Research on Coordinated Development Evaluation Index System of Power Grid Enterprise

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Abstract

Power grid enterprise's sustainable development is very important to China's power industry sustainable development. The basic requirement is that power grid enterprises should first realize coordinated development. This paper gives the definition of power grid enterprise's sustainable development, and the whole index system is considered from internal and external aspects. The internal aspect includes the consistent target of departments' goals and the overall enterprise's goal, employees' satisfaction, clarity of responsibilities, smooth communication and harmony culture, and the external environment includes the political, economic, social and environmental development. The evaluation index system is a hierarchical evaluation system. It can give a good reference for power grid enterprise to realize sustainable development.

Keywords: Power grid enterprise, Coordinated development, Evaluation, Index system

1. Introduction

In the past few years, China's power industry has undergone dramatic changes. The rapid economic growth causes the electricity demand growing and the generations as well as power grid construction has also expanded and developed in large scale. However, from the scientific development concept perspective, the rapid construction is not conducive to the long term sustainable development. Therefore, How to control the rapid construction and realize the sustainable development is an important problem of the power industry. The grid enterprise is an important part of the power industry, and the power grid enterprise's sustainable development is the first task of the power industry's sustainable development.

There are a few researches about regional economy and environment coordinating development of electric industry. Zhang (2001) studies the electric power industry and external environment coordinated development problem, Shang (2007) considers both security and economic context to establish a framework of the power system optimization scheduling theory. Zeng (2004&2006) studies the coordination between the generation and transmission planning problem from a power system plan perspective. Huang (2004) studies the whole electricity supply chain's resource integrated planning problem. These literatures focus on the macro level, which are lack of practical feasibility. In fact, to realize the concept of coordinated development needs to start from the bottom, in other words, it need considering a specific power grid enterprise's situation. This paper first gives the connotation of coordinated development of power grid enterprise, and then built an evaluation index system in order to provide an evaluation tool to achieve sustainable development of a power grid enterprise.

2. The connotation of the coordinated development of power grid enterprise

As an important component of electric industry, power grid enterprise plays an important role in national economy development and social progress. For a single power grid enterprise, it forms a complete system with the local social, environmental, energy and economic. The power grid enterprise needs coordinated develop with these subsystems. This is the only way to promote local economic sustainable development.

In addition, the coordinated development of power grid enterprises should also take into account itself coordinated development. Power grid enterprise itself is a system that insists of infrastructure department, financial department, the personnel department, sales department and so on, and these subsystems interact with each other. Only these subsystems coordinated development can achieve the power grid enterprise's sustainable development.

From the above analysis can be summarized that in the definition of coordinated development of power grid enterprises: in order to achieve the goal of sustainable development under the guidance of the power grid enterprises, it need coordinate the subsystems relationship among each other and the relationship between power grid enterprise and external environment to achieve a virtuous circle of the power grid enterprise. This definition

can conclude that the coordinated development of power grid enterprises mainly includes two aspects as follows:

(1) Inside coordinated development

The inside coordinated development refers to that in accordance to the power grid enterprises overall goals and guiding principles, all the departments within the enterprise can integrated as a good communication mechanism, information transmission mechanism, user-friendly management system and harmonious working environment and so on in order to achieve the sustainable development.

(2) Outside coordinated development

The outside coordinated development refers to that the development of the power grid enterprise must meet the needs of local economic development, pollution in a reasonable range while don't affect the lives of local residents, and can improve the quality of life of local residents. Furthermore, the construction of power grid development plan needs to keep pace with the local nature of regional planning.

3. Coordinated development evaluation index system

3.1 The coordinated development evaluation indicators

Many companies' internal coordination is not smooth, especially for large companies. When a sector needs other departments' support, most people feel very busy and produce a passive attitude. Power grid enterprise has the same problems. To achieve sustainable development, it must realize the inside coordinated development at first. The evaluation indicators mainly conclude a few aspects as follows.

(1)The consistent target of departments' goals and the overall enterprise's goal

Power grid enterprise should design a whole target, so that departments should not only achieve their own goals, but also give the benefit of other departments goals. When the departments' goals are different with the overall target, the departments should consider the overall goals, which is required for the coordinated development.

(2) Internal employees' satisfaction

Now most of the enterprises attach great importance to their external customers, but for some internal departments such as general management, accounting, human resources and IT departments, there should also have customer-oriented concept. Power grid enterprise should survey employee satisfaction in these departments. The results directly reflect the harmony of the internal employees and the coordinated development.

(3) Clarity of responsibilities of various departments

If responsibilities of various departments within a power grid enterprise are not clear, it will lead to problems in its operations. This is very detrimental to the sustainable development of enterprises.

(4) The smooth flow of communication channels

If channels of communication flow are not smooth, it will cause asymmetric information problem, which will also bring a negative impact and affected the normal operation of the enterprise. This is not conducive to the harmonious and sustainable development of a power grid enterprise.

(5) Harmony enterprise culture

Harmony culture refers to an overall business environment which forms a certain reflected traditions, customs and behavior of the spirit of the style. Enterprise culture is invisible and infects all members' movement patterns. The so-called harmonious enterprise culture refers to that the internal and external business between the various elements is in harmony, stability, and orderly condition, which is fundamental for the sustainable development.

3.2 The coordinated development evaluation indicators of outside power grid enterprise

3.2.1 Political indicators

It is closely related between the government policies and power grid enterprises to achieve sustainable development. The political indicators of power grid enterprises are as follows:

(1) Electricity price policy

In current electric market environment, the grid price and selling price are usually determined by the state or local regulations. They are directly related to the profit level of the power grid enterprises. In the future market environment, how to determine the grid price is closely related to the future revenue of power grid enterprises.

(2) Tax policy

Generally speaking, power grid enterprise is one of the big taxpayers in a region. In order to increase local

government revenue, the government always encourages the development of large enterprises and makes some benefit tax policy of power grid enterprises, which is conducive to the power grid enterprises' sustainable development.

(3) Market trading policy

Current electricity market reform has made some achievements, but the gap from the real competitive market is also very far from the future electricity market reform. The reform will be further promoted. In the future, how to settle the market trading price will directly affect the sustainable development strategy of the power grid enterprise.

3.2.2 Economic indicators

Power grid is an important part for the national economy development. Grid development needs meet the requirement of national economic development. The economic indicators of power grid enterprises coordinated development include the following aspect:

(1) Electricity consumption elasticity

Electricity consumption elasticity refers to the ratio of energy consumption growth and the national economic growth, which is also named as energy consumption elasticity. Energy consumption growth is expressed by the generation growth rate and the national economic growth and also named as GNP. This index can reflect the power grid enterprises development.

(2) Unit GDP power consumption

Unit GDP power consumption reflects the efficiency of energy production. Power developments not only remain in the initial stage of economic development, but also promote the energy efficiency and contribute to the national economic structure, promote to the high value-added industries.

(3) Coordinated with GNP

Power grid enterprises should meet the local economic development on electric power and energy requirements, it is necessary to meet not only the current needs, but also the future economic development so as to provide sustainable, adequate and reliable energy.

3.2.3 Social indicators

State grid presents a social responsibility goal called "Develop Corporation, Serve Community". Power grid enterprises development should meet people's demand for electricity, and the construction of power grid enterprises can promote the development of related industries. The construction needs lot of labors, materials and financial resources. In this paper, the pulling capacity of the building materials industry, the pulling capacity of the building labor industry and employment contribution rate are the three aspects considered to evaluate the driving ability. The pulling capacity of the related industry can be calculated by output power value divided output value, and the employment contribution rate can be employed by power related employment divided total employment.

3.2.4 Environment indicators

Power grid development is beneficial to improve energy consumption in the proportion of total energy consumption, while power is good, clean, efficient, convenient energy without secondary pollution, which will also help increase the proportion of reduction in air pollution caused by the direct combustion of coal. Therefore, the environment evaluation indicators of coordinated development are as follows:

(1) Unit CO_2 emissions

Unit CO_2 emissions is equal to total CO_2 emissions divided total power generation.

(2) Unit others gas emissions

Unit others gas emissions is equal to total gas emissions minus CO_2 emissions divided total power generation.

(3) Clean energy generation rate

Power grid development is beneficial to promote the optimal allocation of resources. Increasing clean energy ratio in power generation will reduce CO_2, SO_2 and other gases and solid waste emission, which is conducive to power grid enterprises' sustainable development.

The coordinated development evaluation index system of power grid enterprise is shown in table 1.

4. Conclusions

(1) The coordinated development of power grid enterprises should be considered systematically. This is a complex system which concludes the coordinated development of not only various internal subsystems, but also external environment. The two aspects together form the coordinated development of power grid enterprises.

(2) The coordinated development of power grid enterprises needs to consider the various factors. The internal aspect includes the consistent target of departments' goals and the overall enterprise's goal, employees' satisfaction, clarity of responsibilities, smooth communication and harmony culture, and the external environment includes the political, economic, social and environmental development. The evaluation index system is a hierarchical evaluation system.

Insert table 1 here.

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Table 1. Coordinated development evaluation index system of power grid enterprise

Objection level	Level1	Level 2	Level 3
Coordinated development of power grid enterprise	inside coordinated development	The consistent target of departments' goals and the overall enterprise's goal	
		Internal employees' satisfaction	
		Clarity of responsibilities of various departments	
		The smooth flow of communication channels	
		Harmony enterprise culture	
	outside coordinated development	political	Electricity price policy
			Tax policy
			Market trading policy
		economic	Electricity consumption elasticity
			Unit GDP power consumption
			Coordinated with GNP
		social	the pulling capacity of the building materials industry
			the pulling capacity of the building labor industry
			employment contribution rate
		environment	Unit CO_2 emissions
			Unit others gas emissions
			Clean energy generation rate

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