

A Review of Renewable Energy Scenario in India and Environment Impact Assessment

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ABSTRACT - Hydro power plants convert potential energy of water into electricity. It is a clean source of energy . The water after generating electrical power is available for irrigation and other purposes,Hydroelectric power generation is an established technology that uses the potential energy of water to generate electricity. The main components of the hydropower plants are dam or retaining wall, a water turbine, and an electrical generator.Hydroelectric power works to harvest the inherent energy of moving water by directing the water through turbine converting the energy of the moving water into mechanical energy. The mechanical energy is then converted into electricity in the generator, Most of the power generation in India is carried out by conventional energy sources, like coal and mineral based power plants which contribute heavily to greenhouse gases emission. This paper reviews the recent renewable energy scenario of India.In this paper, the status and growth of renewable energy, National Policies on Renewable energy.

Key words: Hydropower, Renewable Energy, Turbine , Power , Flow, EIA

I. INTRODUCTION

Hydro power projects are classified as large and small hydro projects based on their sizes. Different countries have different size criteria to classify small hydro power project capacity ranging from 10MW to 50 MW. In India hydro power plants of 25MW or below capacity are classified as small hydro, which have further been classified into micro (100kW or below), mini (101kW-2MW) and small hydro (2-25MW) segments, Hydro Power was being looked after by Ministry of Power prior to 1989 mainly with the help of State Electricity Boards. In 1989, plant capacity up to 3MW and below was transferred to the Ministry of New and Renewable Energy (MNRE) and as such 63 MW aggregate installed capacity of 3MW and below hydro projects came within the jurisdiction of MNRE. Many initiatives were taken by the Ministry since then for the promotion of small hydro which included implementation of a UNDP-GEF assisted Technical Assistance project entitled “Optimizing Development of Small Hydro Resources in Hilly Regions of India” and India-Renewable Resources Development Project with IDA credit line having internal small hydro development component with target of 100MW canal based small hydro power projects through private sector participation. Subsequently plant capacity up to 25MW and below was entrusted with the MNRE in November 1999.

The estimated potential of 21135.37 MW from 7135 sites for power generation in the country from small / mini hydel projects is assessed by the Alternate Hydro Energy Centre (AHEC) of IIT Roorkee in its Small Hydro Database of July 2016. The hilly States of India mainly Arunachal Pradesh,

Himachal Pradesh, Jammu & Kashmir and Uttarakhand, and constitute around half of this potential. Other potential States are Maharashtra, Chhattisgarh, Karnataka and Kerala. Focused attention is given towards these States through close interaction, monitoring of projects and reviewing policy environment to attract private sector investments

INDIAN RENEWABLE ENERGY GROWTH & STATUS:

India is one of the countries with the largest production of energy from renewable sources. In the electricity sector, renewable energy accounted for 20 % of the total installed capacity of 150 + GW. As of 31 December 2021,[1] renewable energy has to play a vital role in achieving energy demand in the years ahead and to resolve the issue of being dependent only on fossil fuels.

The following is the break up of total installed capacity for Renewables, as of 31 December 2021:

- Wind power: 40.08 GW
- Solar Power: 49.34 GW
- BioPower: 10.61 GW
- Small Hydro Power: 4.83 GW
- Large Hydro: 46.51 GW

Over the years, renewable energy sector in India has emerged as a significant player in the grid connected power generation capacity. It supports the government agenda of sustainable growth, while, emerging as an integral part of the solution to meet the nation’s energy needs and an essential player for en-

energy access. Government commitments is Reduce India's total projected carbon emission by 1 bn tonnes by 2030, reduce the carbon intensity of the nation's economy by less than 45% by the end of the decade, achieve net-zero carbon emissions by 2070 and expand India's renewable energy installed capacity to 500 GW by 2030. India ranks 3rd in renewable energy country attractive index in 2021.

The country has set an ambitious target to achieve a capacity of 175 GW worth of renewable energy by the end of 2022, which expands to 500 GW by 2030. This is the world's largest expansion plan in renewable energy. India's installed renewable energy capacity has increased 286% in the last 7.5 years and stands at more than 151.4 Giga Watts (including large Hydro), which is about 39 per cent of the country's total capacity (as on 31st December 2021). The installed solar energy capacity has increased by 17 times in the last 7 years, and stands at 49.5 GW. The installed Renewable energy capacity (including large hydro) has increased from 76.37 GW in March 2014 to 151.4 GW in December 2021, i.e. an increase of around 98%. India has achieved its NDC target with total non-fossil based installed energy capacity of 158.17 GW which is 40.2% of the total installed electricity capacity. Up to 100% FDI is allowed under the automatic route for renewable energy generation and distribution projects subject to provisions of The Electricity Act, 2003.[2]

NATIONAL POLICIES & INITIATIVES TAKEN BY GOVERNMENT TO ENCOURAGE RENEWABLE ENERGY:

1. SOLAR POWER

Among the various renewable energy resources, solar energy potential is the highest in the country. In most parts of India, clear sunny weather is experienced 250 to 300 days a year. The annual radiation varies from 1600 to 2200 kWh/m², which is comparable with radiation received in the tropical and sub-tropical regions. The equivalent energy potential is about 6,000 million G Wh of energy per year. The National Action Plan on Climate Change also points out: "India is a tropical country, where sunshine is available for longer hours per day and in great intensity. Solar energy, therefore, has great potential as future energy source. It also has the advantage of permitting the decentralised distribution of energy, thereby empowering people at the grassroots level".

The National Tariff Policy was amended in January 2011 to prescribe solar-specific RPO be increased from a minimum of 0.25 per cent in 2012 to 3 per cent by 2022. CERC and SERCs have issued various regulations including solar RPOs, REC framework, tariff, grid connectivity, forecasting etc. for promoting solar energy. Many States have come up with their own Solar Policy. see Figure.1.

2. WIND ENERGY

India's wind energy sector is led by indigenous wind power industry and has shown consistent progress. The expansion

of the wind industry has resulted in a strong ecosystem, project operation capabilities and manufacturing base of about 10,000 MW per annum. The country currently has the fourth highest wind installed capacity in the world with total installed capacity of 39.25 GW (as on 31st March 2021) and has generated around 60.149 Billion Units during 2020-21. The Government is promoting wind power projects in entire country through private sector investment by providing various fiscal and financial incentives such as Accelerated Depreciation benefit; concessional custom duty exemption on certain components of wind electric generators. Besides, Generation Based Incentive (GBI) Scheme was available for the wind projects commissioned before 31 March 2017.



Figure.1. Sources of Renewable energy generation.

3. BIO MASS

Biomass has always been an important energy source for the country considering the benefits it offers. It is renewable, widely available, carbon-neutral and has the potential to provide significant employment in the rural areas. Biomass is also capable of providing firm energy. About 32% of the total primary energy use in the country is still derived from biomass and more than 70% of the country's population depends upon it for its energy needs. Biogas contains about 55-65 % of methane, 35-44 % of carbon dioxide and traces of other gases, such as Hydrogen Sulphide, Nitrogen and Ammonia, Biogas, in its raw form, that is without any purification, can be used as clean cooking fuel like LPG, lighting, motive power and generation of electricity. It can be used in diesel engines to substitute diesel up to 80% and up to 100% replacement of diesel by using 100% Biogas Engines. Further, Biogas can be purified and upgraded up to 98% purity of methane content to make it suitable to be used as a green and clean fuel for transportation or filling in cylinders at high pressure of 250 bar or so and called as Compressed Bio-Gas (CBG).

II. ENVIRONMENT IMPACT ASSESSMENT

The Environmental Impact Assessment (EIA) is an assessment of the potential impacts - positive or negative - that the

proposed project may have on the environment, taking into account environmental, social and economic factors. The purpose of the study is to ensure that decision makers consider the following environmental impacts to determine whether they will continue with the project. The Environmental Impact Assessment (EIA) is a systematic process used to identify, evaluate, and mitigate the environmental impacts of a proposed project prior to significant decisions and commitments (UNEP). Therefore, it is also a way to ensure that the project can be carried out with adequate consideration of environmental factors. The outcome of the EIA is generally an Environmental Management Plan (EMP) that outlines mitigation and monitoring actions. In most developed countries, an EIA is required by law when a proposed project (hydro) exceeds a certain size.

PHASES OF THE EIA PROCESS:

The EIA has five key stages. If an EIA is required, an Environmental Impact Assessment Report will be completed and submitted with the mining permit application. The public will have the opportunity to comment. This allows you to participate in decision-making.

Step Required: -

1. Review: Determining the need for an EIA
2. Scope of work: Determining what should be included in the assessment and reflected in the EIA report
3. Preparation of the EIA report: The EIA report should include significant environmental impacts on potential development.
4. Application and Consultation: EIA development reports and requests should be made public (including electronic advertising), and stakeholders and the public should have the opportunity to express their views on the matter.
5. DECISION: Submit the EIA report and all comments to the competent authority before deciding whether to approve the development.

After a decision has been made: the developer initiates any monitoring required by competent authorities. Environmental Impact Assessment (EIA) is a systematic process used to identify, assess, and mitigate the environmental impacts of a proposed project prior to key decisions and responsibilities made (UNEP). Therefore, it is also a way to ensure that the project can be carried out with adequate consideration of environmental factors. The outcome of the EIA is generally an Environmental Management Plan (EMP) that outlines mitigation and monitoring actions. In most developed countries, an EIA is required by law when a proposed project (hydro) exceeds a certain size.

III. CONCLUSION

- 1) Renewables can be used for both electricity and heat generation. there is a wide range of renewable energy

technologies suitable for implementation in developing countries for a whole variety of different applications.

- 2) The renewable energy replaces the need for the current fossil fuels used for the generation of electricity, which cuts greenhouse gases and helps in sustainable development.
- 3) Taking environmental considerations into account in development planning does not imply that the pace of socio-economic progress will be slowed down and taking environmental considerations into account in the various phases of placing undue constraints on a country's development options.
- 4) Renewable energy will play a significant role in tomorrow's energy supply like in Public support is high and momentum has been established.
- 5) Renewable energy is generated from natural resources. Renewable energy sources are sunlight, wind, geothermal heat, water and various forms of biomass. These renewable sources cannot be exhausted and they are constantly renewed. They do not harm the environment. Using renewable energy you can save your money and protect the environment.

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