Experience and enlightenment of water conservancy project investment

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Abstract: This paper summarizes and studies the investment and financing policies of water conservancy related projects in the USA, Japan, Australia, India and Brazil, and then analyses the enlightenment of these policies to such areas reform in China. According to the researches, the U.S. government has increased to broaden financing channels, and local governments, collective and private non-federal government agencies are the main body of financing. Japan's domestic water conservancy projects are mainly undertaken by domestic water conservancy related development and construction companies. The design and construction of most water conservancy projects in the six major water systems in Japan are mainly undertaken by the Japanese water resources development group. In Australia, water resources and other related resources are in the charge of each state, so water conservancy projects are also in the charge of each state, and the federal government and local government manage them at the same time. For all kinds of small-scale water conservancy facilities, the Indian government encourages private investors to invest, operate and manage them. Brazil has a large investment in domestic large and medium-sized water conservancy projects, for which the federal government has made great efforts in investment and financing. Therefore, China government should make a reasonable distinction between public and non-public water conservancy projects and adopt different investment policies, and should make clear the rights, responsibilities and interests of the investors and beneficiaries, make clear the property rights, and establish an effective project legal person system.

1. Introduction

Based on the study of foreign investment in water conservancy projects, this study summarizes and studies the investment and financing policies of foreign water conservancy related projects, and then
analyzes the reference and Enlightenment of these policies to the investment and financing of water conservancy projects in China

2. Experiences in Major Countries

2.1. The United States

8% of the annual power generation in the United States is completed by hydropower projects. Hydropower accounts for 75% of the actual renewable energy available, which is an indispensable part of the energy in the United States [1]. However, most of these hydropower projects were completed before 1960s, mainly due to the consideration that the dams built by hydropower stations will have a great negative impact on fish and rivers. With the gradual increase of energy demand in the United States and the continuous improvement of hydropower technology, the U.S. government is changing the existing hydropower policy to alleviate the side effects of fossil fuels on the environment. The relevant departments of the U.S. government encourage the environmentally friendly part of hydropower projects to be built, and provide certain policies and preferential investment and financing for the projects of this department. However, most hydropower projects have other relevant functions, including public welfare and non-public welfare functions.

In terms of investment, Investors can be divided into: federal government, local governments at all levels, private investors and residents. The government is the most important investor, whose investment generally accounts for about 65% of each investment. Generally speaking, the investment focus of each investor is based on the legal division of labor. For example, the investment of the federal government of the United States focuses on the big rivers and interstate rivers, the investment of local governments at all levels focuses on the relatively small rivers within their jurisdiction, and the private investors and residents are in their corresponding legal projects.

In terms of financing, the U.S. government has increased to broaden financing channels, and local governments, collective and private non-federal government agencies are the main body of financing. Local governments have increased the collection of water resources fees and issued relevant bonds to guarantee the funds of water conservancy projects[2]. Generally speaking, financing channels of water conservancy projects can be divided into the following five categories: first, government bonds mainly composed of general obligation bonds, income bonds and additional bonds; second, water related funds for income transfer payment of local governments; third, special funds for water conservancy paid by the federal government; fourth, income payment of local water conservancy projects; fifth, investment income.

For the cost sharing, relevant laws give clear provisions. For the federal water conservancy projects for water resources development, the local government has a certain share proportion. For example, in flood control projects, the share proportion of the local government is 25% - 50%, in hydropower projects, it should be fully paid, in urban water supply projects, it is 100%, in agricultural water supply projects, it is 25%, in tourism, it is 50%, in waterworks, it is 50%, for ecological improvement 25% of the works. In addition, according to relevant laws, the construction funds of water conservancy projects for flood control, shipping, fishery, tourism, environmental protection and other purposes are not repaid; the funds of water conservancy projects for hydropower, living and industrial water supply are repaid at low interest; agricultural projects such as irrigation are repaid without interest within the repayment period of 50 years. In financing mode, direct financing and indirect financing coexist. Most of the water financing comes from the financial funds of governments.
at all levels, but most of them have to be repaid. In addition, for different types of water conservancy projects, the sources of financing are quite different. For example, flood control projects mainly come from government financial allocation, while hydropower and urban water supply projects mostly come from local bonds[3].

In the process of putting the project into operation after the completion of construction, governments at all levels shall compensate the operation cost to maintain the effective and sustainable utilization of water conservancy projects. The maintenance, operation and management funds for flood control, environmental protection and ecological improvement public welfare projects come from the government finance at all levels and the real estate tax in relevant protection areas. For comprehensive water conservancy projects, which are mainly water supply and hydropower, and have public welfare functions such as flood control, the administrative department shall collect the cost of water and electricity for maintenance and operation and pay the profit and loss by itself. The maintenance, operation and management fees of irrigation and other agricultural related projects shall be paid by the local government within the service life specified in the contract.

2.2. Japan

Japan's domestic water conservancy projects are mainly undertaken by domestic water conservancy related development and construction companies. The design and construction of most water conservancy projects in the six major water systems in Japan are mainly undertaken by the Japanese water resources development group, while the electric power development group and electric power company are mostly responsible for the hydropower projects in each water system. However, the Japanese government still adopts more relevant policies to promote the development of water conservancy projects.

As far as the investment policy is concerned, different water conservancy projects are required by Japanese laws to implement different investment and sharing systems. But generally speaking, the investors are still the state and local governments, private investors and beneficiaries. Most of the public welfare water conservancy facilities are undertaken by the state and local governments. Non-public welfare water conservancy projects will be put into the market in an all-round way, and will be borne by private investors and relevant beneficiaries, while the government will bear part of the subsidy costs. In terms of public welfare water conservancy projects such as river control projects and soil and water conservation, the state and the local governments benefiting from the project bear the majority[4]. In irrigation and drainage projects and other agricultural related projects, the local government's special grants and loans from the state bear the majority, and the state gives relevant preferential policies in terms of interest rates. In terms of industrial and domestic water, bank loans and bond stocks account for the majority. As for the financing policy, it consists of government finance at all levels, bank loans, bonds issued by the society, self financing and donation. In addition, Japanese law also stipulates the compensation system for maintenance and operation management of relevant water conservancy projects. The state and local governments bear 50% - 80% of the relevant costs, while the beneficiaries bear 20% - 50%. See Table 1 for specific policies.

2.3. Australia

According to the relevant laws of Australian Constitution, water resources and other related resources are in the charge of each state, so water conservancy projects are also in the charge of each state, and the federal government and local government manage them at the same time. As for flood control works, since there is no direct income, the construction funds needed are generally paid by the federal
government, 40% by the state government and 20% by the local government; the maintenance funds are generally collected according to the number of beneficiary land, and the federal government will no longer participate. For agricultural projects such as irrigation projects, the construction costs are mainly borne by the state government, and some projects are subsidized by the federal government; maintenance and management costs are mainly borne by the beneficiary users, and some states also subsidize some of them. Water supply and drainage works are mainly composed of local finance, bank loans, relevant taxes and fees. The fees paid by users are mainly used to repay the loan, and the funds that cannot be repaid are borne by the government, which is mainly realized by increasing financial allocation and related taxes[5]. Unlike most other countries in the world, the investment in public welfare water conservancy projects in Australia is mainly realized by state governments. In recent years, Australia has carried out share-holding reform on relevant state-owned construction enterprises, selling some shares to private investors, so as to win more funds for water conservancy construction. BOT (construction operation transfer) is adopted for most projects. The BOT mode is that private investors and large consortiums act as owners of water conservancy projects, raise funds for construction, operate for a period of time, and then transfer to the government. During this period, the government gives the consortiums corresponding loan preferences and guarantee conditions.

2.4. India

According to the Constitution and relevant laws of India, each state is responsible for the development of water resources and flood control planning, and each state has the right to make its own regulations in the field of reform, while the federal government is only responsible for coordinating the differences between the States, and providing technical advice and the development of federal rivers. The large and medium-sized water conservancy projects in India are mainly invested by the federal government and the state governments. This part of funds is mainly from the financial allocation of governments at all levels, the rest is from loans, and the repayment of loans is mainly undertaken by local governments. For flood control projects, the funds are mainly from the federal government, and there is no need to repay the funds.

India is a developing country, and the construction tasks of various water conservancy projects are relatively heavy, especially the construction of public welfare water conservancy facilities. However, India's relevant investment funds are limited, and the financial resources of governments at all levels are limited. According to the actual needs of each state, the water conservancy department of the federal government shall report to the national budget for the introduction of foreign capital into the project. After the approval of the state, the relevant departments shall reply to each state government[6]. The principal and interest of the loan shall be repaid by the local government in the form of domestic currency.

For all kinds of small-scale water conservancy facilities, the Indian government encourages private investors to invest, operate and manage them. The federal government gives certain preferential policies and subsidies, exempts the import tariff of relevant equipment, allows foreign investment to hold 100% of small-scale water conservancy projects without the approval of the federal government. In addition, the government of India has broadened relevant financing channels: first, increase financial allocation; second, encourage private investors to participate and give some preferential measures.

2.5. Brazil

Brazil has a large investment in domestic large and medium-sized water conservancy projects, for
which the federal government has made great efforts in investment and financing, and has issued a series of relevant policies. The main sources of funds can be divided into the following six aspects: first, the federal government makes financial allocation in the form of investment in capital stock; second, large-scale relevant companies raise funds by themselves, generally including the profits and returns of these companies; third, the federal government divides certain expenses according to the fees paid by each user to form relevant funds; fourth, the hydropower construction fund is composed of hydropower companies 15% of the electricity charge collected by the company is used for engineering construction, which is of bond nature; fifth, domestic bank loan; sixth, foreign funds, most of which are world bank loans.

### 3. Experience and Enlightenment to China

According to the above experience of water conservancy investment and financing of important countries in the world, the following enlightenment can be summed up:

First, China government should make a reasonable distinction between public and non-public water conservancy projects and adopt different investment policies. According to the investment experience of various countries, the government is the main body of water conservancy investment, but the government's investment in water conservancy projects has strict principles. Governments at all levels strictly invest the free financial funds in public welfare projects, and use the paid funds in non-public welfare projects, and recycle the funds according to the project income. For the division of public welfare and non-public welfare projects, most countries in the world generally consider flood control, environmental protection and ecological restoration projects as public welfare water conservancy projects, water supply and drainage and hydropower projects as non-public welfare projects, but some water conservancy facilities have dual nature at the same time.

Second, China government should broaden the channels of investment and financing for water conservancy projects, and encourage private capital to invest effectively. Most countries in the world adopt diversified and multi-channel water conservancy investment and financing system. The government can be divided into financial allocation, preferential loans, construction funds, etc.; social funds can be divided into bonds, stocks, taxes, etc.; at the same time, self raised funds and donation funds also account for a considerable part in some countries. Although the government's investment accounts for the vast majority, more and more countries put private capital into water conservancy construction, and their incentive policies are diverse. For example, Brazil sold concessions to private companies for several large-scale water projects, and set up special committees to supervise the input of these companies. British water companies invest and finance by issuing shares. The Tennessee Valley Authority issues bonds to the private sector for financing.

Third, the construction funds of public welfare projects shall be borne by governments at all levels. Many countries in the world have adopted part of the central financial investment and mobilized the enthusiasm of local governments for investment. This common practice takes the financial input of the central government or the federal government as a "medicine guide" to enable local governments and other investors to invest in public welfare water conservancy construction.

Fourth, China government should make clear the rights, responsibilities and interests of the investors and beneficiaries, make clear the property rights, and establish an effective project legal person system. All kinds of investment behaviors are guaranteed and benefits are clear. This system is the guarantee of the market economy system, and most countries in the world give clear relevant
systems to water conservancy projects.

Fifth, China government should clarify the source of funds. Most countries have clear regulations on the source of funds for water conservancy project construction. In addition to all kinds of investment mentioned above, some governments take part of certain income as water conservancy construction and maintenance funds on the principle of "who benefits, who pays". For example, California uses part of its oil revenue as a source of funding for the construction and maintenance of water conservancy projects in the region.

Sixth, China government should give preferential policies. In order to solve the problem of lack of funds for construction and management of public welfare water conservancy projects, most countries give more preferential policies to social investors. It can be divided into three parts: investment subsidy, output subsidy and user subsidy.

References
[1] Antonio Estache & Ana Goicoechea, How Widespread Were Private Investment and Regulatory Reform in Infrastructure Utilities During the 1990s?[J]. World Bank Policy Research Working Paper No. 3595. May 2005.
[2] Mitch Renkow. Infrastructure Investment and Rural Development [EB/OL]. http://www.aei.org/docLib/20070515_renkowfinal.pdf.
[3] Douglas Sutherland, Sonia Araujo, Balázs Égert and Tomasz Kozluk. Infrastructure Investment: Links to Growth and the Role of Public Policies [J]. OECD Economics Department Working Paper No. 686. March 16, 2009.
[4] Richard F. Anderson. Trends in Local Government Expenditures on Public Water and Wastewater Services and Infrastructure: Past, Present and Future[C]. The U.S. Conference of Mayors-Mayors Water Council, February 2010, Washington, DC.
[5] Trevor Clements, Vic D’Amato & Tina Taylor. Integrating Water Infrastructure for Sustainable, Resilient Communities[C]. WEFTEC 2010.
[6] Kevin Wall, Jay Bhagwan & Oliver Ive. An exploration of franchising partnerships for the operation and maintenance of water services infrastructure [C]. 34th WEDC International Conference, Addis Ababa, Ethiopia, 2009.
[7] Alexandra Dapolito Dunn & Derrington, Erin, Investment in Water and Wastewater Infrastructure: An Environmental Justice Challenge, a Governance Solution [J]. Natural Resources & Environment, p. 3, Winter 2010.