Research on Depreciation Policy of Fixed Assets in Power Grid Enterprises at Home and Abroad

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Abstract. In the context of a new round of electricity market reform, fixed asset pricing depreciation has become an important factor affecting transmission and distribution pricing, which directly affect the allowable income of power grid companies. In order to further understand the impact of depreciation policies, this paper is based on the comparative study of depreciation policies in developed countries and domestic countries and summarizes the outstanding characteristics of depreciation policy regulations and implementation processes, and compares the impact of domestic financial depreciation and pricing depreciation methods on cost supervision. Therefore, the calculation model of depreciation expense under different depreciation methods is established to provide reference for the depreciation strategy of fixed assets of power grid enterprises.

Keywords: Depreciation Of Fixed Assets · Transmission And Distribution Price Reform · Cost Monitoring

1 Introduction

The power industry is an important pillar of our country's economic development, and its huge fixed assets such as power equipment provide strong support for domestic consumer electricity consumption and production supply. According to the Measures for Supervision and Examination of Transmission and Distribution Pricing Costs, depreciation is an integral part of transmission and distribution pricing costs. In recent years, regulatory agencies have pointed out that depreciation costs account for a high proportion of permitted costs, which has become an important factor affecting the electricity price of enterprises [3]. Therefore, it is of great practical significance to discuss the depreciation policy of fixed assets of power grid enterprises for enterprise asset management and development planning.

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2 Depreciation Method

There are usually two types of depreciation methods for fixed assets, one is the straight-line method, and the other is the accelerated depreciation method. Our country's accounting standards stipulate that there are generally three depreciation methods for enterprises to choose from, which are the average life method, the workload method and the accelerated depreciation method.

The straight-line method means that the accrued depreciation of fixed assets is evenly distributed over its expected useful life, with equal depreciation in each period. This method is relatively simple in practice and has a wide range of applications. However, it can be seen from the calculation formula that it ignores the impact of intangible losses on assets during the use of assets. The workload method refers to calculating the depreciation amount accrued each period according to the workload of the fixed assets. This method fully takes into account the importance of asset use intensity, but also ignore the impact of invisible losses over time. The accelerated depreciation method includes the double declining balance method and sum of years method. The double declining balance method calculates the depreciation amount using the net fixed asset value and double straight-line depreciation rate. The sum of years method multiplies the balance of the original value of the fixed assets minus the estimated net residual value by the depreciation rate to determine the depreciation amount for each period. The accelerated depreciation method can help enterprises to quickly realize value recovery and reduce the risks caused by intangible losses, but to a certain extent, it affects the early-stage profit assessment of enterprises.

3 Comparative Analysis of Depreciation at Home and Abroad

3.1 Depreciation Policy Comparison

After years of development and practice, the depreciation policies of developed countries in foreign countries have become mature and have positive effects in promoting enterprise development and increasing investment activities. The domestic fixed asset depreciation policy is in the stage of continuous development and improvement, and the relevant regulations on improving the depreciation rate of enterprises are relatively complete. However, compared with developed countries, the domestic depreciation policy cannot fully meet the needs of industrial transformation.

The difference between the two depreciation policies is mainly manifested in three aspects. The first aspect is the choice of depreciation method. Foreign developed countries have greater autonomy in choosing depreciation methods, and can freely choose depreciation methods according to their own characteristics, which cannot be changed after confirmation. However, domestic enterprises are limited by the scope of application of accelerated depreciation when choosing depreciation methods, and cannot easily realize investment planning in the early stage of investment. The second aspect is the minimum depreciation period of fixed assets. The equipment update cycle of domestic enterprises is 9–10 years, while the foreign cycle is about 7 years. The long depreciation period in China means that the frequency of enterprise renewal of assets is low, and the low-level equipment technology cannot meet the needs of social development in time,

Table 1. Comparison of controlled depreciation period of transmission and distribution assets at Home and Abroad.

Project	Domestic depreciation period	Foreign depreciation period
transmission line	16–38	25–55
Substation equipment	18–33	20–45
Distribution lines and equipment	18–33	20–50
Automation equipment and instrumentation	8	15
Communication lines and equipment	8	15–20

which is not conducive to the renewal of enterprise production capacity. The third aspect is the incentive policy. In order to further promote the effective value of depreciation policy in enterprises, foreign governments use a series of preferential policies and regulations to encourage enterprises to invest and achieve technological progress. However, domestic policies and regulations in this area are relatively weak, the actual situation of small and medium-sized enterprises is ignored in the implementation of the policy, and there is a lack of more complete incentive policies [4].

3.2 Comparison of Pricing and Depreciation for Electric Power Enterprises

In 2019, the "Measures for Supervision and Examination of Transmission and Distribution Pricing Costs" defined the definition of transmission and distribution pricing depreciation fees, which refers to the expense accrued for the fixed assets related to the power transmission and distribution business according to the depreciation method and period stipulated in these Measures. Judging from foreign experience, countries basically use the straight-line method to depreciate power transmission and distribution assets, but the provisions on the depreciation period are different. Comparing the data on the depreciation life of power transmission and distribution assets in developed countries at home and abroad, it can be found that the foreign depreciation life is higher than the current level in my country.

Comparing the depreciation period and return on equity at home and abroad, it is found that the depreciation period of fixed assets in foreign developed countries is generally high, but the return on equity investment is generally higher than that in my country, and they have flexible fixed asset depreciation policies. For example, in Australia, when the occurrence of future economic stranding is predicted, accelerated depreciation can be used at any time to compensate for asset risk, and its regulators can issue early warnings to reduce the risk of stranded investments. The United States has passed legislation to make up for the insufficient investment of power grid companies. In 2005, the New Energy Act was passed to reduce the depreciation period of power grid assets to stimulate local power grid investment and development.

Table 2. Foreign regulated returns.

Country	Return on equity(%)	Business type
USA	13.5	Transmission line
U.K	7.0	Transmission line
U.K	7.5	Distribution network
Australia	11.96	Transmission line
Canada	9.5	Tntegration
India	14	Transmission line

There are two main reasons for the large difference in the pricing depreciation rates of domestic and foreign power grids. One of them is the life limit of grid assets. On the one hand, foreign manufacturing technology and industrial technology developed earlier, and the quality of product production at this stage is slightly higher than that of domestic equipment. At the same time, the harshness of the early operating environment of domestic equipment will have a negative impact on the use of equipment to a certain extent, and eventually lead to the physical life of domestic equipment is lower than that of foreign countries. On the other hand, from the perspective of technical life, the rapid development of economy and technology promotes the replacement of low level equipment and the elimination of high energy consumption equipment [1]. The second is the economic growth rate requirement. Compared with foreign developed countries, China's GDP growth rate has been at a relatively high level, and the economic development rate is more than twice the average of other countries in the world during the same period. This process requires a large amount of effective investment to play an active role. According to 2020 data, the investment in power grid fixed assets accounts for more than 20% of the average annual net fixed assets. In western developed countries, due to the relatively stable economic growth rate and relatively slow power grid development, the fixed asset investment in the power grid generally accounts for less than 10% of the yearbook's net fixed assets. This is also the main reason why the foreign depreciation rate of fixed assets is generally low when the return on equity investment in foreign countries is generally higher than that in my country.

4 The Impact of Depreciation Policy on Cost Monitoring

In 2015, the issuance of the power transmission and distribution pricing cost supervision and examination method marked that the state's cost supervision of power grid enterprises has entered a new stage of scientific supervision and institutional supervision. According to the document, the current depreciation supervision policy is uniformly determined nationwide by the National Development and Reform Commission, and the depreciation period is determined according to the asset class and voltage level classification. Among them, the pricing depreciation rate of the existing transmission and distribution fixed assets (formed before January 1, 2015) is uniformly determined according to the median depreciation period stipulated by the State Grid Corporation.

The newly added fixed assets of power transmission and distribution (formed after January 1, 2015) shall be determined according to the median depreciation period of the fixed asset classification pricing determined by the National Development and Reform Commission.

In the actual management process, the power grid company will adjust the calculation method of the actual depreciation period and depreciation rate within a reasonable range. For example, Hubei adjusted depreciation strategy in 2018 in order to adapt to the policy supervision requirements under the new situation, which can strive to extend the depreciation life of some assets and gradually converge to the direction of the pricing depreciation life. However, the current financial depreciation period of hubei is slightly lower than depreciation period stipulated by pricing supervision. In order to further clarify the impact of different depreciation methods on actual depreciation benefits, this study will compare the calculation methods of financial depreciation benefits and pricing depreciation benefits. Suppose that t(t = 1,2,3…) represents the useful life of a certain type of asset by the end of 2020, a_t(t = 1, 2, 3 · · · · · ·) represents the stock asset value of the asset with different useful life before 2015, b_t(t = 1, 2, 3 · · · · · ·) represents the value of stock assets with different useful lives from 2015 to 2020, c represents the median value of pricing depreciation stipulated by State Grid Corporation before 2015, f represents the median value of pricing depreciation determined by the National Development and Reform Commission after 2015. Based on the above conditions, calculate the depreciation expenses that can be accrued for certain types of assets in 2020.

The pricing depreciation expense y_1 is calculated in two parts:

$$y_1 = y_m + y_n = \sum_{t=1}^{c} a_t \frac{0.95}{c} + \sum_{t=1}^{d} b_t \frac{0.95}{d}$$

The formula for calculating financial depreciation expense y_2 is as follows.

$$y2 = \sum_{t=1}^{f} (a_t + b_t) \frac{0.95}{f}$$

Generally speaking, f < c < d, after a certain type of asset is fully accrued according to financial depreciation, the asset changes to an overaged state, but its useful life does not reach the priced depreciation life. In the stage of f < t < d, the depreciation of assets cannot be included in the effective cost, which in turn affects the approval of electricity prices. Increasing the financial depreciation period of assets cannot directly solve this problem. Although it can increase the original value of the effective assets verified by the company during the cost supervision and audit, at the same time, the reduction of the depreciation rate will comprehensively reduce the financial depreciation expense of the assets.

The choice of the depreciation method of fixed assets affects the investment, cash flow, capital utilization efficiency and other aspects of the enterprise. When determining the depreciation strategy, foreign experience cannot be simply borrowed directly, and the market value, time value, depreciation rate, return on assets, profit model, etc. of the enterprise are included in the comprehensive judgment of influencing factors to maximize

the benefits. Therefore, the planning of depreciation strategy should be improved from its multi-dimensional evaluation index and flexibility, which can effectively help power grid enterprises to carry out scientific asset management [2, 5].

5 Conclusion

The importance of power grid fixed asset depreciation in cost pricing puts forward higher requirements for fixed asset management. Based on the comparative analysis of depreciation policies at home and abroad, it will further provide guidance for the selection of depreciation method and depreciation period. Combined with the analysis of the impact of depreciation strategy on cost supervision and audit, the following suggestions are put forward for the formulation of fixed asset depreciation policy.

Firstly, it is necessary to improve the flexibility of the depreciation policy based on the actual situation of the enterprise. Combining the national conditions and types of enterprises, while building a competitive environment in the electricity market, it provides more flexible depreciation policies for different types of private enterprises, superior companies, state-owned enterprises, etc., which is conducive to promoting enterprise asset management and improving investment enthusiasm.

Secondly, it is necessary to improve the incentive rules of depreciation policy for the purpose of promoting the implementation of depreciation. During the implementation of the depreciation policy, the establishment and improvement of incentive policy implementation measures for energy-saving and emission-reduction assets and small and medium-sized enterprises will help reduce the burden on enterprises, improve the efficiency of resource utilization, and further stimulate investment vitality.

Finally, it is necessary to use multi-dimensional indicators as a reference to strengthen the dynamic nature of depreciation policies. Enterprise depreciation methods and finance interact with each other. In the selection process of depreciation strategy, multiple influencing factors from different objects need to be considered. Different depreciation methods have no absolute advantages. Therefore, the dynamic adjustment of the depreciation strategy is guaranteed at different stages and from different dimensions, and an effective depreciation method is selected according to the focus of the enterprise to maximize the value.

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