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Research on Improvement of China's Energy Conservation and Emission Reduction Legal System under the Carbon Peaking and Carbon Neutrality Background

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Abstract: ***Improving the energy conservation system and the energy substitution system, and accelerating the construction of an energy conservation and emission reduction system, are reliable legal guarantees to promote the modernization of energy rule of law and to expedite the achievement of the "dual carbon" goals. At present, China has preliminarily established an energy conservation and emission reduction system consisting of two subsystems of energy conservation and energy substitution, which are further divided into three categories: regulatory control systems, public incentive systems, and market regulation systems. These cover pollution control, scientific and technological innovation support, industry incentives, and many other aspects. However, in alignment with the strategic layout for achieving the "dual carbon" goals, China's energy conservation and emission reduction legal system still faces prominent issues, such as the lack of explicit normative guarantees for energy-saving and low-carbon innovation measures, the weak operability of legal provisions, the absence of liability clauses, and low cost of illegal activities. Oriented towards reducing pollution, cutting carbon emissions, pursuing green development, and boosting economic growth, China's energy conservation and emission reduction legal system can be improved by perfecting the system design of "energy-saving + carbon-saving", refining legal provisions to enhance operability, and strengthening the implementation of legal liabilities.***

Keywords: Carbon Peaking and Carbon Neutrality, China's Energy Conservation and Emission Reduction Legal System, Improvement of system**.**

1. Introduction

Climate change concerns the future of human beings and is a major threat to human survival in the 21st century. To control greenhouse gas emissions and avoid greater losses and risks brought by climate change, the United Nations Framework Convention on Climate Change and Kyoto Protocol and Copenhagen Accord, have been successively adopted. The Paris Agreement adopted by the 21st United Nations Climate Change Conference in 2015, as the minimum national actions for global cooperation to protect the planet, represents the direction towards green and low-carbon transformation, and lays the foundation of international law for international cooperation on climate change in the post- Kyoto Protocol era. On September 22, 2020, at the general debate of the 75th session of the United Nations General Assembly, President Xi Jinping of China stated clearly: "China will scale up its Intended Nationally Determined Contributions by adopting more vigorous policies and measures. We aim to have CO2 emissions peak before 2030 and achieve carbon neutrality before 2060 [1]." Achieving carbon peaking and carbon neutrality (hereinafter referred to as "dual carbon" in this paper) is the major strategic plan made by China based on its responsibility to promote the building of a community with a shared future for humanity and intrinsic requirement for sustainable development, which requires extremely arduous efforts.

To achieve "dual carbon" strategic goals, reducing dioxide emissions at the source is crucial. From the perspective of system design, improving the energy conservation and emission reduction institutional system, composed of the "Energy Conservation System" aiming at improving energy utilization efficiency and the "Energy Substitution System" aiming at optimizing energy consumption structure, can promote the modernization of the rule of law in the energy sector and provide a reliable legal support for achieving the "dual carbon" goals. This paper aims to sort out China's current legal system for energy conservation and emission reduction, examine the existing problems within energy conservation system and energy substitution system, and then put forward the perfect countermeasures based on the analysis of the causes of these problems, in order to provide valuable intellectual support for the enhancement of the legal framework to achieve China's "dual carbon" goals.

2. The Legal Framework for Energy Conservation and Emission Reduction in China

Since the reform and opening up, China has made significant breakthroughs in the construction of the energy conservation and emission reduction system. Currently, China has preliminarily established the legal system for energy conservation and emission reduction, which not only includes two core elements of energy conservation and energy substitution but also covers other aspects such as pollution control, scientific and technological innovation guarantee, and industry incentives. Based on the types of system and their control effects, China's current legal system for energy conservation and emission reduction can be roughly divided into three categories.

2.1 Regulatory Control Systems

To achieve energy conservation and emission reduction, it is

necessary to leverage the role of the government through administrative means. In terms of energy conservation, China has established a dual control system for the total amount and intensity of energy consumption, setting binding targets and making mandatory regulations on energy consumption. China is also accelerating the establishment of a dual control system over the volume and intensity of carbon emissions, incorporating these dual carbon emission control targets into assessment indicators to promote the coordinated development of energy conservation and carbon reduction. The energy-saving target responsibility system and assessment and evaluation system have been established, incorporating energy conservation and emission reduction targets into the local government performance assessment system, making the government the leading entity. The management system for energy conservation in key energy-consuming entities, as well as in key industries and fields, has been established to fully utilize the government's supervisory role. Compulsory energy-saving standard systems have also been established, including the building energy-saving standard system, the energy-saving evaluation system for fixed assets investment projects, the product energy consumption quota standard system, the energy efficiency standard system, to restrain the behaviors of energy-using entities. It has established the system for elimination of outdated energy-consuming products, equipment and production processes, as well as the system for management of energy efficiency labels and the system for labeling of energy-saving products, etc.

In terms of energy substitution, China encourages the development and utilization of new energy and renewable energy sources. China has established a total target system for renewable energy, stipulating mandatory regulations on the proportion of renewable energy in the total energy consumption within a certain period, which serves as the foundation of renewable energy development system. A full-guaranteed acquisition system for all renewable energy generated has been established, ensuring that relevant members of the electricity market must purchase the total amount of renewable energy power that meets grid-connection technical standards. Additionally, the renewable portfolio standard has been established, whereby the government mandates that obligated entities include a certain proportion or amount of renewable energy power in their electricity consumption structure.

In terms of pollution control and other aspects, China has intensified regulation and control in three key stages: before, during, and after the fact, implementing a comprehensive approach from top to bottom, point to surface, and from the source to the end. Specifically, China has established the "Three Simultaneities" system, the environmental impact assessment system, the environmental protection facilities completion acceptance system, the key pollutant total emission control system, the pollutant discharge permit system, the pollutant emission standards compliance system, mandatory emission standards and technical standards systems, the pollution source monitoring system, and the clean production audit system, etc.

2.2 Public Incentive Systems

Regulatory control systems, which hold a dominant position in the process of energy conservation and emission reduction, based on the "command-control" as operational logic, may lead to a lack of intrinsic motivation and other shortcomings. The public incentive systems can, to some extent, compensate for these drawbacks and work in tandem to promote energy conservation and emission reduction. Currently, China has established fiscal and tax support systems for energy conservation and emission reduction, such as tax incentives systems for energy-saving product projects and pollution prevention projects, resource tax systems, fuel tax systems, energy-saving reward systems, fiscal subsidy systems for energy-saving products, renewable energy development fund systems, special fund systems for renewable energy in buildings, and government procurement systems for environmental products. Additionally, financial support systems for energy conservation and emission reduction have been established, such as credit support systems for energy-saving and environment-friendly projects, and the green bond systems, to incentivize the development of related industries. China has also established the green technology innovation systems to encourage independent innovation in energy-saving technologies.

2.3 Market Regulation Systems

The market regulation systems primarily leverage the regulatory role of market mechanisms to promote the realization of energy conservation and emission reduction goals. China has established the local pollution rights trading system, effectively utilizing market mechanisms to allocate environmental resources and compel enterprises to reduce pollution and carbon emissions. The Clean Development Mechanism for participating in international carbon emissions trading has been established, with energy conservation and improvement of energy efficiency, development and utilization of new and renewable energy as key sectors. Building on the Clean Development Mechanism, the carbon emissions trading system has been set up to target domestic emission sources, enhancing energy efficiency through market-oriented approaches. The voluntary energy-saving agreement system has been established to shape a new mechanism for energy-saving governance and stimulate the intrinsic motivation of enterprises for energy conservation. Additionally, the voluntary pollutant reduction agreement system has been implemented, which has achieved a certain degree of resource saving and pollution prevention results. The Energy Performance Contracting system involves energy service companies signing energy performance contracts with users, incentivizing energy-consuming entities to undertake energy-saving retrofits. The tradable green certificate system for renewable energy has also been established, allowing subscribers to flexibly fulfill their targets for developing renewable energy. There are other relevant legal systems, which are not elaborated upon here due to the length limit.

3. The Issues of China's Energy Conservation and Emission Reduction System under the Carbon Peaking and Carbon Neutrality Background

The provisions on energy saving and the development of

clean energy in China's legal system of energy conservation and emission reduction can promote carbon reduction, and have been used to control greenhouse gas emissions in practice. However, in alignment with achieving the “dual carbon” strategic goals, China's energy conservation and emission reduction legal system still faces three prominent issues.

3.1 The Lack of Explicit Normative Guarantees for Energy-Saving and Low-Carbon Innovation Initiatives

Improving efficiency of energy utilization is an effective way to reduce carbon emissions. Integrated Reform Plan for Promoting Ecological Process, issued by the Central Committee of the Communist Party of China and the State Council in 2015, proposed to “strengthen the control of energy consumption intensity” and “establish the total amount of energy consumption management and conservation system”. In 2021, the State Council promulgated the Plan for Improving the Dual Control System of Energy Consumption Intensity and Total Volume, further putting forward the requirements for improving the implementation of dual control over energy consumption, aiming to force non-fossil energy substitution and accelerate the energy structure adjustment. The new requirements for dual control over energy consumption provide an important basis for achieving the total reduction of carbon emissions. Since “conservation” not only requires restrictions on the total energy consumption but also emphasizes the efficient utilization of energy per unit, the measures of dual control energy consumption are also reflected in the Energy Conservation Law. However, according to the definition of "energy" (coal, oil, natural gas, biomass energy, electricity, thermal energy, and other resources that are directly or indirectly obtained through processing or conversion) set forth in Article 2 of the Energy Conservation Law, the electricity generated by fossil fuels, renewable energy, and nuclear energy and other clean energy sources, from a literal interpretation, should all be included in the scope of dual control over energy consumption [2]. Nevertheless, it is impractical to both limit the total energy consumption and simultaneously improve energy efficiency for all the above energy sources. This is because China currently adopts a policy orientation that encourages and supports the development of renewable energy. If total energy consumption control is applied to renewable energy, it wound undoubtedly lead to conflicts between policies. In addition, the “14th Five-Year” Comprehensive Work Plan of Comprehensive Energy Conservation and Emission Reduction clearly stipulates that the additional consumption of renewable energy electricity in each region during the "14th Five-Year Plan" period shall not be included in the local total energy consumption assessment. Therefore, the scope of energy with restricted total consumption cannot be generalized, but improving the energy utilization efficiency per unit for all energies is due [3]. In summary, the existing Energy Conservation Law is insufficient to address the challenges brought by innovations in the current policies and measures for energy conservation and emission reduction, which mainly lies in that the dual control of energy consumption is not explicitly stipulated, nor is it reinforced by other laws and regulations, resulting in a lack of explicit norms guarantee.

3.2 Weak Operability of Legal Provisions

At present, China's legal provisions on energy conservation and emission reduction are mostly framework-based or principle-oriented with limited feasibility, easily leading to uncertainty in the behavior expectations of law enforcement subjects and participating entities. This issue is primarily reflected in the green credit system and the public participation system in energy conservation and emission reduction.

Firstly, the regulations on the green credit system are relatively vague and general. From the perspective of norm of law, although laws and regulations concerning the green credit system have been continuously introduced in China since 2017, most are principle-based norms that lack clear requirements for specific matters and entities, and the contents of such norms remain vague and general overall. Some scholars have also pointed out that China's green credit system basically only remains at the level of macro-guidance and recommendations, without delving into the practical operation field of green credit [4]. For example, Article 25 of Chapter 6 “Economic Incentives and Supervision Measures” of the Renewable Energy Law involves green credit, stipulating that financial institutions can provide preferential loans with fiscal interest subsidies for renewable energy development and utilization projects included in the national renewable energy industry development guidance catalogue and meeting the credit conditions. But there is no provision for the specific operational details of credit support. For another example, as the main participants in green credit, commercial banks shall, according to Article 34 and 35 of the Commercial Bank Law, conduct credit business based on the needs of the country and society under the guidance of national industrial policies. However, there are no definite provisions or even no provisions on a series of procedural management such as the assessment and examination of environmental risks, information disclosure, regulatory agencies and other important contents in the process of green credit. In addition, as an important measure for financial institutions to fulfill their environmental protection obligations, the green credit system lacks specific provisions for environmental credit responsibility in the Environmental Protection Law, leading law enforcement agencies to be conservative in identifying and pursuing responsibilities.

Secondly, the public participation system in energy conservation and emission reduction lacks systematic and effective norms. Energy conservation and emission reduction is a broad and comprehensive systematic project that requires not only the management of government and the consciousness of key energy-consuming enterprises but also the active participation of the whole society. However, for a long period, China has placed too much emphasis on the industrial sector about energy conservation and emission reduction, while not paying enough attention to guiding and constraining the public in the daily life, which is mainly reflected in the fact that most legal provisions regulating public energy consumption are principled and have not formed a systematic and effective constraint. For example, Article 9 of the Energy Conservation Law clearly states that individuals are obligated to conserve energy, but does not make specific provisions on the consumption behaviors that

should be avoided; it also stipulates that individuals have the right to report energy-wasting behaviors, but merely affirms the public's right to supervision without providing specific guidance on detailed operations, such as access to relevant information, ways to participate, procedures, content, scope, etc. Due to the lack of systematic and effective norms of the system of public participation in energy conservation and emission reduction, the relevant systems of energy conservation and emission reduction have struggled to gain sufficient recognition and support from the public, which is difficult to play an effective role in fostering and safeguarding citizens' awareness of environmental protection and energy conservation and emission reduction.

3.3 The Absence of Liability Clauses and the Low Cost of Illegal Activities

The implementation of the law depends on legal liabilities. Without the assumption of legal liabilities, the ultimate guarantee purpose of the law will not be achieved. However, when examining existing legal norms related to energy conservation and emission reduction, such as the Coal Law and the Renewable Energy Law, it is evident that China's current laws regarding legal liabilities for energy conservation and emission reduction are relatively rough. Not only are there significant gaps in the provisions concerning legal liabilities, but the penalties for violations, as outlined in the existing legal liability clauses, are generally quite low.

First of all, the behavioral models set by obligatory norms lack corresponding legal consequences, or penalties. China's energy structure is still primarily based on coal, which, as the fossil energy with the highest carbon emission intensity, has significant implications for energy conservation, emission reduction, and environmental protection [5]. However, the current Coal Law has very simple provisions regarding the enterprise's legal liability. Chapter 7 “Legal Responsibilities”, sets forth a total of 10 penalties, among which Articles 62 and 63 mainly address illegal acts that infringe upon the rights and interests of coal mining enterprises by entities and individuals, Article 68 pertains to illegal acts by coal management departments and relevant personnel, Articles 59-61 and 64-67 directly target illegal acts by coal mining enterprises, with only Article 59 being directly related to energy conservation and emission reduction (it stipulates the legal consequences for failing to achieve the required coal extration rate). Although the Coal Law specifies the illegal acts of wasting coal resources in Article 5 and Article 29, and sets out the obligations of coal mining enterprises to utilize resources in a clean and efficient manner and protect the environment during the exploitation and utilization of coal resources in Articles 9, 11 and 19, it does not specifically provide for corresponding legal liabilities. This directly affects the effectiveness of law enforcement and leads to insufficient punishment and deterrence for illegal behaviors that waste coal resources and cause ecological damage.

Secondly, the cost of violating the law is relatively low. Given that promoting the development of renewable energy hinges on its consumption, and the key to ensuring the consumption lies in grid access, China has already mandated in the Renewable Energy Law that power grid corporations must purchase renewable energy electricity so as to expand consumption capacity [6]. However, in practice, the phenomenon of wind and photovoltaic curtailment remains quite serious currently. One possible reason is that the low cost of violating the law leads to weak enforcement of mandatory power grid integration. Although Article 29 of the Renewable Energy Law establishes legal liabilities for power grid corporations that illegally refuse to accept the electricity generated from renewable energy, it only specifies administrative liabilities for such violations, including orders to make corrections within a specified time limit and administrative fines. As for the economic compensation for renewable generators, in view of system practice, generally it is the electricity regulatory agencies that identify the economic loss and supervise the compensation made to the renewable generators by power grid enterprises. Besides, it is difficult to measure indirect losses, and the ecological and environmental damages caused by the power grid enterprises’ illegal conducts cannot be compensated. Moreover, the legal liability of imposing fines of up to “no more than the amount of the enterprise’s economic losses” is too mild and lacks deterrent effect. As for the power generation enterprises, when traditional fossil fuel power generation uses floating electricity prices while under the circumstance that renewable energy generation uses fixed prices, the profits from traditional fossil fuel generation far exceed the illegal costs for refusing to integrate renewable energy power into the grid. Coupled with that wind and photovoltaic power have characteristics such as instability, intermittency and anti-peak shaving, excessive purchases may lead to grid paralysis, hinder smooth power supply, and pose the risk of large-scale power outages. In contrast, purchasing thermal power generation can still bring benefits to local governments and enterprises, reducing their incentive to cut thermal power generation, because the benefits of refusing to accept renewable energy power often outweigh the penalties for doing so. Moreover, current legislation does not specify civil or criminal liabilities for power grid companies that violate regulations, leading to a disregard for their responsibilities. As a result, renewable energy generation is restricted, failing to ensure the priority access of renewable energy to the grid, which exacerbates the issue of wind and solar power curtailment and causes resource waste [7].

4. Improvement Pathways for China's Energy Conservation and Emission Reduction Legal System under the Carbon Peaking and Carbon Neutrality Background

In view of three prominent issues currently existing in China's legal system of energy conversation and emission reduction, and to align with the overall orientation of reducing pollution, cutting carbon emissions, pursuing green development, and boosting economic growth, China's energy conservation and emission reduction legal system can be improved at least by implementing the "energy-saving + carbon-saving" institutional design, refining legal provisions to enhance operability, and strengthening legal liability.

4.1 Perfect the System Design of "Energy-Saving + Carbon-Saving"

The energy industry is a capital-intensive industry with a

relatively long investment return cycle, so investors have higher requirements for the legitimacy of energy industry supervision and the stability of the legal system [8]. The legitimacy and implementation of the dual control system for energy consumption urgently need to be confirmed and guaranteed, which should be promoted from policy to law as soon as possible. Some scholars suggest that "the promulgation of the Energy Law should be accelerated to clarify the legal positioning of reasonable control of total energy consumption and the decomposition and implementation mechanism [9]." The Energy Law is a fundamental energy law and has been listed in China's 2024 annual legislation plan. However, given its long-term absence and slow legislative progress, another scholar's view that "the urgently needed energy legal systems should not be pinned on the Energy Law [10]." is more practical. Considering that the legislative purpose of the Energy Conservation Law is to promote energy conservation and improve energy efficiency, it is legitimate and feasible to establish an authorization provision for the dual control system of energy consumption within this law, which would better integrate "energy – saving + carbon - saving." In this context, the authorizing entity is the Standing Committee of the National People's Congress, the authorized entity is the State Council, and the authorization matter is to formulate administrative regulations on the implementation of the dual control system for energy consumption within its scope of authority. Administrative regulations, compared to laws, have the flexibility and, compared to other normative documents, enjoy a higher level of authority. These characteristics give them an irreplaceable role in managing certain matters. Specifically, in Section 1 "General Provisions" of Chapter 3 "Rational Use and Conservation of Energy" of the Law, the following additions should be made: "The State implements a system of dual control over the total amount and intensity of energy consumption." and "The State Council shall formulate administrative regulations for the implementation of the dual control system for total amount and intensity of energy consumption within its scope of authority." Explicit and specific provisions should be made for the types of energy that should be restricted in total consumption and those that require improved utilization efficiency to avoid contradictions.

4.2 Refine Legal Provisions to Enhance Operability

Currently, China's green credit system and public participation system in energy conservation and emission reduction still face issues such as an excessive number of advocacy legal provisions and weak operability of relevant legal clauses. Future system reforms could address these issues by refining green credit regulations in renewable energy-related legislations and optimizing the systems related to public participation in energy conservation and emission reduction.

First, refine the provisions on green credit in laws related to renewable energy.

Legislative deficiency has posed significant obstacles to the development of green credit, necessitating clear legal norms to provide a foundation for its growth. A comprehensive and highly feasible legal system for green credit is needed to ensure its healthy and orderly development. In the legislations concerning financial management, renewable energy and ecological environment protection, it is essential to stipulate or refine the different contents of green credit in their respective focus areas, so as to address the limitations and operational challenges encountered by green credit in practice. Since the emphasis is on exploring legal issues related to energy conservation and emission reduction, the primary approach is to provide solutions on the provisions of green credit from the perspective of renewable energy legislations. That is, to formulate specialized and targeted provisions in accordance with the characteristics and development plans of the renewable energy industry. At the same time, it is crucial to delve into practical operations, establishing specific administrative regulations, rules, and measures to elaborate on important legal issues. In particular, detailed rules should be made for green credit projects in various green industries such as energy conservation, pollution prevention, and clean energy. In terms of facility, active credit granting supports shall be provided for the enterprises whose businesses are environmentally beneficial such as energy conservation and emission reduction. Concurrently, funding support for induatries with high energy consumption, high pollution, and overcapacity should be reduced to curb their blind expansion, which can also serve to prevent and mitigate credit risks.

Giving that both banking financial institutions and loan enterprises are profit-driven market entities, green credit can be promoted by providing special fiscal subsidies, tax incentives, and other incentive measures. These measures serve to guide the relevant market behaviors, and encourage innovation in loan models, credit products, and green guarantee methods. Additionally, the rating of green banks in the assessment and evaluation system shall serve as the basis and foundation for other positive incentives. The foregoing can also reinforce the awareness of energy saving, consumption reduction, and environmental responsibility of the banking industry [11].

Second, improve the public participation system to respond to national energy conservation and carbon reduction.

As the scope of environmental governance expands and the force of social autonomy rises, public rationality plays an increasingly important role in energy conservation and emission reduction [12]. Energy conservation and emission reduction can not be achieved without the joint efforts of the whole society. To refine public participation system, it is crucial to start with information disclosure mechanism, which involves ensuring the public's right to know about information related to energy conservation and emission reduction, clarifying the subjects responsible for disclosure and the scope of disclosure, gradually increasing the content of disclosure, and detailing the procedures for both proactive and requested information adisclosure. These enable the public to be aware of relevant laws, regulations, policies, and law enforcement processes about energy conservation and emission reduction, thus providing the necessary conditions for the public to actively and effectively participate in energy conservation and emission reduction and exercising their rights to supervision. Additionally, the key of detailing public participation system is to specify the scope, methods, procedures, and content of public participation, and codify

them into articles expressly prescribed by the laws, so that the public can regulatedly and securely participate in the formulation of laws, regulations, and policies related to energy conservation and emission reduction, as well as in monitoring the operation of energy-saving work. Specifically, in order to respond to nationwide energy conservation and carbon reduction, future system reforms should aim to broaden the scope of participants as much as possible; the methods and procedures for participation can be stipulated or further refined starting with the hearing system, the establishment of energy-saving standard participation system, and the energy-saving opinions feedback mechanism, supplemented by mobile Internet technology; and the feasibility of the public acting as eligible subjects for energy-saving public interest litigation can also be considered. Only by improving the public participation system can the enthusiasm and initiative of the public in energy conservation and emission reduction be enhanced, thereby indirectly guiding the public to comply with the relevant regulations of energy conservation and emission reduction from their own initiatives.

In addition, laws such as the Energy Conservation Law should also make specific provisions on the consumer behaviors and concepts ought to be advocated for and avoided, expand the regulatory scope from industry to include individuals, and stipulate the legal responsibilities of residents in energy consumption, so as to effectively regulate the public and urge them to adopt energy-saving consumption practices.

4.3 Strengthen the Legal Liabilities to Implement Energy Conservation and Pollution and Carbon Emissions Reduction

In response to the issues with legal liabilities in the Coal Law and the Renewable Energy Law, future institutional reforms could consider adding legal liability clauses for violations of statutory obligations in the Coal Law. Furthermore, taking the amendment of the Renewable Energy Law as an opportunity, it would be worthwhile to explore solutions to the mismatch between the costs of compliance and the costs of violations related to mandatory grid connection, thereby strengthening the legal responsibilities for energy saving, pollution reduction, and carbon emission reduction, and giving full play to the safeguard function of laws.

Firstly, add legal liability Clauses for Violations of statutory obligations.

The purpose of adding legal liability Clauses for breach of statutory obligations is to ensure that the relevant obligated entities pay attention to the liabilities they should bear. Taking the Coal Law as an example, in the future system reforms, it is required to consider the setting of correaponding penalties for specific illegal acts, in order to severely crack down on various illegal activities that waste coal resources and cause ecological and environmental damages; and additional provisions should be made to specify the legal responsibilities of coal mine enterprises, the primary persons in charge and managers, social intermediary organizations and related personnel, government and their staff for breach of statutory obligations [13].

Specifically, to add legal liability clauses for violations of statutory obligations, starting with the aspect of administrative responsibility, the first step should be to hold government agencies and their staff accountable for administrative responsibilities for not performing or not fully performing their duties. Secondly, legal norms should hold enterprises that violate statutory obligations accountable for corresponding civil liabilities based on the the damage caused. Meanwhile, if administrative violations are involved, administrative penalties such as fines, production restrictions, orders to cessation of production or business, or orders to close down should be applied or imposed in combination according to the degree of administrative illegality. The design of the fine system can draw on the successful legislative experience of the Environmental Protection Law. On one hand, raising the upper limit of fines to warn violators. On the other hand, for those who commit serious illegal acts and refuse to make corrections, showing a strong subjective illegality, systems such as "double penalties" and "daily cumulative fines" should be implemented. Finally, in terms of criminal liability, the system design should strive for maximizing the punitive and corrective functions of criminal penalties on offenders, while also effectively serving the functions of education, prevention, and warning. In light of this, the system design could add dependent clauses such as “pursue criminal liability in accordance with the relevant provisions of the criminal law” or “pursue criminal liability in accordance with the law” for serious harmful acts committed by the primary persons in charge, management personnel, and government staff, based on the type of legal interests infringed.

Secondly, increase the cost of illegal acts while reduce the cost of compliance.

Although grid enterprises are obliged to purchase renewable energy electricity, the low cost of violating this obligation leads them to neglect their due responsibilities. Therefore, to increase the cost of violations and reduce the cost of compliance, it can be considered to amend laws and regulations such as the Renewable Energy Law. On the basis of detailing the provisions on the circumstances where grid companies fail to fulfill their obligations, it should clearly stipulate the civil and administrative liabilities that grid companies and main persons in charge and directly liable persons shall bear for violating the mandatory grid access system. Combining the increase of violations cost and reduction of compliance cost shall focus on the protection of legitimate rights and interests of the main entities involved in the development and utilization of renewable energy, while appropriately strengthening the severity of penalties to raise the cost of violations.

Specifically, to increase the cost of violations from the civil liability perspective, first of all, it is essential to define the coverage and calculation details of damage compensation, and it is necessary to clarify that power grid enterprises should pay compensation for the losses incurred by renewable energy power generators due to their failure to fulfill the mandatory purchase obligation for renewable energy electricity. The civil compensation should be commensurate with the actual losses, including direct and indirect losses with legal causality. Secondly, the setting of administrative liability can also draw

from the legislative experience of the Environmental Protection Law, increasing the amount of fines and implementing administrative sanctions with varying degrees of coercive force according to the severity of the violation, rather than being limited to the current sole measure of ordering rectification within a specified period. This will effectively restrain undesirable behaviors, serve as a deterrent effect of "not daring to violate the law," and fulfill the punitive role that violators deserve, thus implementing the mandatory grid access system. By strengthening the fulfillment of the duties of the grid enterprises, it is possible to avoid the underutilization of a large amount of equipments and the consequent serious waste of resources, thereby safeguarding the rights and interests of renewable energy generators and promoting the benign development of the renewable energy market.

Indeed, to boost the capacity of power grids to absorb electricity generated from renewable energy sources, China cannot blindly stress the acquisition obligations of grid companies, but also focuses on the effect of “incentives” to achieve the balance between the costs of compliance and the costs of violation, as well as between the rights and obligations. The system design could include compensating renewable energy grid-connected power generation projects, encouraging renewable energy power generation enterprises to construct or purchase peak-shaving capacity, and increasing grid-connected scale in various ways to alleviate the burden on power grid enterprises.

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