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Study on Hydro Power Plant

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ABSTRACT: Energy production has many ways, also electricity is very important for daily life work, various ways introduced for the production of electricity like electricity production from water called hydro power plant, electricity produce from heat called thermal power plant, electricity produce from wind called wind energy power plant, electricity production from surface heat called geothermal energy. In this paper discussed the hydro power plant electricity production method and its advantages, drawbacks and its uses at various places. Hydro power plant is one of the most famous, efficient and useful methods for electricity production. Water is a good and efficient renewable energy source for electricity production. Production of electricity by using water has been coming for many decades and it proves itself a better and efficient method of electricity production. Hydro power plants are classified on the basis of power capacity and facility, the first one consist five technologies to make the power capacity fulfill, these five categories such as dammed reservoir, run of river, pumped storage, in stream technology and new technology gravitational vortex. The other category which is capacity is this category further classified on the basis of power limit such as large power, small power, mini power, and micro and Pico hydropower. Earlier villages are not that much developed due to which advance technology was unable to set up there but nowadays village and countries are in their growing stage so they using hydro power plant as their source of electricity production and this method more come in use due to its cheap and effective nature, this paper give a review of hydro power plant for producing electricity, also gives knowledge about hydro power system and the most suitable turbines which can be used in future.

KEYWORDS: Hydropower, dammed reservoir, runs of river, in stream, gravitational vortex, turbines, capacity, Cheap, Coal, Thermal, and Reservoir

I. INTRODUCTION

Hydro power plants have become the power source and this method of electricity production has been praised by many countries. Many countries installed different types of and different capacities of hydro power plants according to the requirement of electricity. Hydro is a renewable energy resource and this is easily available everywhere due to which this method is cheap and more reliable[1]. Based on the report of UNO there 7.6 billion approx people around the world have depended on hydroelectric power plants and this number is increasing day by day. As per the previous data population have been increasing day by day and due to more population people of villages starts migrating into urban area called urbanization (over 55%), 70% of the total population lives in village but due to lack of jobs, facility and resources maximum youth migrate into town due to which population of town goes on increasing day by day, specially migration of those people from undeveloped region which need more energy and have high load requirement.

Every country is working on their economic sector more to increase the growth rate and other facilities of different generations. So every country is working on some development stages of industrialization until its inhabitants mature enough to use proper technology to harvest energy in a clean and renewable way by having the lowest possible impact on the local flora and fauna[2]. Energy production has many ways, also electricity is very important for daily life work, various ways introduced for the production of electricity like electricity production from water called hydro power plant, electricity produce from heat called thermal power plant, electricity produce from wind called wind energy



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power plant, electricity production from surface heat called geothermal energy. In this paper discussed the hydro power plant electricity production method and its advantages, drawbacks and its uses at various places. Hydro power plants come in use in every country, also it is proven that hydro power plants are very good for urban as well as rural areas, when it comes for the growth and success of state or any country energy production for any state or country plays a very important role. Rather than the fixed collide of nuclear vs. nuclear free policy the RES is a natural form of energy harvesting with little or no pollution[3].

Advantage of hydro power plant

- Hydro power plant is environmentally friendly, it is a clean renewable energy resource.
- Hydro is easily available so it has high degree of flexibility
- Hydro nowadays comes in use very much as it is easy to operate and cheap in cost so hydro becomes the part of the multipurpose project.
- Hydro can be used for pumped storage for optimal integrate operation of grid with least operational and maintenance cost
- Additional benefits of Flood control, Tourism, fishery.
- Well recognized for obtaining financial support.

What is hydro potential?

Hydro potential means how hydro is important for practical use such as production of electricity[4]. Hydro potential numbers of power production in watt to be about 84,000 MW at 60% load factor (load factor is the effect of load either over or under voltage load on a hydro power plant). 6,780 MW in terms of installed capacity from Small, Mini, and Micro Hydel schemes have been assessed. Also, 56 sites for pumped storage schemes with an aggregate installed capacity of 94,000 MW have been identified. It is the most widely used form of renewable energy. India is blessed with an immense amount of hydroelectric potential and ranks 5th in terms of exploitable hydro potential in global scenario[5].

II. LITERATURE REVIEW

There have been many research papers and review papers have been published on the electricity production by utilising renewable energy resources such as solar, wind, geothermal, thermal and hydro, so among all the papers is a paper titled Hydro Power and Turbine Systems Reviews by A. H. Elbatrana,b, Mohamed Walid Abdel-Hameda, O. B. Yaakobb,c, Yasser M. Ahmedb,d*, M. ArifIsmailb discussed the different technologies used in the hydro power technology system. Hydro power plants are classified on the basis of power capacity and facility, the first one consist five technologies to make the power capacity fulfill, these five categories such as dammed reservoir, run of river, pumped storage, in stream technology and new technology gravitational vortex.

The other category which is capacity is this category further classified on the basis of power limit such as large power, small power, mini power, micro and pico hydropower. Earlier villages are not that much developed due to which advance technology was unable to set up there but nowadays village and countries are in their growing stage so they using hydro power plant as their source of electricity production and this method more come in use due to its cheap and effective nature, this paper give a review of hydro power plant for producing electricity, also gives knowledge about hydro power system and the most suitable turbines which can be used in future. In this paper discussed the power capacity and head classification, also data of Small-scale hydropower (MW) as defined by various countries shown, different technology classification also shown in this paper, discussed about run of river (ROR) technology, discussed about the dammed reservoir technology, pumped storage technology, In-Stream Technology using Existing Facilities, VIV ACE converter technology, gravitational vortex energy, Gravitational Vortex Plant, impulse turbines, turgo turbines, pelton turbines, cross flow turbines, reaction turbine, francis turbines, axial flow turbines propeller turbines, pump as turbine (PAT), Other reaction turbines[6].



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In a research paper titled Hydro power plants, an overview of the current types and technology by ŠtefanTkáč discuss the types of hydro power plants. Earlier villages are not that much developed due to which advance technology was unable to set up there but nowadays village and countries are in their growing stage so they using hydro power plant as their source of electricity production and this method more come in use due to its cheap and effective nature, this paper give a review of hydro power plant for producing electricity, also gives knowledge about hydro power system and the most suitable turbines which can be used in future [7]. In this paper discussed the power capacity and head classification, also data of Small-scale hydropower (MW) as defined by various countries shown, different technology classification also shown in this paper, discussed about run of river (ROR) technology, discussed about the dammed reservoir technology, pumped storage technology, In-Stream Technology using Existing Facilities, VIV ACE converter technology, gravitational vortex energy, Gravitational Vortex Plant, impulse turbines, turbines, pelton turbines, cross flow turbines, reaction turbine, francis turbines, axial flow turbines propeller turbines, pump as turbine (PAT), Other reaction turbines, Division of Hydro power plants according to configuration, of the 2 largest hydro power plants in the world, types of turbines, hydro turbine manufacturing process and CFD software simulation, turbines division according to the working principle, according to the energy conversion, according to the head, applications[8].

III. CONCLUSION

Energy production has many ways, also electricity is very important for daily life work, various ways introduced for the production of electricity like electricity production from water called hydro power plant, electricity produce from heat called thermal power plant, electricity produce from wind called wind energy power plant, electricity production from surface heat called geothermal energy. In this paper discussed the hydro power plant electricity production method and its advantage, drawbacks and its uses at various places. Hydro power plants come in use in every country, also it is proven that hydro power plants are very good for urban as well as rural areas, when it comes for the growth and success of state or any country energy production for any state or country plays a very important role. Rather than the fixed collide of nuclear vs. nuclear free policy there is a natural form of energy harvesting with little or no pollution. When it comes to hydro energy it is a very famous technology which is very close to the imagination of a large spectrum of the population. Hydro power plant is a renewable energy resource (RES) and availability of its main energy source which is water is commonly available.

Hydro power system is an energy storage method and also it can transform energy from one part to another, in urban areas their main motive is sustainable development. This paper described the technology behind hydro power plant, turbines used in hydro renewable energy fields. It indicates that hydro is a major sector of the electric generation power plant which has proved itself as a great energy resource worldwide, in this paper also discussed the benefits of hydro power plants on the environment and economy of that place. This paper also shows various types of hydropower turbines system and their components and its working.From the above study, it can be provided a guideline to reach about the suitable hydropower system and turbine which can be used in the different hydropower projects.

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