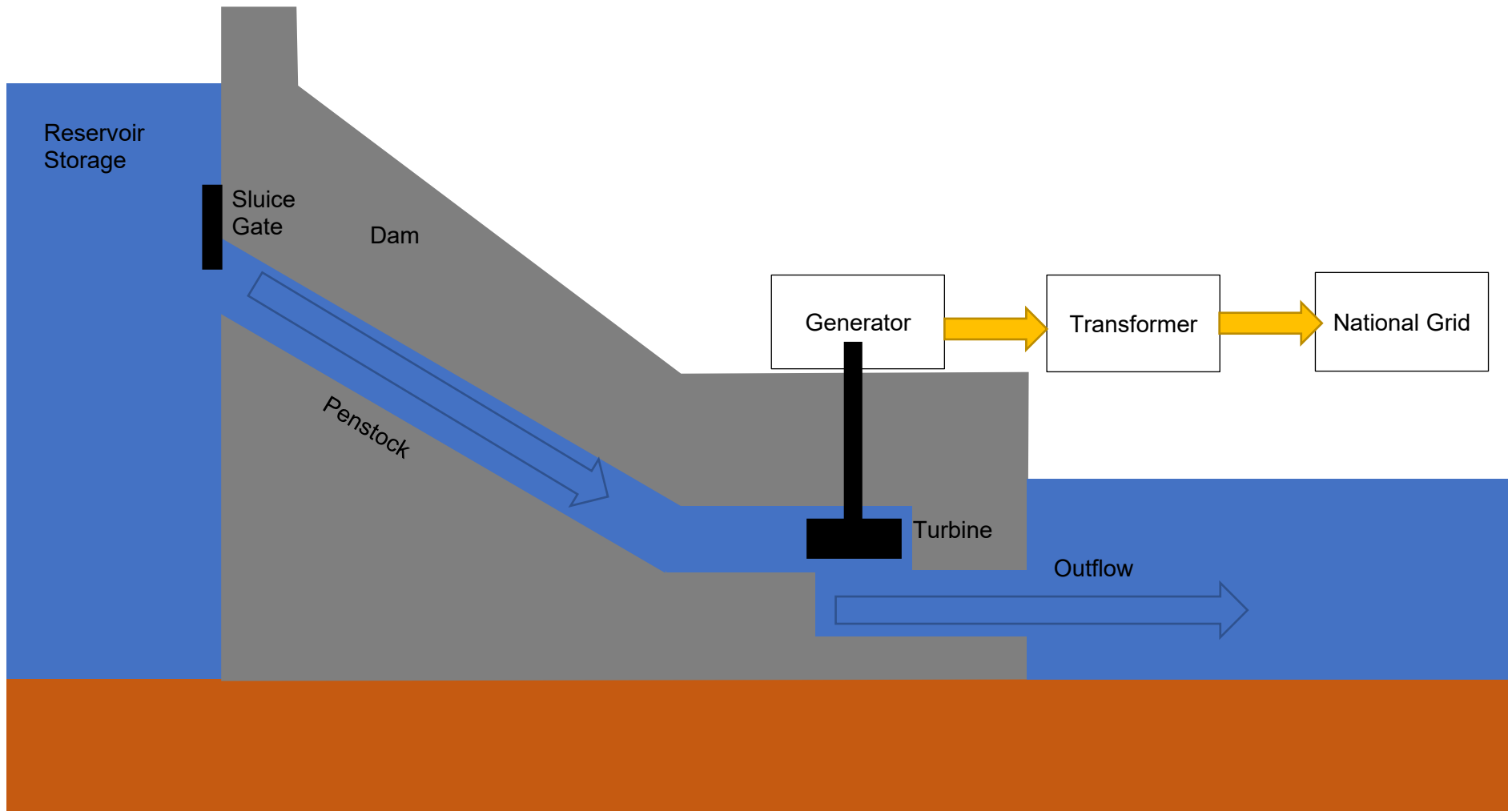


Storage Hydropower



What is Hydropower?

- Hydropower is the generation of electricity or energy by harnessing the motion of water. Turning the kinetic energy of the water into useful energy (electricity). People have used flowing water for thousands of years to power mills to grind flour or saw wood.
- The UK has been generating electricity using hydropower since 1879 and now has an installed hydropower capacity of nearly 4.8 GW producing just under 5% of the UK's energy.

Benefits of Hydropower

- Renewable energy and sustainable. As long as the water continues to flow you will be able to harness the energy. It is a clean form of energy as it does not burn fossil fuels.
- Cheap to operate. After building the infrastructure, hydropower is one of the lowest cost types of renewable energy over the long term. Some dams can easily last more than a century.
- Flexible energy source – unlike other conventional fossil fuel power sources, hydropower can easily be turned off or on to meet demand without affecting its overall performance.
- Provide flood control by storing surges in river water level and discharging the water with a controlled flow to not flood downstream areas.
- Reservoirs can be used to generate secondary income through recreational activities, such as water sports or fishing.

Limitations/Cons of Hydropower

- Environmental impact – Although the energy produced is clean, CO₂ free and renewable, there is a significant environmental impact. Many hydropower plants require stored water in reservoirs which is made by disrupting natural river systems which can disturb wildlife and destroy habitats.
- Needs large scale investment – Majority of Hydropower is cheap to run when installed, however there is a large upfront cost to build the infrastructure.
- Lack of available reservoirs or places suitable to be converted to a man-made reservoir and only can be done with access to water.
- Risk of large-scale failure – All dams involve certain risks during construction and operation, including flooding or dam failure. As some hydropower facilities store large volumes of water, this could cause massive destruction downstream of the dam if things fail.

Types of Hydropower

There are 5 main types of hydropower:

- **Storage Hydropower** – Using a dam to block a river source that stores a large volume of water. The stored water is released by opening the sluice gate, through the penstock (pipe), funneling the water through a turbine to spin a generator and produce electricity. This produces a relatively constant power output, but the sluice gates can be open further to meet peak energy demand when required.
- **Pumped Storage Hydropower** – Similar to storage hydropower, pumped storage hydropower requires a large volume of stored water and acts like a battery for other power sources (Nuclear/wind etc). When there is a surplus of energy, water is pumped to a higher elevation where it is stored in a reservoir and then released through a turbine to fill gaps in the nation grid when the demand is higher than supply of other energy sources.
- **Run-of-River Hydropower** – Harnesses the natural flow of a river to turn a turbine. This does not require the flooding of land to create a storage of water.
- **Tidal Power** – The cyclic rise and fall of the ocean caused by the gravitational pull of the moon, is used to turn standalone tidal turbines or through barrages to generate electricity. Due to the cyclic nature of tides, this form energy generation is very predictable.
- **Wave Power** – Wave power is also a form of wind power. As wind blows over the surface of the water, waves are formed and can be harnessed.

References/Further Reading

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