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Research on the Development Status of the National Energy PPP Model

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Abstract

PPP, the partnership between government and social capital, is a project operation mode in public infrastructure.Under this model, private enterprises and private capital are encouraged to cooperate with the government and participate in the construction of public infrastructure.The advantages of PPP model in the field of public service have been recognized worldwide, but in the 19 industrial fields where PPP model is carried out in China, the development of energy PPP model is relatively slow.China's social capital is actively participating in the construction of the energy sector, but also continuously bidding.However, up to now, China's energy PPP projects are relatively few in terms of the number of projects invested or the total amount of investment.This will enable us to fully recognize the benefits of the PPP model of energy, attracting more private enterprises and other social capital investment.This paper will start from the concept of PPP model, the development of the current situation of the energy PPP model is described, at the same time, the effectiveness and uncertainty of China's energy PPP model is analyzed, and finally some targeted measures are proposed.

Keywords

Energy; The PPP model; Development status; Safeguard measures.

1. Introduction

In China, our daily life is all about the word "energy". Our cars need gasoline, light bulbs need electricity, heating needs media. And where these energy losses come from, this issue deserves our attention. For example, waste incineration power generation, wind power generation, solar power generation, etc., these are all large-scale construction projects. If it is not enough to finish it alone by the government, on the one hand, there is not so much money, on the other hand, it will take a lot of time and energy. However, if these projects cooperate with social capital, they can share benefits and share risks. With the development of PPP mode, social capital in China has actively participated in the construction of energy field, and is also competing for bids. However, until now, the projects of energy PPP in China are still very few in terms of number or total investment. This will enable us to fully understand the benefits of adopting the PPP model and how to attract more private capital investment such as private enterprises, so as to open up a new world for China's energy industry. The innovation of this paper is to start with the concept of PPP mode, and use the literature retrieval, case analysis, data analysis and other related research methods to elaborate the development of China's energy PPP mode. At the same time, it lists relevant examples to analyze the effectiveness and uncertainty factors of China's energy PPP mode, and puts forward relevant constructive suggestions for the stable development of energy PPP mode.

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2. The Development Status of Domestic Energy PPP Mode

2.1. Overview of PPP Mode

PPP is the abbreviation of public private partnership. It refers to the concession agreement between public and private private private based on the starting point of providing products and services, forming a partnership partnership of "benefit sharing, risk sharing and full cooperation". PPP has the advantage of making all partners reach a more favorable result than expected by individual actions: the government has less financial expenditure, The investment risk of the enterprise is lighter. It includes contract underwriting, franchise and privatization. Create according to BDO, BOT, boo and BBO mode. From Figure 1, it can be analyzed that from January 2018 to January 2020, the PPP operation mode in China mainly consists of BOT, and the proportion of boo, rot and TOT mode is in the forefront.In the contract of PPP mode, the government department is the rule maker, while the enterprise acts as the operation of the project, and the enterprise and the government share the responsibilities and obligations. The government can control the product quality in the process of controlling the rules, and enterprises actively participate in the construction of public utilities, realize the win-win interests of all parties and promote the better development of public utilities.

Since the establishment of PPP mode in the 1990s, it has been found that it plays an important role in infrastructure construction and the provision of public goods. In the following decades, PPP mode has been widely used in the world. Before 2010, 150 developing countries have used PPP mode to attract social capital to participate in the investment and construction of public utilities. After the Ministry of Finance issued a document in 2015, China promoted PPP construction in 19 fields including energy, allowing all kinds of social capital to participate in infrastructure construction. At present, it has attracted more than one trillion yuan of capital. Although China has become the second largest economy in the world, it is still a developing country. There is still a huge space for infrastructure construction and development. The use of PPP mode can promote the quality of public goods.

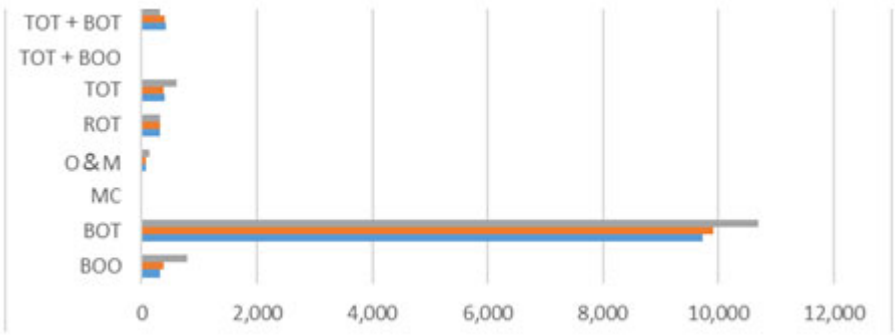

Figure 1. Number distribution of PPP operation mode projects

2.2. Energy PPP Mode Has Broad Development Prospects

The National Energy Administration (NEA) has announced that there are at least three types of PPP promotion modes in the energy field: first, power and new energy projects, including power supply or urban distributed energy generation projects, micro grid construction and transformation, smart grid projects, etc; Second, oil and gas projects, including trunk or branch pipelines of oil and gas pipelines, urban gas distribution pipelines and urban gas storage facilities; Third, coal projects, including coal-bed gas pipeline network, gas power generation, etc.It can be seen that China attaches great importance to energy development, especially clean energy such as natural gas, which needs to be vigorously promoted under the policy of building green water and green mountains. Therefore, the rapid development of new energy makes PPP mode have greater development potential in the field of energy. Now the country is also

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constantly improving the consumption structure, developing new energy infrastructure pipe network construction, and promoting the construction of natural gas production lines, so the demand for natural gas has maintained a rapid growth rate in recent years. In 2014, China and Russia signed a long-term annual supply of 38 billion cubic meters of natural gas, with a contract of 30 years. It can be seen that China now attaches great importance to and demands for natural gas and energy. Therefore, in the future period of time, clean energy such as natural gas and so on needs to be vigorously developed. Therefore, PPP mode is needed to attract a large number of private capital, continuously deepen the structural reform, and improve the construction of energy company facilities.

2.3. Energy PPP Mode Develops Slowly

Compared with developed countries, China's energy official website, especially the natural gas official website, has a relatively low level of coverage. However, China has a large population and a large proportion of area, so it needs a lot of money to lay the basic energy network. According to the relevant data of the national energy administration, it is necessary to build at least 500000 km of natural gas pipelines to transport natural gas from production areas to medium-sized cities in China. However, the number of pipelines constructed now is far from meeting the demand. There is a capital gap of nearly 100 billion for this project alone. Therefore, if we want to speed up the construction of energy pipeline network, It is necessary to make great innovations in the financing system. The emergence of PPP mode provides a lot of funds for the construction of energy infrastructure. This new public-private partnership mode has been widely used in the world. China has also used PPP mode in many fields. However, in the energy field, the application of PPP mode is far lower than other fields. According to the statistics of PPP project database, as of March 2020, there are 6824 energy PPP projects, accounting for 1.34% of all project data. The total project investment is 3663.884 billion yuan, accounting for 0.58% of all industry projects. Referring to figure 2 and figure 3, we can see that from January 2016 to March 2020, both the number of investment projects and the amount of investment in China's energy PPP mode are very low and concentrated, Therefore, it is an indisputable fact that the development of PPP mode in China's energy field is slow.

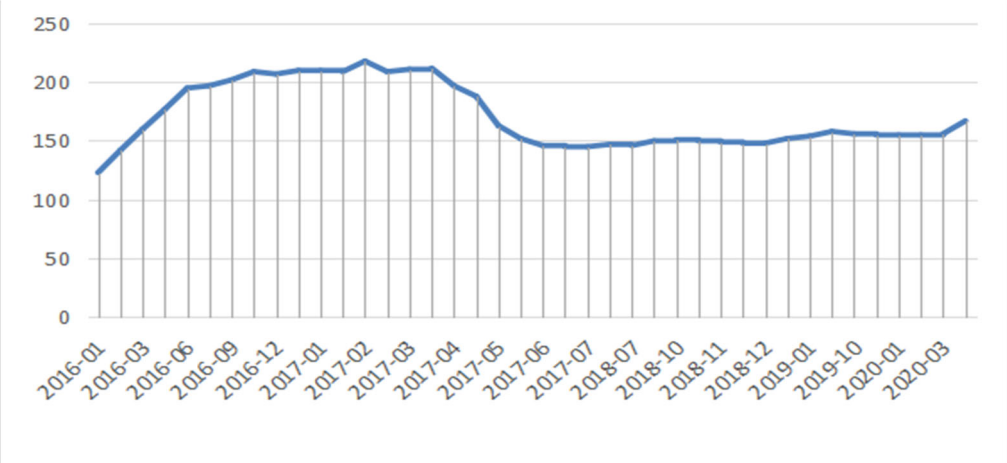

Figure 2. Trend of the number of energy PPP investment projects from January 2016 to March 2020

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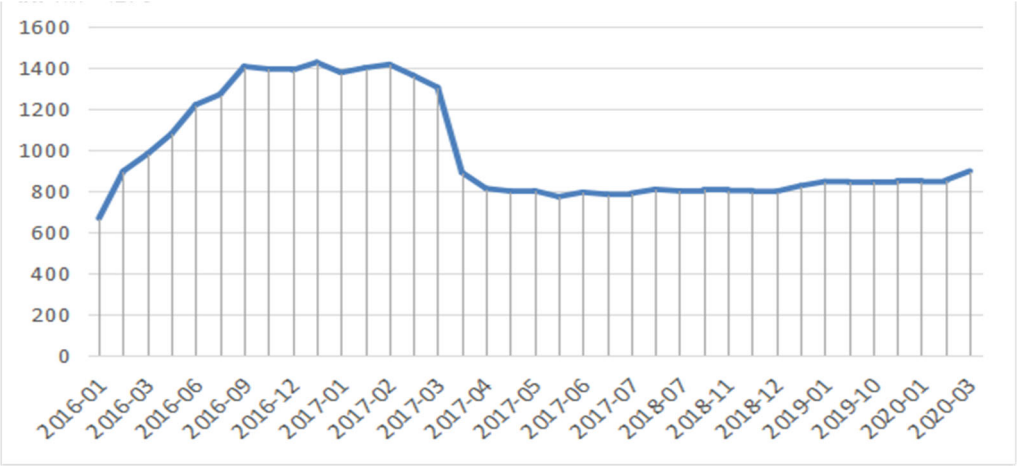

Figure 3. Investment trend of energy PPP project from January 2016 to March 2020

3. The effectiveness of China's energy PPP model

3.1. Reducing Financial Burden

3.1.1. Financing Mode of Energy Pipeline Network Construction in China

The infrastructure construction of natural gas pipeline network in China belongs to capital intensive investment. The amount of investment in the early stage is huge, the construction period is long, and the uncertainty and risk are relatively large. The high risk in the construction process leads to the project investors not only to bear too much capital pressure, but also to bear the loss caused by uncertainty. The official website of natural gas is an important part of the construction of energy official website. Therefore, this paper takes the construction of the basic official website of natural gas as an example to analyze the financing mode of the construction of energy official website, and explores the financial burden of the government in energy projects from this perspective.In the past, most of the funds for the construction of domestic natural gas industry were allocated by government departments and raised by state-owned enterprises. When the construction of energy official website is not open, the financing mode of domestic natural gas pipeline construction is still relatively old, mainly relying on the joint project investment or equity financing of state-owned enterprises and the government. Equity financing is mainly aimed at enterprises that have generated cash flow. According to the analysis of China's A-share situation, after excluding state-owned enterprises, there are only 11 small and medium-sized enterprises participating in the laying of natural gas pipeline network, with a total financing of 5.043 billion yuan. In fact, only a very small part of the financing is used in the construction of natural gas official website. The way of project financing is often used in the laying of natural gas and other energy official websites. However, the construction subjects who can participate in this way are firmly grasped by state-owned enterprises and government departments in the past, and some private enterprises also have the shadow of state-owned capital. Here, we can refer to the laying of natural gas pipeline from Shaanxi to Beijing. The total length of pipeline from Shaanxi Gansu Ningxia natural gas field to Beijing is 900 km. The project is jointly funded by Beijing municipal government and Petro

China's natural gas company, and jointly managed by the government and state-owned enterprises. From the above, we can analyze the single and blocked financing mode of domestic energy industry. Due to the long construction period and the long capital collection period in the energy field, it brings huge capital pressure to the government.

3.1.2. Government Financial Burden Caused by Energy Projects

The construction of every energy project involves huge capital flow, and the payback period is one of the longest projects in the investment. For example, the construction of a waste

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incineration power generation project is time-consuming and expensive, and the project is huge. In the past, the government, state-owned enterprises and other state-owned capital were solely responsible for the laying, construction, maintenance and operation of oil and gas pipelines, which not only involved too much capital flow, but also consumed a lot of time. Under the influence of the Sino US trade war, the attraction to foreign capital is also growing, but the profit expansion of private enterprises and the continuous increase of residents' savings promote the continuous change of social capital structure, and also provide an opportunity for the cooperation between the government and capital.

3.1.3. PPP Mode to Protect Private Capital

Since the reform and opening up, the continuous development of market economy has promoted the vigorous growth of China's private economy. At this stage, the government has been encouraging and guiding the private economy, which accounts for more than 60% of China's national economy, Half of the total social investment depends on the power of private economy. Therefore, with the help of private capital, it is feasible to break the financial dilemma of the government in promoting PPP mode.With the deepening of the opening up of oil and gas market and infrastructure market, the government has guaranteed the access of private capital from the policy, and private capital has begun to enter the process of oil and gas pipeline construction. For the government, it can reduce capital investment, which is undoubtedly a beneficial policy for both sides. The laying of natural gas pipeline network needs a large amount of initial investment, and the payback period is relatively long. Relying on the original channels for capital accumulation can not meet the increasingly accelerated pace of energy structural adjustment.With the continuous promotion of market activity by private capital, the capital investment of private enterprises has greatly alleviated the huge pressure of the government in advance funds, and made up for the lack of capital demand of natural gas pipeline laying at the present stage. The increase of non-public economy makes the market full of competition, and makes the overall construction develop towards a better form. After private capital joined the overall energy layout, it has played a great role in many aspects. Private enterprises have become the main body in some fields. Some enterprises focus on laying Urban Pipelines and improving urban energy network. For example, Xinao group has a good performance in this aspect. ENN has participated in infrastructure construction such as energy pipeline laying in more than 100 cities.

3.2. System Guarantee

In recent years, China has been carrying out the marketization of oil and gas pipeline, network and other infrastructure construction, gradually implementing and moving towards the essence. Especially after the 10th National Congress of the Communist Party of China, the pace of introducing marketization into the oil and gas industry has been gradually accelerated, and the marketization reform has been gradually deepened, so that the infrastructure construction of oil and gas pipeline network has broken the wall, and gradually moved towards fairness and opening up. Whether it is the release of the "new 36" or the government documents to promote the openness of oil and gas pipeline network, it shows that the government has started to let go of the infrastructure construction of oil and gas pipeline network, and actively guide market-oriented capital into it, and support the private capital to join in the infrastructure construction and operation and maintenance of these energy fields. The release of the documents is like a reassuring pill, which gives the relevant enterprises the courage to enter the energy field. The relevant measures of the government have cleared the biggest obstacle for private capital to enter the energy infrastructure construction, and guaranteed the integration of market-oriented capital into the field. With the gradual deepening of national policies on the construction of fairness in this field, the enterprises with relevant qualifications are also building their own implementation plans for the market in different fields.

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China's oil and gas infrastructure construction enterprises gradually present a diversified situation, and gradually deepen with the time of retirement. First of all, the idea of "mixed ownership reform" carried out by the two state-owned enterprises of PetroChina and Sinopec is very clear, and they express openness and support for the participation of diversified capital in the construction of oil and gas pipeline network. CNPC pipeline United Company is a mixed ownership enterprise created by PetroChina and other private capital. It was founded in 2013, and the major participating capital has forged a strategic partnership through the oil and gas pipeline joint venture signed by the instrument. We can also see that with the in-depth support of national policies, enterprises other than the three major oil companies can gradually enter the construction of infrastructure in the energy field. For example, private enterprises such as Xinao group and Ganghua gas have all built exclusive natural gas infrastructure, and some fast-growing enterprises have already laid some natural gas pipelines.It is worth mentioning that 2015 is the key year for the development of PPP mode, also known as the first year of the development of PPP mode in China. Therefore, in this year, the central and local governments have issued many relevant policy documents on promoting the development of PPP mode, gradually advocating to change the situation completely controlled by the government in the field of infrastructure construction and government public services, The government and private capital should cooperate with each other or buy back with government investment. The documents involved in many areas of PPP mode application, with great influence and opened many opportunities. In addition, it is gradually clear that the national development and Reform Commission is responsible for the PPP mode of infrastructure construction in various fields, and the Ministry of finance is responsible for the government funded purchase of PPP mode services of enterprises. From the specific policy analysis, it involves the government's credit guarantee, transparent operation process, open field and return on investment. From 2015 to now, the government's determination to continuously promote the PPP model has not changed, and the strength has not decreased, and the text on promoting the PPP model has also increased. The national development and Reform Commission, the Energy Bureau and other responsible agencies have listed the new energy related projects as key promotion projects.

3.3. Talent Support

In the 1990s, China introduced the development mode of BOT, and now the vigorous rise of PPP mode, the development experience of these 20 years has produced a large number of practical talents and theoretical experts in related fields. With the support of talents, the large-scale application of PPP mode is possible and has a solid foundation. The help of local talents can help relevant departments and enterprises to deeply grasp the operation law of PPP mode, grasp the principle of PPP mode from the inside, and can closely link PPP mode with China's local conditions, find out the internal relationship between the political system, economy and culture with Chinese characteristics and PPP mode, so as to stimulate the government's thinking change and change the management mechanism with the help of PPP mode.In recent years, the Chinese government has invested a lot of talents in related fields. It attaches great importance to the role of experts and scholars in the theoretical research of PPP model, and believes that theoretical talents can play a role in policy planning and practical guidance of PPP model. Therefore, the state attaches great importance to the Research of PPP theory, In particular, we hope that PPP model can have new research breakthroughs in theory and practice. Our national ministries and commissions, major top universities, relevant enterprises and institutions, scientific research institutes and non-governmental social organizations have set up many PPP mode research centers to carry out public relations for the weak points in theory and practice. At the same time, in order to make a breakthrough in theoretical and practical research, many institutions have adopted the method of strong alliance. For example, the national development and Reform Commission and Tsinghua University jointly established the PPP model expert database, hoping to form a resource sharing database through the expert database. At the same

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time, many research centers and forum sharing activities are also in full swing. Through the collision of ideas, innovation sparks are generated. We can work together to tackle key scientific research problems, and use PPP research to promote the upgrading of traditional infrastructure, so that the PPP model purchased by the government in public services can better play its supporting role and serve the society.

4. Analysis of Uncertain Factors

4.1. Policy Risk

Policy risk is one of the biggest risks of energy construction under PPP mode. It specifically refers to the operational risk of the projects that can operate normally in the original period due to the policy changes of subsidies or tax and other financial policies and relevant legal provisions. This risk is not caused by the illegal operation of enterprises, It's just a change in policy. Due to its own characteristics, PPP projects involve more laws and relevant policy documents. Once the relevant policy texts are revised, the changes of relevant items will hinder the project approval process. Problems in any aspect of financial subsidy standards and project charging standards will lead to the normal construction, operation and launch process of the project, Therefore, PPP projects are restricted by policy risks and have strong uncertainty. For example, the hearing of the water price increase plan in Shanghai and Nanjing failed, leading to the withdrawal of foreign capital from China.

4.2. Construction Risk

The construction of energy infrastructure involves many high-risk links. The risk of any link may lead to the termination of the project. The main high-risk links include: the slow speed of land approval affected by policies, the imperfect supporting facilities due to supply chain problems, the extension of construction period due to objective reasons, the gap in cost control, etc. Taking the photovoltaic power station as an example, this paper analyzes the engineering quality problems in the construction. The engineering quality problems of photovoltaic power station have been the bottleneck restricting the development of new energy. Photovoltaic power station is limited by the approval process of installed capacity, and the strict approval process breeds middlemen who sell "road". The middlemen do not carry out the whole process construction, but only sell the "road strip" to get rid of the project quickly after the initial construction. At the same time, the cycle of the photovoltaic project is relatively short, and the middlemen need to get rid of the project quickly, which makes the middlemen not responsible for the project, and the phenomenon of shoddy manufacturing occurs from time to time, and the overall project is completely substandard, This is also the reason why the national development and Reform Commission and the General Administration of energy began to monitor the quality of photovoltaic power generation projects nationwide.

5. Safeguard Measures of PPP Mode Applied in Energy Construction

5.1. Keep Policy Stable

The government has played a key role in promoting the PPP model, so whether the policy in this field is stable and whether the market has been open for a period of time is the aspect that private capital pays more attention to. In the process of promoting the development of PPP model, the government departments should keep the policies formulated for a period of time with continuity and certain expectation. In the process of policy making, we should pay attention to the indispensable research link, control the supervision in the process of policy implementation, and pay attention to the evaluation and summary of the policy after the implementation of the phased policy. We should also listen to the opinions of the market on the policy, create a policy environment in line with the PPP model, and provide strength for the

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supply side reform in the current environment, Let policy adapt to market changes. Under the supervision of public opinion, the government should avoid the government's dishonesty within the framework of rules and regulations. Political changes such as the change of the government should not affect the orderly operation of the project. The government should solve the problem through equal, fair and reasonable consultation with the enterprise.

5.2. In Depth Project Research

The investment characteristics of energy projects lead to unlimited market risk exposure. Under the huge risk, we need to make a series of preparations before investment. For example, in the early stage of the project, the feasibility study report should be implemented, the investment amount needed for the project should be accurately analyzed, the market demand and interface should be predicted, the expected cost reduction formed by large-scale construction should be controlled, and the project investigation should be refined before the project. This is conducive to the detailed discussion between the government and enterprises. The multi round discussion on the expected return rate of investment and the expected project cycle is conducive to the profitability of social capital and the expectation of in-depth cooperation of capital. In the process of the project has been started, operation and maintenance, the management and filing of risk prediction need to be paid attention to. It is necessary to estimate the risk of construction, operation and maintenance, exit and other stages, do a good job in defense prevention, and minimize the loss caused by the uncertainty of the project.

5.3. Break Through the Single Role of the Project

Usually, the result orientation of a project is one purpose, but in order to maximize the profit and work efficiency, it can promote a project to generate multiple profit models. For example, an energy generation and lighting project can ensure the lighting function at the same time, it can use the generated heat to provide heating service, so as to ensure the energy saving and achieve the maximum efficiency at the same time. The total amount of power generation should be combined with the reality and rational planning, and the wind power projects should be continuously optimized. Attention should be paid to the construction of the base layout of photovoltaic power generation, the inherent use area of wind power should be changed, and the opening of wind power should be transited from the "Three North" region to the Middle East region with relatively developed economy and large power consumption. At the same time, the construction of green water and green mountains can be promoted. Fully expand the planning of new areas of wind power, and promote the local utilization and development capacity of wind power. For example, we can use clean energy for heating, wind power and geothermal to form a green heating system.

5.4. Standardizing the Selection Mechanism of Private Investors

In the past, the monopoly of state-owned capital on energy has hindered the rapid development of China's energy network. There is no fresh and sufficient capital, and the infrastructure construction of the whole energy can only rely on the stock capital. Now, with the rapid development of China's cities, there is a greater demand for the laying of energy pipe network. The existing demand has long been unable to be met by the stock funds. It is an inevitable choice to introduce market capital in front of the capital gap. The introduction of private capital has a positive significance for the construction of energy official website. In the process of PPP mode in the construction of energy official website, continuously standardizing market access is an important guarantee for private investment. Partner selection is very important for the normal start-up and operation of the whole project. Due to the huge interests involved in energy projects, the government has the right to decide in the process of partner selection. Therefore, there are still some problems in the selection mode of private investors in China at this stage.

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The selection of non optimal investors is actually a waste of social resources, It has lowered the level of the project. Therefore, I personally think the government should pay attention to the following points when selecting individual investors.

5.4.1. Fair Bidding Mode

Fair market competition environment is the most basic condition to ensure market-oriented operation. Therefore, in the process of bidding, the government should ensure that the bidding environment is fair and the operation process is standardized. All participating enterprises should be treated equally and relevant information should be transparent. Only in this way can the whole bidding environment be harmonious and stable and better enterprises be selected.

5.4.2. Clear Access Conditions

When choosing partners, the government should adhere to standardized selection and clarify the entry conditions of enterprises. In the process of introducing investment enterprises, the government should not only pay attention to the size of capital and investment ability, but also pay attention to the capital flow and capital status of enterprises, and make a comprehensive judgment on the social influence of enterprises, For the enterprise management process and other elements also need to be analyzed, for unqualified enterprises are not allowed to bid, only clear access conditions can promote the deepening of the project.

5.4.3. Persisting in Punishment

In the PPP mode of energy construction projects, the construction and management of the government is for the public welfare, while the purpose of private investors is to obtain more benefits for enterprises. There is a natural contradiction between the two. Different values may cause both parties to violate the prior agreement in the process of project operation, or the limited information exchange between the two may lead to problems in the final contract and the dissolution of the project. These problems will lead to problems in the process of the project and affect the overall income. Therefore, it is necessary to monitor the whole process of the project, the principle of life-long responsibility, the principle of life-long project responsibility, and seriously punish any illegal act.

6. Conclusion

The infrastructure construction of China's oil and gas official website belongs to capital intensive investment. The amount of investment in the early stage is huge, the construction period is long, and the uncertainty and risk are relatively large. The high risk in the construction process leads to the project investors not only to bear too much capital pressure, but also to bear the loss caused by uncertainty. Therefore, the integration of PPP mode into energy is particularly important. Firstly, this paper studies the concept of PPP mode and its development in the field of energy. Secondly, it studies the effectiveness of PPP mode: reducing financial guidance, institutional guarantee and talent support. At the same time, it analyzes the uncertain factors. Finally, it analyzes the safeguard measures from four aspects and gives relevant suggestions.

References

[1] Wang Xiaoni (2016) application of PPP mode in the construction of peak shaving and gas storage facilities.

[2] China electric vehicle charging infrastructure promotion alliance. Annual report on China's charging infrastructure development (2017-2018 version) [R]. July, 2018.

[3] Qiu Yiqing. Research on the dispute resolution mechanism of China's PPP model [D]. Nanchang: Nanchang University, 2018.

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202108_4(8).0065

[4] Li kaimeng, Wu Di. The hierarchy, basic characteristics and Chinese practice of PPP [J]. Journal of Beijing Jiaotong University (SOCIAL SCIENCE EDITION), 2017,16 (3): 1-12.

[5] Li Lihong, Zhu Baifeng, Liu Yachen, et al. Research on risk sharing mechanism under the overall framework of PPP model [J]. Construction economy, 2014 (9): 11-14.

[6] Wu Miao, Zhang Jingfu. Review on risk management of public private partnership (PPP) projects [J]. Journal of Wuhan University of technology, 2019 (1): 39-47.

[7] Chen Shijin, Liu Hao. Analysis on Influencing Factors of PPP mode decision-making -- Based on the experience of developing countries [J]. Statistics and information forum, 2016,31 (5): 70-76.

[8] Li Sumei, Yang Jie, Zhang Qing. Analysis and comparative study on the development path of PPP mode in China [J]. Journal of engineering management, 2018,32 (6): 52-57.