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Commentary

Advantages and disadvantages of hydroelectric power

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DESCRIPTION

Hydroelectric power is electricity generated by hydropower. By 2020 hydropower produced one-sixth of the world's electricity, about 4500 TWh, which was more than all other renewable energy combined and more than nuclear power. Electricity can supply large amounts of low-carbon electricity when needed, making it the key to many safe and clean electricity grids. With a dam and reservoir it is also a flexible source of electricity, as the amount produced by the channel can vary up or down in seconds or minutes to suit the changing energy requirements. Once a hydroelectric power plant has been constructed, the project does not produce direct waste, and it probably always has a much lower rate of emissions than the power plants used in petrol. However, when built in rain forest areas, where part of the forest is required to be immersed, they can emit large amounts of greenhouse gases.

Advantages

Flexibility: Hydropower is a flexible source of electricity as channels can pile up and down very quickly to adapt to changing energy needs. Hydro engines have a start-up time of a few minutes. Although the battery power is faster its power is less compared to hydro. It takes less than 10 minutes to deliver multiple hydro units from cold start to full loading; this is much faster than nuclear and all fossil fuels.

High value power: The main advantage of conventional hydroelectric dams is that they have their own energy-efficient low-cost storage for later use as high-value clean electricity. In 2021 the IEA estimated that "dams for all conventional combined hydropower plants could store a total of 1,500 terawatt-hours (TWh) of electricity in one full cycle" "which was about 170 times more powerful than international industrial vessels hydropower".

Suitability of industrial applications : While many hydroelectric power projects provide public power networks, some are designed to assist certain industrial businesses. Dedicated hydropower projects are usually constructed to provide the maximum amount of electricity needed for aluminium electrolytic plants.

Reduced CO_2 emissions: Since hydroelectric dams do not run on fuel, electricity generation does not produce carbon dioxide. Although carbon dioxide begins to be produced during project construction, and some methane is emitted every year by the dams, hydro has a very low-emission engine that captures heat in generating electricity. The low impact of greenhouse gases caused by hydropower is found mainly in cooler climates.

Disadvantages

Ecosystem damage and land loss: Large dams connected to traditional hydroelectric power stations cause widespread flooding along the river, sometimes destroying rich and productive forests in plains and river valleys, swamps and plains. Killing dams disrupts river flow and can damage the environment, and building large dams and dams often involves removing people and animals.

Drought and water loss by evaporation: Drought and seasonal changes in rainfall can significantly reduce hydropower. Water may also be lost through evaporation.

Pollution and water shortages: When water flows it has the ability to transport the heaviest particles downstream. This has a detrimental effect on dams and their power stations, especially those in rivers or high-density wetlands.

Methane extraction (from reservoirs): Low positive effects are found in tropical areas. In low-lying areas of rain forest, where part of the forest is required to be immersed, it has been observed that hydroelectric ponds produce a lot of methane.

Relocation: Another disadvantage of hydroelectric dams is the need to relocate people living in dams. In 2000, the World Commission on Dams estimated that dams left 40-80 million people worldwide.

Risks of failure: Due to large conventional dammed-hydro facilities hold back large volumes of water, failures due to poor construction, natural disasters or property damage can be catastrophic in low-lying areas along rivers and infrastructure.

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