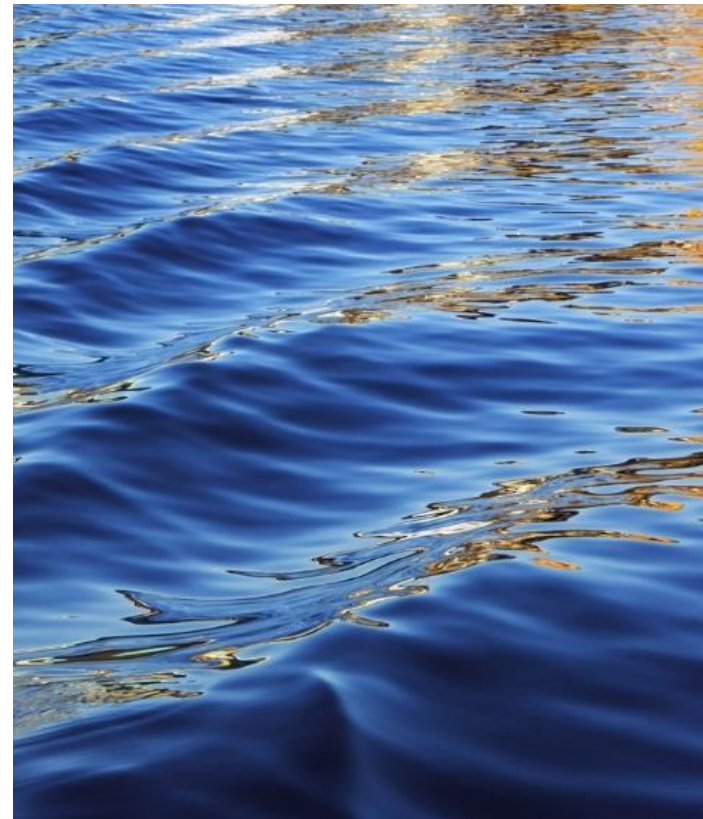




Hydropower



Short Overview

- Definition
- Types of hydroplants
- Impoundment facility
- Advantages and Disadvantages
- History
- Resources in other countries
 - Portugal and Italy
 - Norway and Germany
 - Turkey

Definition

- Hydropower is derived by capturing flowing water and converting it into electrical energy
- Power source (water) turns a propeller like machine: turbine
- Used for mechanical power & hydroelectricity
 - E.g large dams have the purpose to create hydroelectricity
- hydroelectricity has less adverse effects than other options
- Water engines/ water motors



Types of hydroplants

1. Impoundment facilities

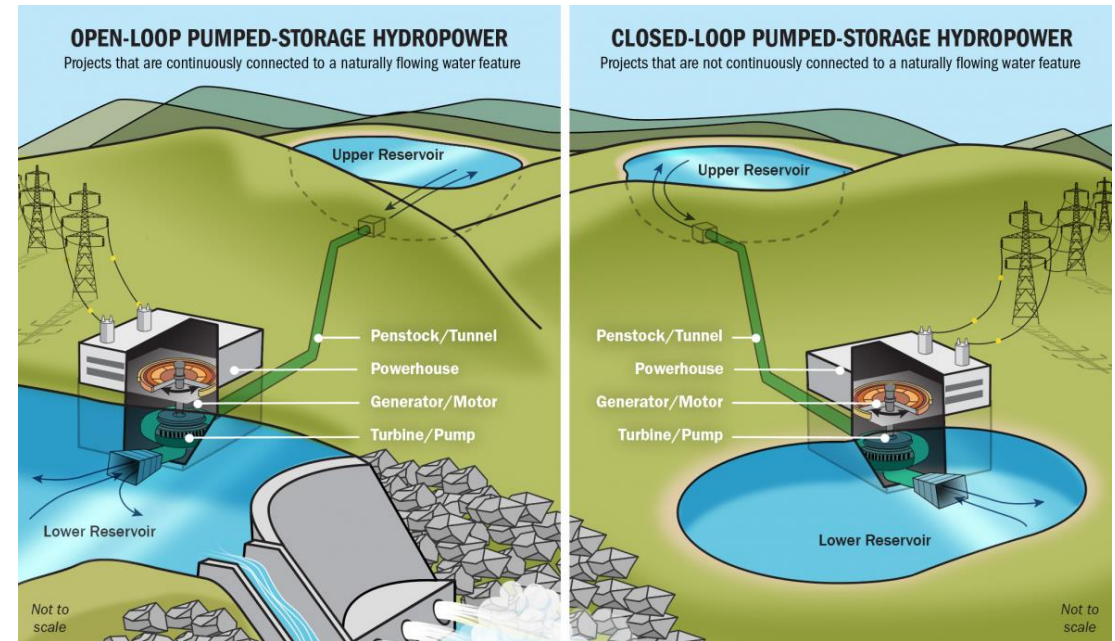
- Most common
- Dam used
- Water through turbines

2. Pumped storage facilities

- Similar to first but have second lower reservoir
- Water pumped back and forth depending on electricity demand

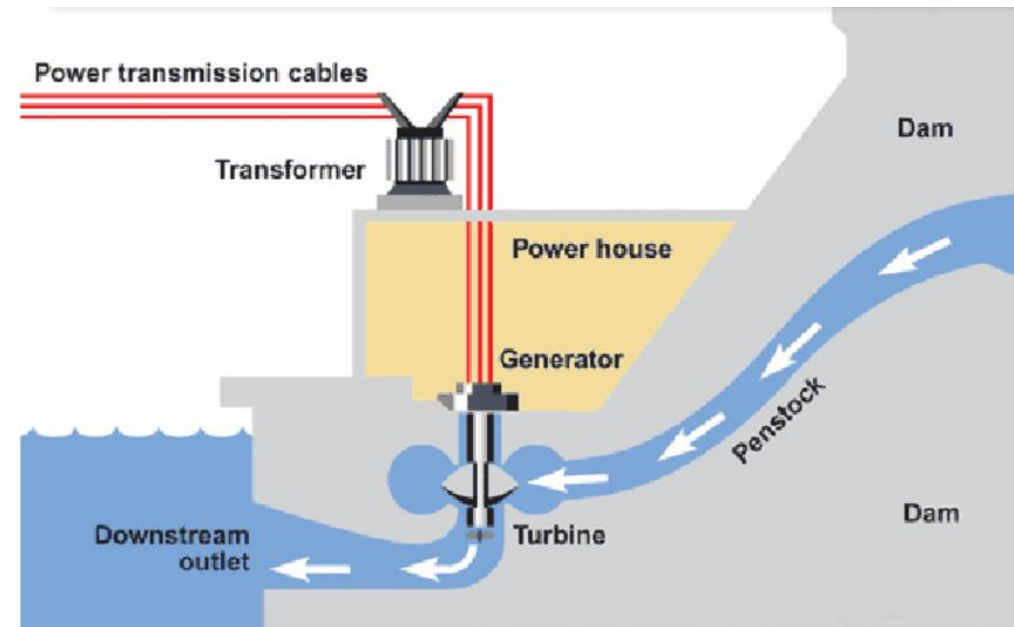
3. Run-of-river facilities

- Rely on natural water flow rate
- Only part of water runs through turbines -> more intermitted than dammed hydro



Impoundment facility

- Mechanical energy created
- Moving water spins rotors (turbine)
- Turbine connected to electromagnetic generator -> electricity
- Different categories:
 - Large (> 30 MW)
 - Small (100 kw)
 - Micro (<100kw)



Advantages and Disadvantages

Advantages

- Consistency of production
- High durability
- Dams become tourist attractions
- Water used for irrigation
- No greenhouse gases
- No fossil fuels
- To control the amount of water

Disadvantages

- Flooding of nature -> destruction of environment
 - Travel routes of fish disrupted
- High construction costs
- Geological damage
- Dams can breach
- Conflicts between countries
- Alteration of water table

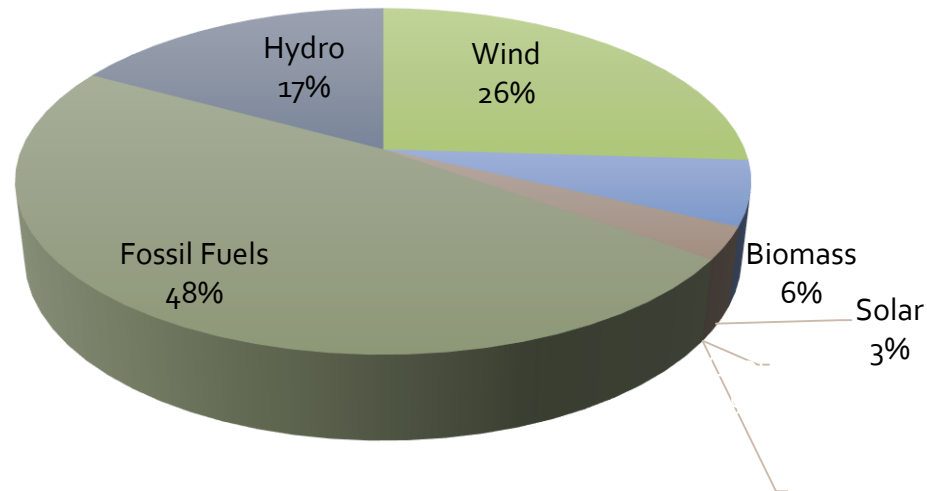
History

- Watermills were used since 3rd century(developed in Greece)
 - Water from river diverts to a water wheel through a channel
 - Force of water drives the wheel, that rotates the other machines
 - Sluice gates control the passages of water
- **1831** : the first electric generator was invented by Michael Faraday.
- beginning of the **1800's**: (industrial revolution) provided mechanical. power for textile and machine industries.



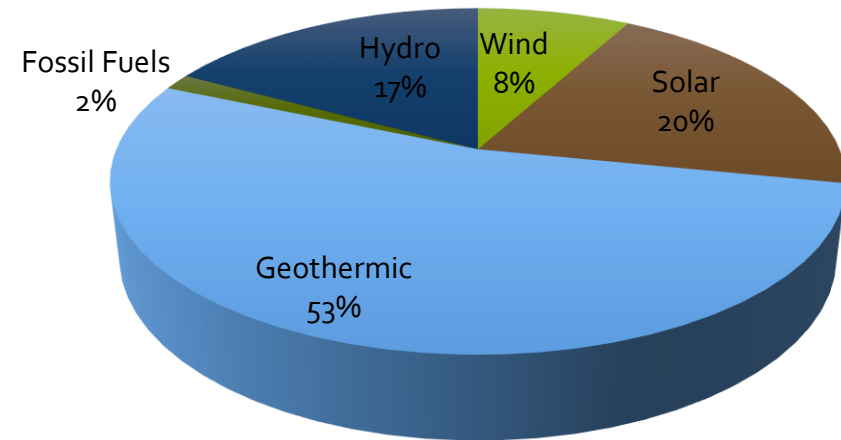
Resources in other countries

Portugal



- Due to the weather conditions e.g. wind Portugal has a huge amount of wind energy

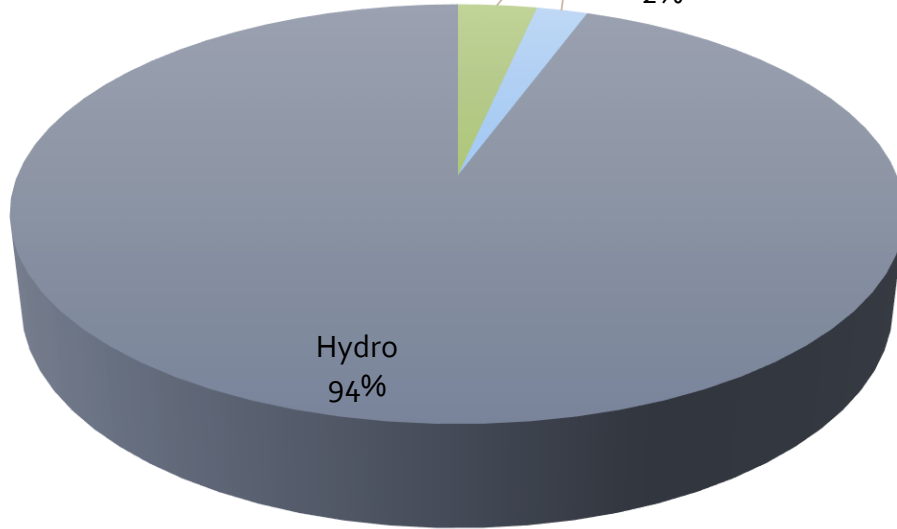
Italy



- Due to the volcanos Italy uses Geothermic

Resources in other countries

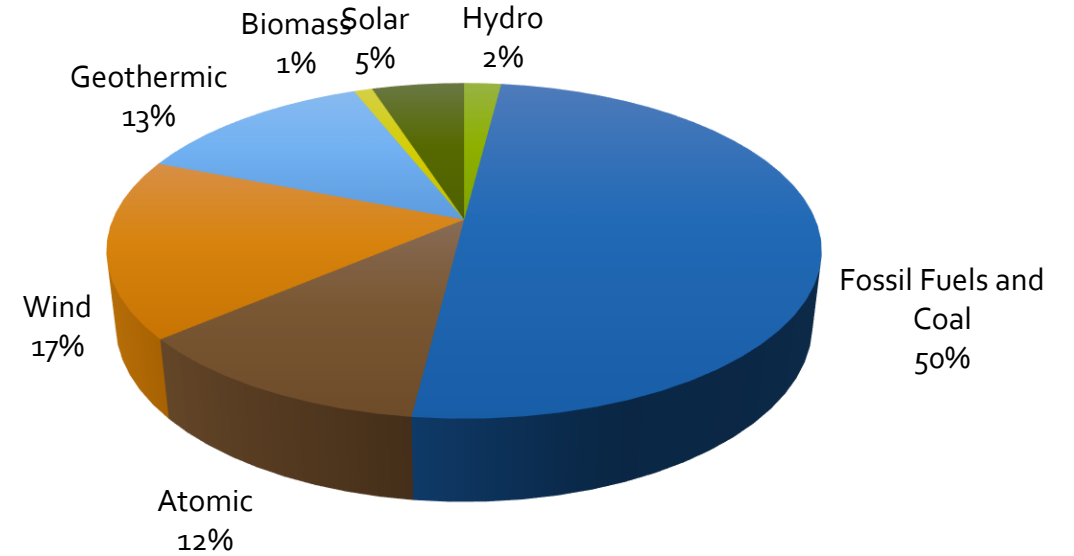
Norway
 Wind 4%
 Geothermic 2%



Wind Biomass Solar Atomic Geothermic Coal Fossil Fuels Hydro

- Due to geographical reasons e.g: the high precipitation, the valleys (caused by glaciers) . Norway uses a lot of hydro energy.

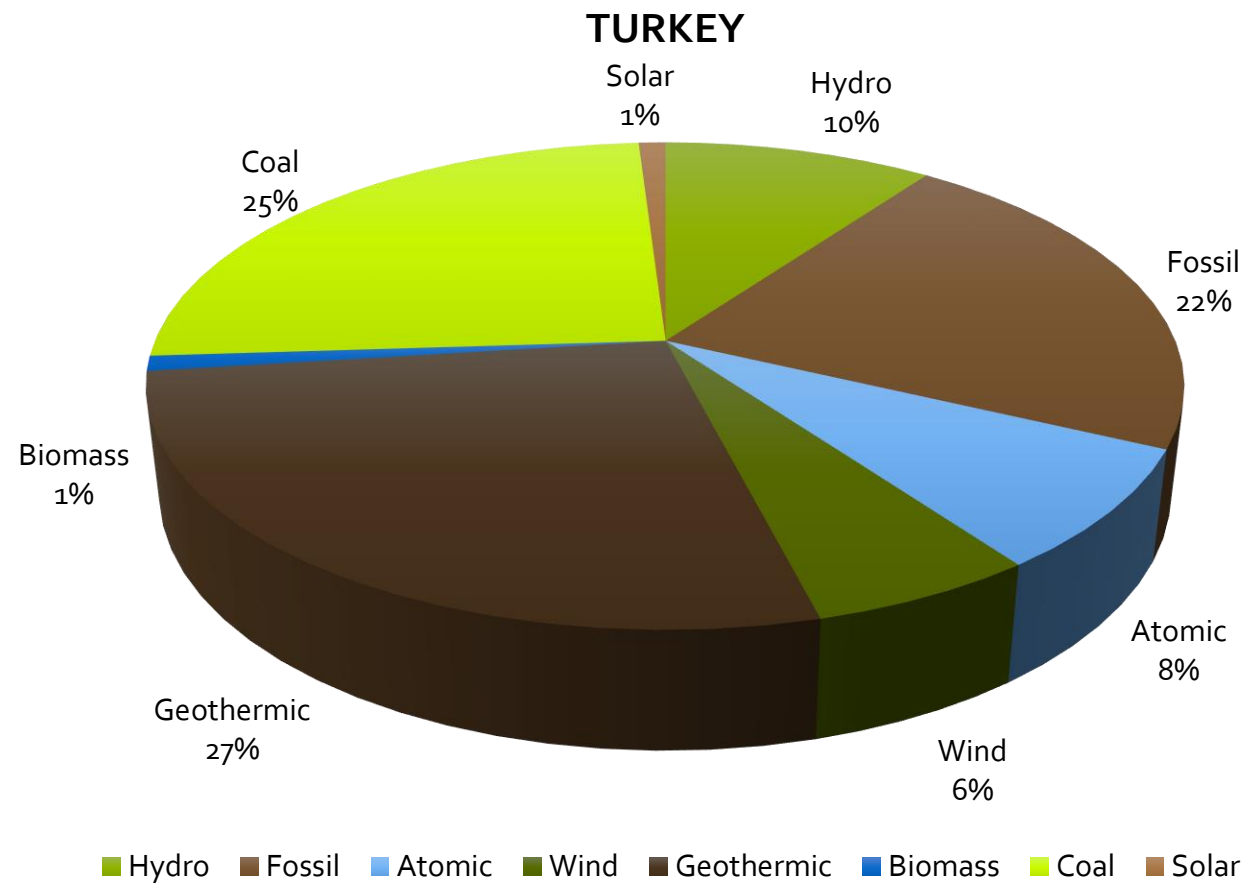
GERMANY



Hydro Fossil Fuels and Coal Atomic
 Wind Geothermic Biomass
 Solar

- Due to natural resources Germany uses a lot of Fossil fuels and coal, but has the chance to use renewable energies in the future consequently the flat land and the wind in the north

Resources in other countries



- Due to the volcanic activity and the natural resources, Turkey uses geothermic and fossil fuels as energy sources.