Aalto University
School of Engineering

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Baltic Sea Region

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Baltic InteGrid
Integrated Baltic Offshore Wind Electricity Grid Development

Offshore wind power and interconnectors; Legal perspectives from Finland

Offshore Wind in the Baltic Sea: Legal and Policy Perspectives on a Regional Meshed Grid, IKEM, Berlin, 25.11.2016

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Wind power in Finland (2015)

- **Total electricity production in 2015 was 2.3 TWh (2.8 % of the total electricity consumption)**
  - 110 % growth from 2014
- **Total production capacity 1005 MW in the end of 2015**
- **387 wind power plants in the end of 2015**
- **Target 6 TWh/year by 2020 and 9 TWh/year by 2025**
  - With the permitted plants, the target of 6 TWh would be reached

Offshore wind power - in Finland?

- **Several projects in different planning phases (mainly early phases)**
  - Approx. 2000 - 3000 MW has been planned

- **Pori Tahkoluoto II is under construction**
  - 40 MW, distance to shore 600 m – 2000 m
  - Investment subsidy
  - Pori Tahkoluoto I a pilot plant

- **Kemi Ajos**
  - In artificial islands/ onshore
  - 10 turbines are to be changed to bigger ones

- **Suurhiekka has received the permit under Water Act (587/2011) and the master plan for wind power has been approved**

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Offshore transmission

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- **Maritime transmission cables**
  - Sweden – Finland
    - Fenno-Skan 1 (HVDC, 550 MW)
    - Fenno-Skan 2 (HVDC, 800 MW)
  - Finland – Estonia
    - Estlink 1 (HVDC, 350 MW)
    - Estlink 2 (HVDC, 650 MW)
  - Finland - Åland
    - Ål-link (HVDC Light, 100 MW)

➢ The transmission lines in the maritime areas are currently interconnectors
  ➢ Connection cables belong to the production unit

Network development

- **The Finnish TSO Fingrid prepares the ten-year network development plan in every two years**
  - The plan is not legally binding
- **Also general obligation for network operators to develop their networks according to Electricity Market Act (588/2013)**

- **The development of the network according to the reasonable needs of users in an economically feasible way**

- **Fingrid makes scenarios on electricity production and consumption**

- **Obligation to connect to network (Section 20 of EMA)**
- **Quality requirements for transmission network operation (Section 40 of EMA)**

- **Fingrid carries also the system responsibility (Section 45 of EMA)**

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System responsibility

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- **Fingrid is responsible for the**
  - System reliability and transmission
  - Maintenance of the balance and voltage
  - Imbalance settlement

  - Decree of Ministry of Economic Affairs and the Employment on the System Responsibility of the Main Grid Operator (635/2013)

- **Fingrid as a company**
  - Private company but the biggest owners State and National Emergency Supply Agency
  - Economic Regulation (rate of return model with incentives)

Network connection

- **Connection Agreement**
  - Rights, duties, division of costs
  - Detailed elaboration of ownership
  - NB! Wind power provider owns the connection cable
  - Annexes
    - General Connection Terms (2013)
    - Specifications for the operational performance of power generating facilities (2013)
- **Main Grid Contract**

➢ **Contracts but also instruments to bind the users of network to comply with the technical requirements**

- **The capacity of the network directs mainly the selection of the connection place**
  - Reinforcements can also be carried through

Political Strategies

- **Finnish Energy and Climate Strategy (2013)**
  - Separate target for wind power 6 TWh by 2020 and 9 TWh by 2025
  - No separate strategy for offshore wind power, mentioned in the Strategy and later reports
  - No separate targets for offshore transmission

- **Act on Production Subsidy for Electricity Produced by Renewable Energy Sources (1396/2010)**
  - 'Feed-in-tariff system': guaranteed price for wind power 83.5 €/MWh for 12 years
    - Compared to the Finnish Nord Pool Area average price of three months
    - Subsidy covers the difference
    - Limit 30 €/MWh
  - Quota for wind power full (2500 MVA)
  - Investment aid for an offshore wind power pilot

The new strategy

Energy and Climate Strategy 2016 (24.11.2016)

- **Renewable energy >50 % of final energy consumption in 2020's**
  - Emphasis in bioenergy
  - Carbon neutrality in the long term

- **The rate of self-sufficiency in energy production should be raised to 55 % by the end of 2020's**
  - Mainly increasing energy efficiency and share of renewable energy

- **Finland will abandon energy use of coal by the end of 2020, though security of supply requirements are to be taken into account**

The new strategy

Wind power

- **In the longer term the target is a market-based system without subsidies**
- **In the transition phase, a new subsidy system for renewable electricity**

- **'Technology neutral' tendering for renewable electricity 2 TWh during 2018–2020**
  - In 2020, approx. 13 million
  - In 2021–2030, 265 million
- **Investment aid for 'innovative projects'**
  - Among others offshore wind power in artic conditions
- **In spatial planning, large exploitation of wind power will be taken into account**
  - The wind parks should be located in larger units to avoid health effects
- **Health and environmental assessment on wind power will be conducted**

Implementing the plans

- **Spatial planning (Land Use and Building Act (132/1999))**
  - Hierarchal system of plans
  - In maritime areas new maritime spatial plans are to be implemented (not legally binding instrument)
  - Wind power parks and cables often based on special master plan for wind power

- **Construction in general should be based on a plan >> permit**
  - In case of wind power local plan or special master plan for wind power (also in maritime areas)
  - Construction permit required for the plant
  - The power cables don't require construction permit
  - The municipalities have possibility to affect the cable routes

Authorisation

- **'Project permit' under Electricity Market Act (Section 14)**
  - Permit required in case of the construction of at least 110 kV
- **Permit under Water Act (587/2011)**
  - When detrimental effects to water environment, fishing, harm to waterborne traffic, larger dredging…
  - Nature Conservation Act (1096/1996), Antiquities Act (295/1953) taken into account, also Land Use and Building Act (132/1999)
- **Permit under Environmental Protection Act (527/2014)**
  - Neighbours (noise/ flickering)
- **Research permit under Act on Territorial Surveillance (755/2000)**
  - Surveying of seabed
- **Possibly expropriation permit (Expropriation Act (603/1977)), Water Act in some cases)**
  - Right to use the area for cables if not based on contracts
- **Aviation Obstacle Permit (Aviation Act (864/2014))**
- **<u>No one stop shop -principle</u>**

Authorisation (EEZ)

- **Act on the Finnish Exclusive Economic Zone (1058/2004)**
  - In artificial islands, devices and other structures, the Finnish legislation is applied as it is applied in the nearest territorial water area > how does this affect?

- **Applicable permits:**
  - Water permit
  - Permit for high-voltage cable (Ministry of Economic Affairs and the Employment)
  - Theoretically a construction permit if artificial island?

- **Consent from the Council of State**
  - to exploit the EEZ (Section 6)
  - build in the EEZ, if the building could hinder the right of Finnish state to use its rights under international law (Section 7)

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Key points

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- **Offshore wind power in very early stages in Finland**
- **Fingrid Oyj liable for transmission network operation and system responsibility**
- **Connection cable is not legally part of the transmission network**
- **Permitting and spatial planning procedure takes time**
- **Effects of the brand new Energy and Climate Strategy?**