Research on Fixed Asset Management System for Power Grid Enterprises Based on Long Term Value Goals

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Abstract. As an important foundational industry related to national economy and people's livelihood, power grid enterprises have a single product structure and a large asset scale. Their unique industry attributes determine that they need to focus on the long-term sustainable development of the enterprise. Power grid enterprises have the characteristic of being capital intensive, with fixed assets accounting for a significantly higher proportion than other types of assets, but the profit margin and turnover rate of fixed assets are relatively low. The current fixed asset management of power grid enterprises pursues maximum profit (or EVA), which can easily lead to short-term behavior in the process of fixed asset management. In the long run, it is not conducive to continuously improving enterprise value. Therefore, how to improve the input-output efficiency of fixed assets in power grid enterprises, improve and optimize the management of fixed assets, implement scientific investment, and continuously enhance enterprise value have become key issues in fixed asset management of power grid enterprises. On the basis of analyzing the relationship between fixed asset management behavior and long-term value goals, this article proposes a fixed asset management system for power grid enterprises based on long-term value goals. Finally, the expected implementation effect of the fixed asset value management method was demonstrated through examples. Through this study, it is beneficial to enhance the value creation ability of fixed assets in power grid enterprises, overcome short-term behaviors in fixed asset management, and help power grid enterprises achieve the goal of maximizing enterprise value.

Keywords: Fixed asset management, Enterprise value, Power grid enterprises, Long term value goals

1 Introduction

Although power grid enterprises are typical capital intensive enterprises, the distribution of fixed assets presents a network like and dispersed characteristic. As fixed assets account for the vast majority of total assets, the management level of fixed assets is closely related to the development of power grid enterprises. In recent years, with the strengthening of power grid construction, the total amount and proportion of fixed assets investment of power grid enterprises continue to increase. How to improve the value creation ability of power grid

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enterprises' fixed assets and implement scientific management of fixed assets investment has gradually become an important issue in the research of power grid enterprises' fixed asset management [1-3].

Fixed assets are the most important assets of power grid enterprises, and the effectiveness of fixed asset management directly affects the management level of power grid enterprises [4-6]. Studying practical and feasible methods for managing fixed assets in the power grid and value enhancement strategies can help effectively enhance the contribution of fixed assets to enterprise value, standardize the company's value management work, and drive the improvement of the overall level of enterprise management. Deeply understanding the current situation of enterprise fixed asset management, determining asset value management objectives, and exploring value creation potential will help improve the lean management process, identify the value creation mechanism of fixed assets, and clarify the basis and purpose of fixed assets investment. While optimizing resource allocation, seek control models to maximize enterprise investment value and help achieve the ultimate goal of maximizing enterprise value [7-8].

Value management belongs to a value based enterprise management method. It is a comprehensive management system, which is an inevitable choice for the development of enterprise management in the current social era. It includes various elements such as control, budgeting, incentives, evaluation, and even culture. For the study of value management, it is first necessary to fully understand the relevant viewpoints held by different scholars.

The full lifecycle management and investment decision-making research are two key focuses of fixed asset research in power grid enterprises. In the research on the full life cycle management of fixed assets, Zhang Yinhong analyzed the problems in its management process, combined with the theory and methods of fixed asset full life cycle management, and proposed a new model for the full life cycle management of fixed assets in the power grid. Taking Shaanxi Electric Power Company as an example, Kang Xue proposed comprehensive methods from two aspects: management process and work time limit control, based on summarizing and analyzing the problems [11-13].

This article will be guided by the theories of enterprise value management and fixed asset management, exploring their application in power grid enterprises. Based on the analysis of the value characteristics and specific current situation of fixed asset management in power grid enterprises, clarify the composition of fixed asset value and the problems in current management. Based on long-term value goals, propose a new fixed asset value management method to improve the entire process management system of fixed assets. Through the study of the relationship between fixed asset management behavior and long-term value goals, a new classification of fixed asset management behavior based on this relationship is proposed. On the basis of the original fixed asset management methods, further improvement is made in asset inventory management, efficiency management, maintenance management, investment management, etc., to achieve full process value control from project generation, implementation to acceptance evaluation, Realize comprehensive value enhancement including current stock assets and future new assets, and enhance the ability to create value for fixed assets.

2 Overview of fixed assets and value management theory

2.1 The meaning and characteristics of fixed assets

Fixed assets are tangible assets held by enterprises for the production of goods, provision of services, rental, or business management, with a useful life exceeding one year and a high unit value. In addition, the determination of fixed assets should emphasize the following aspects: firstly, fixed assets create economic benefits, and the economic benefits created are highly likely to flow into the enterprise; The second is that fixed assets can be reliably measured; Thirdly, the service life of fixed assets exceeds one year.

It is precisely because fixed assets are a large category of assets, and the types and quantities are difficult to count, that the role played by fixed assets varies for different types of enterprises, requiring different methods and means of management. There are various ways to classify fixed assets, and they can be classified into three types based on their usage: unused, in use, and to be disposed of. It should be noted that assets in use include those that are in the maintenance process and those that are idle in the short term. According to the purpose of fixed assets, they are divided into two categories: non production and production. The fixed assets used by enterprises in the production process, such as machinery and equipment, that directly provide services for production, belong to the category of production use; Assets used for non productive projects, such as employee dormitories, food palms, etc., that are not directly related to production are classified as non productive fixed assets. According to property rights, fixed assets can be divided into two categories: enterprise owned and financing leased fixed assets. Enterprises not only have the right to use, but also have ownership of fixed assets, which belong to their own assets; The fixed assets obtained by enterprises through financing leasing, leasing and other methods belong to financing leasing fixed assets. These types of fixed assets only have the right to use, but do not have ownership, so they have no right to dispose of.

Fixed assets are the most important assets of power grid enterprises, exhibiting different characteristics. In order to facilitate enterprises to make the most scientific asset management decisions, it is necessary to carefully analyze the characteristics of fixed assets. Fixed assets have the following characteristics: fixed assets are tangible assets. Fixed assets, as the name suggests, are tangible goods, which is the biggest difference from intangible assets. Although intangible assets can produce products for enterprises, have a service life exceeding the accounting period, and meet other characteristics of fixed assets, they cannot be classified as fixed assets due to the lack of physical form. The asset has a long payback period. The scale of fixed assets investment is generally large, most of which are basic investments such as land purchase, plant construction or equipment purchase. Generally, they are large-scale investment activities of enterprises. Once implemented, the enterprise assets formed will often take several years or even longer to recover costs. Fixed assets investment is related to the direction of enterprise production and operation, and closely related to the future development of enterprises. The amount of funds occupied by fixed assets remains stable. After the completion of fixed assets investment, the amount of funds occupied is relatively stable in a certain period of time, and investment will not be increased or reduced in the short term. The production of enterprises is affected by seasonal or market conditions, and they often respond by expanding production or reducing production. Generally, they do not adjust production

activities by changing the scale of fixed assets. Of course, only when the environment faced by the enterprise changes significantly or the enterprise itself changes significantly, such as large-scale expansion, bankruptcy, shutdown and other phenomena, will the quantity of fixed assets investment change.

2.2 Related theories of fixed asset management

Fixed asset compensation generally adopts two modes: physical compensation and value compensation. Repairing and updating mechanical equipment, including technical modifications to ensure their support for the production process, is considered as physical compensation; Not providing physical supplements, but directly recording the cost of loss in accounting, and ensuring the calculation of the true value of fixed assets through depreciation, belongs to value compensation.

In fixed asset management, depreciation is the most widely used form of value compensation, and the choice of depreciation policy directly affects the quantity and time of value compensation. The repair of assets belongs to physical compensation, and the degree of repair and the interval between maintenance can also affect the efficiency of asset output, that is, the performance of fixed assets. How to highlight the true performance management status of assets and provide optimal compensation requires corresponding asset management mechanisms and systems, and the ability to timely and accurately grasp the use of assets in order to arrange compensation resources reasonably.

The management concept of full lifecycle cost is formed based on the planning of long-term benefits of fixed assets, combined with the concept of lean management. Optimize and manage the procurement, installation, use, maintenance, scrapping, and other aspects of the entire asset to reduce overall costs and achieve the ultimate goal of cost control. The lean management concept has been applied to scientifically define and segment the costs generated throughout the entire process of fixed asset management, with the aim of improving input-output ratio and optimizing management processes. Enterprises hope to achieve maximum benefits with minimal cost consumption, in order to achieve sustainable development. However, the focus of full lifecycle cost management is on controlling costs, and there is no practical guidance on how to improve the output efficiency of fixed assets.

Some calculation formulas used by power companies in fixed asset management. These formulas can help power companies better manage their fixed assets, improve asset utilization efficiency, and reduce maintenance costs. The following are some commonly used fixed asset management formulas for power companies:

$$X^* * (1 - Y^*)/Z^* = R^* \tag{1}$$

Formula 1 is the fixed asset depreciation formula, where X^* is the original value of the fixed asset, Y^* is the estimated net residual value rate, Z^* is the estimated useful life, and R^* is the annual depreciation amount.

$$X^* - L - T = V \tag{2}$$

Formula 2 is the fixed asset net value formula, where L is cumulative depreciation, T is impairment provision, and V is the fixed asset net value.

$$R^*/A^* * 100\% = S \tag{3}$$

Formula 3: Fixed asset utilization rate formula, where R^* is the actual usage area, A^* is the total area, and S is the fixed asset utilization rate.

$$W^*/(A+1) = S^* \tag{4}$$

Formula 4 is the fixed asset maintenance cost formula, where W^* is the total maintenance cost, A is the number of repairs, and S^* is the cost of each repair.

3 Fixed asset management system for power grid enterprises based on long-term value goals

3.1 The environment for system implementation

The programming platform for implementing the system is Visual Studio2008, and the database is SQL Server 2005,

Use C # for programming language.

(1) Visual Studio 2008 Development Platform

Visual Studio is a development environment launched by Microsoft. It is currently the most popular Windows platform application development environment. Currently, it has been developed to version 10.0, which is Visual Studio 2010. Visual Studio can be used to create Windows applications and network applications on the Windows platform, as well as network services, smart device applications, and Office plugins.

(2) SQL Server 2005 Database

Microsoft SQL Server 2005 is a comprehensive database platform that provides enterprise level data management using integrated business intelligence (BI) tools. SQL (Structured Query Language), also known as Structured Query Language. The main function of SQL language is to establish connections and communicate with various databases. According to ANSI regulations, SQL statements can be used to perform various operations, such as updating data in a database, extracting data from a database, and so on. The vast majority of popular relational database management systems adopt the SQL language standard. Even though many databases

Developed and extended SQL statements, but included Select, Insert, Update, Delete, Standard SQL commands such as Create and Drop can still be used to complete almost all database operations.

3.2 Implementation of basic information management

The basic information management module includes various basic data processing modules of this system, such as role information setting, permission information setting, salesperson information setting, customer information setting, supplier information setting, warehouse information setting, asset information setting, and so on.

The main functions of each submodule for basic information maintenance are as follows:

Switching user modules: Before entering the system, log in from the login interface. When logging in, multiple login roles can be selected to have different usage permissions;

Permission information setting module: The system administrator uses this module to perform relevant operations on the permission information of different users, that is, to correspond to each jump page based on the data in the backend database;

Salesperson Information Setting Module: System administrators use this module to perform related operations on salesperson information; Customer Information Setting Module: System administrators use this module to perform related operations on customer information, such as adding and deleting customer information;

Supplier Information Setting Module: System administrators use this module to perform related operations on supplier information, such as adding and modifying supplier information;

Asset Information Setting Module: System administrators use this module to perform related operations on asset information, such as modifying the description of asset information;

Warehouse information setting module: System administrators use this module to perform related operations on warehouse information, such as modifying the quantity of warehouses, etc;

Role information setting module: System administrators use this module to perform related operations on role information, such as modifying the corresponding role information;

3.3 System experiment

To verify the effectiveness and feasibility of the system, we conducted a series of experiments. The experimental results are shown in table 1:

Table 1. Asset Category Table.

Number	Experimental steps	Observing phenomena	Data record
1	User login	The user is able to successfully log in	Success
2	Asset Information Management	Information can be successfully added	Success
3	Asset acquisition management	The claim information can be successfully added	Success
4	Asset scrapping management	Scrap information can be successfully added	Success
5	Asset maintenance management	Repair information can be successfully added	Success

Logic functional testing is used to test the logic of a system, mainly targeting the business logic and operational logic of the system. The operation logic check mainly includes: page link check, relevance check, checking whether the function of the button is correct, information duplication, checking deletion function, etc. Taking system login testing as an example, as shown in table 2, describe the functional testing process of this system.

Table 2. Functional testing.

ID	20110607004	Name	System Login
Use case description	System login Enter the system with a valid username and password Page information includes: Page background display User name and password input interface, login system interface after inputting data		
Use case entry	Open IE and enter the corresponding address in the address bar to enter the login page of the system		
Test Case ID	Scene	Testing procedure	Expected results
TC1	Initial page display	Enter from the entrance of the use case	Design consistency
TC2	User name input verification	Enter an existing user	Admin input successful
TC3	Password entry	Enter data associated with username	Input successful
TC4	System login	Click the login button	Successfully logged into the system

The performance metrics for a workflow management system include whether the workflow model meets performance requirements, throughput, average turnaround time, resource utilization, and more. The system was performance-tested using LoadRunner 7.6.0.5, and the results are shown in the figure 1 below:

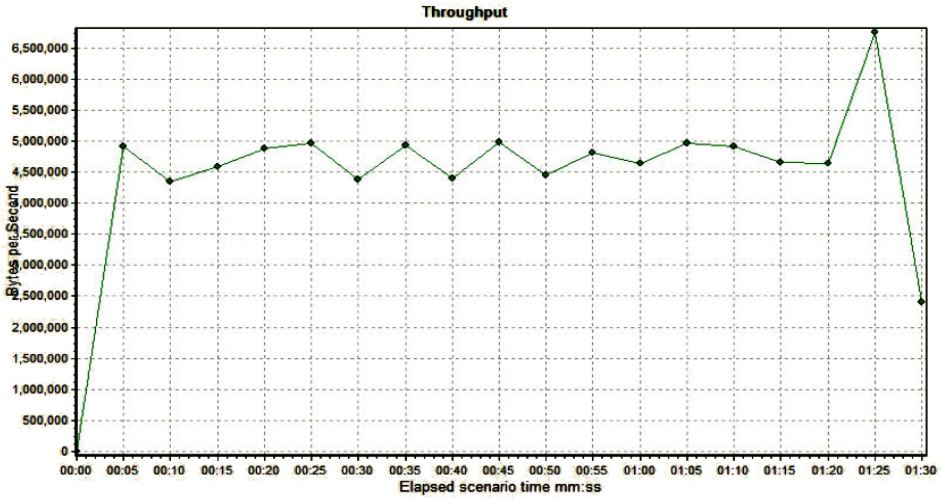

Fig. 1. Performance test result chart.

The above test results show that the stability of this system can effectively manage power asset management.

4 Conclusion

The current fixed asset management of power grid enterprises pursues maximum profit (or EVA), which can easily lead to short-term behavior in the process of fixed asset management. In the long run, it is not conducive to continuously improving enterprise value. Therefore, how to improve the input-output efficiency of fixed assets in power grid enterprises, improve and optimize the management of fixed assets, implement scientific investment, and continuously enhance enterprise value have become key issues in fixed asset management of power grid enterprises. On the basis of analyzing the relationship between fixed asset management behavior and long-term value goals, this article proposes a fixed asset management system for power grid enterprises based on long-term value goals. Finally, the expected implementation effect of the fixed asset value management method was demonstrated through examples. Through this study, it is beneficial to enhance the value creation ability of fixed assets in power grid enterprises, overcome short-term behaviors in fixed asset management, and help power grid enterprises achieve the goal of maximizing enterprise value.

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