



14.5.2024

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# How to connect large offshore wind farms to the electricity grid in Finland

Wind Finland Offshore 2024

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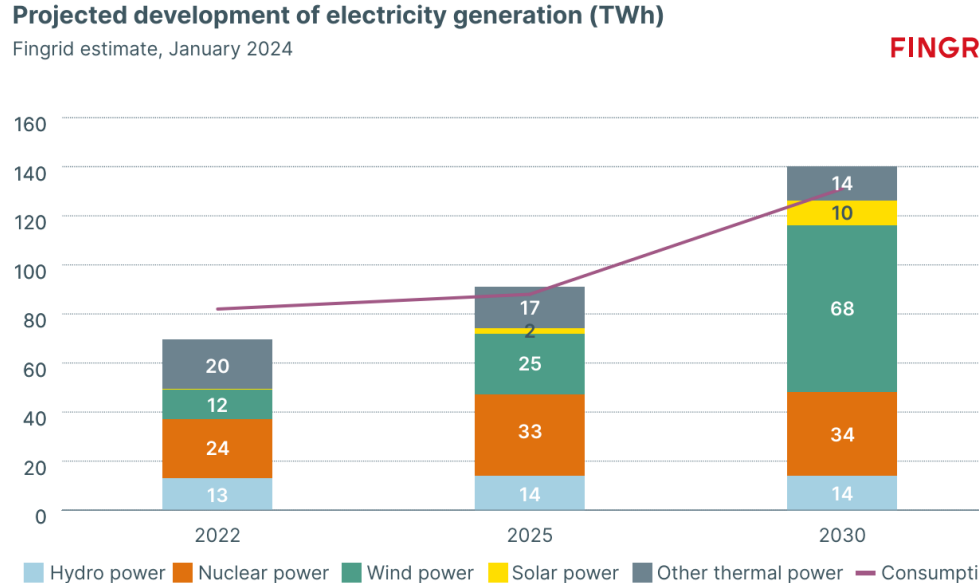
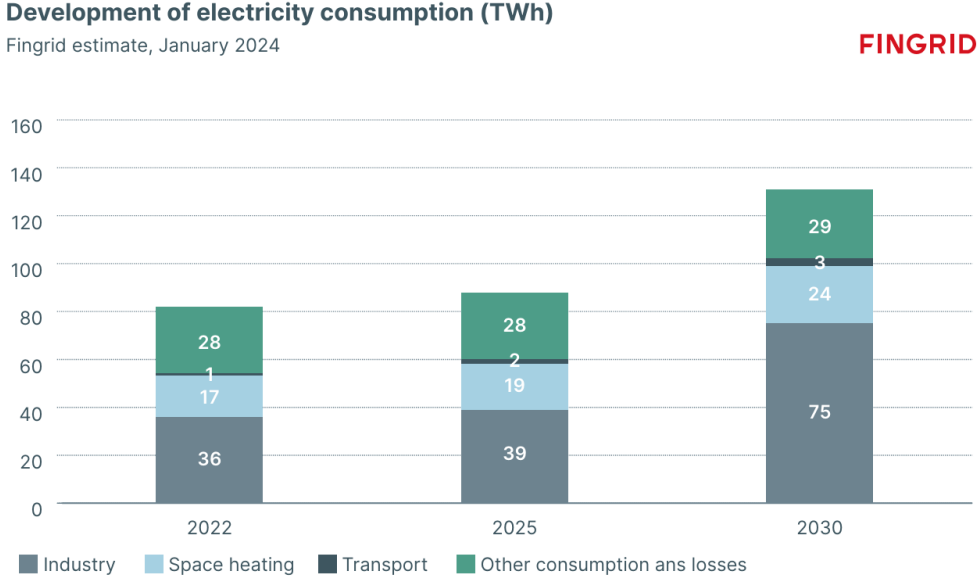


**Fingrid is Finland's  
transmission system operator.**

**We secure cost effectively reliable  
electricity for our customers and society  
and we shape the clean, market-oriented  
power system of the future.**

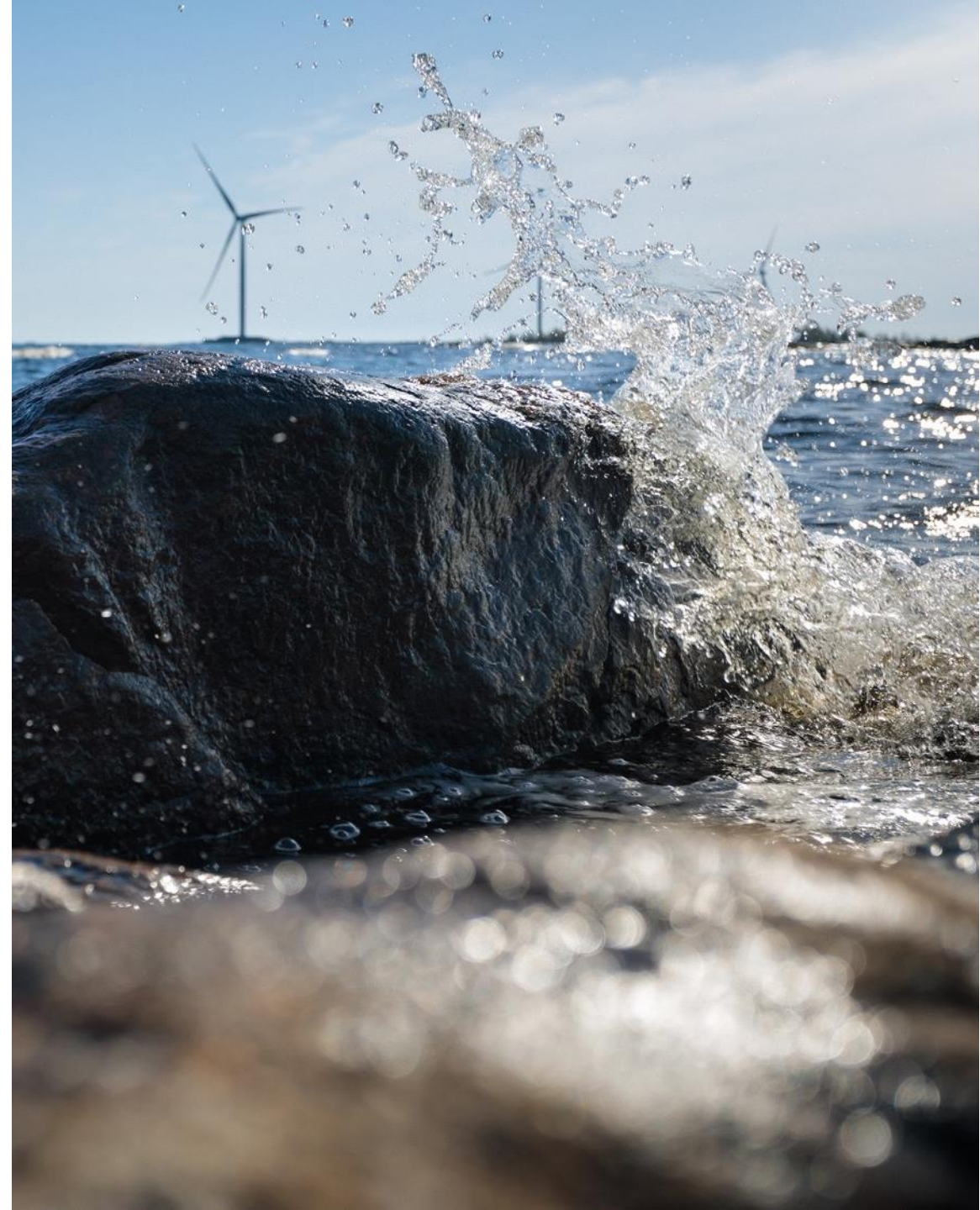
# Future of the power system is electric

- Energy transition opens great opportunities for Finland as we have plenty of potential both in new consumption and clean generation
- Grids are enablers of this transition – Finland today has a strong electricity grid and has ambitions also for the hydrogen grid
- The electricity grid has a growing need for transmission connections from north to south and west to south, also stronger interconnections are needed for electricity market to operate efficiently
- Fingrid has a historically large investment program ongoing, over the next ten years, Fingrid is planning to invest approximately EUR 4 billion, averaging EUR 400 million per year – this will almost double the existing 400 kV electricity grid



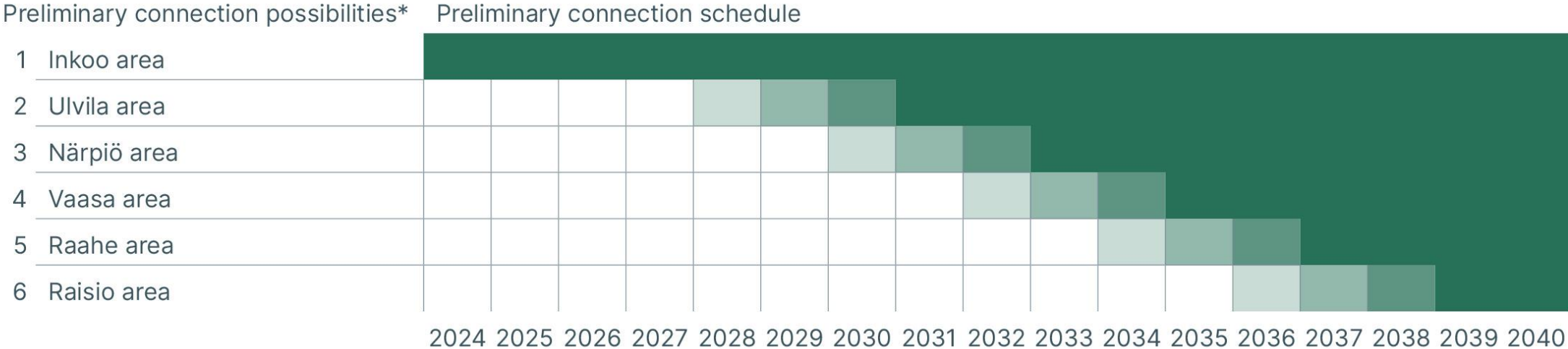
# Fingrid's offshore study

- Fingrid has studied connection possibilities for offshore wind, [report](#) just published
- The study is based on a scenario in which offshore wind will dominate in 2030s, this is not Fingrid's baseline scenario used currently in our grid planning
- The study is technical, not economic in nature
- There are some uncertainties in the results due to assumptions regarding consumption and generation development
- We are consulting our stakeholders until 23<sup>rd</sup> June
- New release of report with more detailed results planned for autumn 2024



# Preliminary grid connection possibilities for offshore wind in Finland in 2030s

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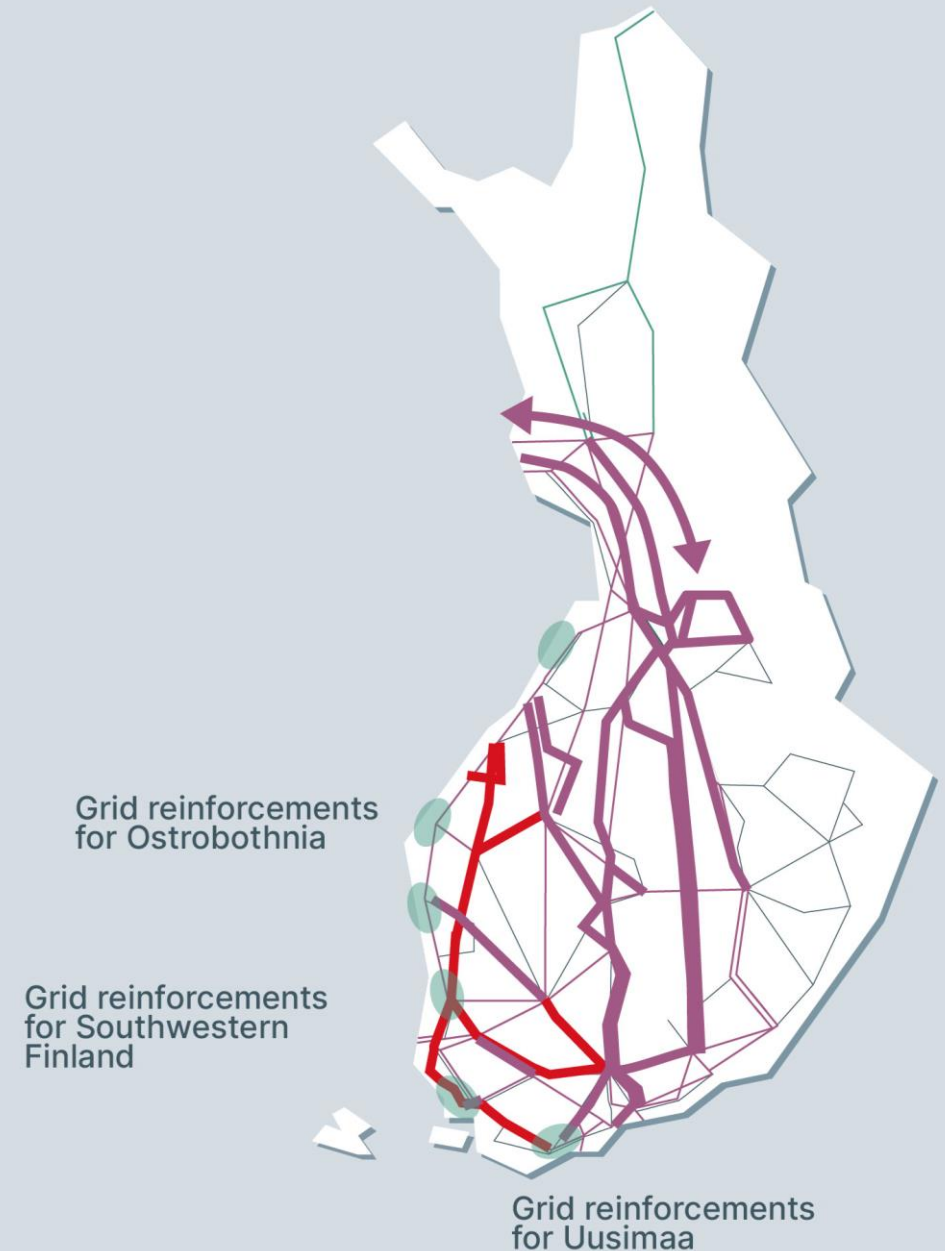


\*Maximum size of an individual connection is 1,3 GW

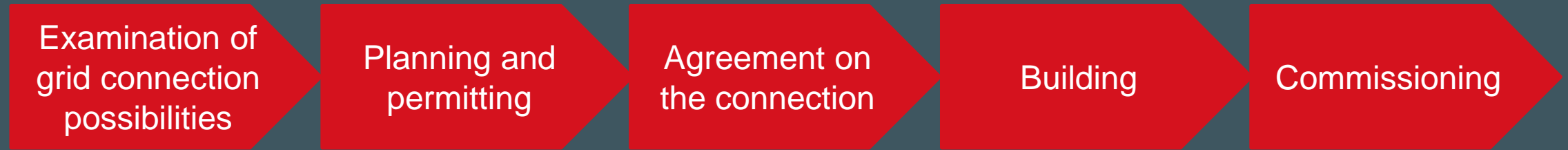
Welcome to join [our stakeholder event](#) on 22<sup>nd</sup> May!

# What would be required from the grid?

- Roughly 1,000 km new and reinforced 400 kV lines needed in addition to the 3,700 km already identified in the Fingrid's main grid development plan ~ EUR 0,6 billion
- Building of transmission lines and offshore wind farms takes years, schedules should be coordinated
- Fingrid will consider the progress of offshore wind power project development when it updates its main grid development plan, next time in 2025
- There are limitations on how grid reinforcements can be implemented, prioritization needed
- Offshore wind in Finland's southern sea areas would decrease the needed grid reinforcements

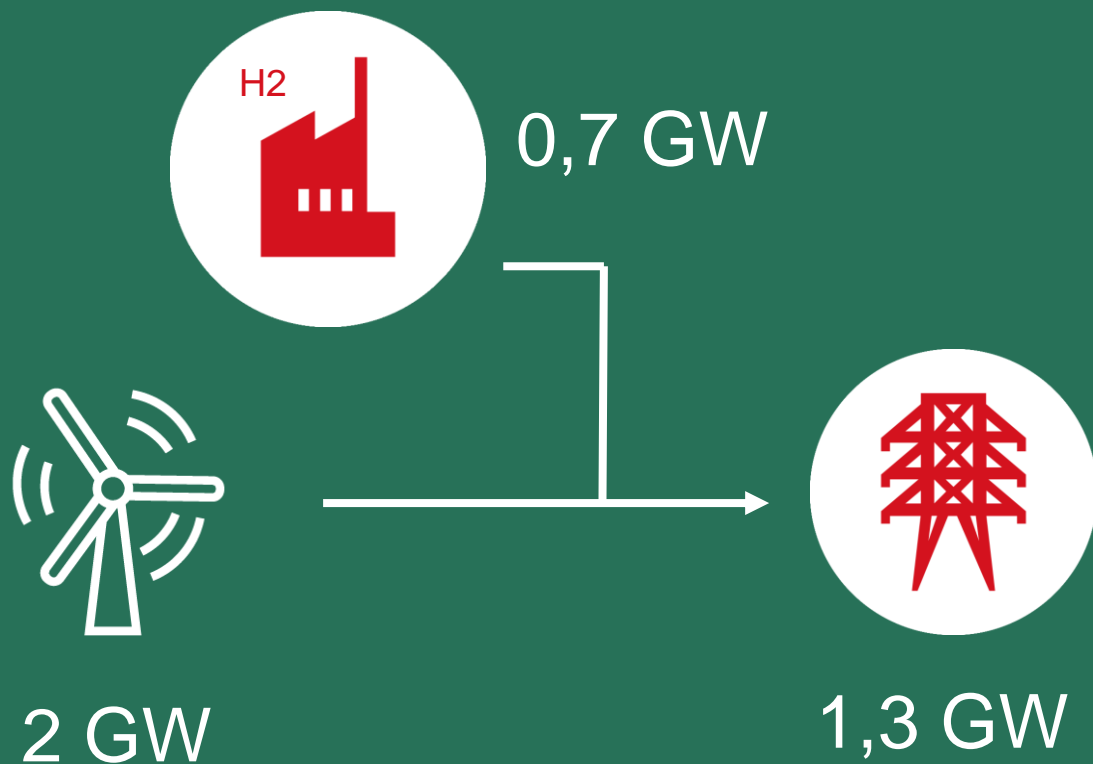


# Grid connection process will be renewed



- Today grid connection capacity is secured in the connection agreement which can be signed after the project has gained its legal permits
- This has been a fair process as projects have been similar permitting-wise (i.e. mainly onshore wind)
- Fingrid has identified the need to update its connection agreement practices, especially for large customer projects where the permit process takes a long time, and the customer must make a significant financial commitment before securing permits
- Identified possible solution: fixed-term pre-connection agreement with conditional connection reservation
- Remaining challenges from Fingrid's point of view: When to sign the pre-connection agreement as the commitment has possible consequences also for other projects? How to handle competitive projects in the area?

# Hybrid connections as future solution?



- Hybrid connection = both consumption and generation behind the same connection point
- Condition: central controller which takes care that output to the grid stays within agreed limits  
-> dependency between the units
- For customer: larger project sizes, faster connection, more connection possibilities, probably some cost savings
- Security of supply aspects to be carefully considered, also grid connection requirements to be created for these type of connections
- Legal clarifications expected in the reform of the Electricity Market Act in 2025



**Finland's prospects for success in the energy transition are extremely promising, offshore wind is part of the potential.**

**Industrial consumption growth is essential for new generation investments. This is at the core of our national competitiveness.**

**Fingrid is committed to enable this.**



**FINGRID**