



POLICY ANALYSIS AND STAKEHOLDERS PERSPECTIVE OF RENEWABLE ENERGY UTILIZATION IN KERALA

Soorya Narayan

Research Associate,
International Centre for Technological
Innovations

Aaron Joseph George

Director,
International Centre for Technological
Innovations

ABSTRACT

The power sector plays a vital role in all construction work in Kerala. The scarcity of electricity is the main obstacle to the development of new ventures in the manufacturing sector. The electricity demand is rising and the power production should increase accordingly. Hydro-thermal and wind sources form part of the power grid in Kerala. Hydropower is Kerala's most secure and reliable outlet. A survey was taken among people belonging to three sectors namely Energy policymakers, Energy generation companies, and Energy customers. The questions were about the importance of renewable energy in Kerala, the commercialization of various renewable energy and also the increasing power demands. 87% of respondents agree that renewables will play an important role in Kerala's future economy and climate. 67% believed that renewable energy will satisfy energy demands after the expiration of oil. 47% of interviewees believe that renewable energy will be the best field for investment. In response to government efforts concerning renewable energy, 53% of interviewees believed that the government has done sufficient effort to promote renewable energy. Also, the Indian Central and Kerala State Renewable energy policies are reviewed in the literature review section of this paper.

1.0 INTRODUCTION

1.1 Power Sector in Kerala

In all the development work in Kerala, the power sector plays a crucial role. The electricity shortage is the primary challenge to the introduction of new projects in the industrial sector. The electricity demand is growing and the output of power should rise accordingly. Monsoon is necessary to maintain the state's hydropower base, and the lack of rainfall normally causes a power crisis. Kerala has received ample monsoon during the current year and has raised the inflow to the KSEB reservoirs; the KSEB has been able to handle the power supply situation with a higher quantity of cheaper hydel power. Kerala is one of the very few states in the country in which the load lowering and power loss did not occur in 2019. KSEB was responsible for electricity generation, transmission, and supply in the Kerala State, with a special focus on supplying electricity for both domestic and agricultural purposes at an affordable cost. In the energy sector, the Board has been going through a transitional process of reforms. The Electricity Act 2003 envisages separate organizations for Transmission

and Distribution. (The Kerala State of Environment and Related Issues, 2020)

1.2 Renewable Energy Sources of Kerala

The power system in Kerala encompasses hydel, thermal, and wind sources. Hydel energy is the most reliable and dependable source in Kerala. Of the total installed capacity, 2746.19 MW, the lion's share of 1933 MW of installed capacity comes from 24 hydel stations; 783.11 MW is contributed by the thermal projects including NTPC at Kayamkulam which is Kerala's dedicated thermal station. Kanjikode wind farm, Palakkad has an installed capacity of 2.03MW. Wind Energy from IPP is 28.05 MW. Capacity addition during 2009-10 was only 51.44 MW (1.9 %) to 2746.19 MW as on 31-3-2010 from 2694.75 MW on 31-3-2009. Monsoon is vital to preserving the state's hydroelectric power base and the rainfall deficit causes power crises. The most reliable and trustworthy source in Kerala is hydropower. Of the total power installed in 2012-13, hydel contributed a significant share of 2053MW (71%); whereas the thermal projects in Palakkad contributed 793MW, including NTPC in Kayamkulam and Kanjikode wind farm, Palakkad



has contributed 2MW, Wind Energy from IPP is 33 MW.

KSEBL Internal Generation.

Sl no.	Particulars	Capacity as added in march 2018 (MW)	Capacity as added in 2018-19 (MW)	Capacity as added in march 2019 (MW)	Total Internal Generation as per 2018-19(MW)
1	Hydel	2055.76	3.00	2058.76	7602.42
2	Thermal	159.96		159.96	4.093
3	Wind	2.025		2.025	1.33
4	Solar	14.71	2.14	16.85	18.54
	Total	2232.46	5.14	2237.60	7626.37

2.0 RESEARCH METHODOLOGIES

A survey was taken among people belonging to three sectors namely Energy policymakers, Energy generation companies, and Energy customers. The questions were about the importance of renewable energy in Kerala, the commercialization of various renewable energy and also the increasing power

demands. The survey was conducted on the 3rd Week of January and responses were collected from 120 people including policymakers, Energy generation companies, and also customers. The survey questions are similar to the survey done by M.A. Mohamed, Amin Al-Habaibeh, and Hafez Abdo in Libya on 2013

Q A: Do you think renewable energy is available in Kerala for commercial utilization?			
Sectors	Responses		
	Yes	NO	Don't know
Energy Policy makers (EPM)	100%	0	0
Energy Generation (EG)	71%	0	29%
Energy costumers (EC)	56%	0	44%
Total %	78%	0	22%

2)

Q B: Do you think renewable energy is important to the development of Kerala?			
Sectors	Responses		
	Yes	No	Don't know
Energy Policy makers (EPM)	91%	9%	0
Energy Generation(EG)	82%	12%	6%
Energy costumers (EC)	88%	13%	0
Total %	87%	11%	2%



3)

Q C: Do you think renewable energy will satisfy energy demand for future Kerala?			
Sectors	Responses		
	Yes	No	Don't know
Energy Policy makers (EPM)	82%	0	18%
Energy Generation (EG)	59%	12%	29%
Energy costumers (EC)	56%	6%	38%
Total %	67%	5%	27%

4)

Q D: Which type of renewable energy do you think has the most potential and could become the most economically feasible for large-scale use?					
Sectors	Responses				
	Biomass	Geothermal	Wind	wave and tidal	Solar
Energy Policy makers (EPM)	0	0	32%	23%	45%
Energy Generation(EG)	0	0	35%	18%	47%
Energy costumers(EC)	0	0	38%	13%	50%
Total %	0	0	35%	18%	47%

5)

Q E: What energy sector do you think could have the best investment opportunities?		
Sectors	Responses	
	Oil and Natural Gas	Renewable Energy
Energy Policymakers (EPM)	45%	55%
Energy Generation (EG)	41%	59%
Energy Costumers(EC)	75%	25%
Total %	53%	47%



6)

Q F: What are the reasons behind the insufficient electricity production to meet demand?				
Sectors	Responses			
	The productive capacity of stations	Increasing energy demand	The size of the grid	Other technical problems
Energy Policy makers (EPM)	18%	41%	14%	27%
Energy Generation (EG)	18%	47%	18%	18%
Energy Costumers (EC)	31%	38%	31%	0
Total %	22%	42%	20%	16%

7)

Q G: Do you think that adequate effort was done to promote renewable energy by the Kerala government?			
Sectors	Responses		
	Yes	No	Yes, but more is needed
Energy Policy makers (EPM)	64%	14%	23%
Energy Generation (EG)	47%	29%	24%
Energy Costumers(EC)	50%	13%	38%
Total %	53%	18%	28%

3.0 RESEARCH ANALYSIS

100% of Energy Policy Makers (EPM) claim clean energy for industrial use is available in Kerala. The bulk of electricity generation accounts for 71 percent (GE) and about 56 percent of energy customers. Nevertheless, none of the participants did argue with the lack of market prospects and 22% of respondents lacked facts or expertise. The energy decision-makers have more expertise and knowledge than the other two industries. Furthermore, renewable sources of electricity generation (EG) claimed that their operations would be significantly impacted, with many consumers losing business. 87% of respondents agree that renewables will play an important role in Kerala's future economy and climate. However, 9% (EPM firms), 12% (EG companies) and 13% (EC companies) assume that they are not. On the other side, 6% of (EG firms) said they don't know. 67% believed that renewable energy will satisfy energy demands after the expiration of oil, 5% of respondents, however, think not, and 27% lack the knowledge and information with regards to the ability, and capacity of renewable energy which will be the best alternative. It was felt that consumers and producers of energy have limited

confidence or knowledge regarding the capability of renewable energy. about 47% of interviewees believe that renewable energy will be the best field for investment. On the other hand, 53% of interviewees think fossil fuels such as oil and natural gas where the investment should be. The insufficient electricity production to meet demand is caused 64% by the increase in demand with limited production capacity from power stations. However, 16% indicated other maintenance and technical problems and 20% indicated the effect of the size of the grid. It was evident that demand has been growing much faster than the production capacity in place. In response to government efforts concerning renewable energy, 53% of interviewees believed that the government has done sufficient effort to promote renewable energy, and 18 of the respondent stated that the Kerala government has promoted renewable energy but more work is still needed. About 28% of them said NO, Kerala government has not done enough sufficient work to promote renewable energy.



4.0 LITERATURE REVIEW

4.1 Renewable Energy Policy in India

Today, India has significant potential for the generation of power from renewable energy sources. India's search for renewable energy resources that would ensure sustainable development and energy security began in the early '70s of the last century. Consequently, the use of various renewable energy resources and efficient use of energy was identified as the two thrust areas of sustainable development. (Ministry of New and Renewable Energy, 2016) The few important steps taken by the ministry of India for the development of renewable Energy sources are recapitulated below:-

1. India has among the world's largest programs for renewable energy. India's activities cover all major renewable energy sources of interest to us, such as biogas, biomass, solar energy, wind energy, small hydropower, and other emerging technologies. In each of these areas, India has programs of resource assessment, R&D, technology development, and demonstration. Several renewable energy systems and products are now not only commercially available but are also economically viable in comparison to fossil fuels, particularly when the environmental costs of fossil fuels are taken into account.
2. Realizing the need for concentrated efforts in this sector, The Government of India established a Commission for Additional Sources of Energy (CASE) in the Renewable Energy Sources – Policies in India 295 Department of Science and Technology, in 1981. The mandate of CASE is to promote research and development activities in the field of renewable energy.
3. CASE was formally incorporated in 1982, in the newly created Department of Nonconventional Energy Sources (DNES). In 1992 DNES became the Ministry for Nonconventional Energy Sources, commonly known as MNES.
4. India has a vast supply of renewable energy resources, and it has one of the largest programs in the world for deploying renewable energy products and systems. Indeed, it is the only country in the world to have an exclusive ministry for renewable energy development, the Ministry of Non-Conventional Energy Sources (MNES). MNES was renamed the Ministry of New and Renewable Energy (MNRE). (India 2020 Energy Policy Review).
5. India has pioneered in the world in many administrative actions of renewable energy promotion such as:- 1) Electricity regulatory commission within liberalized market 1991

2) Mandatory environmental audits for power projects -1992 3) Energy conservation bill -2000 Renewable Energy promotion bill- 2005.

6. The Ministry is encouraging the setting up of grid-interactive power projects based on renewable energy through private investment route. The State Nodal Agencies are responsible for the promotion and development of private sector projects by way of providing necessary clearances, allotment of land, allotment of potential sites in case of SHP projects, and facilitating power purchase agreements, etc. State Electricity Regulatory Commissions (SERCs) are determining tariffs by taking into account the submissions of all stakeholders, including consumers. Several leading financial institutions and banks are financing renewable energy-based power. (Rajnath Ram, 2016)

4.2 Renewable Energy Policy in Kerala

The spread of various renewable energy technologies has been aided by a variety of policies and support measures by the Government. Major policy initiatives have been taken to encourage private/foreign direct investment to tap energy from renewable sources including the provision of fiscal and financial incentives. This policy is directed towards a greater thrust on the overall development and promotion of renewable energy technologies and applications. This will facilitate excellent opportunities for increased investment in this sector, technology up-gradation, induction of new technology market development, and export promotion. The conventional sources of energy in Kerala are fuelwood, petroleum products, and electricity. Till recently Kerala has been depending solely on hydropower for electricity, availability of which is limited due to lack of technically favorable sites and unfavorable ecological impacts. Nuclear power and fossil fuel-fired thermal stations are the other conventional sources. Owing to widespread popular opposition, because of high population density and fragile ecology, nuclear stations could not be installed in Kerala. The only other alternative was fossil-fuelled thermal stations like Brahmapuram or Kayamkulam. It is widely accepted that fossil fuels are limited, that their price will go on increasing, that they do not offer a long-term solution, that they contribute to global warming and that alternative sources are to be identified. To cater to the ever-increasing demand for power, the Government of Kerala has decided to encourage power generation from Non-conventional Energy Sources. It is proposed to generate energy from municipal waste, agro waste, industrial waste, sewage, and other biomass, small-hydel units, solar



photovoltaic, wind, tide, wave, geothermal, etc. These technologies are environmentally friendly. The use of Municipal Solid Waste for power generation, besides generating power, will eliminate the problem of pollution and disposal of urban waste. Private investment will be attracted in all these sectors. Ministry of Non-Conventional Energy Sources (MNES), Government of India has formulated a legal, financial, and administrative framework for the promotion of investments in this sector and has advised the State governments to formulate policies. (Kerala State Govt, Renewable Energy Policy)

5.0 CONCLUSION AND DISCUSSIONS

A survey was performed between people from three industries, including energy decision-makers, energy generation firms, and energy consumers. The questions were about the value of green energy in Kerala, the commercialization of different forms of renewable energy sources, as well as the growing energy demand. 87% of respondents agree that renewables will play an important role in Kerala's future economy and climate. 67% believed that renewable energy will satisfy energy demands after the expiration of oil. 47% of interviewees believe that renewable energy will be the best field for investment. In response to government efforts concerning renewable energy, 53% of interviewees believed that the government has done sufficient effort to promote renewable energy. These are the remarkable results of the survey taken. Apart from the usage of renewable energy sources, it is very important to know about the national and state renewable energy policies. Under the central government of India, there is a wide range of activities they are as follows.

- Promotion of renewable energy technologies
- Renewable energy resource assessment
- Production of biogas units, solar thermal devices, solar photovoltaic, cooks stoves, wind energy, and small hydropower units.
- Strengthen India's energy security
- Find A viable solution for rural electrification □ Administered pricing mechanism
- Optimum utilization of existing assets
- Adoption of energy-efficient technologies in giant industries
- Decrease dependence on energy imports
- Administered pricing mechanism
- Optimum utilization of existing assets □ Formulation of policy and legislation
- Institutional Linkages for the integration of renewable energy
- Identification of high focus areas
- Marketing outlets
- R&D and specialized institutions

- International partnerships and exports
- Concern for the environment
- Take efforts to minimize the demand-supply gap, especially as the population increases.

The objectives of State government policies are as follows.

- Development, propagation, and promotion of Non-conventional Energy sources.
- The exploitation of Natural resources to avail cheaper power.
- Acceleration of identification, development, and implementation of new projects with the long-term objective of substituting all non-renewable sources.
- Development of Eco-friendly Projects.
- Provision of a "single window" service for technical consultation, sources of finance, and project clearance.
- Decentralized and microlevel power generation through renewable energy sources to reduce expenditure on transmission lines and transmission and distribution losses.
- Self-sufficiency in Power shortly.
- Creation of suitable environment for private participation in Power Generation sectors.
- Publicity of Renewable Energy through various media.

As per the mandate given to it by MNRE, ANERT shall be the State Nodal Agency for coordinating all activities relating to Renewable Energy Development. ANERT should lay down procedures for project preparation, approvals, monitoring, etc., and should act as the State Agency to:- (a) Promote the development of renewable energy sources. (b) Function as a single-window clearing agency for all renewable energy power projects including small hydel power plants up to and including 3 MW, for issuing necessary clearances and approvals on behalf of the Government of Kerala, providing technical support, facilitating financing, etc. (KSEB will be the authority for SHP projects above 3 MW and up to 25 MW). (c) Make recommendations to the Government on issues related to renewable energy development. (d) Certify/arrange for certification of all devices related to renewable energy sources. Companies, co-operative, partnerships, local self governments, registered societies, NGOs, individuals, etc would all be eligible producers to generate power from non-conventional energy source conditions.

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