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Evaluation and Promotion Mechanism of Urban Energy Internet Development under Double Carbon Target

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Abstract: Under the "double carbon" strategy, as the main source of carbon dioxide emissions, the energy industry is the main force in carbon reduction, and cities which are the main energy consumers are the main battleground. Thoroughly implementing the new development concept, building a clean, low-carbon, safe and reliable, intelligent and open energy network, and building a modern intelligent energy system are the key to realizing the low-carbon transformation of the national energy industry. This paper analyzes the requirements of energy Internet development and the shortcomings of energy Internet development based on the necessity of energy Internet development in China, constructs a development evaluation index system, and proposes the development mechanism and policy recommendations of urban energy Internet under the background of "double carbon".

Keywords: Double Carbon; Urban Energy Internet; Evaluation Indicators; Development Mechanism.

1. Introduction

As a basic driving force for social development, energy is closely related to economic development and is also an important strategic material for national security. The global climate and environmental crisis has sounded the alarm for the development of every country, and the polluting substances mainly greenhouse gases produced by human production and life have greatly hindered the healthy and sustainable development of the global economy. Against the background of increasing pressure for low-carbon economic transformation, a dual-carbon strategy is proposed. This goal provides a clearer, more concrete and greener path to sustainable development for the world economy. On the basis of this goal, it also means that in a long period of time, human beings will actively explore the specific energy structure and energy utilization forms.

Cities are an important part of human society, the main body of energy supply and consumption, as well as the main spatial carrier of carbon emissions. In the context of "double carbon", the development of energy is facing new challenges, and the establishment of energy Internet is one of the key ones. The establishment of energy Internet can solve the imbalance of energy supply and demand, excessive energy consumption, environmental pollution and other problems, lay a solid foundation for sustainable energy utilization, and provide a fulcrum for national strategic decision-making. It is an important measure to promote energy revolution and ensure energy security.

2. The Need for Urban Energy Internet Development under the Double Carbon Goal

Since the goal of "carbon peaking and carbon neutral" was proposed, various fields have been doing related thinking and exploration, and enterprises and institutions in the energy field are also actively contributing their wisdom and strength.

1)A higher proportion of new energy needs to be embraced

China is rich in clean energy, but demand exceeds supply. The development of UHV transmission networks with large capacity, long distance and low loss is an inevitable choice to accelerate the development of new energy resources and large-scale deployment. At present, the overall construction of ultra high voltage power system is relatively backward and lacks effective resource allocation, which brings a great limit to the development of new energy. Such as clean energy-rich "three north" region, the transmission capacity of only 65 million kilowatts, less than 32% of the installed capacity of clean energy, far from meeting the needs of the transmission. Compared with industrial, transportation, construction and other areas of end-use energy consumption emissions reduction, clean energy power generation instead of coal technology is mature, economic, easy to implement, which is also the most efficient and the most economical carbon emission reduction measures. To achieve the goal of "double carbon", the ecological and environmental management model is required to achieve a change from end-of-pipe management to source prevention and control, while will force the country to continuously improve the installed capacity and power generation capacity of new energy, thus promoting the deep transformation of the new energy industry.

2) The situation of carbon emission reduction is serious

In 2019, China's carbon emissions accounted for 28% of the global total, and per capita emissions are 46% higher than the world average. Continuing the current path, China will not only fail to achieve its emission reduction targets, but will also face huge losses from coal power and other infrastructure built first and then demolished and assets stranded. Studies show that the current increase of 100 million kilowatts of coal power installed capacity will squeeze 300 million kilowatts of clean energy development. The cumulative increase in carbon dioxide emissions by 2050 will be 15 billion tons, 1.5 times of China's carbon dioxide emissions in 2019, while the early retirement of coal power generation systems will bring property losses of more than 300 billion yuan. CO2 emissions from the power sector account for about 40% of China's CO2 emissions from energy activities. Promoting decarbonization

of the power sector and accelerating electrification of end-use energy is the main means to promote low-carbon transformation of the energy system and long-term GHG emission reduction. Energy Internet is a kind of power as the center, the integration of new energy generation technology and information technology, electricity, natural gas, heating/cooling and other energy networks combined with electric power transportation network, to form a power as the center of a new energy network. It is an effective path to promote the consumption of new energy, improve energy efficiency and realize China's "double carbon".

3) Energy Eco-Structure is changing

Under the goal of "double carbon", the new energy ecology needs to implement new concepts and apply new models to coordinate the management of energy-using subjects. The governance subjects of modern energy networks are more diversified than traditional energy networks, including governments, energy producers, energy consumers, Internet service companies, information technology platform companies, etc.Energy consumers will also become producers, so the network relationship will become more complex, energy governance will face greater challenges, and the ability of decision makers is also a test. Secondly, the integrated energy consumption mode of multi-energy cooperation will gradually replace a single energy consumption type, and carry out mutual transformation among various energy sources. This series of changes means that the future energy market structure will be more flat, decentralized and interactive.

Energy Internet takes electricity as the core and "Internet Plus" technology as the main means to build a green, low-carbon, safe and efficient new energy ecosystem, realizing the interconnection, comprehensive utilization and optimal sharing of various energy sources. Since the American scholar Jeremy Reeve proposed the idea of energy Internet, the concept of energy Internet has been widely recognized and expected at home and abroad, and it is regarded as the inevitable development form of energy production, transmission and supply. In the past few years, China's National Energy Administration has laid out several demonstration projects to promote the development of the energy Internet. The Energy Internet is a product of the deep integration of the energy revolution and the digital revolution, and has become an important way to promote China's energy transformation, improve energy utilization efficiency, achieve energy conservation, emission reduction and sustainable development, which is a pivot for the realization of the dual carbon goal.

3. Current status of urban energy internet development

3.1. Urban energy Internet concept and characteristics

Urban energy Internet refers to an energy ecosystem that integrates various forms of networks, such as gas supply network, heating network and electrified transportation network, with the power network as the core and on the basis of power-to-gas technology and electric-vehicle access technology, within the urban area with dense population and concentrated load. It aims to build an open public service center and energy management platform, enhance the participation enthusiasm of users, solve the access problem of high penetration of renewable energy, improve the comprehensive energy utilization efficiency, and finally realize the integration of energy flow, information flow and value flow. At this stage, the specific characteristics of the urban energy Internet are as follows:

1) Intelligent. Energy Internet is built on network information technology, which organically combines users' energy demand and merchants' energy supply through network, and then accesses, transmits, stores and exchanges energy information through smart grid to intelligently realize the balance between supply and demand.

2)Interconnection and sharing. Compared with the traditional energy distribution method, the openness of network resources determines the information reciprocity between energy supply and demand. Both subjects can obtain services fairly and conveniently through the resources on the network according to their actual conditions, while uploading the remaining energy information to the network platform for other demanders, thus realizing the interconnection and sharing of energy information.

3) Sustainability. Since sustainable energy sources have the characteristics of difficult collection and storage, the construction of energy internet can realize the rapid and reasonable use of sustainable energy on the platform again, which can effectively solve the characteristics of inconvenient storage of new energy and thus promote the sustainable development of new energy.

4) Diverse big data nature. Energy Internet is a large platform for energy exchange and distribution. All kinds of energy supply data and trading operation data uploaded on the platform are very large and involve many subjects, which requires the use of cloud computing and big data to analyze the status of each subject, so as to quickly, effectively and reasonably distribute energy, achieve the optimal allocation of energy and improve the efficiency of energy utilization.

3.2. The current situation and problems of urban energy Internet development

1) Technology. The energy interconnection system has insufficient digital sensing and terminal processing capacity, and has not yet realized the coherence of production, transmission and consumption data, especially in the stage of large-scale access to new energy and gradual integration of different types of energy transmission and distribution networks, data silos still widely exist in each link. Secondly, the application of advanced information technology and intelligent technology in the traditional energy system is still in the primary stage, leading to the value of energy data is not fully reflected, the level of intelligent analysis and decision-making is not high, and a large gap with the personalized and interactive service requirements of the smart energy system.

2) Policy. Although the relevant ministries and commissions have issued some macro plans and guidelines that are conducive to the development of regional energy Internet, many cities have not incorporated the concept of regional energy Internet into relevant plans, which especially lack the support of comprehensive energy planning. In addition, some regions lack policies on heating and cooling prices, distributed power supply grid connection policies, and clean energy subsidies specifically for regional energy Internet projects.

3) Market. At present, different energy markets are fragmented from each other, and the prices of various types of energy lack a conversion medium, making it difficult for price signals to promote the coordinated development of

various types of energy. How to effectively mobilize massive grid-based adjustable resources through market means and promote market participants to take the initiative to balance energy supply and demand conflicts will be the key to the design of energy Internet market.

4. The evaluation system of urban energy Internet development under the dual carbon target is constructed

4.1. Construction principles

1) Specific. The urban energy Internet development level indicator system is an objective description of the development level of smart grid, clean energy and demonstration projects in each city, and serves for the evaluation activities of urban energy Internet development level. The indicator system should be specific and specialized for the evaluation of the development level of energy Internet.

2) Measurable. In view of the huge scale of the indicator system of the development level of urban energy Internet, and the collection and collation of the indicator data of the evaluated cities, it is necessary to establish a unified, standardized, representative and sustainable development ability evaluation standard.

3) Trackable. The purpose of evaluating the development level of urban energy Internet is to analyze the current situation, summarize the experience and carry out development. Therefore, the evaluation of the development level should be updated and continuously followed up, and the effect of the evaluation should be tracked and re-evaluated after a certain period. This requires that when designing the indicators of urban energy Internet development level, the difficulty of monitoring and controlling the corresponding indicators should be fully considered, and the indicators must be established with stable and reliable data sources to facilitate timely updating and evaluation of the development level at a later stage.

4.2. Indicator system construction

This paper takes quantifiable, measurable and independently traceable as screening criteria, takes the concept, framework and vision of the energy Internet as the main line, analyzes the development needs and key tasks and objectives of the construction of China's energy Internet, and combs several links such as planning, construction and operation to form a multi-level evaluation index system for the development of the energy Internet.

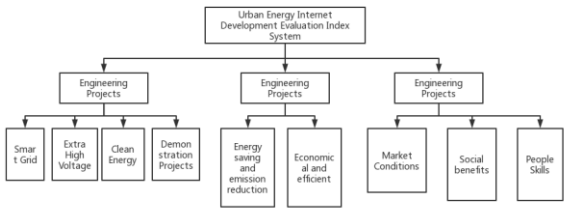


Figure 1. Energy Internet Development Evaluation Index System

1) Engineering projects.

The development and construction of engineering projects is the foundation of development. Similar to the previous energy revolution, energy Internet is also a complex system engineering related to many fields. The smart grid, which takes extra-high voltage piezoelectric network as the backbone frame and is widely interconnected, is the basic platform for large-scale development, transmission and use of clean energy, namely "smart grid + extra-high voltage grid + clean energy". Among them, smart grid is the foundation, UHV grid is the key, clean energy is fundamental. China is actively promoting these projects and has conducted extensive research and practice in the fields of related technological innovation, standard setting and demonstration. In the near and medium term, it will be carried out in two stages, with the first test and demonstration, and then popularized and applied in the future work in order to achieve practical results.The secondary indicators of the project dimension are thus obtained, as shown in the following table:

Table 1. Secondary indicators of engineering project

Tier1 Indicators	Components	Secondary indicators
Engineering Projects	Smart Grid	Smart grid engineering construction investment (billion)
	Extra High Voltage	Substation equipment capacity (million kVA)
	Clean Energy	Share of clean energy generation (clean energy generation/total generation)
	Demonstration Projects	Project scalability (adding functionality or optimization to the same logical unit)

2) Low carbon and high efficiency is the development principle and goal. The energy Internet upholds the development ideology of green, low-carbon, safe and efficient, relying on the ultra-high voltage power grid to realize the development and utilization of clean energy, optimal allocation of resources and clean substitution and electric energy substitution on a large scale, control and reduce energy consumption per unit of GDP, and enhance the rate of pollutant reduction, so as to promote clean and green ways to meet the demand for electricity and achieve its development goal of promoting energy conservation and emission reduction. At the same time, the efficiency of energy utilization is improved from the perspective of technology and management in order to achieve sustainable development. The economic and efficient use of energy is an inevitable requirement for the development of the energy Internet, and the relevant indicators need to take into account such subjects as power generation, power grids, users and other stakeholders. As a result, the following table shows the secondary indicators of low-carbon and high-efficiency dimensions in conjunction with the National 13th Five-Year Plan for Energy Development:

Table 2. Low carbon and high efficiency secondary indicators

Tier1 Indicators	Components	Secondary indicators
Low carbon and high efficiency	Energy saving and emission reduction	Pollutant reduction rate (reduction of pollutants this year/emission last year)
		Energy consumption per unit of GDP (energy consumption / GDP)
	Economical and efficient	Reliability rate of electricity supply (normal electricity consumption time/total time)
		Grid line loss rate (integrated grid line loss rate)

3) Innovative practice of value-added services is the key to development. Energy Internet provides basic energy commodities such as electricity, gas, heat and related financial derivatives, value-added services such as analysis of users' energy consumption behavior and load demand prediction, etc. Through the deep integration of "Internet+" and innovative business models, it drives the formation of new business models for energy Internet development, thus promoting related institutional reforms and giving rise to new economic models. This is the main channel to realize its value. Value-added services are the basic manifestation of the open and shared value of the energy Internet. In addition to traditional services, customized services should be provided based on users' individual needs to realize user value, mainly including energy consumption consulting based on big data, energy efficiency products sales, new energy vehicle market and energy saving solutions, O2O commercial consumption, etc. Its evaluation index needs to consider:

Table 3. Secondary indicators of value-added services

Tier1 Indicators	Components	Secondary indicators
Value Added Services	Market Conditions	Market size (market volume of new energy value-added services)
		Subscriber growth rate (increase in energy VAS subscribers / original market subscriber volume)
	Social benefits	Industry growth (value-added energy services industry output growth rate)
	People Skills	Education and Training (Number of Education and Training）

4.3. Development of evaluation methods

Entropy weighting method uses objective evaluation method to analyze multi-indicator and multi-attribute decision making, which avoids artificial weighting and makes the evaluation results more objective and accurate. In this paper, according to the constructed development evaluation system, entropy weighting method is used to calculate the weights of each index of development evaluation. Compared with the subjective assignment method, which relies too much on subjective judgment, the entropy method uses the principle of information entropy to determine the weights, which can evaluate the research object more objectively and accurately.

1)Standardized processing of raw data

In order to eliminate the differences of different economic meanings expressed in the data of each indicator and the differences of different dimensions in the indicator data, this paper uses the extreme value method to standardize the selected indicator data, assuming that Cij s the original data, Cij' is the standardized data , Max Cij is the maximum value, Min Cij is the minimum value, and Cij is the average value. For the standardization of positive indicators, the method Cij' =(Cij-Min Cij)*(Max Cij-Min Cij) can be used, while for the standardization of negative indicatorsCij' =(Max Cij-Cij)*(MaxCij-Min Cij) is used.

2) Calculate the entropy value

The use of entropy method to determine the weights is a more mature method in comprehensive evaluation methods, and this method is the objective assignment method. Using it to determine the dispersion of the data itself can avoid the bias caused by subjective factors in a transformation performance evaluation system that contains multiple indicator layers. For the calculated indicators, the greater the variability of the indicators, the higher the calculated entropy weight will be, and the more information will be reflected. The indicator weight Fij of the j the indicator of the i the program is calculated as Fij=Cij' /Σni-1*Cij'; the entropy value of the jth indicator is calculated as ej=-1/Ln(n)Σni-1 *Fij*lnFij(n=1,2,3…14) (n=1,2,3…14). The weight of the calculated price indicator is Wj=(1-ej)/Σni-1 *(1-ej). The following table shows:

Table 4. The weight of the entropy value of each metric

	Secondary indicators	Weights	Total weighting
Smart Grid	Smart grid engineering construction investment (billion yuan)	6.89%	34.63%
Extra High Voltage	Substation equipment capacity (million kVA)	7.64%	
Clean Energy	Share of clean energy generation (clean energy generation/total generation)	11.21%	
Demonstration Projects	Project scalability (adding functionality or optimization to the same logical unit)	5.89%	
Energy saving and emission reduction	Pollutant reduction rate (reduction of pollutants these year/emissions last year)	10.36%	38.44%
	Energy consumption per unit of GDP (energy consumption / GDP)	9.87%	
Economical and efficient	Reliability rate of electricity supply (normal electricity consumption time/total time)	8.98%	
	Grid line loss rate (integrated grid line loss rate)	9.23%	
Market Conditions	Market size (market volume of new energy value-added services)	8.14%	26.93%
	Subscriber growth rate (increase in energy VAS subscribers / original market subscriber volume)	7.39%	
Social benefits	Industry growth (value-added energy services industry output growth rate)	6.97%	
People Skills	Education and Training (Number of Education and Training)	4.43%	

As can be seen from the above table, in the evaluation system of urban energy Internet development level, energy saving and emission reduction and economic efficiency take up a greater weight, among which clean energy has the greatest impact on the high-quality development level of urban energy Internet, followed by the pollutant reduction rate and finally the grid line loss rate.

5. Promotion Mechanism of Urban Energy Internet Development under the Double Carbon Target

5.1. Increase investment in science and technology and focus on innovation mechanism

Energy Internet technology innovation is a necessary

condition to achieve the "double carbon" goal. The key to achieving carbon peaking and carbon neutrality lies in reducing carbon emissions and increasing carbon absorption. In terms of reducing carbon emissions, we can vigorously promote the clean and low-carbon transformation of energy supply, develop renewable energy and reduce the use of fossil energy around green and low-carbon. Comprehensively promote energy conservation and emission reduction in the whole society, strengthen energy efficiency management, and increase electric energy substitution. Promote key core technology innovation in hydrogen energy, energy storage, energy conservation and environmental protection. In terms of increasing carbon absorption, carbon neutrality requires the elimination of all carbon dioxide produced by production and life, and ultimately achieving a balance between the amount of carbon dioxide production and elimination to achieve net zero emissions, while the current technologies of carbon capture, utilization and storage are not mature, and there is an urgent need to strengthen scientific and technological innovation to support and lead, and promote the large-scale application of carbon absorption technologies such as carbon capture and storage. In addition, build a low-carbon base combining R&D and demonstration, create a low-carbon technology innovation research and development base, and layout a number of forward-looking, strategic and disruptive science and technology research projects in the fields of energy conservation and environmental protection, clean production and clean energy. Foster the construction of a number of green technology innovation centers, science and technology resources sharing service platforms, key laboratories and technology innovation centers and other innovation base platforms.

5.2. Promote science and technology projects and build market mechanisms

1)Establishment of market access mechanism

Establish a business licensing management system. Further implementation of the "management and administration" to maintain order in the energy market and improve the order of the energy industry licensing management. Such as forgiveness in the energy authorities through the filing or approval of distributed power generation projects and other power business license. Simplify the solar, wind, geothermal and other new energy generation business financial statements and audit reports and other business license application requirements. The items that must be examined and approved in the application conditions of power business license of power supply enterprises should be adjusted so that the supply and marketing parties can reach an agreement by themselves. Withdraw the electric power business license qualifications ordered to be shut down by the regulator due to environmental protection and other issues.

2)Establishment of price mechanism

The price mechanism is the centralized manifestation of the realization of the market regulation role, which is related to the trading method and the type of energy. For bilateral transactions, the pricing is mainly negotiated between the two trading parties. For centralized transactions, different pricing mechanisms such as aggregated price, system marginal price, zonal marginal price and nodal marginal price can be adopted according to the energy type. At present, it is generally recognized in the electricity market that nodal marginal tariffs are superior in terms of price guidance and blockage management. Considering the network economy attributes of the energy Internet market, pricing mechanisms for ancillary services and transmission and distribution costs are essential. The current international transmission and distribution prices are mainly based on the "cost + benefit" pricing method, and there are also maximum caps and incentive controls based on results, and the main methods for determining natural gas pipeline prices are cost of service pricing method and price cap pricing method.

5.3. Develop laws and regulations and improve regulatory mechanisms

1)Sound new energy laws and regulations

Strengthening new energy and building a new type of power system requires innovative legal system design, so that China's energy governance is based on law. China should actively promote the Energy Law, properly revise the Renewable Energy Law and the Electricity Law, establish basic legal systems on guaranteed power supply and power trading, and regulate the order of market operation. The Energy Law should be fully dovetailed with the Renewable Energy Law, and put forward detailed, specific and clear development goals and requirements from the specific national conditions. From the current actual situation, government departments should actively issue documents to encourage coal production capacity, prevent excessive coal hoarding, and actively reverse the situation of extreme supply and demand mismatch. At the same time, improve the standards related to new energy power into the network, and connect the grid with the standards of power generation enterprises. Also focus on the flexibility and rationality of the policy and legal system to better balance the supply of traditional and new energy sources.

2)Establish regulatory mechanism

Construct a supervision and management system for the energy Internet, implement the central government's strategic instruction of "four revolutions and one cooperation", set up a special management and service organization for the energy Internet, and separate the administration and supervision. The government will guide the formulation of the overall plan and improve the relevant laws and regulations to ensure fair competition in the operation of the energy Internet market system, taking into account the problems in practice. At the same time, it will establish an innovative project approval mechanism, simplify approval procedures, implement one-stop service and approval in one window, establish industry associations to do self-management, attract participants from various groups in society, and form a self-regulatory organization with strong binding force. Speed up the coordination of economic supervision such as oil and gas industry and social supervision such as resource conservation and environmental protection, and build an efficient supervision agency with independent organization, synergy and clear division of labor.

5.4. Build information platform and develop coordination mechanism

Carbon trading platforms have been mushrooming everywhere and are prompting companies to innovate their production and operation technologies, thus changing the energy structure of society in all aspects. The introduction of blockchain technology and the carbon footprint monitoring and recording function based on blockchain can provide a feasible solution for carbon verification and trading. For example, a low-carbon mini program can be developed to

organically combine various application scenarios such as personal fitness exercise and transportation. Then, through the influence of the Internet, the role of the market mechanism can be brought into play, so that more citizens can actively participate in energy conservation, green transportation and other projects, so as to transform carbon reduction from physical to human. Integrate commercial market buildings, industrial enterprises, schools, hospitals and other public facilities as well as their ancillary facilities, carry out digital management of their whole life cycle, and realize collaborative optimization of energy production and consumption by means of intelligent collaborative regulation and decision support, so as to effectively adjust the real-time balance between power generation and electricity consumption. Improve the local consumption rate of new energy and the overall energy utilization rate of the region.

In the future, more Internet companies, digital companies, financial companies and comprehensive energy service companies will participate in it, and explore a quick and safe way to reach the double carbon goal by building a new energy ecosystem that is "clean and low-carbon, safe and efficient, open and shared".

6. Conclusions and Recommendations

6.1. Policy Recommendations

1)Integrate the idea of regional energy networks into local planning and guide the review of new projects, subsidies and incentive policies with a planning orientation. When formulating urban energy planning, urban thermal planning, clean heating planning, renewable energy building planning, etc., consider local energy demand, resource endowment and climate conditions according to local conditions, and strengthen the synergy with planning for construction, transportation and land, etc. Through expanding, strengthening and supplementing the chain, accelerate the formation of a world-class clean energy industry chain cluster with high spatial concentration, close upstream and downstream synergy, and global competitiveness.

2)Use regulatory regulations as a tool to promote cross-sectoral collaborative planning, renewable energy or integrated energy grid integration, and energy efficiency optimization. Use regulatory regulations to require investment and development enterprises to fully compare regional energy Internet solutions with other energy solutions and select the clean, efficient, economic and safe solutions. Develop building and industrial energy efficiency certification standards compatible with the regional energy Internet, and promote the construction of unified cross-regional energy efficiency accounting standards to encourage users to build the regional energy Internet.

3)Use a variety of subsidy incentives such as preferential financing policies, fiscal and tax policies, and direct capital subsidy policies to help regional energy Internet projects solve their financial problems. Develop pricing policies or subsidy policies that encourage clean heating and cooling, including subsidies higher than those for coal-fired heating in centralized heating areas in the north. Further clarify the policy of grid access for waste electricity and waste heat in regional energy internet projects. Promote in an orderly manner the organization of distributed power generation market-based trading pilot, allowing all types of distributed power plants to participate in power trading.

4)In addition to the demonstration of new technologies, demonstration projects should strengthen the demonstration of related new policies, new standards, new business models, new organizational management models, and organize business subjects to learn and reference the existing successful models or potential models. Encourage operators, virtual power plants, and investors to innovate on new marketing models, and encourage them to enter the energy market as new energy subjects. Open pilot projects for energy construction and delivery in emerging industrial areas, or residential areas, as well as engineering projects for distributed energy, energy double-star delivery, energy price regulation, and energy interchange. By leading through innovation, the demonstration projects can significantly improve the level of energy and power technologies and equipment, and promote the goal of a cleaner, lower-carbon, safer, and more efficient energy revolution.

6.2. Conclusion

Energy Internet is the inevitable product of the integration and development of new generation information technology and energy, and is the concrete realization of "promoting energy revolution and accelerating digital development". To achieve the goal of carbon neutrality, we must rely on energy Internet technology innovation to promote economic development. This paper focuses on the connotation of urban energy Internet and the requirements of development under double carbon, and constructs an urban energy Internet development evaluation index system to dynamically evaluate the future development of urban energy Internet. The paper proposes to deepen the technological innovation system and mechanism reform of urban energy Internet, establish carbon trading and other comprehensive information platforms, promote the diversified development of Chinese urban energy Internet, and help the smooth realization of the double carbon goals. In the establishment of new clean energy, power as the core, based on the Internet of modern energy network system at the same time, but also in China and the world, continue to innovate the development model of energy Internet, to accelerate the national carbon emission reduction to provide comprehensive, efficient integrated solutions.

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