Thoughts on Carrying out Enterprise Energy Audit under the Background of New and Old Kinetic Energy Conversion

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Abstract. As China’s economy shifts from a high-speed growth stage to a high-quality development stage, it is an important measure taken by the country to promote supply-side structural reform to transform old kinetic energy and cultivate new kinetic energy. It is also the only way to promote economic restructuring and upgrading. In this context, this paper focuses on the new and old kinetic energy conversion strategy from the perspective of auditing, discusses the necessity of implementing energy auditing, explains the classification of energy audit, audit procedures, audit content and other issues, and hopes to help transform old and new kinetic energy from the perspective of auditing.

1. Introduction
With the gradual deepening of the new round of scientific and technological revolution and industrial transformation, new kinetic energy development is supported by new production factors such as new technologies, new information and new talents, and China’s economic development has entered a new normal. Under the new normal, there are two important ways to promote the transformation and upgrading of China’s economic structure. First, the state encourages the cultivation and growth of new kinetic energy to promote the formation and development of new technologies, new industries, new formats, and new models. Second, the state promotes the transformation of old kinetic energy, and transforms and upgrades traditional industries with new technologies, new formats, and new models. In the process of promoting the transformation and upgrading of the economic structure, from the perspective of auditing supervision, carrying out enterprise energy auditing work and paying attention to the efficiency of old kinetic energy transformation are of great significance for the development of new and old kinetic energy conversion strategies.

2. The necessity of implementing energy audit
In the 1970s, when the global energy crisis broke out, governments such as the United Kingdom and the United States gradually realized the importance of energy and began to explore energy auditing issues. China’s exploration of energy audit issues originated in the 1980s, and the definition of energy audit was defined in the General Principle of Energy Audit on Industrial and Commercial Enterprise issued in 1997, but the energy audit was not implemented on a large scale. The “Implementation Plan for Energy-saving Actions of Thousands of Enterprises” issued by the government puts forward clear requirements for enterprises to conduct energy audits, and energy audit issues are receiving more and more attention. In the context of the current national implementation of the old and new kinetic energy conversion strategy, it is imperative to carry out enterprise energy audits.
2.1. The need for the state to change the current energy consumption problem
Although China’s total energy is relatively abundant, its per capita possession is too low compared with the world level. From the perspective of energy utilization, China’s old kinetic energy consumption such as coal and oil is too large. Many traditional industries, especially high-energy-consumption and high-pollution industries such as iron and steel, still have energy consumption problems such as extensive management, backward technology, high energy consumption per unit of output value, and low energy efficiency. At the same time, China’s unreasonable energy consumption problems have also triggered a series of problems such as ecological damage and environmental pollution. It is an inevitable requirement to fundamentally change the current situation of energy consumption in China by conducting enterprise energy audits and supervising the energy consumption, energy conservation and emission reduction, and the efficiency of transforming old kinetic energy.

2.2. The need for the state to regulate energy conservation and emission reduction work
During the new normal period, the acceleration of industrialization and urbanization and the continuous upgrading of the consumption structure have prompted China’s energy demand to continue to grow. The resource and environmental issues still constrain China’s economic and social development. Therefore, the situation of energy conservation and emission reduction is still grim. Carrying out enterprise energy audits, reviewing the implementation of energy conservation and environmental protection laws and regulations, and the task objectives of energy conservation and emission reduction will not only help enterprises to save energy and improve efficiency, but also help the people to form a sense of resource conservation and environmental protection. Therefore, carrying out enterprise energy audit is the need to carry out national energy conservation and emission reduction supervision, and is also an inevitable requirement for building a resource-saving and environment-friendly society.

2.3. The need for the government to promote the conversion strategy of new and old kinetic energy
In the past many years, China has relied on three old kinetic energy to drive economic growth: exports, investment and consumption, extensive investment in economic factors, and the GDP-oriented system. While the three old kinetic energy are driving economic growth, they also bring about a series of problems such as overcapacity in the real economy, intensified resource and environmental constraints, and asset price bubbles. The three old kinetic energy are no longer adapted to the current development needs of high-quality economic growth. Implementing new and old kinetic energy conversion and nurturing new kinetic energy are key measures to achieve sustainable development. The implementation of energy audits, auditing the energy consumption of enterprises, the efficiency of the transformation of old kinetic energy, and the cultivation of new kinetic energy can effectively guarantee the implementation of the old and new kinetic energy conversion policies.

2.4. The need for enterprises to improve economic efficiency and enhance competitiveness
As the mainstay of the market economy, enterprises play an important role in stimulating market vitality and promoting economic development. In the process of transforming the economy into a high-quality growth stage, the state implements the old and new kinetic energy conversion strategies to enhance the vitality of the old kinetic energy and cultivate the advantages of new kinetic energy. The implementation of this strategy can encourage enterprises to adjust their structure and take the initiative to transform, which can further stimulate the vitality of the market and promote the sustainable development of enterprises. Carrying out enterprise energy audits can supervise the energy consumption of enterprises and the conversion of new and old kinetic energy from the perspective of auditing, which not only helps enterprises to save energy and improve energy efficiency, but also helps enterprises to upgrade their old kinetic energy and cultivate new kinetic energy.
3. The basic framework of energy audit

3.1. The classification of energy audit

3.1.1. Classified by audit object
According to the classification of audit objects, energy audits can be divided into government energy audits and enterprise energy audits.

The government’s energy audit, from a macro level, focuses on energy audit issues at the provincial, municipal, local, and even national levels. The government’s energy audit is implemented by the relevant energy regulatory authorities. The main purpose is to supervise the energy consumption of the region or country, improve energy efficiency, promote the transformation of economic growth mode, and realize the country’s sustainable development strategy.

The enterprise energy audit, from the micro level, pay attention to the energy consumption of the enterprise itself. The enterprise energy audit is mainly initiated by the owner of the enterprise, and is implemented by an internal energy auditing institution specially set up by the enterprise or by hiring an external independent energy auditing institution. The purpose is to supervise the energy consumption of the enterprise, reduce unnecessary waste, and improve energy utilization rate, improve the economic efficiency of enterprises. The content described later mainly studies enterprise energy audit issues.

3.1.2. Classified by audit object
From the perspective of auditing subjects, energy auditing can be carried out by national auditing agencies, independent social organizations, and internal auditing institutions. Therefore, energy auditing can be divided into national energy audits, social energy audits, and internal energy audits.

3.2. Purpose of energy audit
The purpose of conducting energy audits is to help the governments at all levels to strengthen energy management and promote the transformation of the country’s economic growth mode while protecting the environment and achieving sustainable economic and social development. From the enterprise level, conducting energy audits can encourage enterprises to save energy, improve energy efficiency, enhance the economic efficiency and comprehensive quality of enterprises, and achieve sustainable and healthy development of enterprises.

3.3. The basis for energy audit
With the country’s emphasis on energy auditing, China has promulgated a series of rules and regulations related to energy auditing in recent years, which has become the basis for conducting energy audits.

3.3.1. National standards for energy audit
The main audit basis for energy auditing is the "Audit Law of the People’s Republic of China" and the "Energy Conservation Law of the People’s Republic of China". On this basis, the national standards for series energy audits have been promulgated. The General Principle of Energy Audit on Industrial and Commercial Enterprise issued in 1997 considered energy auditing as a method of conducting energy science management and services, and proposed an objective examination of the energy use efficiency, consumption level and economic effects of energy use. In 2006, the government issued the “Thousands of Enterprises Energy Conservation Action Implementation Plan”. Under the promotion of the National Development and Reform Commission, thousands of enterprises in nine key energy-consuming industries, including steel, coal, chemical, and papermaking, took the lead in conducting energy audits, and based on energy audit results, they found problems, tapped potential, and formulated practical energy-saving measures. In 2018, the seven ministries and commissions jointly revised and promulgated the Measures for Energy Conservation Management of Key Energy-using
Units, requiring key energy-using units to implement energy audits and submit energy audit reports to relevant government departments.

3.3.2. Industry standards for energy audit
With the expansion of the scale of energy audit implementation, various industries began to pay attention to energy audit issues, and the industry’s energy audit specifications were gradually improved. In 2011, the Ministry of Industry and Information Technology issued the “Energy Auditing Standards for Chemical Enterprises” and “Energy Auditing Standards for Petrochemical Enterprises”. Some industries such as chemical and petrochemical companies actively carry out energy audits based on industry energy auditing standards. At the same time, enterprises use energy audit results to carry out energy-saving renovation and enhance their competitiveness. In 2016, the Ministry of Housing and Urban-Rural Development issued the “Guidelines for Energy Auditing of Public Buildings”, which standardized the audit procedures, audit contents, audit methods and audit reports of building energy audits. In addition, the industry standards for energy auditing include the “Technical Guidelines for Energy Auditing of Public Institutions” and the “Regulations for Energy Auditing of Energy-using Units”.

3.4. The procedures of enterprise energy audit

3.4.1. Audit preparation stage
In the preparatory stage, the audit institution shall understand the industry, main production and operation scope and basic energy consumption of the audited entity, and accordingly organize auditors to set up a special energy audit group, define the division of labor of each member and formulate the energy audit plan of the enterprise.

3.4.2. Audit implementation phase
The implementation phase of the energy audit is mainly to conduct on-site audits in enterprises. Collect energy audit data of enterprises by consulting relevant energy consumption data, inventory checking, on-site inspection, interviewing key personnel, and conducting on-site testing.

3.4.3. Audit report phase
In the audit report stage, the collected audit data is collated and analyzed, and an energy audit report is prepared. The energy audit report should include the basic information of the company, the energy management of the enterprise, the energy consumption of the enterprise, the analysis of the energy saving potential of the enterprise and the audit conclusions.

3.5. The content of enterprise energy audit

3.5.1. Auditing the energy management of enterprises
Conducting enterprise energy audits, one of the main audit contents is to audit the energy management of enterprises. Auditing the energy management of enterprises mainly focuses on two aspects: first, paying attention to the establishment of enterprise energy management institutions and energy management systems; second, paying attention to the establishment of energy management systems in terms of procurement, approval, production, measurement, and archives storage.

3.5.2. Auditing the energy consumption of enterprises
The actual energy consumption of enterprises is the focus of energy auditing. During the audit process, the auditors need to audit the total amount of energy consumed, the type of energy, and the energy consumption per unit of product in the production and operation process of the enterprise. Then, the auditors need to check the use of the production equipment of the enterprise to verify whether there is a situation in which the use of the state prohibits or eliminates the use of energy-consuming equipment.
Finally, auditors also need to review related book records such as energy purchases and consumption to verify energy consumption.

3.5.3. Auditing the conversion of new and old kinetic energy of the enterprise
In the high-quality development stage of national economic growth, tapping the potential of new production factors and upgrading old kinetic energy are important concerns of energy auditing. In the audit process, the auditors shall review the rationality of the new and old kinetic energy conversion plans formulated by the enterprise based on the industry development status and prospect analysis data made by the enterprise, and audit the conversion efficiency of the new and old kinetic energy of the enterprise according to the implementation progress of the plan.

4. Conclusions and recommendations
Carrying out enterprise energy audit work under the background of new and old kinetic energy conversion is not only conducive to the country’s energy management, but also helps enterprises to improve their comprehensive quality and achieve sustainable development of the country and enterprises. In order to better implement enterprise energy audit work in this context, we propose the following recommendations.

4.1. Improve the energy audit system
At this stage, the energy audit implemented in China is still mainly based on the energy situation of the government or large state-owned enterprises. The energy audit system is still not perfect. We should gradually improve the energy audit system jointly implemented by the national energy auditing agency, the social energy auditing institution, and the internal energy auditing department of the enterprise. The national energy auditing agency audits the energy situation of the government or large state-owned enterprises. The social energy auditing institution and the internal energy auditing department of the enterprise mainly conduct energy audits on enterprises. It is recommended that the energy audit work be transformed into a regular audit work like the financial statement audit.

4.2. Improve energy audit evaluation standards
At present, major energy-consuming industries such as petroleum, chemical, and construction have issued their own energy auditing specifications. It is suggested that other energy consumption industries will gradually establish their own industry audit specifications, and incorporate evaluation criteria for assessing the conversion of new and old kinetic energy in the industry audit specifications, and improve China’s energy audit evaluation standards.

4.3. Keep up with the times and update the audit methods
Energy auditing is different from financial statement auditing. Its auditing content is special. In the auditing process, it is necessary to combine the characteristics of energy consumed by each enterprise, and it can also be combined with financial auditing methods such as inventory checking. In the era of big data, energy auditing can also be combined with modern auditing techniques and electronic data auditing.

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