

## Flexible energy

# Norway can act as a battery for Europe

Norway should treble its current energy generation capacity by about 2040-2050 to facilitate a pan-European transition to renewable energy, according to CenSES model studies.

This can be done by constructing new wind farms to create a power generation system made up of hydro power, onshore wind and offshore wind, each accounting for about a third of total capacity.

The recommendation is controversial because this will require vast investment in infrastructure, which some people consider both unsightly and expensive, according to Professor Gunnar S. Eskeland, environment economist, The Norwegian School of Economics, NHH.

“Politically, wind farm expansion offshore is more palatable than on land, because it’s actually difficult to place them on land where there is high population density,” he says.

“Many people don’t want wind turbines in their backyard, or rather, in natural environments where they live or go on holiday.”

A lot of wind farms are nevertheless likely to be constructed on land in Norway, in areas that many consider suitable due to their low population density.

The surplus energy will mostly be used outside Norway, but it can also benefit the domestic economy.

“If we’re to increase energy generation capacity, we can also increase economic acti-



*Achieving a flexible energy system is important, not just within individual countries but also across Europe.*

vity in Norway. We can do this for instance by expanding industry,” says Asgeir Tomasgard, professor at the Department of Industrial Economics and Technology Management at NTNU, The Norwegian University of Science and Technology in Trondheim.

“But in reality, it’ll mainly be for exports, so obviously we’ll need cables to transfer this renewable energy to Europe.”



*Norwegian hydropower can be used as a battery for Europe, to cover periods when they cannot produce enough wind and solar power.*

Europe will need this energy to provide power when the wind is not blowing or when the sun is not shining.

Currently, this requirement is met by power generated in gas and coal power plants that can be quickly turned on and off in response to fluctuating demand.

In future, Norway's hydropower can be turned on quickly instead, at least if the reservoirs have been filled up rather than used to supply energy constantly. This is feasible if some energy is instead provided to the Norwegian people by solar and wind.

Hence, once coal and gas have been phased out, there will be a need for Norwegian hydropower to provide flexibility to the European energy system, essentially acting as an energy storing battery for Europe.

This can happen if Norway gets something in return, observes Tomasgard, who is also director of CenSES.

"We don't really need the energy ourselves," he points out.

This is because Norway's hydropower provides

enough for Norway's current and foreseeable energy requirements.

Though if Norway uses all its hydropower, there will not be a surplus available for others who will need it when there is no sun or wind.

"So if we are to develop our onshore and offshore wind generation capacity, it must be in cooperation with our European neighbours," says Tomasgard.

"This will ensure that we share both the costs and the benefits, and of course the risk, attached to what will be huge investments."

Developing an integrated European power system will benefit everyone, according to Stefan Jaehnert, researcher at SINTEF, one of the largest independent research bodies in Europe.

Yes, Norway will be selling power when prices are high, while Europe will be selling when prices are low, but this is not a zero-sum game.

Without Norway providing this flexibility, the price variations between low and high would be even greater, so Europe would pay even more during periods when electricity is

scarce, Jaehnert reasons.

“The Norwegian hydropower system’s flexibility can be beneficial for all of Europe.”

Safeguarding Norway’s capacity as an efficient battery for Europe will require investment of 10 - 15 billion euros in the grid system alone.

“In addition, investment will be required to build wind farms that would deliver some 80 gigawatts of capacity in the North Sea, plus similar investment required onshore,” says Tomasgard.

“Quantifying the investment requirements in onshore and onshore wind is tricky, as the economics is constantly changing as prices fall.”

With technologies like carbon capture and storage, Norway might need a bit less wind power, because they could then also provide stable energy deliverances from natural gas and coal. This too would carry costs, however.

“It’s clearly going to be costly, but also very valuable.”

Norway is in a position to benefit here, but this will not become its new oil.

“This can bolster industrial development in Norway during the next three to 10 decades, while Europe transitions to a climate-friendly future,” says Eskeland.

”But the earning potential will not be on par what we have had in the petroleum sector, which has been an unbelievable blessing for the Norwegian people.”

### **Our recommendations:**

- Develop pan-European cooperation that will secure investment in new renewable energy developments, where both costs, benefits and risks are shared.
- Explore how industry in Norway can benefit and grow as a result of additional access to renewable energy.
- Educate stakeholders, including the Norwegian people, about the pros and cons of developing additional wind power generation capacity.

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