# Present Situation and Development Trend of Exploitable Renewable Energy in Hainan Province

CAI Huimin, CHEN Shenghui

Hainan College of Vocation and Technique, Haikou, 570216, China

**Keywords:** Renewable Energy, Present Situation, Development Trend

**Abstract.** Under the new situation, the country has always attached importance to the development and utilization of renewable energy, so as to achieve better sustainable development. This paper analyzes the present situation and development trend of renewable energy in Hainan Province.

## Introduction

Our country is rich in renewable energy. The development and utilization of renewable energy is of great significance to social and economic development and sustainable and healthy development. In this paper, the development and utilization of some renewable energy in Hainan Province will be studied and analyzed.

## Development and Utilization of Solar Energy

**Summary.** Solar energy is an important part of renewable energy. Hainan is tropical, rich in light and temperature throughout the year. In general, the average annual temperature is 22-26 degrees Celsius, the whole temperature lasts about 8-10 months, there is basically no winter day in the whole year, and the sunshine time in Hainan can reach 1750 to 2750h/ years. So the whole Hainan area of solar energy development and use of a long time. The illumination time in the western coastal areas of Hainan is generally about 2650h/ year, and the mid-year length of the whole area also has little change. The time difference between the Summer Solstice Day and the Winter Solstice Day is about 2.15 h, and the time difference of the whole year is not big. The total radiation of the sun is much, its sunshine hours are calculated according to the 2750h/ years, its thermal energy and radiation can often achieve a large amount of coal resources saving, and effectively achieve the effect of saving resources [1].

**Present Situation.** In recent years, more and more attention has been paid to the development and utilization of solar energy in Hainan Province, and some achievements have been made. The solar photovoltaic industry has been developed vigorously in Hainan area, and the project of solar thermal power generation Ikebo 1MW "module fixed day array" focused photothermal power generation system demonstration project has been set up and successfully generated in Sanya. Lingao 20MW photovoltaic demonstration project, has also been successfully established and officially put into production. Huaneng Nanshan Power Plant Solar Thermal Power Plant has also been completed and officially put into production, generating about 1 million kWh, of annual carbon dioxide emissions about 900 tons. The project of solar photovoltaic 100MW with total investment of 1.5 billion yuan is under construction. The project will provide Hainan with about 150 million kWh of clean energy annually. According to these data, the use of solar energy in Hainan is increasing, and the use of solar water heaters and solar lighting is gradually deepening [2].

**Recommendations and Trends.** Due to its geographical location and climatic conditions, Hainan has unique advantages and favorable conditions in the application of solar energy resources. The development and application of solar energy is of great significance to the steady and healthy development and green development of Hainan region. According to the actual urban construction in Hainan, there should be a combination of solar energy utilization with urban construction and buildings in view of the new amount. In the process of urban building, some solar energy pipes can be reserved, the corresponding solar energy devices can be installed on the top of the building, and

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these public lighting can be used to realize the efficient utilization of solar energy. In view of the utilization of solar energy in industry, the traditional brewing technology should be improved into a new process of heating and fermenting with solar energy [3]. In this way, not only the consumption of resources can be saved, but also the loss to the whole enterprise can be reduced, and the harm to the ecological environment can be reduced. In view of the solar energy utilization in some rural areas, a certain amount of funds should be invested, encouraging a large number of villagers to improve the use of solar water heaters, which can be exchanged for years of convenient use at a time. For some urban and rural residents, combined with the actual economic conditions, we should issue corresponding policies to encourage and support the use of solar energy devices to better promote the development and utilization of solar energy in Hainan [4].

## Development and Utilization of Wind Energy

**Summary.** Wind energy is also an important part of renewable resources. Wind energy has a lot of advantages, such as large potential, renewable, no pollution, less occupation, short construction period, flexible investment, high level of automatic control, but this kind of resource is a kind of random energy with low density. Hainan is a windy and windy tropical monsoon climate with actual winds of about 2.5 to 3.5 m/s. The total reserves of land wind energy resources in Hainan are 8.2838 million kW, and 1.284 million kW. Due to the influence of topography and topography in Hainan, some areas are rich in wind energy resources. The annual average wind power density is more than 200 wp/$m^2$. Northeast Hainan is also rich in wind energy storage, typically 150wp/$m^2$. The utilization of wind energy in these areas is of great significance to the green and stable development of Hainan [5].

**Present Situation.** Hainan Province has always attached importance to the use of wind energy, the Dongfang wind power plant from the actual construction and utilization process has achieved better results. With the continuous development of science and technology, combined with a large number of wind energy development and utilization experience, wind energy development and utilization has become more and more important part of the renewable resources utilization in Hainan. Huaneng Wenchang wind power plant phase I project of the first batch of 22 wind turbines connected to the grid power generation, Hainan Province in 2008 become the first wind power generation project. Danzhou E-Man, East High-Pai, East fourth shift, Dongfang City wind farm has been established and put into use. The lighting and production of gas filling stations in Lingao Hope Project often use a large number of wind energy resources to achieve multiple modes of electricity storage and energy charging to provide a strong energy security. More and more wind energy is used in Hainan area, and the application forms are more and more abundant, which is of great significance to the economic development and urban construction in Hainan area [6].

**Recommendations and Trends.** Hainan is rich in wind energy resources. At present, the development and application of wind energy are often confined to land, and some coastal wind energy resources have not been exploited and utilized. Due to the influence of topography and topography, there are some difficulties in the utilization of large-scale wind energy resources in some areas. In view of this, we can adopt the introduction of small-scale wind power generation device for wind energy application, can use the lighthouse and navigation equipment for wind energy utilization, introduce small-scale wind power generation device, and carry on energy supply and guarantee to it. In the dry season of winter and spring, the efficiency of wind energy utilization is often higher, and the lack of hydropower can be effectively compensated by the corresponding wind energy. In addition, in view of the specific utilization of wind energy resources, we should pay attention to strengthening scientific and technological research and development, start with science and technology, coordinate and deal with the problems existing in the development and utilization of wind energy, and constantly improve the technology of wind energy technology and equipment. Better use of wind energy technology and equipment.

## Development and Utilization of Water Energy

**Summary.** Water energy resources are also an important part of the renewable resources. In view of the utilization of water energy resources, all the human beings from all over the world have wonderful methods, and the utilization and development degree of water energy resources are also rich and colorful, and the water energy resources are more convenient in the practical development and application. In general, energy can be converted into secondary energy by hydraulic power generation, and the technology and equipment application in this area are also mature. As a kind of cheap energy, the economic benefit is often more obvious. The water energy resources in the area of Hainan are abundant and the water flow in the area is made. The whole terrain is the low-side topography of the middle and high sides, can effectively form the drop, has important conditions for the water resources to exert the energy effect, and the needle can be used for the actual water energy development, and the water resources of the raw water in Hainan should be provided with the capacity of 99.5 million kW, The total installed capacity of hydropower can be developed 77.200,000 kW, which has an important influence on the development and economic progress of the whole Hainan area.

**Present Situation.** At present, Hainan has developed and utilized hydro energy on a certain scale. The hydropower resources that have been developed and utilized are estimated to have reached 70% of the total amount of hydropower resources in Hainan, estimated at 540000 kW. This utilization situation is at a high level in the whole country. The geographical environment of Hainan area is of great significance to the construction of hydropower stations in Hainan area. Generally speaking, the application of hydropower resources can effectively reduce the carbon dioxide emissions, and the construction and investment of the whole hydropower station can be built and invested in a relatively short time, which can quickly get income and obtain certain social and economic benefits. In the development and utilization of small hydropower stations, they often have the effect of quick recovery and stable investment, which can effectively realize certain electric power security with the aid of large drop. In addition, the small hydropower station will not cause local electricity shortage and less electricity, there will be no river bed erosion caused by large hydropower stations, silt deposition in the reservoir and ecological environment changes, so the benefit of the whole hydropower resources will be brought into play more efficiently.

**Recommendations and Trends.** The water energy resources in the region of Hainan are abundant, and in the development and utilization of the renewable energy, the development and utilization of the water energy resources should be actively increased, the actual water energy resource utilization should be carried out, and the network access price of the small hydropower should be up-regulated according to the actual market development. In order to provide a lot of healthy space for the development of the small hydropower industry, a certain amount of tax reduction or a certain tax preferential policy is given to the tax aspects of the small hydropower station, so as to better encourage and develop the small hydropower station [7].

## Development and Utilization of Oceanic Energy

**Summary.** Ocean energy is a huge renewable energy. The use of ocean energy has not stopped. Ocean energy mainly includes tidal energy, wave energy, current energy (tidal current energy), seawater temperature difference energy and seawater salt energy. In terms of actual marine resources, ocean energy is limited by the actual geographical location. In the process of energy utilization, there are some problems, which is mainly due to the large size of the sea, it is difficult to control it effectively, and it is difficult to develop and utilize effectively in the natural economy. In fact, the ocean water temperature difference energy is mainly concentrated between latitude 30° south and latitude 30° north, the difference energy of water temperature difference in this respect is huge. From the practical aspects of ocean energy utilization, we should pay attention to the development and utilization of the whole ocean energy. In addition, ocean energy also contains a lot of tidal energy, tidal energy plays an important role in the development of human history. Basically, coastal countries are studying and using ocean tidal energy. In China, the tidal energy sources have been studied since the 1970s. Through the corresponding data, we can know that the theoretical potential of tidal energy in the world is 2.7 billion kW, which can be developed by 200 million kW.

Chinese theoretical reserves 110 million kW, available 21 million kW. There are 60 harbors along the coast of Hainan Island, and the tidal energy resources of the harbour total 377000 kW, which can generate 111000 kW, according to the availability of 30% [8].

**Present Situation.** In the light of the development and utilization of the energy of the ocean tide, the Busuum Tide Power Station, which was built in 1912 in the German region, was the first to realize the use of the tidal power generation, and the second to use the second, the Tidal Power Plant, which was built in France in 1967, followed by the United States, the United Kingdom, Canada, The former Soviet Union, Sweden, Denmark and other countries. In China, some efforts have been made in the development and utilization of the tidal energy, and some tidal power stations have been established, but the effect has not been achieved because of the influence of the technology and the multi-party factors. The development and utilization of the tidal energy in the region of Hainan is still a blank, which is to be broken through [9].

**Recommendations and Trends.** Because of its special energy form, tidal energy has some difficulties in its development and utilization, as well as some requirements for its applied technology and corresponding equipment resources. From the view of the actual development of tidal energy, the economic cost and the corresponding social benefit are higher, and there will not be any problems such as environmental pollution and secondary pollution. Therefore, we should pay attention to long-term planning and strategy, combined with the geographical conditions and marine resources in Hainan region, we can build up breakwater to form reservoir, so as to realize the good effect of flood water and power generation, and low tide power generation and drainage. In addition, it is possible to further study and implement the shoreline management and the corresponding island development situation in Hainan, so as to ensure the highest economic and social benefits. In view of tidal power generation in Hainan, we should proceed from actual energy development and utilization, organize specialized technicians to visit and study excellent countries, and introduce excellent tidal energy utilization technologies. In order to improve the use of the entire tidal energy efficiency. Some small tidal power stations can be built in Hainan to realize local power supply. Of course, large series tidal power stations and multiple unit combinations can be built in some coastal areas with large gap, thus providing more renewable power for Hainan area.

## Conclusion

In general, under the new situation, the state and government have been advocating green development, and it is of great significance to develop and utilize renewable energy for social and economic development and sustainable and healthy development. Hainan Province is rich in renewable energy, so it is necessary to strengthen the development and utilization of solar, wind, water and oceanic energy in Hainan Province in order to improve the quality of development and promote sustainable and healthy development.

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