Research on Energy Accounting under Energy Conservation and Emission Reduction Policies

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Abstract. In recent years, the rapid growth of the national economy come at the expense of the environmental problems and the resource crisis. Conserving energy and reducing emissions has received more and more attention to help economy achieve sustainable development. More and more countries and companies has been beginning to realize the importance of energy accounting. The paper begins by stating the definition of energy accounting. The accounting content of energy accounting are then listed and discussed, and energy accounting information disclosure is discussed. The necessity of establishing energy accounting under the current situation is analysed. Finally, the paper puts forward the opinions and suggestions for establishing a sound energy accounting system.

1. Scientific cognition of energy accounting

1.1. Energy Accounting
As a new branch of enterprise accounting, energy accounting comprehensively applies the theories and methods of economics and accounting. Environmental accounting guided by energy conservation and emission reduction targets, with currency as the main unit of measurement, and related energy laws and regulations as the main basis. It confirms, measures and reports on energy conservation and pollution reduction activities of enterprises, so as to achieve the purpose of coordinating economic development and environmental protection.

1.2. Accounting content
Energy accounting mainly accounts and measure for the management and control of energy costs, the expenditure of prevention and treatment of pollutants, and the benefits of energy conservation and emission reduction. Through accounting, companies can be encouraged to pay great attention to environmental and social benefits while focusing on economic benefits.
### Table 1. Specific contents of energy accounting

| Project                                           | Specific contents                                                                 |
|--------------------------------------------------|-----------------------------------------------------------------------------------|
| the management and control of energy costs       | Control the energy consumption cost of enterprises through technology, equipment and capital investment and advanced management to achieve energy conservation purposes |
| the expenditure of prevention and treatment of pollutants | To understand the social, environmental and economic benefits of the company through the control of energy costs and the input of pollutants |
| the benefits of energy conservation and emission reduction | The economy invested in the management and prevention of pollutants, such as environmental governance, environmental compensation and environmental development. |

1.3. The disclosure of energy accounting information

The disclosure energy accounting information is a further extension of the company's daily energy accounting. It can be disclosed in the current financial report, or it can be compiled into separate reports. Enterprises need to disclose energy assets, energy depreciation, consumption of environmental protection fees, environmental resource tax, energy income, energy expenditure, etc., and can also add an energy loss report form, which specifically indicates the energy consumption and income of enterprises. For energy-related matters that exist objectively or may occur but are difficult to measure in monetary terms such as pollutant emissions and recycling of waste products, the enterprise should explain in the notes to the financial statements.

2. The necessity of establishing energy accounting

2.1. Energy crisis and environmental pressure is receiving increased attention in the recent times

Energy is the most prominent source of economic development and is vital to sustaining a modern society and economy. But with the economic development and population growth, energy crisis and environmental pressure are becoming more and more serious.

In the world's primary energy consumption in 2018, oil ranked first, accounting for 31%; second, coal, accounting for 26%; third, natural gas, accounting for 23%. The total of three traditional fossil energy sources accounts for 80% of the world's total primary energy consumption in 2018.

![Figure 1. The composition of the world's primary energy consumption in 2018](image-url)
More importantly, compared with 2000, the proportion of oil, coal and natural gas in the world's primary energy consumption has not changed. The proportion has remained at 80% after 19 years, of which only oil. The proportion fell by 5 percentage points, but the proportion of coal increased by 3 percentage points, and the proportion of natural gas increased by 2 percentage points.

Table 2. Comparison of world disposable energy consumption between 2000 and 2018

|            | Biomass and waste | Hydro | Nuclear | Natural Gas | Oil | Coal | Others (Renewables) |
|------------|------------------|-------|---------|-------------|-----|------|---------------------|
| 2000       | 10%              | 2%    | 7%      | 21%         | 36% | 23%  | 1%                  |
| 2018       | 10%              | 3%    | 5%      | 23%         | 31% | 26%  | 2%                  |

This means that the energy consumption of world is still in the era of traditional fossil energy today. Oil, natural gas and coal are currently the main sources of energy for human consumption. There will still be a long way to go to realize the good wishes of changing the world’s energy consumption structure. Therefore, many countries are actively adopting energy conservation and emission reduction policies. Enterprises are the main force of energy consumption, and therefore, they have to be duty-bound to become the main force of energy conservation and emission reduction. As an important part of economic management, the function of accounting is to reflect, monitor and participate in decision-making. Therefore, it is necessary to combine energy issues with accounting issues to construct a complete theoretical system for energy accounting. On the one hand, development and implementation of energy accounting can get information on energy consumption of enterprises so that relevant data emission reduction targets of more scientific and reasonable and a more comprehensive energy conservation plan can be formulated, and a more reasonable energy saving and emission reduction targets can be arranged. On the other hand, the situation of sacrificing ecological resources in exchange for economic growth can be changed, and the coordinated development of environmental protection and economic growth can be promoted, which is conducive to the healthy development of national economy and the establishment of a resource-saving and environment-friendly society.

2.2. The establishment of energy accounting is important for companies to establish a good image and improve their competitiveness

At present, some enterprises have high energy consumption and wanton discharge of pollutants. They emit pollutants into the atmosphere and rivers without treatment, which will not only affect the economic benefits of the enterprise, but also damage to the brand benefit and will be condemned by all circles. More serious cases may be subject to government punishment or even be banned. In addition, in the context of the accelerating process of economic globalization, if enterprises fail to deal with energy and environmental issues, they will be eliminated in the trend of economic globalization. Therefore, enterprises should establish and improve energy accounting system, which will help companies monitor energy consumption better and implement energy conservation and emission reduction measures better. At the same time, companies can control the consumption of energy costs, to minimize the cost in exchange for the best interests of the enterprise. The establishment and improvement of the energy accounting system is conducive to the company's all-round balance of
production and business activities. Enterprises no longer only consider direct production costs, but consider all aspects of production costs, environmental governance costs, resource utilization, etc., which can effectively promote corporate accounting processing to become more rational, scientific and objective.

2.3. The disclosure of energy accounting information can meet the needs of different users
Due to the diversified development of the economy, the information users’ requirements for corporate information are gradually diversified. Government departments should not only master the capital strength of enterprises, but also know the work of enterprises in energy conservation, emission reduction and environmental protection. In addition to assessing the economic strength of enterprises, the creditors and investors of enterprises should also consider the ability of enterprises to use and protect resources such as environment, ecology and energy, so as to comprehensively measure the efficiency and efficiency of profit creation. Corporate customers also want to know whether their products are “green products” by obtaining energy accounting information.

3. Advice on establishing and improving the energy accounting system

3.1. Establish a sound and relevant legal system and formulate energy accounting standards
In the background of Low-carbon economy and energy conservation and emission reduction, the first step in developing energy accounting is establishing and improving laws and regulations on energy conservation and emission reduction, formulating accounting systems and guidelines related to energy accounting, establishing the authority of energy accounting in the form of laws and regulations, and incorporating environmental and economic factors into the current accounting elements. Through the improvement of relevant laws, the government can get rid of short-term profit-driven mechanism to discourage businesses use energy accounting, increase the punishment enforcement of energy waste. At the same time, relevant laws and regulations can cause more concern for the public, and supervision and opinion of public will also play a positive role in the construction of corporate energy accounting system. The establishment of unified norms and standards for enterprise energy accounting treatment can provide a basic support for enterprises to formulate a comprehensive energy system, which is convenient for enterprises to make better and more appropriate decisions for themselves and the interests of society. Relevant departments should let the responsible persons of high-energy-consuming industries, accounting industry experts and scholars, and people from all walks of life publish their opinions and suggestions on energy accounting fully in the process of developing policies and rules.

3.2. Strengthen energy accounting theory research and empirical research
Some countries have made certain achievements in energy accounting research and applied it to practical operations. However, the lack of standardized, scientific and unified norms and standards is not enough to provide sufficient basis for enterprises to implement energy accounting. Therefore, the theoretical basis of energy accounting should be improved. It is important to strengthen the study of the practicality of energy accounting, which can a better accounting of energy services in the community to play its due role. Relevant departments can organize experts and scholars from universities to explore the theory and practice of energy accounting, take actual high-energy-consuming enterprises as models, conduct empirical investigations, and promote the research results in relevant enterprises.

3.3. Cultivate professional talents and improve the professional level of accountants
In order to establish a sound energy accounting system, enterprises must have a good team of accountants. Only by strengthening the professional understanding of accountants on energy accounting can we ensure the development and growth of energy accounting. Energy accounting is a new branch of accounting science. It is an interdisciplinary subject integrating accounting, resources,
environment, society and law. This requires energy accountants not only to have solid accounting expertise, but also to understand relevant economics and energy and environmental knowledge. Therefore, accounting firms and major universities should focus on the training of professional talents, so that they can reserve certain energy and environmental knowledge on the basis of familiarity with accounting skills and economic management knowledge. The field of energy accounting should be set up in the accounting profession in colleges and universities, and elective courses in other branches of energy accounting and social responsibility accounting should be established. At the same time, the teachers in related fields should be trained to make students recognize energy conservation and emission reduction, and lay a good foundation for the company to carry out energy accounting. In addition, related companies should also strengthen the training of energy accounting. Accountants also have the responsibility and obligation to improve their professional level.

4. Conclusion
To sum up, with resource crisis and environmental pollution, energy conservation and emission reduction becomes a new choice for future economic development, which is a kind of social responsibility of enterprises, but also a self-rescue way in the increasingly serious environmental crisis of mankind. With the global awareness of energy and social responsibility to our planet it was inevitable that energy accounting would occur. Relevant departments can help enterprises establish a sound energy accounting system by improving relevant laws and regulations, strengthening the practical theoretical research of energy accounting, and strengthening the training of professionals. The implementation and development of energy accounting has a long way to go. Through the improvement of energy accounting, enterprises are encouraged to cooperate with the promotion of sustainable economic development, thereby achieving the goal of energy conservation and emission reduction.

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