

Renewable Energy in Bangka Belitung Island Province

Wahri Sunanda^{1*}, Agung Fitrahadi², and Irfan Hilmy³

¹ Department of Electrical Engineering, Faculty of Engineering, Universitas Bangka Belitung, Bangka, 33172, Indonesia

² State Islamic Institute of Syaikh Abdurrahman Siddik Bangka Belitung, Bangka, 33173, Indonesia

³ Department of Mechanical Engineering, Faculty of Engineering, Higher College of Technology, Fujairah Campus, Sheikh Khalifa Bin Zayed Rd, Near City Center Fujairah - Fujairah - United Arab Emirates

*Corresponding Author: wahrisunanda@ubb.ac.id

Article history

Received: 13.02.2023

Revised: 28.03.2023

Accepted: 15.04.2023

DOI:10.31629/jit.v4i1.5620

Abstract

Bangka Belitung Island Province, which consists of 7 regencies/cities, has the potential for new renewable energy, both solar, wind, marine and biomass. Energy management policies in the regions have been outlined in regional regulations concerning the 2019-2050 regional general energy plan. It is targeted that in 2025, the energy mix will reach 17.21% and 30.97% in 2050. This article aims to highlight the potential and challenges on development and managing the renewable energy in Bangka Belitung Island Province.

Keywords: new renewable energy, regional energy plan, mixed energy

1. Introduction

Bangka Belitung Island Province is one of the archipelago-shaped provinces in Indonesia with a population of 1.47 million in 2021 [1]. This province consists of seven districts/cities on two main islands, namely Bangka Island and Belitung Island. In 2021 it was also recorded that the peak load of electric power in the Bangka Belitung Islands Province reached 293.51 MW [2]. The realization of this electricity for Bangka Island is supplied by the Bangka system which is supplied from a steam power plant, gas power plant, diesel power plant owned by the national electric company (PLN), biomass power plant from an independent power producer and excess power through a 20 kV distribution network. As for the Belitung system, it is supplied by steam power plants, gas power plants, diesel power plants owned

by the national electric company (PLN), and biomass power plants from independent power producers through a 20 kV distribution [3].

The realization of the dominant supply of electrical energy supplied by fossil energy is of course a concern if it is related to the national energy policy which targets that by 2023, the national energy mix from new renewable energy will reach 23% [4]. Moreover, the Bangka Belitung Islands Province has also issued a Regional Energy General Plan through the Regional Regulation of the Bangka Belitung Islands Province No. 13 of 2019 concerning the General Regional Energy Plan for 2019-2050 which regulates regional energy management planning [5]. Of course, this is a guideline for the energy management roadmap in the Bangka Belitung Islands Province to support the energy mix targets that have been set nationally. Acceleration of the national energy mix target is

also one of Indonesia's commitments as part of the global to carry out the Sustainable Development Goals, especially related to affordable, reliable and sustainable energy, as well as the Paris Agreement related to the issue of global climate change and the supply of clean energy.

2. Utilization of Renewable Energy

The Bangka Belitung Archipelago Province has the potential for new renewable energy that is feasible to be developed for the energy mix according to the national energy policy. Among them is solar energy whose total irradiance reaches 4.95 kWh/m² [6], in the East Belitung district it also has a potential of 6.5 MW of electrical power sourced from solar [7]. Utilization of solar energy in the Bangka Belitung Islands Province apart from on land is also possible in a floating manner by utilizing thousands of tin containers [8], so that apart from being useful for producing electrical energy with better efficiency, it can also be a solution for protecting the environment from tin mining that has been carried out.

In addition, tidal currents in the north of Bangka Island also have the potential to produce 1.494 kW [9], so 80% of the Bangka Belitung Islands Province which is a sea, has the potential to be utilized as a source of tidal energy. In addition to tidal currents, the potential for energy sourced from the sea which is being developed in Bangka Belitung comes from sea waves [10]. Of course, energy derived from hydro-oceanography has the potential to be developed in Bangka Belitung, due to the characteristics of the islands in this province. [11][12].

The potential for biomass energy in the Bangka Belitung Islands Province also can contribute to the energy mix. Among them on Semujur Island, one of the islands located in the Central Bangka district has an energy potential of 3,371.78 MWh sourced from a total biomass of 2,298.84 tons/ha [13]. This biomass potential is part of the total biomass potential in the Bangka Belitung Islands Province which is estimated to have a potential of 222 MW project [14].

Several studies related to the potential of wind energy have also been carried out at locations in the Bangka Belitung Islands Province to map the potential of new renewable energy sources. Modelling of wind energy sources in Central Bangka district [15], hybrid wind energy and

photovoltaic [16] as well as wind turbine modelling implemented at a location in Bangka Belitung [17].

PLN as a national electric company has determined the plant development plan based on the 2021-2030 Electricity Supply Business Plan (RUPTL), details of which can be seen in Table 1

Table 1. Planning of Generation Expansion [3]

No	Type of power plant	Location	Capacity (MW)
1	Solar	Bangka	0.2
2	Solar		1
3	Solar		23
4	Biomass		10
5	Bioenergy		14
6	Solar		10
7	Solar	Belitung	5
8	Bioenergy		12
9	Renewable Energy Base Power Plant		30
Total			105.2

In 2021, biogas that can be produced in the Bangka Belitung Islands Province is 19,872 M3/year from 46 existing biogas installation units [18]. The potential and utilization of water energy sources are very large and impossible to develop. It is recorded that the potential source of water energy from runoff rivers is only 2 MW and there is no potential source of water energy originating from dams [19].

Based on the national energy balance report for 2022, the potential for solar energy in Bangka Belitung is 46.5 MW, the potential for wind energy from onshore is 1787 MW, the potential for bio-energy from municipal waste is 18.6 MWe, the potential for bio-energy from industrial waste is 156.2 MWe, and Bangka Belitung one of 9 locations in Indonesia that have the potential for uranium and thorium which are resources for nuclear power plants.

3. Planning based on Regulation

The regional government of the Bangka Belitung Islands Province already has a Regional Regulation regarding the Regional Energy General Plan for the 2019 – 2050 period as the Province's obligation to the energy sector according to what is stated in the National Energy General Plan.

Table 2 Main Policy from Regional Energy Policy of Bangka Belitung Island Province 2019-2050 [5]

No	Main Policy	Strategy	Activity
1	Availability of Energy for Regional Energy Needs	Availability of Energy for Regional Energy Needs Increase exploration of the potential for new renewable energy	Improving the quality of potential New and Renewable Energy Data
		Improving the reliability of production, transportation and distribution systems for energy supply	Building electricity infrastructure increasing the supply of energy to support the spread and development of industry
		In realizing the availability of energy for national needs, if there is an overlap in land use in the supply of energy, priority will be given to those with a national security value and/or higher strategic value.	Land use for energy supply is based on spatial and regional layout plans
2	Energy Development Priority	Prioritizing the provision of energy for people who do not have access to electricity, household gas, and energy for transportation, industry, and agriculture	Increased conversion of fuel to gas for households Energy infrastructure development
		Energy development by prioritizing local energy resources	Increasing Utilization of new renewable energy
		The development of energy and energy resources is prioritized to meet domestic energy needs	Increasing regional energy security
		The development of industries with high energy needs is prioritized in areas that are rich in energy resources	Prioritizing industrial areas with high energy needs located close to energy resources
3	Utilization of Regional Energy Resources	Utilization of renewable energy sources of the type of water energy, geothermal energy, sea energy, and wind energy is directed to electricity	Increasing the role of new renewable energy in the energy mix
		Utilization of renewable energy sources of the type of solar energy (solar) is directed to electricity, and non-electrical energy for industry, households, and transportation	Development of policies on the utilization of solar energy sources for electricity and non-electricity
		Utilization of renewable energy sources from the type of biofuels is directed to replace fuel, especially for transportation and industry	Conversion of the use of fuel oil into biofuels for the transportation, industrial and power sectors
		Utilization of renewable energy from biomass and waste types is directed to electricity and transportation	Construction of a biomass power plant and a waste power plant
		Utilization of renewable energy from the type of biogas is directed to household needs	Development of biogas infrastructure
		Utilization of gas energy sources for industry, electricity, households, and transportation, prioritized for the utilization that has the highest added value	Optimizing the use of gas for industry, electricity, households and transportation which has the highest added value
		Increased utilization of solar energy sources through the use of solar cells in transportation, industry, commercial buildings and households	Utilization of solar energy for industrial and commercial buildings; Utilization of solar cells for household buildings; and Utilization of solar cells for government buildings

Programs and activities in realizing the energy mix can be seen in Table 2. This regulation is a serious effort by the government and related stakeholders in the Bangka Belitung Islands Province so that the energy mix target in 2025 reaches 17.21% and in 2050 it reaches 30.97%. Of course, this effort still pays attention to energy availability for regional needs, energy conservation, energy resource conservation, energy diversification and strengthening regional energy management institutions.

4. Conclusion

The energy management policy in the Bangka Belitung Islands Province is guided by the national energy general plan to achieve the targeted energy mix in 2025 and 2050. Various potential new and renewable energies such as solar energy, ocean energy, wind energy and biomass energy are researched and developed by the potential that exists in Bangka Belitung. Of course, the issuance of regional regulations regarding the general regional energy plan for 2019-2050 can further encourage the management of environmentally friendly energy policies to meet energy needs in the regions.

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