# Norway's power supply

## 98% of Norway’s energy comes from renewable sources[1]

**1st** for hydropower production **in Europe**

**6th** for hydropower production **in the World**

**39.7GW**
Norway installed capacity[1]

**156TWh**
Produced by Norway annually[1]
as of beginning of 2022

Norway consumes approximately
**123TWh**
of electricity leaving a surplus for export[2]

**1550+**
Hydropower plants[1]

**88%**
Hydropower (135.6TWh)[1]

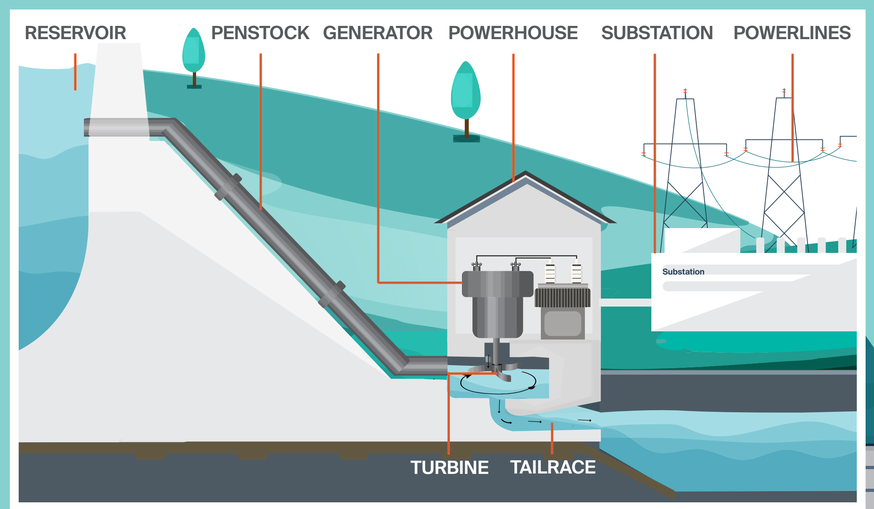
**11%**
Wind power (7.7TWh)[1]

**1%**
1% Geothermal (642MW)[1]

**<1%**
Solar power (153MW)[1]

## What is Hydro Power?

Hydro power (or hydro-electric power) is the process of generating electricity by harnessing the energy of moving water. There are several types of hydro power system such as run of river, direct dam or through piped water or ‘penstocks’, the latter being a very common system here in Norway (as shown in the illustration).




## How does it work?

1. A high reservoir will contain a lot of water, which is the stored energy (“storage”), and these reservoirs can serve as seasonal, sometimes multi-yearly, energy storage systems. As a result, Norway is very well placed to ride through global energy shocks like that seen in winter 2022-23.

   To release this stored energy the water must be fed down through the pipes (the “penstock”) from the reservoir down to the turbine house (the “power house”). The advantage of this penstock hydro is the high degree of control over the flow and therefore the power production. This flow can be regulated if for example the power load in the system needs to be balanced quickly.
2. This water flows through the penstock due to gravity and as it falls it gains speed and energy called ‘kinetic energy’. The penstock directs this water towards the power house and onto the fins of the turbine which acts like a giant fan.
3. As the moving water enters the turbine, the kinetic energy makes the blades spin, and this is converted into mechanical energy. This mechanical energy spins the rotor inside the generator which sits on top of the turbine. This generator contains electromagnets and as the rotor spins it creates a changing magnetic field – this changing magnetic field induces a flow of electricity.[3]
4. The electricity generated by the hydropower plant is then sent through a network of power lines to a substation which then adjusts the voltage for distribution to homes and businesses.

[1] Energi Fakta Norge (2023)
[2] International Energy Agency (IEA)
[3] Known as “Faraday’s Law of Electromagnetic Induction”