity industry. A new Electricity Law should make specific provisions for unbundling the transmission, distribution and retail businesses of the Grid companies.**

However, on the second element, the Energy Law remains silent on horizontal market structure. In the first round of reform in 2002, the generation assets of the vertically integrated State Power Corporation of China was nearly equally divided into five generators. In 2015, China Power Investment Corp, one of the big five, merged with State Nuclear Power Technology Corp to form State Power Investment Corp[13]. In 2017, China Guodian Corporation, another big five, merged with Shenhua Group who was China's largest coal producers and one of the largest coal generators outside the big five[14]. These two mergers substantially increased wholesale market concentration in some provincial markets. Because they are all state-owned-enterprises, the merger decision was made by their legal owner, the State-owned Assets Supervision and Administration Commission of the State Council. This made it was easy to avoid merger scrutiny under the

[13] https://www.hydropower.org/companies/state-power-investment-corporation-spic
[14] https://www.ft.com/content/0ee2659e-9855-3516-9445-98fe945b13d0

Antimonopoly Law. From international experience, a competitive horizontal structure is vital for the success of electricity reform. China has already enacted the Antimonopoly Law in 2007 which was aimed at strengthening merger scrutiny. The Energy Law needs to include the provision to coordinate with the Antimonopoly Law on market competition.

The Energy Law needs to set the principle that a competitive market structure should be created and sustained throughout the whole reform process. Any proposed merger should be subject to strict scrutiny under the Antimonopoly Law to make sure that it will not hinder future competition.

This last element is echoed in Article 66 of the Energy Law draft which states that the prices of the competitive segments should be determined by the market, while the natural monopoly charge is set by the relevant government agency. Nonetheless, the current natural monopoly price regulation is largely cost plus oriented which is reflected by Article 67 '*Price Cost Supervision and Examination*'. For China to bring itself in line with international best practice, there must be strict accounting and legal separation of transmission, distribution and retail businesses. An obvious way forward is for the responsible regulatory agency to compare distribution and transmission costs at the provincial level and use benchmarking methods to set the efficient level of revenue for the transmission and distribution sectors. **In line with the unbundling of transmission, distribution and retail businesses, it is worthwhile setting out the principle of incentive regulation in the Energy Law.**

(3) the creation of wide area independent system operators .

The creation of independent system operators and merit-order based dispatch is key to achieving substantial savings in the power system. The system operator plays an indispensable role in balancing the power generation and load in real-time. Since all the resources in the power system must follow the system operator's direction, the system operator should be independent of generators or retailers to maintain impartiality. The system operators in different jurisdictions may adopt different dispatch regimes such as cost-based dIspatch, bid-based dIspatch and self-

dIspatch (Sioshansi and Pfaffenberger, 2006). A common feature of these dispatch regimes is to let the least cost plants be dispatched first. Meanwhile, the extension of single system operation control to a wider area can achieve substantial benefits (Mansur and White, 2012).

There is no related provision on this in the Energy Law draft due to it being specific to the electricity sector. Only Article 18 emphasises that *the state adopts various methods to ensure energy conservation and efficient development and utilization*. Article 18 of the current Electricity Law also states that *power generation and grid operation should follow the principles of security, high-quality and economic operation.* The current default equal share dispatch regime (see Pollitt et al., 2017) does not support efficient system operation and weakens the competition among generators. The advantage of merit order dispatch is that it underpins competition between power plants by massively sharpening incentives to reduce operating costs for individual plants to be dispatched with higher probability. **We hope there will be provisions in the future amendment of Electricity Law to legally underpin a comprehensive move towards merit order based economic dispatch.**

China currently has five tiers dispatch hierarchy ranging from national, regional, provincial, prefectural and county levels[15]. But dispatch is largely organized at the provincial level with some higher-level interprovincial bulk power flows. Interprovincial electricity trading has kept growing as power market reform has progressed. As one of the active regional markets, the bulk power flow from the western to eastern provinces (e.g. Yunnan to Guangdong) within the China Southern Grid has increased by 4.1% to 226.5 TWh in 2019[16]. Interprovincial power trading can both reduce overall electricity costs and carbon emissions. Unfortunately, the Energy Law is silent on this topic. Article 22 of the current Electricity Law merely states that the state encourages the

[15] The Power Grid Dispatch and Management Regulation: http://www.nea.gov.cn/2012-01/04/c_131262812.htm
[16] 2019 South China Regional Power Market Annual Report: https://www.gzpec.cn/main/indexnew.do?method=load&INFOID=1232074672025440&INFOTYPE=3

generation companies and grid companies to connect with each other and follow the uniform dispatch rules. The background to such a provision is that when the Electricity Law was enacted, uniform nationwide grid connection was not yet established and many independent power producers were not connected with the main grid. China has now built a national interconnected power grid through Ultra High Voltage connections. It is therefore possible to create a wider area system operation. **The future amendment of the Electricity Law needs to include provisions that encourage interprovincial trading through wider area power market arrangements.**

(4) privatisation of monopolies.

Monopoly state ownership has resulted in many inefficiency problems such as arbitrary administrative inference, corruption etc (Newbery, 2002). Privatisation or part-privatisation of state-owned companies generally sets up a long run dynamic which will force state-owned companies to improve their performance and be subject to external pressure from competitors and anti-trust authorities. Many leading reform countries usually break up monopolistic power companies and privatise them separately. In Great Britain, the privatised firms created out of the CEGB (which previously monopolised both generation and transmission in England and Wales) experienced substantial efficiency improvement (see Newbery and Pollitt, 1997).

There is no provision about ownership arrangements in Energy Law draft. Article 14 only states that *'Investors engaged in energy development and utilization activities should engage in fair competition, and their legitimate rights and interests should be protected by law'*. This implies that a private company can get more involved in the public ownership dominated energy sector. As renewable energy experienced fast growth in recent years, private investment accounts for a higher portion of the overall investment portfolio than before (Zeng, et al., 2014). But this only has a marginal impact. Some of the coal generation plants are suffering big losses at the moment

(mid-2020) and face the prolonged risk of insolvency[17]. Therefore, there is a good opportunity to privatize some of these generation assets to find out what would happen after privatization and as a prelude for further privatization. **For the Energy Law, it is important to create a level playing field and ensure that private investors get fair treatment compared to their publicly owned peers and to leave the open possibility of privatizing some coal generators on the brink of insolvency.**

For decades, the foreign investment access restriction regime in China was based on a Foreign Investment Industrial Guidance Catalogue jointly issued by the NDRC and Ministry of Commerce(MOFCOM). The latest version was published in 2019 (the 2019 Catalogue)[18]. Foreign investment activities are divided into three categories: 'encouraged activities', 'restricted activities' and 'prohibited activities'. Any activity or sector not listed in the catalogue is 'permitted'. Those falling in the 'encouraged' category benefit from streamlined approval procedures, tax breaks and other incentives.

On 15 March 2019, the long-expected Foreign Investment Law was passed at the National People's Congress[19]. The law aims to provide a level playing field for foreign investment into China, including in particular the treatment of foreign investors as domestic peers in all business activities other than those specifically set out in the Foreign Investment Negative List. This List has replaced the restricted and prohibited activities from the Foreign Investment Industrial Guidance Catalogue. Any business investment not on the Negative list is deemed as permitted. Table 3 summarizes the evolution of guidelines for foreign investors in the electricity sector since 2015. In 2015, foreign ownership of small scale coal generation under a certain capacity level is

[17] The generation plants located in Gansu and Yunnan province applied for insolvency.
http://www.chinapower.com.cn/moments/20190628/1279528.html
http://www.chinapower.com.cn/fdcj/20191115/1290481.html
[18] Sector Catalogue that is encouraged for Foreign Investment (2019 version):
http://www.gov.cn/xinwen/2019-06/30/content_5404701.htm
[19] The Foreign Investment Law:
http://www.chinalaw.gov.cn/Department/content/2019-03/18/592_230773.html

prohibited. Meanwhile, nuclear generation and electricity grid investment projects should have the majority of shares held by Chinese (mainly public) investors. In 2017, the prohibition on small scale coal generation was lifted, while foreign investors can have the majority share in private electricity network businesses from 2018. In 2019 flexible generation (such as pumped-storage) and energy efficiency projects such as trigeneration emerged as encouraged foreign investment, but nuclear generation investment was still subject to Chinese majority share holding restrictions.

Table 3 Different Guidelines for Foreign Investment in Electricity Sector since 2015

	2015	2017	2018	2019
Ultra-Super Critical Coal Generation Unit with Capacity over 600MW	🟢	🟢	🟢	🟢
Coal Generation Unit with Capacity below 300MW	🔴	🔵	🔵	🔵
Combined Heat and Power Generation Unit with Capacity over 300MW	🟢	🟢	🟢	🟢
Combined Heat and Power Generation Unit with Capacity over 200MW	🔴	🔵	🔵	🔵
Air-Cooled Coal Generation Unit with Capacity over 600MW in Water Scarcity Area	🟢	🟢	🟢	🟢
Integrated Gasification Combined Cycle Coal Generation Unit	🟢	🟢	🟢	🟢
Generation Unit equipped with Circulating Fluidized Bed Boiler Burning Coal Gangue or Coal Slurry with Capacity over 300MW	🟢	🟢	🟢	🟢
Large Scale Hydro Generation	🟢	🟢	🟢	🟢
Pumped-storage Generation	🔵	🔵	🔵	🟢
Nuclear Generation	🟡	🟡	🟡	🟡
Renewable Energy including Solar, Wind, Geothermal, Tidal and Biomass	🟢	🟢	🟢	🟢
Peaker Generation and Distributed Generation with Guaranteed Natural	🔵	🔵	🔵	🟢

Gas Supply Located in Load Centre	●	●	●	●
Renewable Generation Complemented with Gas Generation				
Electricity Grid	●	●	●	●
Combined Cooling Heating and Power Utilizing Natural Gas, Electricity and Renewables	●	●	●	●

Source: the administrative order by NDRC and MOFCOM[20].

●:Encouraged; ●: No mention; ●: Majority holding by Chinese; ●: Prohibited.

The latest Foreign Investment Negative List published according to the Foreign Investment Law has cleared the way for the foreign investors to enter most electricity subsectors, thus creating the opportunity to privatize part The relevant China's el government agencies need to further promote a level playing field for both domestic and foreign players.

(5-6) creation of spot and ancillary services markets to support real time balancing of the system; participation of demand -side in wholesale electricity markets .

The real time balancing of the modern power system requires careful power market design that is different from other commodity markets. A complete set of power markets involves a spot market to balance energy supply and demand and also ancillary markets for frequency response, reactive power, voltage regulation and reserve capacity (Stoft, 2002). The spot market price may surge to a high level when system demand reaches the total generation capacity limit. Demand-side response and reserve capacity markets are low-cost ways to balance the system and curb

[20] Foreign Investment Sector Catalogue Guidance (2015 version):
https://www.ndrc.gov.cn/xxgk/zcfb/fzggwl/201503/t20150313_960793.html
Foreign Investment Sector Catalogue Guidance (2017 version):
https://www.ndrc.gov.cn/xxgk/zcfb/fzggwl/201706/t20170628_960838.html
Foreign Investment Negative List (2018 version):
https://www.ndrc.gov.cn/xxgk/zcfb/fzggwl/201806/t20180628_960861.html
Sector Catalogue that is encouraged for Foreign Investment (2019 version):
http://www.gov.cn/xinwen/2019-06/30/content_5404701.htm
Foreign Investment Negative List (2019 version):
https://www.ndrc.gov.cn/xxgk/zcfb/fzggwl/201806/t20180628_960861.html

potential price hikes. Both the US and Great Britain have introduced demand-side participation and reserve markets to complement their spot energy markets (Khalid, 2016).

Regarding the characteristics of different fuel sources, the Draft Energy Law makes provision that each energy submarket (coal, electricity, oil, natural gas, etc) should have its own market development targets. But it does not include any specific provision for the power market. The current Electricity Law also does not have any provision for spot markets. Nearly all the provinces have engaged in electricity long term trading and eight of them have been chosen to begin spot market pilots, while many provinces also engage in ancillary service market pilots to cope with the curtailment of renewable energy (China Electricity Council,2020; Yuan and Xi,2020). Energy Laws must catch up with actual reform progress. **The high-level Energy Law has already acknowledged the market reform principle. It is, therefore, necessary to include more detailed provisions for spot and ancillary service markets in a future Electricity Law.**

Unlike deindustrialised economies such as the US and the UK, China's high proportion of industrial load suggests a high potential for demand response. Traditionally Chinese energy policy has focussed on the supply side but ignored demand-side response (Zhou and Yang, 2015). The chapter on electricity supply and consumption in the Electricity Law only involves the obligation of the grid companies for uninterrupted supply to customers, and customers are obligated to follow safety regulations and pay their electricity bills. **Regarding the indispensable role of demand-side participation, it is imperative to give some guidelines in a new Electricity Law to facilitate future demand side participation in spot market.**

(7) regulated third party access to, and efficient allocation of scarce transmission capacity **.**

Transmission capacity is a scarce resource for developing countries whose electricity demand growth rate often surpasses the speed of network construction. How to allocate transmission capacity when the power network is congested needs to be carefully designed (Hogan, 1992).

From the experience of reformed countries, allocating transmission capacity on a market basis can provide signals for efficient utilization by generators and loads. There are two approaches to allocate transmission capacities. The first one is locational marginal pricing which generates different prices at different nodes in the power system considering local demand and supply (Bohn, et al., 1984). The second one is allocating transmission cost by location such that different generators pay individualized use of system charges. Besides that, the allocation of capacity among generators and loads should be non-discriminatory between incumbents and entrants (Pollitt, 2004).

Article 53 of the Draft Energy Law makes clear that there should be open access to third parties on non-discriminatory terms. However, an efficient network capacity allocation mechanism is still missing in China. The network charge is all paid by the customers and is usually a uniform price for each province regardless of location[21]. The provision of Draft Energy Law indicates that transmission constraints may be alleviated by increasing transmission capacity (Article 15). This is not always a cost-effective way for transmission capacity allocation and often not compatible with market reform objectives. **The Energy Law draft should modify its provisions to promote the general efficient pricing principle for energy transmission. Meanwhile, a new Electricity Law should include more detailed guidelines for efficient power transmission capacity allocation, which can be learnt from international best practice.**

(9) mechanisms to ensure competitive procurement of wholesale power for regulated final customer groups.

Customers who are on regulated final tariffs need to be supplied with wholesale power, which can be procured on a competitive basis rather than on a regulated basis. This could signal the real wholesale cost to regulated customers and also help to identify how much subsidy regulated

[21] The Pricing Method of Provincial Electricity Transmission and Distribution Network https://www.ndrc.gov.cn/xxgk/zcfb/ghxwj/202002/t20200205_1219961.html

customers receive. In Italy, residential customers pay a default mark-up on wholesale cost while the wholesale cost element of default service customers is determined by auction in the US (Littlechild, 2008; IEA, 2016).

China traditionally suppresses the regulated price for residential customers at the expense of industrial and commercial customers. Article 58 of the Energy Law states that there should be a compensation scheme for the energy company to fulfil the universal service obligation of cross-subsidy for household supply. The No.9 document also excludes residential customers from power market. However this is unnecessary. In the short run, the energy regulator could specify the basis of the short term contract for procuring bulk power for residential customers, at the same time as requiring a fixed retail price for the regulated final customers. In the long run, a special fund could be set up to cover the potential financial losses due to the difference between the wholesale price and the fixed regulated retail price. **Thus the Energy Law should encourage all demand to participate in the wholesale market and have a proper reimbursement mechanism to stabilise the regulated price charged to final consumers who are not exposed to wholesale market prices.**

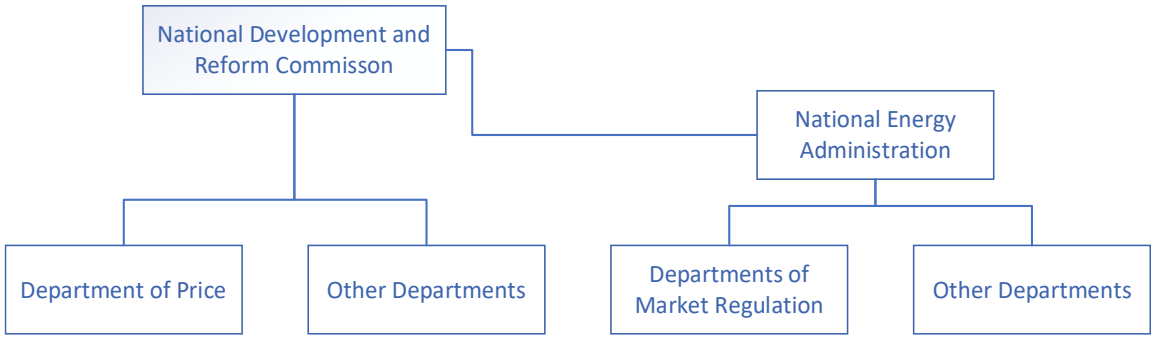
(10) the creation of independent regulatory agencies to regulate monopoly network charges and monitor competitive segments.

Liberalised electricity markets created from incumbent monopolies are vulnerable to anti-competitive behaviour. The high-frequency transactions in the spot market make it hard for the general competition authority to keep a close eye on the state of competition. The network charge of transmission and distribution still needs to be regulated by a public agency. These are reasons for the establishment of a dedicated regulatory agency even after the whole sector is deregulated (Besant-Jones, 2006). The regulatory agency should be independent enough to protect it from the central government's arbitrary intervention in order to avoid government appropriation of investors' assets. Independent regulation coupled with private ownership can provide a credible commitment to reasonable investment returns. Otherwise, the government may force private

firms to reduce electricity prices after irreversible investments have been made (Gilbert and Newbery, 1994). Independent regulation in Great Britain plays an important role in protecting competition in the power market and investment incentives for network businesses. The GB regulator, Ofgem (together with its predecessor Offer), is a non-minister government department which is kept an arm's length from the energy ministry. Working with the Competition Authority, it facilitated the break-up of the duopolistic generators who manipulated the power pool in the early years of reform and oversaw significant new investment in the sector following privatisation (Newbery, 2005).

In the Energy Law draft, there is no statement about an independent regulatory agency. Article 16 grants the Energy Department of the State Council the authority to supervise and manage national energy development but does not make it clear what it has to do with regulatory tasks. Article 66 states the Price Department of the State Council sets the price of natural monopoly segments in the energy sector. Figure 2 depicts the relationship between these two departments. The Energy Department means the NEA and the Price Department means Department of Price of the NDRC.

Figure 2 Sketch of Organization Chart of NDRC and NEA



Gilbert and Newbery(1994)distinguished two regimes regarding ownership and regulation. The first one is public ownership with administrative interference, the second one is private ownership with independent regulation. Private ownership can boost efficiency but requires independent regulation to assure investment incentives. The state ownership arrangement leaves

the scope for administrative intervention to achieve a lower price. From 2018 to 2020, the State Council's annual 'Work Report' presented to the National People's Congress has proposed electricity price cut for small and medium industrial and commercial customers by 10% in first two years and 5% in 2020. Most of the cost burden of such a policy falls on the shoulders of state-owned grid companies (Xie, et al., 2020). **Regarding the close connection between private ownership and independent regulation, the Energy Law should allow for a whole policy package of privatization and independent regulation. Although public ownership and government intervention can keep the electricity price at a low level, this is surely not sustainable for the vast Chinese electricity system in the longer run.**

(11) competitive procurement processes for low carbon generation, with some exposure to wholesale price variability.

Two reasons make low carbon generation deserve government subsidy: its technological infancy relative to mature fossil fuel generation and its positive environmental externalities (Grubb, et al., 2008). But it still should be exposed to the competitive wholesale market to give it the incentive to respond to supply and demand factors. That means that renewable energy would receive a variable price that closely depends on the spot market price rather than a fixed price. A common method for this is Tradable Green Certificates (TGCs). The energy suppliers must buy enough TGCs from renewable generators to fulfil their legally predetermined minimum ratio of renewable consumption (Currier, 2013).

Various articles of the Energy Law draft give high priority to the development of low carbon generation (Articles 14,18,32 and 43) and there is a section in chapter 3 dedicated to non-fossil fuel energy. But there is no explicit provision for subsidies to renewable energy. Nonetheless, the Renewable Energy Law introduces Feed-in tariffs for solar and wind energy. The Renewable Energy Development Fund is established according to the Renewable Energy Law to subsidize renewables. Due to the rapid development of wind and solar, the Renewable Energy Development

Fund was quickly depleted by mounting renewable capacities[22]. So, the Feed-in tariff is no longer sustainable. China has decided to shift to a renewable energy portfolio standard regime[23]. This is echoed in Article 45 of Energy Law which says the state will set targets for minimum renewable energy consumption for each province and that those market participants who have not reached the minimum target should buy TGCs from those who have a surplus in order to fulfil their obligation.

There is no explicit provision about low carbon generation participating in the wholesale market. There is only competitive procurement for the investment and construction of new wind and solar projects. New wind and solar projects are paid fixed prices which are determined by this competitive procurement[24]. But they are still not exposed to wholesale price volatility**. It is desirable to include renewable sources in the spot market in any future amendment of the Electricity Law and government subsidy should be based on a market compatible regime.**

(12) cost reflective access terms for renewables.

The dilemma for cost-reflective renewable grid connection charges is that it would penalize renewable sources whose underlying resource is favourable but far from load centres. Most countries – which are much smaller than China - are paying the same price to renewable sources regardless of their location. But some jurisdictions have tried different ways forward. In Great Britain, part of system upgrade cost (shallows connection cost) is paid by renewable sources, while the Flexible Plug and Play project allows renewables to avoid such cost at the expense of increased interruption (Anaya and Pollitt, 2015).

[22] National People's Congress: The inquiry report of the Renewable Energy Law implementation http://www.npc.gov.cn/npc/c30834/201912/2b7568de01944c33b9326c325dcd498f.shtml
[23] The notice of establishing minimal consumption ratio of renewable power for every province http://zfxxgk.nea.gov.cn/auto87/201905/t20190515_3662.htm
[24] The list of solar generation sites with its subsidized generation price http://zfxxgk.nea.gov.cn/2020-06/23/c_139172930.htm

In China, Article 48 of the Energy Law draft makes it clear that the connection cost of renewable energy fully shifts to the grid company:'…*Grid enterprises should strengthen the construction of power grids, expand the scope of renewable energy allocation, develop smart grids and energy storage technologies, and establish energy-saving and low-carbon power dispatching operation systems*.'

Since the additional costs of connecting remote renewable sources are paid by the grid company and fully compensated under cost-plus regulation of the network charge, renewable generators do not face any locational signals. The provision of Article 48 fails to recognize that the expansion of power grids, smart grids and storage capacity compete with each other. **This article could be revised so that renewables bear some portion of the cost incurred by the grid company for the accommodation of renewables. In the meantime, the state should encourage grid companies and renewable producers to adopt more cost-effective options for connection.**

(13) Appropriate pricing of environmental externalities (both carbon dioxide and other atmospheric pollutants, such as sulphur dioxide).

Power generation from fossil fuels inevitably produces various environmental pollution. Pollution taxes, permit schemes and legal liability for damage can all be used to efficiently price the external costs of such pollution. The US sulphur permit system and the RECLAIM scheme in Southern California have successfully reduced SO2 and NOx (Ellerman, 2004; Fowlie, et al., 2012). The EU Emissions Trading Scheme in the EU also supports the decarbonization of the power sector.

The Energy Law draft sets out the general principle that energy producers and customers should reduce pollution and Greenhouse Gas emissions. Due to the division of relevant Laws, the relevant environment protection provisions are included in the environment law system. The Environment Protection Law was enacted in 1989 and amended in 2014. It is the basic law in the

environment domain.[25] The Environment Protection Tax Law, enacted in 2016 and amended in 2018, imposes taxes for SO2 and NOx emissions.[26] The Air Pollution Prevention and Control Law enacted in 1987 and amended in 2015 promotes pollution permit trading for key air pollutants[27]. Emissions trading dates back to 1994 and proliferated nationally in 2014 (Chang and Wang, 2010; Ye, et al., 2020). Relevant research finds that the SO2 emissions trading pilots have played an important role in pollution abatement(Wu, et al., 2019). Carbon emissions trading is being extended from large scale pilots to a national scheme(Lin and Jia, 2019).

The legislative progress on appropriate pricing of environmental externalities is not uniform. The polluters were obliged to pay an emissions levy by the tentative version of the Environment Protection Law enacted in 1979[28]. The Environment Protection Tax Law enacted in 2018 just replaced the relevant provisions of the emissions levy. There are only policy documents but no laws for pollution and the pilot carbon emissions trading arrangements[29]. The national carbon emissions permit trading market is currently delayed due to the huge regional differences in China. The provincial governments are worried about the dampening of local economic growth(Lo, 2012). **China should take a more proactive attitude towards appropriate pricing of environmental externalities and push forward a national carbon emissions permit market based on the experience of existing pilots.**

[25] The Environment Protection Law 2014
http://www.gov.cn/xinwen/2014-04/25/content_2666328.htm
[26] The Environment Protection Tax Law 2018
http://www.mee.gov.cn/ywgz/fgbz/fl/201811/t20181114_673632.shtml
[27] The Air Pollution Prevention and Control Law 2018
http://www.mee.gov.cn/ywgz/fgbz/fl/201811/t20181113_673567.shtml
[28] The Environment Protection Law (Tentative) 1979
http://www.npc.gov.cn/wxzl/gongbao/2000-12/10/content_5004381.htm
The Tentative Charging Method of Pollution Emission Levy 1982 (repealed)
http://www.pkulaw.cn/fulltext_form.aspx?Db=chl&Gid=03e530f39af83eacbdfb
[29] The Guiding Notice of Further Proliferate Pollution Emission Permit Auction and Trading 2014
http://www.gov.cn/zhengce/content/2014-08/25/content_9050.htm
The Carbon Emission Trade Administration Provisional Regulation (Public Consultation) 2019
http://www.mee.gov.cn/hdjl/yjzj/wqzj_1/201904/t20190403_698483.shtml

4. Conclusion

The newly published Energy Law draft has incorporated many of the reform principles in the No.9 document and will set the legal framework for future electricity reform. After giving a summary of the Energy Law draft and its legislative background, this paper has suggested some potential improvements in the Energy Law as currently drafted, as well as suggesting some possible future amendments to the current Electricity Law and Renewable Energy law. These are summarized in Table 4.

Table 4 Legal support and Suggestions for the Energy Law draft

Classification	Reform elements	Legal support	Suggestions
Market restructuring and ownership changes	*Vertical separation of competitive elements (generation and retail) from natural monopoly networks.*	*Partly support for vertical separation*	*More detailed provision on distribution-retailing unbundling.*
	Sufficient horizontal restructuring of generation to create a competitive wholesale market.	*Lack of support*	*Strict antitrust scrutiny of horizontal merger by coordination with the Antimonopoly Law.*
	Unbundling of regulated network charges and competitive segment charges.	*Adequate support*	*General guidance of incentive regulation for network charges.*
	Creation of wide-area independent system operators.	*Lack of support due to its specific to the electricity sector*	*Merit order based economic dispatch and wider power market geographical scope for the Electricity Law.*
	Privatisation of monopolies	*Lack of support*	*Create a level playing field, privatizing some coal generators on the brink of insolvency, open market for foreign investors.*
Supportive secondary market arrangements	Creation of spot and ancillary services markets to support the real-time balancing of the system.	Partly support due to its specific to the electricity sector.	Detailed provisions for spot and ancillary service markets for the Electricity Law.
	Participation of demand-side in wholesale electricity markets.	Lack of support	Facilitate future demand side

			participation for the Electricity Law.
	Regulated third party access	Adequate support	
	Efficient allocation of scarce transmission capacity	Lack of support	General efficient pricing principle on energy transmission
Appropriate economic regulation	*Mechanisms to ensure competitive procurement of wholesale power for regulated final customer groups.*	*Lack of support*	*Encourage all demand to participate in the wholesale market.*
	Creation of independent regulatory agencies to regulate monopoly network charges and monitor competitive segments.	*Lack of support*	*Adopt the whole policy package of privatization and independent regulation institution.*
	Competitive procurement processes for low carbon generation, with some exposure to wholesale price variability.	Partly support through renewable portfolio standard	Include renewable sources in the spot market.
Efficient promotion of low emission technologies	Cost reflective access terms for renewables.	Lack of support	Renewables to bear a portion of the grid connection cost.
	Appropriate pricing of environmental externalities (both carbon dioxide and other atmospheric pollutants, such as sulphur dioxide).	Adequate support by the Environment Laws	Push forward national carbon emission permit market.

A clear positive aspect of the Energy Law draft is its support for market-oriented reform in the energy sector. However, as we have suggested many provisions can be improved based on international experience. **The final version of the Energy Law could: create a competitive horizontal market structure with the use of the Antimonopoly Law; incorporate the principle of a market mechanism for allocating transmission capacity; apply incentive regulation to regulated energy network companies; create a level playing field for both private and foreign investors; put the regulated customers' demand in market and reimburse the revenue potential losses; establish an independent regulatory institution as a credible commitment to the promotion of private investment incentives;**

encourage grid companies and renewable producers to adopt the most cost-effective options for connection; and make more use of the pricing of environmental externalities.

The Electricity Law should also be updated once the Energy Law comes into force. The difference between the Electricity Law and the Energy Law is that the former can be more detailed and specific to electricity. **A new Electricity Law could: make specific provisions for unbundling the transmission, distribution and retail businesses of the Grid companies; underpin a comprehensive move towards merit order based economic dispatch; encourage interprovincial trading through wide-area power market arrangements; include detailed provisions for spot and ancillary markets and efficient power transmission capacity allocation; and facilitate the participation of demand-side and renewable sources in the spot market.**

The Renewable Law also needs to be updated so that renewable subsidies are based on a market compatible regime. Meanwhile, renewable energy needs to bear some portion of the grid connection cost. With respect to Environmental Laws, it is time to push forward with the national carbon emission permit market based on the experience of the existing carbon pilots.

At present, the 2020 Draft Energy Law is not on the legislative plan to be considered by the current session of the National People's Congress Standing Committee (2018-2023), but it is on the subordinate list of draft legislation that will be "submitted for deliberation once conditions become mature"[30]. As we discussed above, the Draft Energy Law has highlighted many important aspects of China's future energy reforms. With ongoing reforms taking place there is a need for China to complete the updating of its energy law system.

[30] The Legislative Plan for the 13th session of the National People's Congress Standing Committee http://www.npc.gov.cn/npc/c30834/201809/f9bff485a57f498e8d5e22e0b56740f6.shtml

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