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OFFSHORE WIND

OFFwind – Report

"Offshore Wind overview for Finland, Sweden, and Norway", info 1b

(ref. - Hywind Tampen)

The OFFwind project is funded by Interreg Aurora.

Project partners are, Novia (Finland), Merinova (Finland), Tampere University (Finland), Luleå Technical University (LTU) and SINTEF Narvik.

ABSTRACT

The report provides an overview of offshore wind in the Aurora area (Sweden, Finland and Norway, with some focus on the northern areas), from the early feasibility, preparatory and planning phases, to the auction and field and farm development with a description of a typical offshore wind farm (farm area, turbines and substructures, AC/DC converter station, DC/AC converter land station, array cables and DC cable to shore) and an outline of future wind farm plans for the Aurora area and finally a brief economy overview.

Typical Offshore Wind Farms

A typical offshore wind farm development seems to be based on delivering 1.300 MW of power and an area of around 200 km2 with approximately 100 turbines with substructures, offshore HVDC converter substation with substructure (with distance from shore much larger than the breakeven distance for AC-transmission to shore), turbine to substation transmission cables, HVDC transmission cable to shore and an onshore substation for conversion to AC and transmission to the Grid. Offshore wind farm projects are large project developments.

Total investment costs will of course depend on development concept (various factors as foundation, depth, distance to shore, farm lay out, number of turbines, requirement for AC/DC conversion, distance to Grid connection etc.). A normal investment cost seems at present time to be 50 to 80 billion NOK.

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Picture 1. Middelgrunden offshore wind farm, 3.5 km outside Copenhagen, Denmark (2, Wikipedia, Offshore wind power).

Planned Offshore wind in the Norwegian Continental Shelf

The Norwegian government has announced a goal to allocate areas in Norwegian waters for 30,000 MW of offshore wind by 2040 (1). This will provide roughly the same amount of power production as Norwegian hydropower generates today.

Picture 2. Potential areas for Offshore Wind on the Norwegian Continental Shelf. (ref. NVE)

Planned Offshore wind in Swedish waters

Sweden announced its intention to expand its offshore wind power capabilities, aiming for an increase in annual production capacity of 20 to 30 TWh and planning for additional offshore developments in the Baltic Sea area.

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Picture 3. Overview map of Sweden's three marine zones, Havsplaner/planeringsförutsättningar, 2022.

Planned Offshore wind in Finnish waters

There are several development plans for establishing offshore wind farms in Finland (in the Bothnian Sea), and as per May 2023, over 57 600 MW of offshore wind power capacity is being planned in Finland.

Picture 4. Offshore wind power Finland, Map no. 2

Interreg Aurora
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