

Original Article: Efforts to Generate Green Energy



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ABSTRACT

Construction of hydropower, wind, solar, nuclear, geothermal and recycling power plants. It is one of the solutions that the experts in this field of energy production have succeeded so far and have made significant progress in the world by presenting appropriate plans. Iran also did not hold back from this convoy and by building hydropower plants and using the potential of the country's surface water, which amounts to 50. TVVH / y annual energy production by this type of power plants, has taken a step that the vision it puts a light in front of it. Attention and emphasis on sustainable and economic development of energy supply in the national sphere, reduction of greenhouse gases to prevent environmental degradation, expansion of production capacities and increase of energy revenues, replacement of fossil products including oil and gas in power plants, maximum use. The potential of the country's hydroelectric power and ultimately the economic efficiency of this type of power plants during operation to balance the supply of cheap energy to consumers is one of the goals of the energy production sector in our country. In order to implement these goals, the Ministry of Energy based on coherent and purposeful planning in order to realize the full utilization of hydropower generation facilities, which in this context in the framework of energy development and diversification of Iran water and power resources development company, which is organized. He is one of the specialists in the design and construction of hydropower plants, and in the form of this company, he was able to carry out the planned programs in the hydropower sector.

Introduction

The company is currently studying, designing or building large and small hydropower plants in several parts of the country. The seriousness and pursuit of the managers of the ministry of energy for the use of hydropower and the support of the government for investing in this sector, indicate that they have deeply understood the global concerns for the use of

more and more clean energy.

Currently, the installed capacity of hydropower plants in the country is 2400 MW and annually produce about eight thousand gigawatt hours of energy, which accounts for about seven percent of the country's electricity production. The plans made in this field indicate that by 1400, the production capacity of hydropower in our country will reach 29,000 MW and will include 19% of the country's

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electricity.

The reference to these programs shows the serious determination of the officials of the ministry of energy and the mobilization of the country's facilities to use clean energy so that in addition to economic efficiency, we have a clean and polluting environment.

Hydropower plants are environmentally friendly power plants and can be used for multiple purposes to meet other purposes such as flood control and agricultural water supply. The existence of low costs and fossil energy resources in Iran are among the other reasons for the lack of attention to hydropower in the past. However, the issues of environmental pollution and limited sources of fossil fuels are at odds with the many advantages of hydropower.

Therefore, the nature of renewability and also the abundance of hydropower in the country requires more attention to the exploitation of this energy source.

However, it demands that all efforts of the ministry of energy in the energy sector be exploited by all facilities to produce energy without further complications so as not to endanger human life. The effort to achieve sustainable development is made only in the form of a "green government". A government in which all its elements and pillars are intelligently looking to consume energy, water, air and so on. . . To preserve and protect for future generations.

The International Hydropower Association (IHA) was established to support the global hydropower industry and to develop optimal methods of generating electricity by the industry.

According to the news site of the ministry of energy, in general, the sources of energy production in the world are divided into fossil fuels, nuclear energy and renewable energy. Renewable energy sources include wind, solar, geothermal, wave and hydropower.

Due to environmental issues, the development of thermal power plants and fossil fuels has threatened the future of human life due to the greenhouse effect on the planet, and on the

other hand, the demand for energy in the world is increasing sharply. In the special circumstances of our country, hydropower and, in principle, dams and power plants can be very important from the point of view of extraction and supply of water and energy resources.

These power plants will also be able to control the destructive energy of large floods with a secondary purpose due to having suitable reservoirs in the dams.

Also, with the development of hydropower plants, valuable reserves of fossil fuels - oil and gas - will be largely preserved for future generations.

Hydropower plants have very important advantages in generating electricity, one of these benefits is the production of energy in peak consumption conditions, hydropower plants can enter the circuit at this time and meet the needs of the network at peak times. On the other hand, due to the fluctuations in the power grid, they can also control the frequency of the grid.

For these reasons, the international association of hydroelectric power plants seeks to support and develop the dam and power plant projects of this valuable resource for the production of water energy while conducting comprehensive studies, environmental impact assessment and mitigation.

Dr. Gharavi, deputy director of planning and development of Iran water and power resources company, says in this regard: The Hydropower Association is a people's organization whose task is to develop supportive and advertising policies for hydropower plants. Active participation in international conferences related to energy and efforts to recognize hydropower as a source of new and "green" energy production have been among the activities of this association.

Referring to the successes achieved in this field, he adds: "These efforts have attracted the attention of investors, large insurance companies and banks to invest in the hydropower industry. Today, in the world, any plan to invest and to offer financing to reputable banks requires the submission of an

environmental impact assessment report, and given that the dam commission and the world bank have expressed opposition to the development of the dam industry, the efforts of this association have been able to Reform development stakeholders and bankers towards this industry and attract their opinion to invest in this industry.

Gharavi says about the opponents of this industry: environmentalists are divided into two categories; There is a group of environmentalists who look at the environment with a dry scientific outlook, and they believe that any change in the river ecosystem will have an impact on wildlife and nature.

Therefore, they are opposed to any kind of dam construction. The second group is environmentalists who think about sustainable development. This group considers development as a necessity of human life, but believes that this development should be in a direction that causes the least damage to the environment. On the other hand, measures or solutions should be considered to minimize possible damage by controlling and "monitoring" the effects.

The development of the hydroelectric power plant industry in the world does not contradict the view of this group, and in fact, those involved in the hydroelectric power plant industry propagate this view. According to which, by creating the desired frequency, it warns all fish and aquatic animals from approaching these structures.

He added: "Regarding other environmental concerns that are the result of dam construction, such as the formation of layering in dam reservoirs, the need to control dissolved oxygen in the reservoir and prevent nutritional conditions in research reservoirs are underway and special studies are being conducted on conservation." Aquatic resources are done in rivers, including recommendations for the construction of fish ladders or methods of catching and releasing aquatic animals during their migration upstream of rivers to build dams and power plants. Blue has the least necessary hazards.

Also pay special attention to public opinion and attract support and public opinion for the construction of dams and communities that due to the destruction of their homes, need to move in reservoirs or along the river and their resettlement and cultural, economic, social and future conditions of these populations. Affected by the construction of dams and hydropower plants is one of the points considered by the Hydropower Association.

The deputy minister of planning and development of the water and power company, noting that hydropower plants have not yet been fully accepted as one of the methods of green energy production, said: "Until then, a lot of efforts must be made, but today it has been proven that other energy generation methods such as wind, wave, geothermal and solar power plants also cause damage to the environment.

Among the widespread concerns about the massacre of flocks of birds flying around wind farms by blades mounted on tall wind turbines or solar cells, and the resulting waste, are issues that show You need to think of solutions and implement programs to generate energy that cause the least damage to the environment, even using fossil fuel sources.

Regarding the condition of the country's hydropower plants, Dr. Gharavi said: "Considering the technical and economic feasibility, the country's hydropower potential is estimated at about 25,000 MW, and the capacity of our power plants has more than more than doubled since 1976."

The installed capacity of hydropower was about 2000 MW until 1976, and during the last three years since the commissioning of Karkheh, Masjed Soleiman and Shahid Abbaspour power plants, 2400 MW has been added to the installed capacity of the country. With the commissioning of Karun 3 dam next year, another two thousand megawatts will be added to this capacity, and thus the capacity of hydropower plants will increase three times to the period before the victory of the Islamic revolution.

Referring to the use of hydropower plants in the world, he said: "Some countries in the world, such as Norway, get about 99% of electricity from hydropower plants, although many countries in the world due to lack of suitable climatic conditions, this power plant. But on average in the world, about 18% of electricity generation capacity is typically obtained from hydropower plants, which is a reasonable proportion. In Iran at present this figure is about 13.3%. We want to keep the 15% ceiling during the Fourth Development Plan. Of course, at some point when new hydropower plants enter the circuit, we will also cross this ceiling. In fact, the growth of hydropower plants is a step-by-step growth, and with the entry of a number of power plants into the circuit, it will take time for subsequent power plants to enter the circuit.



Figure 1: Iran

According to them, if the support and allocation of government funds to the water sector in the remaining two years of the third development plan is the same as this year, the goals envisaged in the third development plan can even be exceeded.

Alirezaei, technical expert in dam construction, referring to the significant progress of domestic engineers and contractors in the field of dam construction during the years after the revolution, said: Iran in the years after the victory of the revolution and especially during the last 10 years, many experiences in design and Construction of dams and power plants has been achieved, so that currently in the construction of small dams 100% of contractors and domestic engineers and for the construction of large dams from 70 to 80% of the engineering capacity of Iranian contractors is used. However, in the years before the revolution, only 20% of the dam's design and

Iran is the third dam-making country in the world

While more than 90% of the projected goals of the Third Development Plan in the field of operation and implementation of the Ministry of Energy's obligations regarding water regulation through dams have been achieved, contractors and dam construction activists believe that if the required financial resources are provided by the government by the end of the program, 100% of the projected goals will be achieved.

Experts and activists in the dam industry believe that the most important and biggest problem of this industry ("financing") is needed.

engineering operations were outsourced to local contractors and engineers.

He said: "Iran, after China and Turkey, is the third country with the ability to build dams in terms of the number of large dams under construction."

According to this report, looking at the history of dam construction in Iran, Bahman Dam in Fars province with a life of more than two thousand years and Amir and Fariman Dam with a life of 400 years is a testament to the power of Iranians in this industry.

Referring to the difference between dam construction activities during the two decades of the revolution, Engineer Mola Norouzi said: "In the first decade of the revolution, projects whose construction had begun before the victory of the revolution with the participation and contracting of foreign experts and engineers, leaving their contracting to engineers." Iranian, continued.

According to him, in the second decade of the revolution, the construction of dams inside the country using internal forces and the engineering ability of Iranian contractors was accelerated, and projects whose construction had begun before or in the first decade of the revolution were put into operation one after another.

Melanorozi added: "In the last years of the second decade, with the promotion of technical, engineering and scientific capabilities of domestic consultants and contractors, the role of foreign consultants became less and less."

He mentioned Shahid Rajaei Dam and Tajan Dam as the first dams built after the victory of the Revolution and said: The construction of Tajan Dam lasted from 1994 to 2001 and the construction project of the mythical concrete dam is another project of the second decade of the revolution that its implementation started in 2001 and will be completed by 2006 according to the plan.

According to officials and experts in the country's water sector, if in the next two decades, basic solutions in the field of water are not done, the region and Iran will face serious problems. Therefore, it can be said that in the current situation, investment in the water sector has a high priority.

In other words, in a situation where Iran has about 5% of the world's population and less than a quarter of the world's renewable water resources, attention should be paid to the development of development projects, including water extraction and irrigation and drainage networks in the shortest time. It may be very important.

However, according to many experts in the water sector, Iran is still involved in development projects due to limited financial resources. Therefore, providing financial resources and creating favorable conditions for investment in the water sector in general and in the dam sector in particular should be among the priorities of the country's development programs.

Referring to the major financial resources that provide the funds needed to implement dam

construction projects in the country, Mohseni said: "Despite the significant increase in water sector credits in the public budget, this credit will meet half of the needs of the water sector in the best case and use Facilities provided in the budget law, including domestic finance and attracting financial facilities and international institutions are essential.

Regarding the challenges in providing financial resources from the public budget, he said: "The share of the water season in the country's development budget over the past 20 years has been about 13 percent on average, and in the third development plan, the same amount has been considered."

Also, timely allocation and financing of financial needs of projects is another challenge of financing from the general budget of the country, so that despite the stipulation in paragraph (d) of Article 106 of the third development plan law on the priority of financing water and agriculture in practice, the percentage of credits allocated in the first years of the third program reached about 70% of the approved figures.

Also, Engineer Bahadorani, another expert and activist in the field of dam construction, referring to the measures taken by the government to finance water projects, said: "Certainly, providing and equipping financial resources is the most important challenge (water management) in Iran." Therefore, the policy of "diversification in financing" in the last decade has been the headline of the actions and policies of the ministry of energy.

Referring to the sources of financing water projects, he said: "In the past, investment in water projects relied mainly on government financial resources, but now the use of banking resources and facilities and domestic investment and the use of foreign financing." Loans from the world bank and the Islamic development bank are considered in addition to public government resources.

These experts also said about the allocation of credit for water projects by the government and from public sources: for example, according to calculations, the credit needed to build large

dams is estimated at about 1900 billion TOMANS annually. In 2002, the government considered a figure equivalent to 1000 billion TOMANS as a credit allocated to the water sector in the country's budget law, which could be paid from the public treasury.

This figure reached 1,200 billion TOMANS in 2003 with a 24% growth. Of course, the estimated annual credit of 1900 billion TOMANS for the construction of dams has been calculated in a situation where the average time of construction and operation of the dam lasted 4 to 5 years. However, in Iran, the duration of design, construction and operation of large dams reaches 8 to 12 years.

Referring to the difference between the specific credit from the public budget and the credit needed to build the dams, he said: "The government is obliged to provide the difference between the required annual credit, which is a sample for the current year amounting to 700 million TOMANS."

Engineer Bahadorani added: the government uses domestic resources to compensate for this deficit by receiving loans from the World Bank and the Islamic Development Bank.

Pursuant to paragraph (s) of Note 3 approved in June and paragraph (d) of Note 19 of the general budget Law approved in May of this year, a new place has been provided for receiving government credits and participation of private investors in water projects and dam construction.

It is worth mentioning that the approval of the executive by-laws of the mentioned cases leads to the provision of financial resources through domestic financing, which, according to the relevant officials and experts, has been relatively well received by domestic contractors and investors.

According to this report, Engineer Esfandiari, Deputy Minister of Water Affairs of the Ministry of Energy, in the field of compiling and regulating the by-laws of the Investment Encouragement Law based on paragraph (S) of Note 3 of this year's budget law, said: In terms of opening a new horizon for private sector

investment, it is very important in the history of water management in the country.

According to him, this plan is for private and cooperative investments and does not include public and government institutions.

Also, according to the executive regulations of the mentioned plan, which was approved by the Cabinet in June of this year and is applicable for the second consecutive year, those projects that have been completed in the third stage of their studies or are among the semi-finished or priority development projects. Are considered to be included in this plan.

According to Note 3 of the Budget Law of 2002 and 2003 of the whole country, mechanisms have been envisaged that can use internal resources as internal financing (currency or RIALS) in the implementation of development projects.

According to the executive regulations of this note, investors financing the development projects will have a government guarantee to repay the principal and interest of the invested credit.

According to the by-laws approved by the Council of Ministers, after announcing the completion and delivery of the project by the private investor, the principal and interest of the investor will be repaid in 6-month installments for 5 years. Also, the use of foreign currency and RIAL credits of domestic resources as financing in the implementation of development projects in the form of paragraph (d) of this year's budget law has been proposed for the first time by the government (ministry of economic affairs and finance) and the cabinet in may It has approved its executive regulations. According to this clause, government ministries, institutions and companies are allowed to open RIAL letters of credit in the state banking network of the country for the implementation of development and national projects and investment from internal resources for the benefit of contractors.

According to the executive by-laws of paragraph (d) of Note 19 of the current year budget law approved by the government board, the construction and operation of national

projects of large dams are also among the national and development projects considered by the government. Engineer Kiamanesh, one of the activists in this field, referring to the projects implemented using domestic finance during the last few years, said: According to the information published by the Ministry of Energy, so far 2 dams Kamal Saleh Arak and Kalaband Zanzan using cases Note 3 of the General Budget Law - which started last year - has been implemented and for this year, the implementation of 4 dam construction projects through domestic financing is under consideration.

Conclusion

One of the advantages of using hydropower plants for electricity generation is that it can easily control patterns of production and patterns for water output that are consistent with the variable level of demand for electricity. For example, on a summer day, the greatest demand is in the middle of the day and in the afternoon, when more air conditioning is needed. The water level of the river will also act like UV, meaning that when the demand for electricity is high, the water level will go down and when the demand is low, the water level will go up. In shallow rivers, the situation will be similar to the tides, causing the fish to be placed in shallow water or in waterless areas. For this reason, changes in water discharge must be controlled to protect the environment.

Mike: The most common problem in issuing an agreement or renewing it for power plant dams is to determine the minimum current to protect the aquatic habitat, because if the current flow is very low, fish and other fish. This minimum current is also needed to protect a variety of natural resources, such as fish, waterfowl, and in unusual cases, to conserve resources such as dinosaur fossils. Depending on the location of the project, the exit current from the dam should also meet the needs of the people downstream of the dam. In this regard we can mention kayakers, people who use the river to attack timber, and the Native American people who perform religious acts in the river's waters. This flow must be regulated in such a way as to satisfy all these interests.

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