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Megha Middha, Assistant Professor of Law in Mody University of Science and Technology, Lakshmangarh, Sikar

Megha Middha, is working as an Assistant Professor of Law in Mody University of Science and Technology, Lakshmangarh, Sikar (Rajasthan). She has an experience in the teaching of almost 3 years. She has completed her graduation in BBA LL.B (H) from Amity University, Rajasthan (Gold Medalist) and did her post-graduation (LL.M in Business Laws) from NLSIU, Bengaluru. Currently, she is enrolled in a Ph.D. course in the Department of Law at Mohanlal Sukhadia University, Udaipur (Rajasthan). She wishes to excel in academics and research and contribute as much as she can to society. Through her interactions with the students, she tries to inculcate a sense of deep thinking power in her students and enlighten and guide them to the fact how they can bring a change to the society

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ISSN: 2582-6433

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Assistant professor of Law

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Avinash Kumar

Avinash Kumar has completed his Ph.D. in International Investment Law from the Dept. of Law & Governance, Central University of South Bihar. His research work is on "International Investment Agreement and State's right to regulate Foreign Investment." He qualified UGC-NET and has been selected for the prestigious ICSSR Doctoral Fellowship.He is an alumnus of the Faculty of Law, University of Delhi. Formerly he has been elected as Students Union President of Law Centre-1, University of Delhi.Moreover, he completed his LL.M. from the University of Delhi (2014-16), dissertation on "Cross-border Merger & Acquisition"; LL.B. from the University of Delhi (2011-14), and B.A. (Hons.) from Maharaja Agrasen College, University of Delhi. He has also obtained P.G. Diploma in IPR from the Indian Society of International Law, New Delhi.He has qualified UGC – NET examination and has been awarded ICSSR – Doctoral Fellowship. He has published six-plus articles and presented 9 plus papers in national and international seminars/conferences. He participated in several workshops on research methodology and teaching and learning.

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HYDROPOWER AND ITS IMPORTANCE

AUTHOR: SHRADHA MATHUR (B.COM LLB(H)) 210060402010
CO-AUTHOR: PRAKASH KUMAR (B.COM LLB(H))210060402011
CO-AUTHOR: SIKANDER KHATANA (BBA LLB(H))210060403034

Abstract

Electricity can be produced in many ways, including hydropower. Coal, natural gas and oil were the three most used electricity sources in 2009. Therefore, more energy production methods shouldbe investigated. Hydropower captures the energy of flowing water by passing water through a turbine that converts the energy of flowing water into mechanical energy.

The generator then converts the mechanical energy into electrical energy. It is necessary to knowthe flow rate of the water and the head pressure to choose the best generator for the application. Small-scale power generation is one of the most profitable business opportunities for rural powergeneration in underdeveloped countries. It also represents an important opportunity for the futuredevelopment of hydroelectric power in Europe, where large resources are used or currently considered environmentally unacceptable. As one of the best solutions around, its small energy consumption is very sustainable.

In the 20th century, the construction of large dams is often associated with the development of hydroelectric power. Hundreds of large dams made of rocks, stones and earth cross rivers all overthe world to create great lakes. Although the canals continue to provide a vital, reliable and efficient source of energy, irrigation and flood protection, they have driven thousands of local residents from their homes, causing massive flooding of fertile land. In some cases, the productionand lifespan of ponds has been reduced due to rapid alluvium. Such large-scale interruptions in water flow can affect the environment in many ways.

ISSN: 2582-6433

Introduction

HYDROPOWER - WHAT IS IT?

It is a form of energy... an additional resource. Hydropower provides about 96 percent of renewable energy in the United States. Other renewable sources include geothermal, wave, tidal, wind and solar power. Power plants do not use resources to generate electricity, they do not pollute the air, soil and water like other power plants. Hydropower has played an important role in the development of my country's electric power industry. The development of both small and large hydroelectric power has been instrumental in the early expansion of the electric power industry.

Rivers generate electricity, water flows from mountain streams and clear lakes in winter and spring. Water can be used to turn turbines and generators that generate electricity as it flows due to gravity.

Hydroelectricity is important for our country. Modern technology and large numbers of people need enormous amounts of electricity to create, create and grow. In the 1920s up to 40% of electricity was supplied by hydro plants.

While the energy produced in this process has increased steadily, other forms of power generationare faster and produce more electricity, and hydropower currently accounts for about 10 percent of U.S. electricity production. Hydropower is an important part of the national grid because it canrespond quickly to sudden changes or interruptions in the system; this does something that combustion plants or nuclear-powered steam engines cannot do.

Reclamation: 58 power plants in the western United States produce an average of 42 billion kilowatt-hours (kWh) per year, enough to power more than 14 million homes. That's roughly the electrical power equivalent of 72 million barrels of oil. The best way to generate electricity is hydroelectric power stations.

During the Industrial Revolution, waterwheel technology reached such a high level that tens of thousands of waterwheels were in regular use with around 70% efficiency. The modern turbine was born from advances in engineering during the 19th century and the need to generate smaller,faster

ISSN: 2582-6433

power. French engineer Benoit Fourneyron may have built the first water turbine in the 1820s. It is called a hydraulic motor. 431 Hydroelectric was built at the turn of the century.[1]

Many factories began to switch from water turbines to turbines, and the government began to focuson using hydropower to generate electricity on a large scale.

Hydropower enjoyed its golden age in the first half of the 20th century, before replacing oil as an energy source. Dams and power plants in Europe and North America are being built rapidly, using 50% of their potential. Hundreds of suppliers have emerged to meet the needs of today's business world. The small electricity market has been in decline since the 1960s, when large electricity producers were able to maintain their position in export markets, especially in developingcountries.

There will be no growth in this sector without environmental incentives for the use of renewable energy sources. Some countries, notably Germany, have stimulated the economy in recent years with attractive policies promoting "green" energy. Electricity, but small hydropower often cannotcompete with existing fossil fuel or nuclear power plants.

In 1870, the country's first power station was built at Cragside in Rothbury, England. Electric generators were used to light theaters and shops in Grand Rapids, Michigan, in 1880, marking the beginning of electricity. In 1881, Niagara Falls, New York, had electrically powered street lighting combined with mill turbines.

Generators and turbines were interconnected and on September 30, 1882, the world's first 12.5 kilowatt electric generator was shipped to Fox River, two paper mills and a building at the Vulcan Street Mill in Appleton, Wisconsin, United States. provide good lighting. The first hydroelectric power stations were more reliable and more efficient than the fossil fuel sources of the time.

As a result, small and medium-sized power plants will grow as long as there is sufficient demandfor water and electricity. The number and size of fossil fuel, nuclear and hydroelectric power plantsare increasing with the demand for electricity.

[1] Combs, Susan. "Hydropower." Window on State Government Energy Report. Rep. Web. 21 June 2012.

ISSN: 2582-6433

HOW HYDROPOWER WORKS?

Moving water and moving water generate electricity. Given that the sun drives the hydrological cycle that supplies water to the earth, it can be considered a form of solar energy. In the hydrological cycle, precipitation is how water reaches the Earth's surface from the atmosphere. Most of the water enters or flows into the soil, and some evaporates. Finally, water from rainwaterand melting snow flows into lakes, ponds, reservoirs or oceans where evaporation always occurs.

Groundwater (groundwater) is moisture that enters the soil and enters a body of water from riversor groundwater. During drought, groundwater will rise from the soil and evaporate back to the surface.

Water enters the atmosphere through evaporation and circulates there, condenses into clouds, and some eventually returns to the earth as precipitation. Therefore, the water cycle is complete. Wateris a natural renewal.

GENERATING ENERGY

Energy cannot be created or destroyed in nature, but it can have a form. When generating electricity, there is no electricity anymore. In fact, energy is transferred from one form to another.

To generate electricity, water must be transported. This energy is kinetic energy (motion).
When water is used to turn the blades of a turbine, energy is converted into energy. The electric rotor rotated by the turbine converts mechanical energy into electrical energy. We call it hydropower, or hydropower for short, because water is a source of energy.

Hydroelectric energy is produced in a place called hydroelectric power plant. Some power plantsare based on rivers, streams and canals, but dams are required for reliable water supply.

Dams store water for later release for power generation, agriculture and industry, and irrigation. The reservoir works like a battery that stores water that can be released when electricity is needed.[2]

[2] "Basic Hydrogeology." North Carolina Department of Environment and Natural Resources.

ISSN: 2582-6433

The height formed by the dam is the height of the water flow. Water flows from the reservoir to the turbine through pipes called penstocks. Turbine blades are moved by the fast water in a similarfashion like a pinwheel in the wind.

The rotor is the moving part of the turbine that is rotated by the power of the water acting on the turbine blades. Electricity is produced when fixed electric coils (stator) are swept across the rotor coils.

Michael Faraday discovered the theory when he realized that a copper coil containing a rotating magnet could generate electricity.

When the water finishes its work, it continues to flow in the same direction for other needs. Transformers near substations come down from the electricity supply so it can be distributed and distributed throughout the area.

Electricity is extended by replacing the mast (or buried in the ground in some communities) to electricity and electricity for household use. When it comes to our house, we get electricity in kilowatt-hours, and the meter keeps track of how much we consume.

The generator is an electric generator; other types include electrons or atoms that leave to form gases that are used to generate electricity. Other sources include gas turbine, solar, geothermal andwind turbines.

All these power plants can use the region's transmission lines and stations to supply you with electricity. Using the "grid", electricity can be transferred between multiple generators to meet multiple needs. Your desk lamp will now use electricity from hydroelectric power plants, wind turbines, nuclear power plants, coal plants, oil or gas plants, or a combination of plants.

The electricity available where you live plays an important role in determining the type of electricity you use. For example, in 2002, power plants in Washington state produced about 80 percent of the state's electricity.

ISSN: 2582-6433

By contrast, Ohio's abundant coal resources have allowed coal-fired power plants to produce about87 percent of the state's electricity over the same period.

Large grids serving large areas and local power stations serving specific communities are examplesof utilities. Electricity companies are mostly business owners (private) of electricity services. Cities, towns, and strong communities have some of these.

The Electricity Market Department sells excess electricity from government facilities to relevant electricity users (mostly non-profit organizations and utilizing public institutions, consumers are legally favored in purchasing government energy).

ADVANTAGES

There are many benefits to using and investing in hydroelectric power. Its main benefit is that it can generate electricity continuously after the dam is built. The "door" can be closed to avoid electricity unless needed. An added benefit of this is that water can be stored for later use when electricity demand is high.

Water sports and other fun activities can be done in the pool behind the pool. Many of the great lakes have been turned over to tourists. Another advantage is that, unlike natural gas, coal or gas-fired power plants, generators do not cause greenhouse gases or other bad weather conditions. Today, hydropower prevents the world from burning 4.4 million barrels of oil a day, which is a huge greenhouse gas emission.

Hydropower also helps conserve drinking water because rainwater is collected in the plant's reservoirs and used for irrigation or utility. By storing water, they prevent the depletion of the groundwater level and reduce our exposure to floods and droughts. Energy security and price stability are additional benefits of hydroelectric power. Unlike oil or gas, water is a domestic commodity that is not subject to exchange in the economy. In addition, hydropower is a long-terminvestment that can provide benefits for generations, as its lifespan is between 50 and 100 years.

They are very cost-effective to operate and maintain, and are flexible enough to integrate with today's technology.

ISSN: 2582-6433

DISADVANTAGES

As with every renewable energy source, hydroelectric energy has many disadvantages. The disappearance of water in the water is the first negative. Dams built on streams can cause serious damage by affecting the flow of water. It is possible for fish and other aquatic organisms to enterthe powerful water pipes, end up in turbines and die there.

Dams can also interfere with the growth cycles and habitats of aquatic animals. Some aquatic animals have to swim in the water during the breeding season. If dams are built during migration, migrating fish can be killed and prevented from reaching their destination. This can destroy the whole fish.

Another disadvantage is that the local people are damaged by the dams.

Because fresh water always flows through the rivers, there are animals and plants around them. In order for dams to be built, many areas that disturb plants and animals must be removed. The needto cut down trees often leads to the destruction of the life of plants and animals that depend on them. The construction of dams affects plants and animals more than changing the direction of rivers.[3]

The third disadvantage is that it requires a lot of land as transformers and generators have to be connected to the national grid.

Therefore, many natural ecosystems must be destroyed by deforestation. Finally, because dam construction is scaled, workers are often required to be relocated. Many people are offended by this, leading to widespread protests and protests against the lake. For example, one of the biggestwater projects called "Sardar Sarovar" has met with intense protests in India. Although millions ofpeople will benefit from the project, the government has not been able to solve the critical problem of immigrants living in the area surrounding the relocation project.

This led to one of the largest protests in the history of India, which included several strikes, hunger strikes and even police attacks on protesters (National Renewable Energy Laboratory).

[3] "Renewable Energy: Hydroelectric Energy." National Renewable Energy Laboratory. Web. 21 June 2012.

ISSN: 2582-6433

Environmental impacts

There are certain restrictions on the use of water in wastewater or in the environment. Although hydropower can be used without using or releasing fossil fuels, the technology has many negative effects on the environment. Because hydroelectric power plants require large amounts of water to operate, flooding of shores can destroy rich habitats such as wetlands, which are the first to impactthe environment. Another negative impact on the environment is the high production of methane, a greenhouse gas, due to decomposition of plants in storage facilities in power plants in the tropics.

Sediment buildup in reservoirs can absorb pollutants and nutrients. As sediments accumulate, the reservoir becomes shallower and shallower. According to the World Council on Dams report, "Greenhouse gas emissions from reservoirs may be higher than from conventional oil-fired power plants." So this will cause more damage and release more methane than rotting forests. Degassing (e.g. removal of gases from water), methane bubbling, plankton growth and decay, submerged biomass and soil decomposition, carbon ingress to basins, growth and decay of aquatic plants, long ice years, carbon dioxide diffusion, water level fluctuations and vegetation loss (Electric State Government Window).[4]

Due to the operation of the power plant, the water in the reservoir may heat up, causing plants and animals that are always near the reservoir to leave, changing the surrounding ecosystem. Water activities can also have adverse effects on the facility's upstream and downstream aquatic ecosystems. For example, many studies have shown that salmon populations are declining as damson the Atlantic and Pacific coasts of North America prevent fish from migrating. However, somedams, such as Bonneville Dam, have "smart ladders" that help fish migrate (especially those trying to swim upstream).

Fish ladders, thanks to the big ladders placed on the river and pond, the fish can slowly move upwards instead of being completely blocked by the pond.

Another disadvantage of renewable energy is that the amount of water in a water source needs to be

[4] "EWTEC Tidal Energy Conference." EWTEC. European Wave and Tidal Energy Conference, 2009 Web. 11 June2012.

ISSN: 2582-6433

changed frequently (Renewableenery.no). The water levels that change each year can cause erosion and other problems in nearby land (eg coastal erosion). Finally, power lines designed for swimming pools can have an impact on birds through accidents or short circuits due to bird contactwith the builders of these structures (National Geography).[5]

ECONOMIC FEASIBILITY

There are many factors that affect the total production cost and economy of hydroelectric power generation.

About a third of the world's electricity is produced here. Most of the electricity produced in many countries outside of North America comes from power stations. For example, about ten years ago, power stations met 99 percent of Norway's electricity needs. According to the National Energy Administration, the United States produced 159.74 gigawatts, or about 6, in 2010.

Since sulfur dioxide, nitrogen monoxide, carbon monoxide and mercury from the combustion of fossil fuels are not released during electricity generation, it continues to compete with other renewable energy sources. It also avoids the risks and negative effects of coal mining on the environment and human health.

Unlike nuclear power, it does not generate nuclear waste (there is no need to find a way to store the waste) and does not pose risks associated with mining. Hydroelectric power stations are more predictable than wind or solar power stations as they contain water and can generate electricity when needed. They can also adapt quickly to accommodate changes in power and demand. In addition, hydroelectric power plants can meet the world's energy needs. For example, in 1998, power plants in Brazil and the Democratic Republic of Congo produced 91 percent of the electricity, while power plants in Norway and the Democratic Republic of Congo provided 99 percent of the country's electricity.[6]

[5] "The Future of Hydropower." IEEE Spectrum. N.p., n.d. Web. 27 Nov. 2012.

[6] "Environmental Impact of Hydropower." RenewableEnergy.no. Web. 21 June 2012.

ISSN: 2582-6433

According to the US Department of Energy, there are more than 2,000 hydropower plants in the US, making hydropower the largest source of renewable energy in the US (49%). Electricity production in the United States increased steadily from 16 billion kWh in 1920 to about 306 billionkWh in 1999. However, the world's largest electricity producer is Canada. In 1999, electricity production exceeded 340 billion kWh.

FUTURE FORECAST

Despite "expected growth", the future of hydroelectric power in the US and around the world remains uncertain. While hydropower in the United States has reached its maximum potential, thisis not the case in many countries. There are many large hydropower projects currently under construction in industrialized countries. The true future of hydropower worldwide depends on scientists' ability to develop new technologies. Although IEO2012 predicts an increase in energy production, there is some conflicting evidence that it is difficult to predict how much water will beproduced in the future.

Due to climate change, the old way of estimating water flows – recording past water flows and building dams accordingly – no longer works. In many tropical regions, rivers are already runninglow or drying up. Power generation from existing canals has been restricted or stopped due to lowwater levels. Kenya, for example, is investing in land and wind power to compensate for weak electricity production due to severe droughts. While water decreases in mid-latitudes, the report "Projected Changes in Hydropower Production by 2050" by researchers from the Norwegian University of Science and Technology found that the region of Northern Europe, East Africa andSoutheast Asia will have less hydropower. generation.

Therefore, the IEO2012 forecast is correct, but when talking about hydropower as a renewable energy source to meet the world's energy needs, it is necessary to consider where water shortageswill arise in more areas in the future.

ISSN: 2582-6433

CONCLUSION

With the latest developments in technology and construction, hydropower is the best source of sustainable energy. 14 major projects are currently under development, mostly in China, which will be completed between 2012 and 2022 in China, India, Venezuela and Bermuda. At low water levels, some water utilities, including the Hoover Dam in the USA, are considering replacing existing ones. turbines (IEEE). A country cannot rely solely on hydropower to meet its electricityneeds, even if it will generate a significant portion of our future electricity.

Therefore, the country wants to integrate this technology with other types of technology.

Also, although not used today, tidal power has great potential for future electricity generation as itis more predictable than other new technologies such as wind and solar. Since oceans cover abouttwo-thirds of the Earth's surface, they truly represent renewable energy with great potential. OceanThermal Energy Conversion (OTEC), a technology that uses the temperature difference between deep and shallow water (as deep water is colder) to generate electricity, is one of the technologiescurrently being developed in the ocean. Wave energy is the kinetic energy found in ocean waves caused by the wind.[7]

However, the current state of technology prevents us from realizing this possibility. Issues such asthe ecological impact, cost and size of the power plants should be addressed (UNICEF). Technologies that use large amounts of ocean energy or tidal energy are now needed. If we achievethis, renewable energy sources could have a huge impact on how we can be successful in the future.

[7] "Renewable Energy." Institute for Energy Research. Web. 27 Nov. 2012.

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