

Hydropower and climate

- Hydropower uses the force of flowing water to generate power.
- Climate factors such as rainfall can affect the amount of energy that can be made through hydropower.
- Hydropower is used to generate around one-fifth of Samoa's energy.

What is hydropower?

Hydropower is a renewable source of energy that uses the force of moving water to generate power.

This power, or 'hydroelectricity', is generated when flowing water is channeled through water turbines. The force of the water on the turbines powers a generator, converting the motion into electrical energy (or electricity).

Link between hydropower and climate

Hydropower schemes, such as the Afulilo Hydropower Scheme in Samoa, rely on rainfall to ensure reliable power supply.

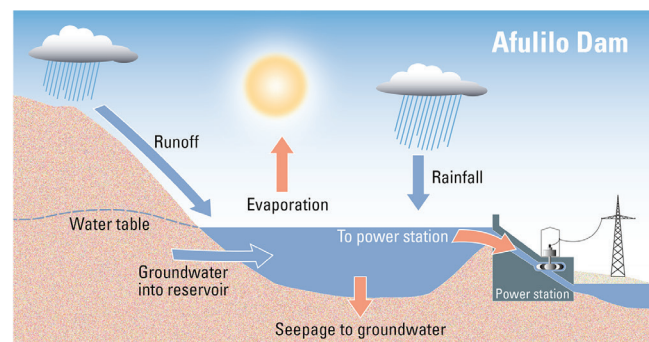
This is because dams and reservoirs need to have enough water available to push the turbines that generate electricity.

Hydropower in Samoa

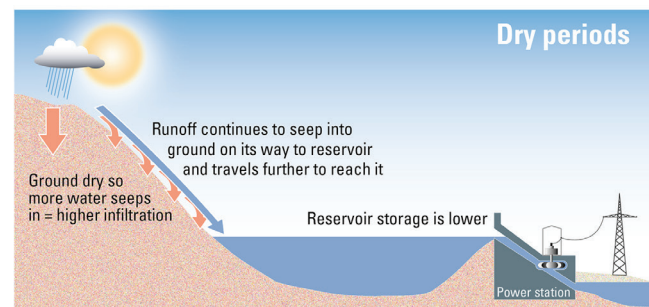
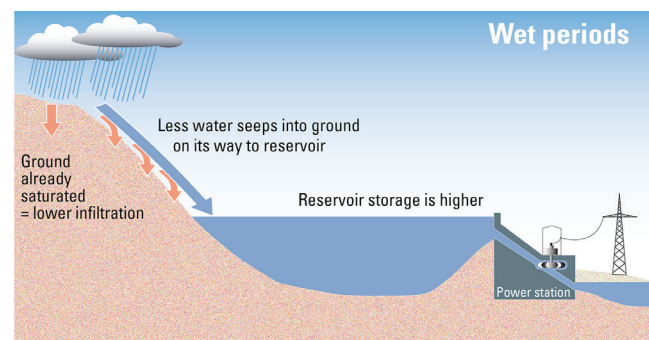
Afulilo Hydropower Scheme is the main supplier of hydropower in Samoa, generating around one-fifth of the country's energy.

Rainfall in Samoa is highly variable on both seasonal and annual time scales. This variability can affect the amount of energy that can be generated through hydropower, and can impact the reliability of Samoa's energy supply network.

Water balance of Afulilo Dam



The water available for generating hydropower is influenced by many factors. The effect of each of these factors can be analysed using a water balance model.



Availability of water for energy generation varies considerably between dry and wet periods, underlining the value of climate forecasts for managing this resource.

Water storage outlooks for Afulilo Dam

- The Samoa Meteorology Division and the Electric Power Corporation have been working together to develop a water balance model for Afulilo Dam.
- This project combines key elements of Samoa's seasonal rainfall outlooks, with projected energy generation to provide a monthly water storage outlook.
- This will help decision makers to better manage available water resources.

Producing a water storage outlook model

The project has developed a pilot water storage outlook for Afulilo Dam. The outlook will provide relevant agencies in Samoa with information so that they can adjust energy generation processes to better manage available water resources.

Using the model

This outlook will allow the Electric Power Corporation (EPC) to make informed operational decisions, by providing forewarning of possible water shortages. This allows decision-makers in the Samoa Meteorology Division and the EPC to adjust energy generation processes and better manage the water resources at the reservoir.

The model allows climate outlooks to be integrated with other hydrological information to aid in making more efficient use of water resources and improving water security. This will help ensure a reliable and cost-effective supply of energy from the Afulilo Hydropower Scheme all year round.

Further information

For further information, please contact Tile Tofaeono (Samoa Meteorology Division) at tile.tofaeono@mnre.gov.ws



The pipe (penstock) that carries fast-flowing water from the dam to the hydropower station to generate energy.

Rainfall forecasts

Afulilo Dam rainfall forecast for the coming month, provided by the Samoa Meteorology Division

Recent dam level measurements

The measured water storage level at the end of the previous month

Projected energy output

The Electric Power Corporation's energy generation target for the coming month

Water storage outlook for Afulilo Dam

Generated each month by the Samoa Meteorology Division, using a statistical model, and provided to the Electric Power Corporation for use in decision-making