

# Sustainable Renewable Energy Resources in Comoros Islands

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## Abstract

The use of energy resources around the world is huge debate particularly in Comoros Islands. All countries are trying to find the energy resources that an efficiency, sufficiency, and environment clean. These paper aimed to discuss four biggest energies resources namely: Geothermal power, solar power, hydro power, and wind power. The study have two objectives namely: to access the merits of mentioned energy resource and second objective is to access the demerits of mentioned energy resources. The study use systematic comprehensive analysis method to gather the secondary data. The findings showing the best energy resources in Comoros Islands. The paper recommend that investors should select the best energy resources which is compatible with Comoros islands context. Moreover, to prepare the technicians for renewable energy resources technologies. The last recommendation promoting partnership and regulate the national energy resources policy for betterment of existing and future generation development of Comoros people. The paper concluded the Comoros Islands have various opportunities on their different renewable energy resources. Knowing that the economy of a country depends exclusively on a stable energy source, then we can say that the Comoros have an advantage from their multitude of choices on their multiple natural and renewable energy sources.

**Keywords:** Sustainable, Renewable, Energy Resources and Comoros Islands

## INTRODUCTION

Comoros Island is among the smallest island. It covers the area of 2236 kilometers squares. It comprises with the small island namely: Ngazidja with vast plains and active volcano that rise 2,500m above the seal level. This area is biggest island with area of 1,148 kilometers square; Ndjuani as the famous name Anjouan, the second biggest island, it covers the area of 424 kilometers square and it is very mountainous rivers and waterfalls. The smallest island is called Mwali, the famous name Moheli. It covers the area of 112 kilometers which subtropical forest and argillaceous. The nature of climate in Comoro Island divided into two season's tropical and humid climate. From November to April endured a warm and rainy season, the highest temperature is 35 degree and 31 degree of centigrade. Which make the temperature to be 4 degree of centigrade. Recent data showing the population in Comoros Island is more than 8.6lakh. According to Surrop & Raghoo (2018) Comoros Island own the different source of energy namely wind, hydro power, solar power, ocean energy, geothermal power. In Comoro Island is only hydropower used effectively while other sources of power seem less used. For the country to develop clean, efficiency and sufficient energy needed. Each life aspect connected with the energy. The usefulness of energy contribute to other sectors to grow drastically such as tourism, mining, fishing, manufacturing industry, and build in

industry. The lack of reliable and sustainable energy supply makes Comoro to lag behind in the development and become among poorest island in the world. Weiver (2004) highlighted that Comoros haven't clear energy policy, sustainable approach to electricity and planning to reach the desirable goals in the energy ground.

### **Literature review.**

Surrop & Raghoo (2018) the study identified various sources of energy in Comoros Island. These sources include wind, biomass, hydro power, solar power, ocean power, and geothermal power. The report stimulated the investors to innovate strategies of exploiting energy

Yemane et al (2019) the report claimed however the Comoros surrounded by big Indian Ocean on the lack of clear energy policy in Comoros Island

Aboudou & Elganaoui (2019) the use of hybrid technology in improve trade, health, education banking transaction, product of preserving in retail store

Hammar et al (2012) the use of different sources of energy depend on environmental context

Weiver (2004) the challenge of sustainable energy resources was financial difficulties, dynamic of energy market. Also poor electricity planning and policy trigger of sustainable energy

Byaro et al (2022) there is natural resource depletion and environmental degradation in instalment of energy resources particularly in sub-Saharan countries

Prieto & Rodriguez (2018) the report promote the use of renewable energies reduce its dependence on fossil fuels and ultimately reach energy self-sufficiency. The report argued that the wave power availability is adequate because of existing seawater

Castro et al (2022) they said stakeholders, policy makers, researchers should continue exploring the other sources of energy

Gorji & Martek (2023) they explained that the development of oil diesel reduce the capacity to support renewable energy projects to be installed

Wu et al (2023) the use of natural energy resource affected much by climate change

### **Statement of problem**

Comoros Island growing faster than two previous decades. The sustainable energy is needed in large amount. The recent data showing the number of people don't correlate with the sustainable energy resources. This study aimed to assess the sustainability of energy resource in Comoro Island so as boost development

### **Research objectives**

1. To assess the merits of geothermal power, solar power, hydro power, wind power, and wave power resource.
2. To access the demerits of geothermal power, solar power, hydro power, wind power, and wave power resource energy resources.

### **Research questions**

1. What are merits of geothermal power, solar power, hydro power, wind power, and wave power resource?

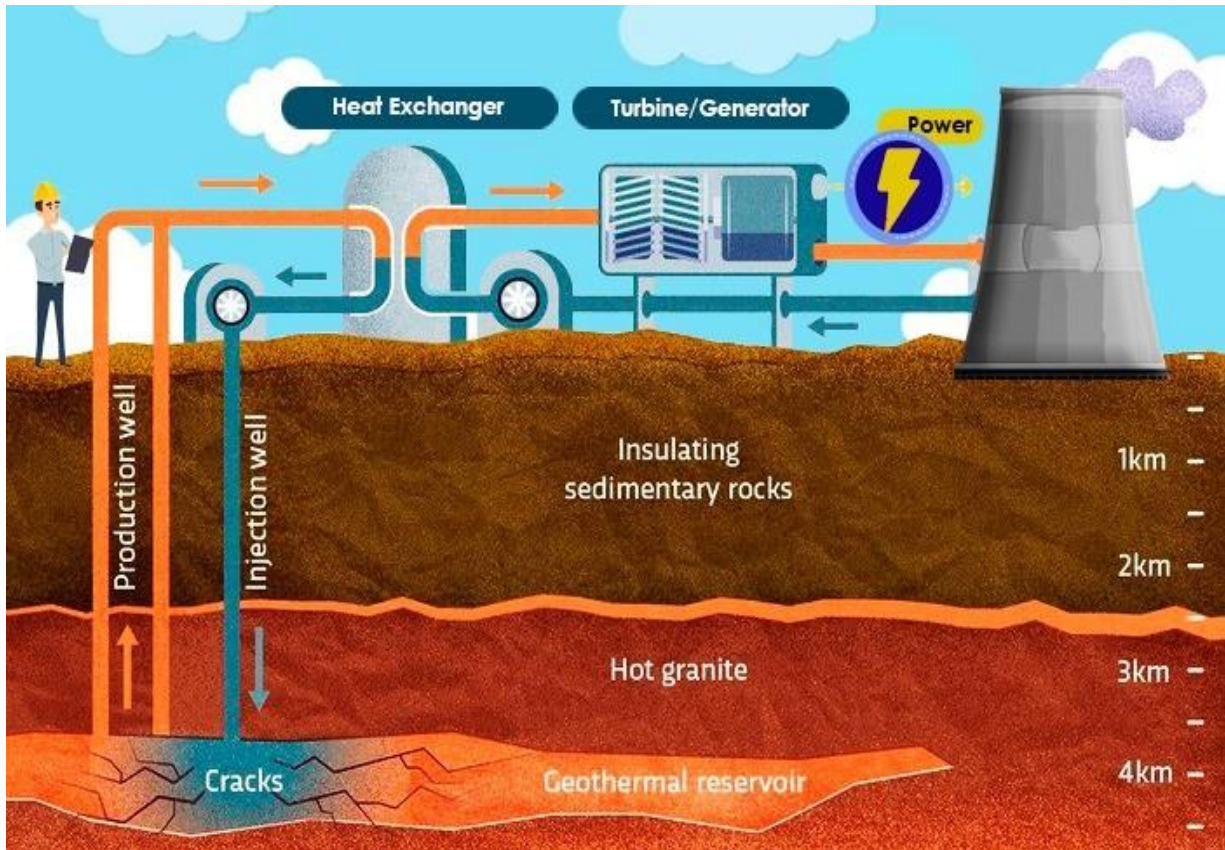
2. What are demerits of geothermal power, solar power, hydro power, wind power, and wave power resource?

**Research Methodology.**

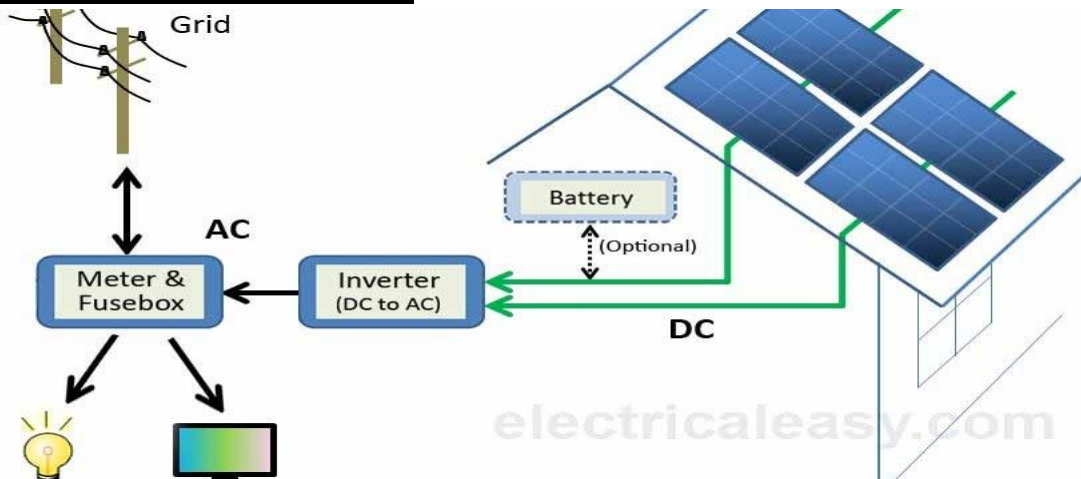
The study use systematic comprehensive analysis method to gather the secondary data.

**Finding and discussion**

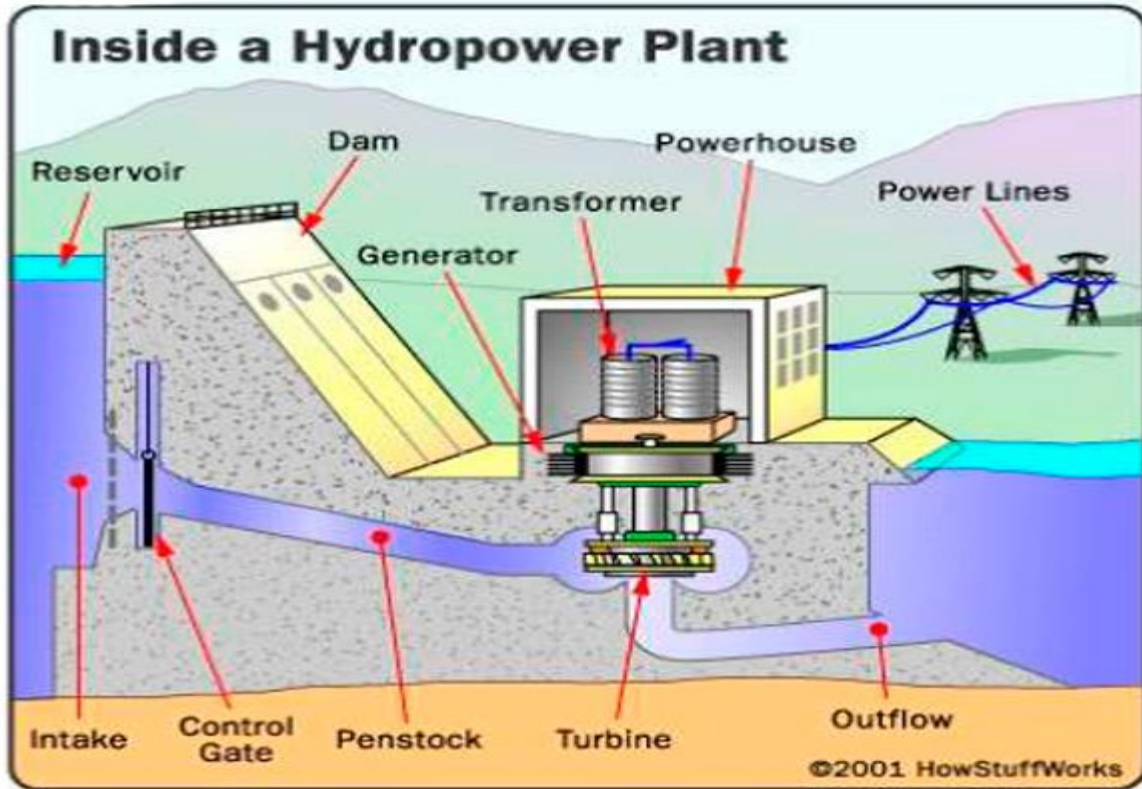
Picture to show extraction of Georthemal power



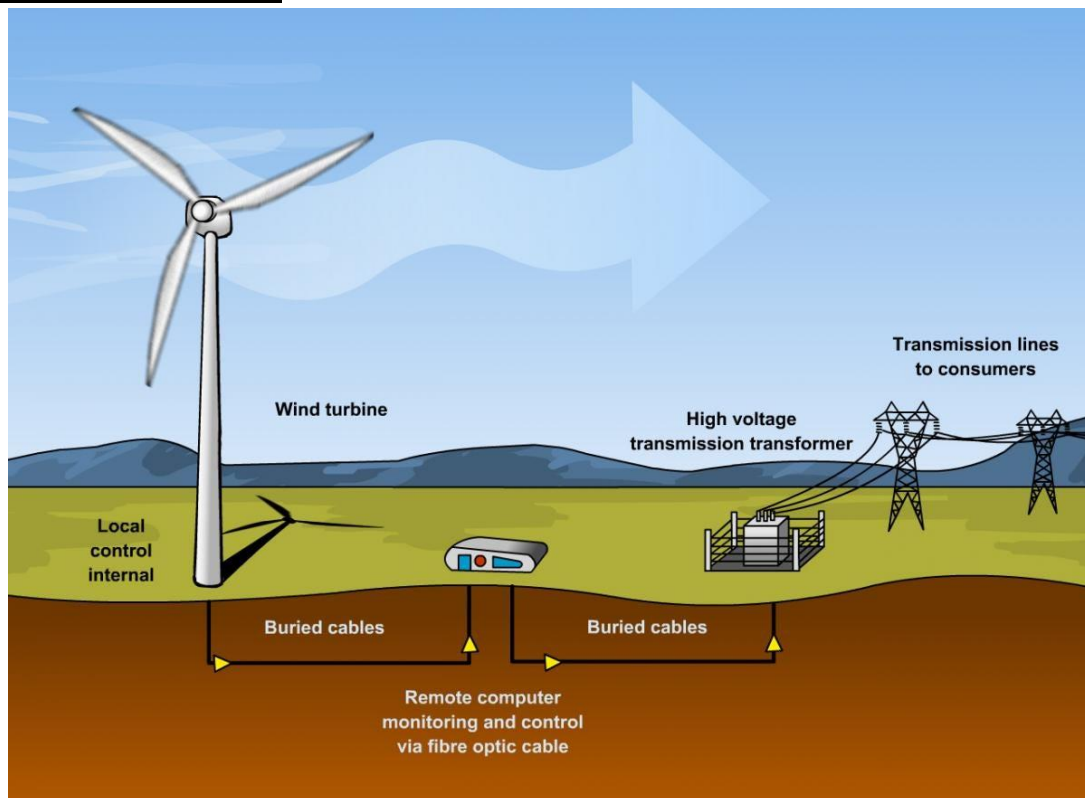
Picture to show extraction of solar energy



Picture showing the Extraction of hydropower



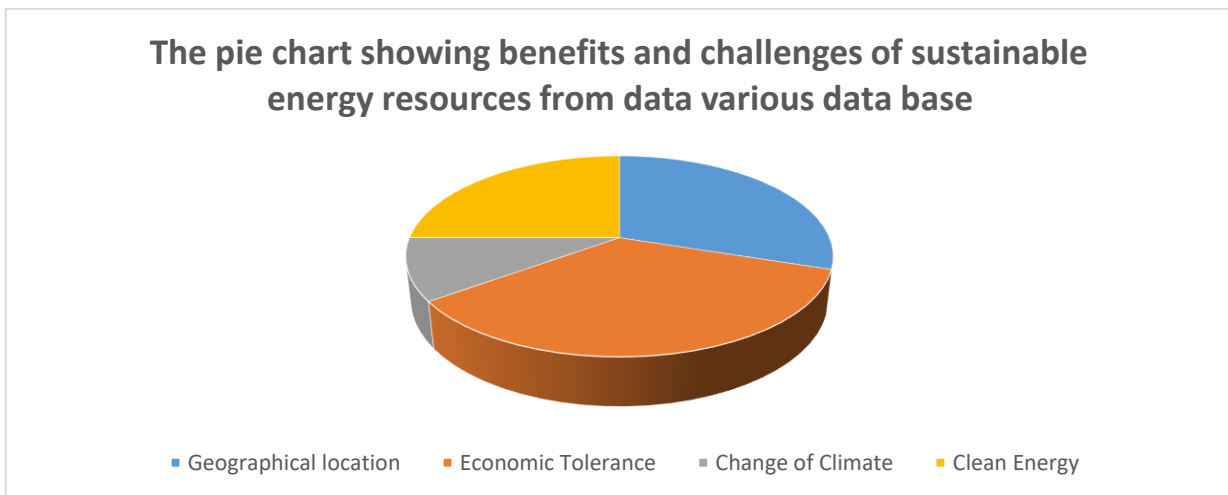
The extraction of wind power



**Table 1: showing the benefits and limitation sustainable energy resources**

Factors considered on merits and demerits of energy resource	Geographical location	Economic tolerance	Change climate	Clean energy
Percentage of data showing the different sources of data base	30%	35%	10%	25%

According to table 1 analyzed the benefits and limitation of solar energy: economic tolerance have highest rate of 35%; Geographical location was the second advantages for 30%; clean energy for 25% and the great challenges of climatic change was 10%



### Geographical location

According to table 1 analysis the geographical location was the first factor to be considered. Almost the whole part of the earth reached with the solar radiation, wind power and hydropower. The usefulness of solar energy appears important in equatorial areas where the sun is almost overhead in all parts of the world. The areas experienced tropical regions, desert landscape and prolonged dry season have great essential opportunities to use sustainable energy resources because of lack the permanent source of energy. Because this energy cover the large part of the earth they easy available and don't depend on physical factors such as availability of mountains or waterfalls to allocate them (Hammer, 2012). The area with strong wind and shortage of rain such desert areas wind power seemed to fit in those areas. Geothermal power seemed to be practically in volcanic eruptions areas such alpine Himalaya, plate tectonic zones, convergences zones and circumpacific belt and Great Rift Valley. These area is easy to extract geothermal power. The desert areas include Arabic countries the major sources of energy only fuel such as petroleum, diesel and gas. The usefulness of solar energy appears important in equatorial areas where the sun is almost

overhead in all part of the world. The areas experienced tropical regions, desert landscape and prolonged dry season have great essential opportunities to use solar energy because of lack the permanent source of energy. Because this energy cover the large part of the earth they easy available and don't depend on physical factors such as availability of mountains or waterfalls to allocate them (Hammer, 2012)

### **Economic tolerance**

The majority of people in Comoros Island still live under 1 USA dollar per day. People can't afford to get a single meal per day. The use of solar energy act the remedy to them. As the table shown 35% of data showing solar energy was less expensive but the market of ranged from 0.59% to 0.94% the solar energy still demand high market (sun et al., 2023). According the Maoulida et al (2021) the solar energy was profitable in the margin of economic, environmental problems, less expensive and low cost of energy. Aboudon & El-Ganaroui (2019) the solar energy was promising technology in terms of economic efficiency. Furthermore the use of solar energy the hardwires are less expensive. According to Etongo & Naidu (2022) the data showing 82.9% the solar energy is cheap and affordable to all people and save cost for 100%. The use hydropower seemed as expensive from construction until its consumptions. The majority of Comoros people suffer from extreme poverty and can't afford this type of energy.

### **Clean energy**

The solar energy is efficiency renewable resource. The table 1 analyzed that it carried 25% of its benefit. This solar energy have less emission of carbons and it keeps the environment clean. Surroop & Raghoo (2018) argued that the use of solar energy is working efficiency and prevent from the environment problems such as cutting down trees. According to Jia et al (2016) report showing a photovoltaic electrolysis system have high solar to hydrogen efficiency. Modeste (2020) have high thermal comfort when it is being in use than other source of energy. The solar energy system achieve 48-h average solar to –Hydrogen efficiency of 30% these results demonstrated the potential of photovoltaic electrolysis system for cost effective solar energy storage (Jia et al., 2016). Etongo & Naidu (2022) showing the security energy was solar for 91. 7% and environmentally friendly perception was 76.7% Byaro et al (2022) there is natural resource depletion and environmental degradation in instalment of energy resources particularly in sub-Saharan countries.

### **Change of climate.**

The nature of climate inconstant it changes according to the season. The usefulness of wind energy appear well during the summer in most of areas on the earth. However solar photovoltaic have batteries to absorb solar energy in such as that they store energy for long period of time. This idea supported by Dadash et al (2022) whose believe climatic changes have influence on solar energy. Due to climatic change and high competition from other sources Saud Arabia now is thinking to invest in solar energy. And now 210% of solar energy consumption taking place. Maoulida (2023) the solar energy can perform better in the use of photo vatic in any three climate. The solar energy improve the solar efficiency, highly relevant, solar spectrum, and light filters (Sun et al., 2023). Wind power seemed as useful during the wind season.

### **Recommendation.**

The study recommended that enacting the law to let other private companies to produce and supply solar energy; to increase the using of solar energy like the first and primary source of energy in Comoros Islands;

the government train superior technicians by putting them on university programs to learn how to use and fix these new solar energy technologies materials. Comoro Island is among the poorest island in world. It needs to have many alternatives sources of energy in order to fight poverty. Furthermore the paper recommend that investors should select the best energy resources which is compatible with Comoros islands context and prepare the technicians for renewable energy resources technologies. The last recommendation promoting partnership and regulate the national energy resources policy for betterment of existing and future generation development of Comoros people.

### **Conclusion.**

The paper concluded the Comoros Islands have various opportunities on their different renewable energy resources. Knowing that the economy of a country depends inclusively on a stable energy source, then we can say that the Comoros have an advantage of their multitude choices on the renewable energy sources.

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### **Conflict of interest.**

This academic paper has no any conflict of interest to any block such as professional conflict of interest, person relationship conflict of interest, intellectual conflict of interest and organizational conflict of interest.

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