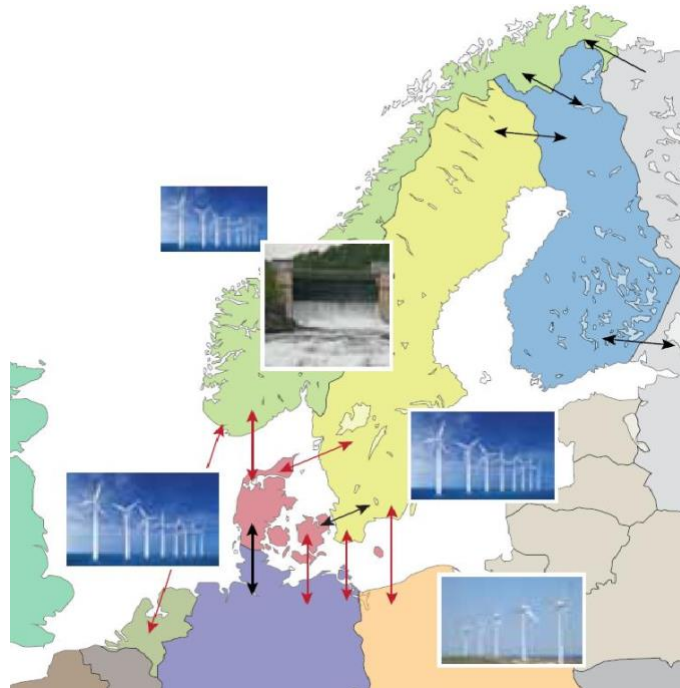




The HydroBalance Project: Energy Storage from Hydropower in Norway Supporting Intermittent Renewable Electricity Generation in Europe



Sustainable Development Goals Addressed



<p>Organization, Institution or Company</p> <p>The Center for Environmental Design of Renewable Energy (CEDREN) is developing the HydroBalance Project. CEDREN main partners include SINTEF Energy Research (Norway), Norwegian Institute for Nature Research (NINA), and Norwegian University of Science and Technology (NTNU).</p>
<p>Location of project site, Country</p> <p>Norway</p>
<p>Brief narrative description of objective/project/activity/initiative</p> <p>The goal of the HydroBalance project is to assess the feasibility of using Norwegian hydropower storage capacities for supporting a better, more efficient and affordable integration of intermittent renewable electricity generation in Europe. The work combines technological, environmental and social science.</p> <p>The HydroBalance Study has shown the value of energy storage from hydropower if compared to other options for storage such as natural gas and batteries. A model was developed assuming a scenario of existing and potential future additional hydropower capacities in Norway and possible additional power systems interconnections.</p> <p>A very accurate wind and solar power output model was developed for Europe. Results from simulations show that availability of energy storage capacities of 23 TWh could help to make the European electricity system emission free by 2050.</p> <p>Norway presently has 32 GW installed capacity in the hydropower system and 85 TWh reservoir storage, providing 97 per cent of its own electricity supply. Studies have shown that it is possible to develop additional 20 GW of new capacity in the Norwegian hydropower without construction of additional reservoirs.</p>
<p>Economic, environmental and climate benefits, challenges and lessons learned</p> <p>The power system in Northern Europe is characterized by large shares of wind and solar. Hence, power supply may be intermittent during periods of low wind speeds or low radiation. If new interconnectors are built between Norway and other European countries, Norwegian hydropower sites can store energy during periods in which variable renewable generation exceeds the total demand, and produce energy during periods during which continental European production fall short of demand.</p> <p>Additional hydropower storage capacity offers an alternative to expensive capacities for peak thermal power generation. Comparing cost of new gas-power plants located in Europe versus costs of additional pumped-storage in Norway shows that the latter option would be more</p>

cost-effective for the provision of peaking capacity. The CEDREN/SINTEF study calls for further dialogue and information exchange to evaluate technical options and their potential economic and environmental benefits.

Additional information: website addresses and contacts

CEDREN website: <https://www.cedren.no/english/Projects/HydroBalance>



Photo by CEDREN