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How weather and climate affect renewable electricity sources in Norway

Ingjerd Haddeland and Maria Sidelnikova

Norwegian Water Resources and Energy Directorate, Oslo, Norway (iha@nve.no)

European electricity production is increasingly based on renewable energy sources, inspired by ambitious climate politics. Hence, the power system must adapt to larger shares of less flexible electricity sources like wind and solar, which depend on fluctuating weather. Here, hydro power inflow, wind power, solar power and electricity demand in Norway are estimated based on meteorological data for the period 1961-2020. The installed capacity of the production technologies is kept constant at 2020 levels throughout the analyses. Mean annual power production is higher than mean annual electricity demand. However, the variability in production potentials is large for all renewable energy sources at time scales ranging from hourly to annual, and power deficits occur occasionally even at the annual scale. Hydro power inflow shows an increasing trend during the period studied, and the relative increase is largest during the winter season. Wind and solar power production are only marginally affected by climate differences in the study period. Electricity consumption decreases somewhat during the 60-year period, due to increasing average temperatures. The combined effect of production and consumption changes is an increase in mean annual surplus of electricity during the period studied. However, although a surplus of electricity exists at the mean annual level, additional available electricity in the form of reservoir storage or import is needed to maintain security of supply within the country.