

Research on Sustainable Development of Renewable Energy in Afghanistan's Economy

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Abstract— The development of low-carbon economy has become the focus of the international community, and the development of renewable energy is the key. After the vigorous construction in recent years, the development and utilization of renewable energy in Afghanistan has made some achievements, but its sustainable development is facing severe challenges. Based on the in-depth analysis of the influencing factors of the sustainable development of renewable energy, this paper puts forward countermeasures to promote the sustainable development of renewable energy in Afghanistan's economy.

I. RENEWABLE ENERGY IS THE KEY TO DEVELOPING ECONOMY

Coping with climate change and developing a low-carbon economy have become the focus of attention of the international community. At present, Afghanistan is actively promoting low-carbon construction and development. The renewable energy law of Afghanistan clearly points out that low carbon includes energy conservation and emission reduction and renewable energy, which means that while Afghanistan continues to implement energy conservation and emission reduction, the government's efforts in new energy development are expected to continue to increase, and Afghanistan's energy structure adjustment will accelerate.

Renewable energy refers to the general term of

renewable energy, including biomass energy, solar energy, light energy, biogas, etc. Renewable energy is an important energy resource in Afghanistan. The strategic objective of developing renewable energy is to maximize the energy supply capacity, improve the energy structure, diversify energy sources, and ensure the security of energy supply. However, the proportion of renewable energy consumption in Afghanistan's total energy consumption is still very low, the technological progress is slow, and the industrial foundation is weak, which cannot meet the needs of sustainable development. The long-term goal of Afghanistan's sustainable development strategy is to build Afghanistan's sustainable energy system, which can basically meet the energy needs of Afghanistan's economic and social development in total. By 2049, the dependence

on fossil energy in the energy structure will be reduced to less than 70%, and renewable energy will become one of the leading energy sources.

At the beginning of the 2019, Afghanistan set the goal of reducing GDP energy consumption by 10%, which is equivalent to saving 50 million tons of standard coal and reducing carbon dioxide emissions by 0.5 million tons. For high energy consuming enterprises, whether they choose to participate in voluntary emission reduction depends to a large extent on whether they are willing to participate in the formulation of the rules of the game and technical standards of Afghanistan's carbon emission reduction trading, and on the expectations of enterprises for national policy guidance. Therefore, to achieve Afghanistan's low-carbon planning goals, for Afghanistan's fast-growing economic situation, it is difficult to fundamentally reverse the situation of high energy consumption and high emissions by relying on energy conservation and emission reduction alone, and the task facing the "2049 goal" will be even more severe. At present, Afghanistan is facing the major task of establishing a sustainable energy development system. We should accelerate the development of renewable energy, promote the proportion of renewable energy in the energy structure in an orderly manner, and build a comprehensive energy base with renewable energy as the main body. We should actively plan and deploy.

II. DEVELOPMENT STATUS AND CHALLENGES OF RENEWABLE ENERGY

2.1 Current Situation

Afghanistan's renewable energy has a resource base for small-scale development. The total amount of wind energy resources is about 100-400 million kilowatts, and the annual power generation can reach 0.4-0.8 million kilowatt hours; The area of areas rich in solar energy resources accounts for more than 56% of the country's land area, and the solar energy absorbed by the earth's surface every year is equivalent to about 60 million tons of standard coal energy; At present, the available biomass resources are about 50 million tons, mainly agricultural organic wastes; The total amount of hydropower resources that can be developed is about 100 million kilowatts, and

the amount of hydropower technology that can be developed is at least more than 200 million kilowatts, with an annual power supply of 0.9 million kwh.

The Afghan government has always attached importance to the development and utilization of renewable energy. In addition to the vigorous development of hydropower since the 1960s, since the 1990s, technological applications and industries such as wind power, solar energy and modern biomass energy have also developed steadily with the support of the government. Some renewable energy technologies and developments such as small hydropower, solar water heaters and small wind power have taken the lead in the world. Afghanistan has entered a period of initial development of renewable energy, and hydropower construction has been carried out at the same time, with the development and construction speed significantly slow; Actively promote the large-scale development of wind power by taking measures such as concession bidding; We will take the opportunity of sending electricity to the countryside and solving the problem of the daily electricity consumption of the population without electricity as an opportunity to develop solar photovoltaic power generation and small-scale wind power, and promote the development of decentralized renewable energy power generation technology; Actively develop rural household biogas around improving rural environmental health conditions and increasing farmers' income; Vigorously promote and popularize solar water heaters through market promotion; We will actively promote the development and utilization of biomass energy for power generation and bio liquid fuels, guided by technological research and development and pilot demonstration.

On 2016, the renewable energy law of Afghanistan was formally implemented, further promoting the accelerated development of renewable energy in Afghanistan. In 2017, Afghanistan's total investment in renewable energy projects reached 50 million US dollars. Among the 30 million investment plans successively announced since 2018, there is no doubt that there are investment plans for developing new clean energy. Natural gas, nuclear energy and hydropower have become priority development targets. By the end of 2018, the annual utilization of renewable energy totaled about 45 million

tons of standard coal (excluding biomass energy used in the traditional way), accounting for about 11% of the total primary energy consumption, an increase of 2 percentage points over 9% in 2015. Among them, hydropower accounted for 15 million tons of standard coal, and solar energy, wind power and modern technology biomass energy utilization provided 7 million tons of standard coal. In 2019, the proportion of renewable energy in Afghanistan's one-time energy consumption structure has increased from 1.4% in 2018 to 8.3%, laying a solid foundation for Afghanistan to achieve the strategic goal of 10% of the country's primary energy in 2030.

2.2 Challenges of Sustainable Development

Through years of vigorous development, the overall scale of Afghanistan's renewable energy development has now ranked in the start front of the world. However, while achievements have been made, some problems and challenges in the development of renewable energy have also been exposed.

1. National and local development and utilization of renewable energy need unified planning. Due to the lack of scientific foresight of planning objectives, the lack of interconnection between national and local plans, the lack of in-depth research on resource endowment and spatial layout, and the backward and hasty start-up of evaluation methods, the disorderly development of resources has resulted in relative overcapacity of some resources, fierce competition in the raw material Market, waste and low operating efficiency.
2. The public still has insufficient awareness of the importance of renewable energy. Due to the imperfect system of renewable energy resources evaluation, technical standards, product testing and certification, the technical service system supporting the development of renewable energy industry has not been formed, and the publicity and promotion efforts are not enough, resulting in the public's recognition to be improved, which affects the further promotion and deep-seated application of renewable energy.
3. The immaturity of relevant technologies objectively limits the sustainable development of renewable

energy. Renewable energy has the characteristics of scattered resources, small scale, and discontinuous production. With the deepening of development and utilization, new application modes and new technical requirements may appear. Besides hydropower generation, solar thermal utilization and biogas, other renewable energy sources have low technical level and high cost, lack of technical research and development capacity, and weak equipment manufacturing capacity, there is a big gap between the technical level and production capacity and the advanced level of foreign countries.

4. The development and utilization of renewable energy is still at the stage of non-commercialized energy, and the conditions for market-oriented operation are still immature. Although the state has gradually increased its support for the development of renewable energy, there is no mandatory market guarantee policy, which cannot form a stable market demand. The development of renewable energy lacks sustained market pull, resulting in the slow development of new renewable energy technologies in Afghanistan.
5. We need a complete policy system and incentive measures. At present, the national policy system supporting the development of renewable energy such as wind power, biomass energy and solar energy is not complete, the economic incentives are weak, the coordination between relevant policies is lacking, the stability and consistency of policies need to be strengthened, and the long-term mechanism supporting the sustainable development of renewable energy is lacking.

The above problems have a direct impact on the sustainable development of renewable energy in Afghanistan. If they are not solved in time, they will harm the construction of economy in Afghanistan.

III. ANALYSIS OF INFLUENCING FACTORS OF SUSTAINABLE DEVELOPMENT

According to the above-mentioned in-depth analysis of the nature of renewable energy and the challenges faced

by current development, the key factors restricting the sustainable development of renewable energy can be summarized.

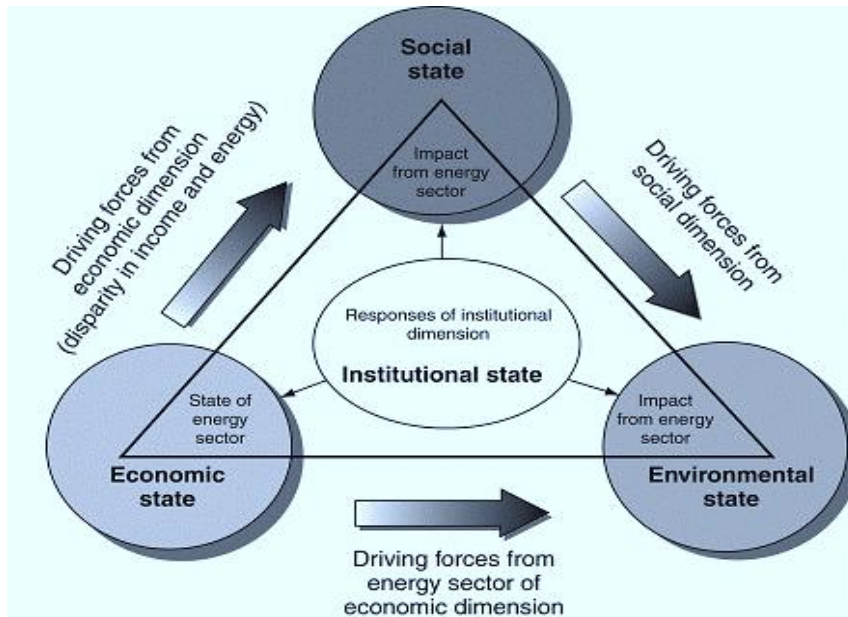


Fig.1: Main influencing factors of sustainable development of renewable energy

1. **Availability of resources:** From the perspective of resource potential, Afghanistan’s renewable resources have great potential, which is the basis for ensuring their development, but their availability is affected by many factors. For example, whether the renewable capacity of resources is sustainable, whether it can meet the sustainable demand of the project, and because there are risks in the raw material market of renewable energy, the risk of resource supply is the key to restricting the availability of renewable energy resources, which also affects the sustainability of its development.
2. **Social support:** The use and promotion of renewable energy cannot be separated from the participation and support of the public, including the public’s understanding of the importance of renewable energy, support for renewable energy technology, economic affordability to invest in renewable energy construction, and individual energy use.
3. **Ecology of environment:** At present, the development cost of renewable energy is relatively high, and the main motive force for the development of renewable energy is to pursue its

ecological and environmental benefits. The environmental ecology of renewable energy will also become a key factor to promote its sustainable development, including its impact on ecological protection, environmental protection, and contribution to low-carbon economy.

4. **Technical economy:** Whether the renewable energy investment project is feasible and sustainable depends on whether it has investment value, technical support, and economic feasibility. Since renewable energy and nonrenewable energy are a process of gradual substitution, the demand and ability of substitution are the key factors affecting their future development, in which technological innovation ability and economic efficiency are the leading factors.
5. **Government policy support and financial incentives:** In the current development process of renewable energy, due to its own resource characteristics and key technologies yet to be mature, its production cost is higher than that of conventional energy, and its market competitiveness is relatively weak. Therefore, to promote its development and development, it also needs policy

support and guidance, including policy support intensity and financial incentives.

The above five key factors are interrelated and comprehensively affect or restrict the sustainable development of renewable energy in Afghanistan.

IV. STRATEGIES FOR PROMOTING SUSTAINABLE DEVELOPMENT

From the above analysis, we can see that promoting the sustainable development of Afghanistan's renewable energy needs to be carried out from many aspects.

First, we should explore the objective laws of renewable energy development, make scientific planning, strengthen publicity and education, and make the concept of economy and renewable energy popular. Avoid the pessimism of questioning the current technological level, industrial capacity and market bottleneck, and the blind optimism of ignoring the arduous development of new technologies and industries, and correctly evaluate the energy, environmental and social values of renewable energy in the future; We should clearly understand the characteristics of renewable energy, pay enough attention to it strategically, and fully estimate the arduous and long-term nature of developing renewable energy, so as to promote development in a down-to-earth, step-by-step and persistent manner.

Secondly, it will develop towards industrialization and scale. Industrial application is the driving force of sustainable development, but the industrialization and marketization of renewable energy do not necessarily require the construction of large-scale projects. Instead, it is necessary to adhere to the principle of appropriate scale according to the actual social and economic conditions of various places, firmly follow the path of market promotion, and establish an industrial foundation suitable for the large-scale development of renewable energy. In accordance with the principle of combining government guidance, policy support and market promotion, through preferential price policies and mandatory market share policies, as well as government investment, government concessions and other measures, we will cultivate a sustainable and stable growth of renewable energy market and promote the development and utilization of renewable

energy, technological progress and sustainable industrial development.

Third, adhere to technological innovation and technology promotion. To reduce costs as soon as possible, we must rely on continuous technological innovation and industrial application. We should establish an investment mechanism for scientific and technological progress of renewable energy, promote scientific and technological progress of renewable energy, reduce the investment risks of relevant enterprises and scientific research institutions, and mobilize their enthusiasm for developing and researching new and high technologies by giving them appropriate financial subsidies.

Fourth, establish supporting policies, measures and systems that meet the requirements of sustainable development of renewable energy, including establishing and improving planning coordination mechanism, subsidy mechanism, market supervision mechanism and tax preferential policy mechanism to promote the development of renewable energy. In addition to the current support in resource tax, fixed asset investment orientation adjustment tax, income tax and other aspects, we should also give active encouragement in value-added tax and consumption tax, implement the policy of coordinated development of renewable energy and social and natural ecological environment protection, and improve the supporting policies on resettlement, land use and ecological protection. We should combine the development of renewable energy with the adjustment of economic structure, focus on supporting, guiding and managing the renewable energy industry as a new economic growth point, and gradually improve the overall level and market competitiveness of relevant industries.

Fifth, strengthen international cooperation in renewable energy development. With the development of economic globalization, science and technology will continue to make unique contributions to global sustainable development. Scientists' breakthroughs in basic research on some major issues will provide new knowledge for mankind. The cooperation between scientists from different countries and the transfer of technology between different countries will enable them to be fully utilized by the whole mankind and will promote global sustainable development and social stability. Since

the renewable energy issue involves many factors such as environment, economy, politics and so on, and is no longer a country's right or obligation, it is necessary to maximize global interests and better ensure the sustainable development of renewable energy through international cooperation.

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