Electricity production in a changing climate

Potential climate change impacts of water, wind and temperatures on electricity production from today’s power plants

Overall, the EU increases its hydro production

- Northern EU:
  - 1.5 °C: +1%
  - 2 °C: +2%
  - 3 °C: +3%

- Southern EU:
  - 1.5 °C: +1%
  - 2 °C: +2%
  - 3 °C: +3%

Hydro production increases in northern EU

Less than +/-1% impact with 1.5 °C, 2 °C and 3 °C warming

The lower efficiency of solar panels due to higher temperature is small

Less thermal power production (biomass, coal, gas, oil) is needed to meet demand thanks to higher hydro production

- 1.5 °C: -4%
- 2 °C: -7%
- 3 °C: -15%

River water is used to cover the cooling needs of thermal plants

- 1.5 °C: -1%
- 2 °C: -2%
- 3 °C: -5%

Lack of cooling water

Spill-over effects from the rest of the world are small (less than +0.1%)

In northern EU, increasing water availability leads to more power production by hydro and less by other thermal sources through substitution.

In southern EU, reduced water availability leads to less hydro and nuclear power production.

Electricity production costs are pushed up in southern EU and down in northern EU.

For the EU & UK as a whole, wind and solar are not significantly impacted.

More hydropower resource means lower production costs

- 1.5 °C: -1%
- 2 °C: -2%
- 3 °C: -4%

More fuels needed to compensate lower hydro production, leading to slightly more expensive production costs

- 1.5 °C: +0%
- 2 °C: +1%
- 3 °C: +1%

For more information, including assumptions of the modelling framework used, see: JRC PESETA IV project https://ec.europa.eu/jrc/en/peseta-iv