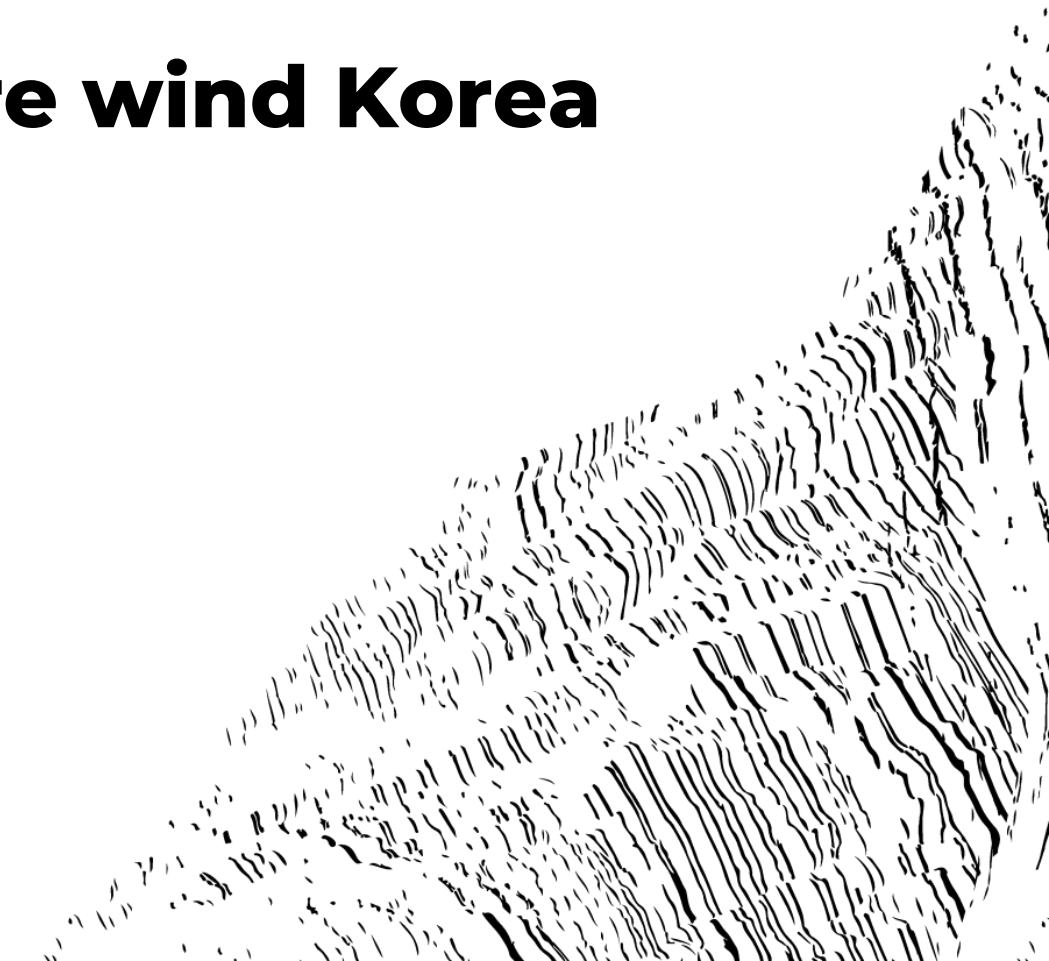
Market opportunities offshore wind Korea

- October 2022
- Eric Arends, Director / Vice Chairman Pondera Group



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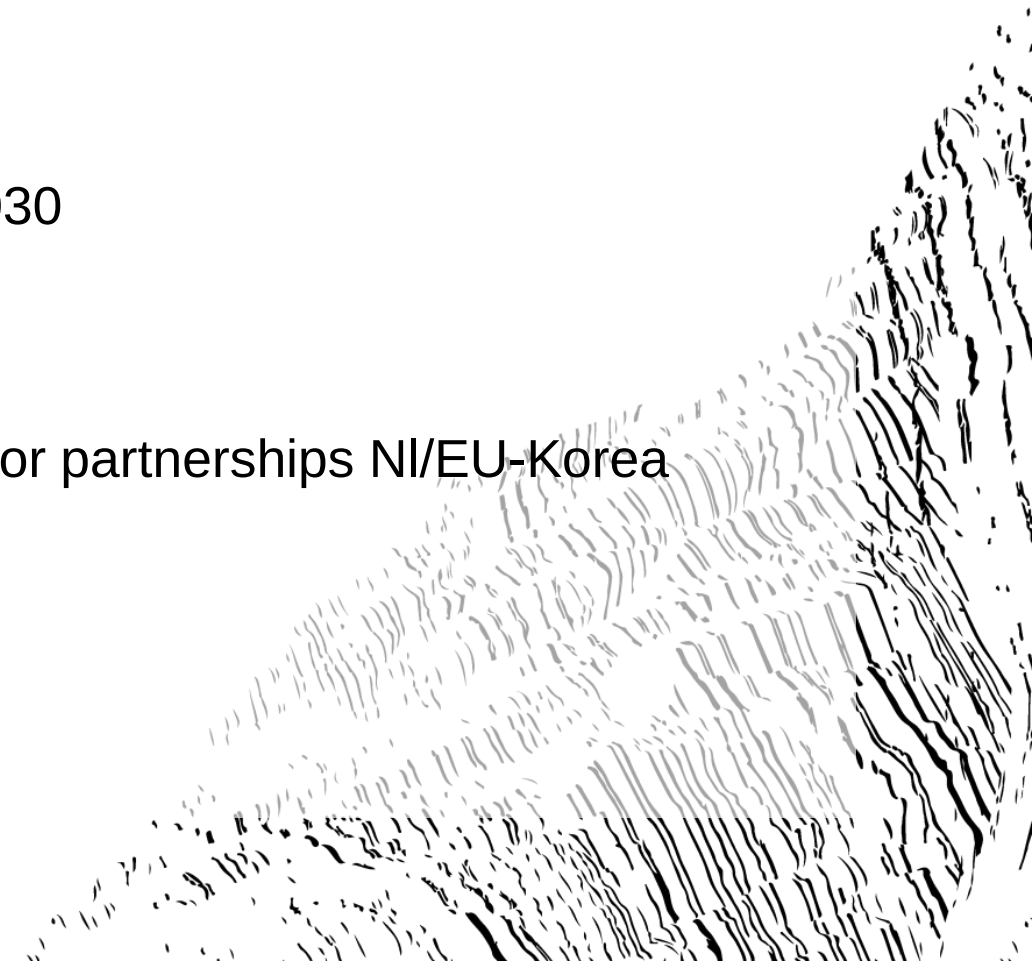
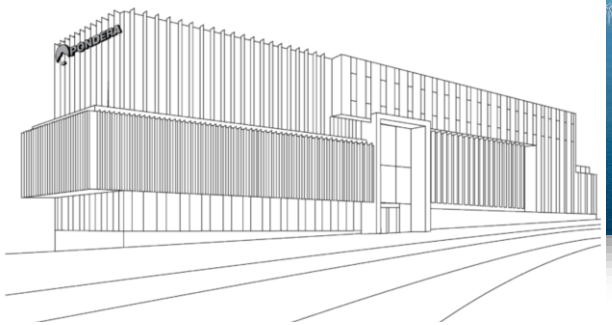


Who is Pondera?

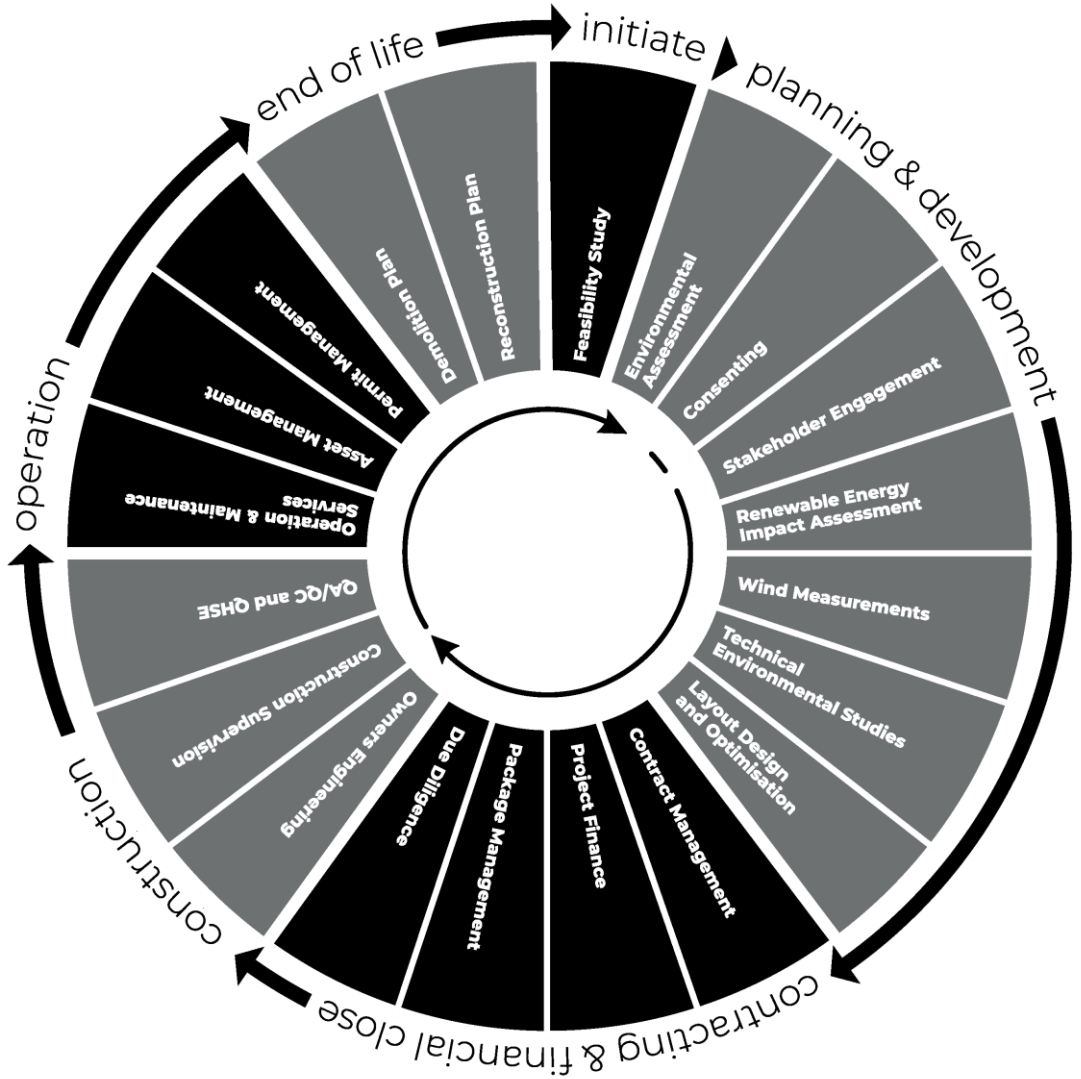
- Specialist in the development of renewable energy projects
- Focus on (offshore) wind energy
- Consultant, Engineer and Investor (WP Strekdammen Eemshaven, Haliade-X)
- Operates globally
- Offices in the Netherlands, Indonesia, Vietnam and South Korea
- Medium sized group of companies with 70 employees
- Operates since 2007



Services Pondera: in all stages of the project life cycle

In Korea often Korean partners needed!

- Location and Feasibility Studies
- Consenting and Stakeholder Management
- Environmental Impact Assessment (EIA)
- Wind measurements: metmast, LIDAR, Floating LIDAR
- WRA, Advanced Atmospheric Modelling and Yield Calculations
- Grid connection study
- Technical design and layout optimization
- Owner’s Engineering
- Technical Due Diligence
- Contracting and financing
- O&M Strategy and management
- Construction supervision



Current position Pondera Korea

- Known in the Korean offshore wind energy sector (with all major developers and supply chain companies)
- Assignment as Owner’s Engineer for Jeju Hanlim Offshore Wind Project
- Several smaller assignments for private companies, knowledge institutions and state-owned companies
- Looking for opportunities to deliver specific services based on expertise and experience gained in Dutch/EU offshore wind market
- Our formal office in Seoul (4 Korean employees) started in 2019: COVID made it difficult to travel, now we can further develop relations and bring in specialists from Europe

Korean offshore wind policy: ambitious targets for 2030

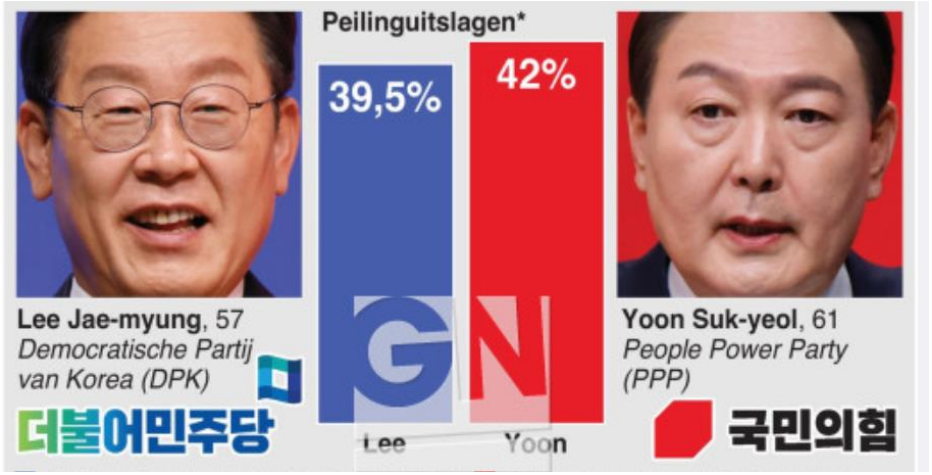
Targets Offshore Wind Korea

- Transition to a renewable energy system
  - Share increase of renewables to 20% in 2030 and to 30-35% by 2040
  - Significant reduction in coal-fired plants and no lifespan extensions of aged nuclear plants
  - Investment for relevant job creation and cultivating new business in renewable energy
  - Low-carbon energy
- Offshore wind capacity
  - 2020: 124.5 MW
  - 2030: 12,000 MW

Policy plans

- 2017: Renewable Energy 3020 Implementation plan (RE3020)
- 2019: 3rd Energy Master Plan
- 2020: 9th Basic Plan for Long-term Electricity Supply and Demand
- 2020: Basic Plan for New and Renewable Energy
- 2020: Green New Deal
- 2021: Carbon neutral declaration by 2050

New government March 2022: change in policy



From

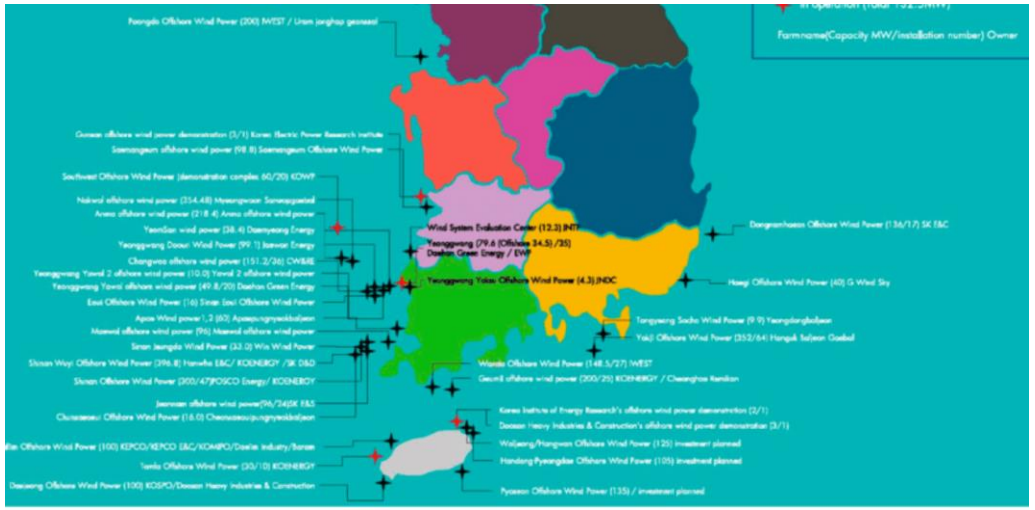
- Explicitly promoting renewables to achieve 2050 zero emissions goal

to

- Prioritizing nuclear power as source of non greenhouse gas emitting energy over renewables
- Retaining coal for longer
- Developing hydrogen economy

- Korea's overall green deal and zero net emission plan for 2050 are rated highly insufficient (Climate Activity Tracker (https://climateactiontracker.org/countries/south-korea/))
- New administration's plans not yet fully known, consequences for (support for) current major offshore wind initiatives unclear

Korea Offshore Wind Status



- in Korea no full-scale offshore wind farm has yet been built, only four pilot plants are in operation
- Korean companies with EBLs: little progress towards construction
- Issuance of 39 new EBL's (Electricity Business Licenses) between January 2021 and April 2022
  - changed challenges from permitting needed to achieve the EBL to subsequent steps to construction of more than 50 new offshore farms within 2-3 years allowed in the license
- Total of 59 sites with current EBL's: intense competition for construction resources in terms of manpower, ships, equipment
- Relatively small offshore wind farm projects (average 100-300 MW)
- Permitting process is complex: companies which have obtained EBL are now often stuck at Contracts and Renewable Energy Certificates (profitability under pressure), Grid connection and Agreement with local residents and Fishermen
- Most important reform under consideration is the 'One Stop Shop' permitting process (requires multiple legal revisions to 19 different laws and a Special Act on the Distribution of Wind power)

Some Korean offshore wind market issues

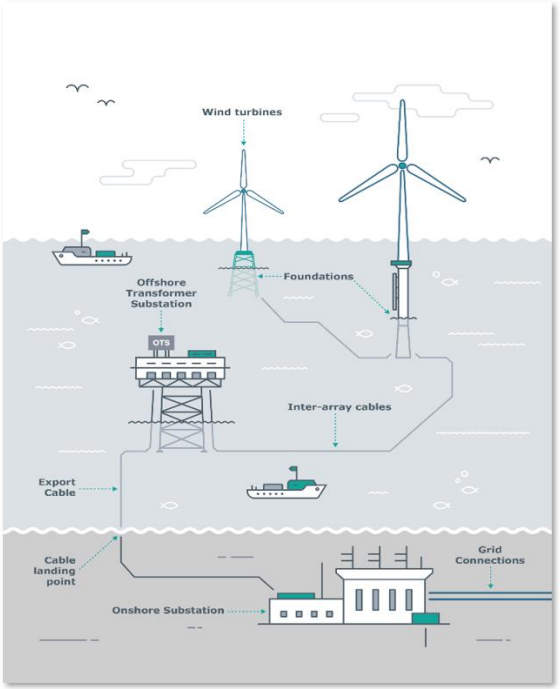
Construction Issues

- No construction of full-scale wind farms in progress
- Korean companies have lack of in-country knowledge of engineering solutions for offshore wind, equipment supplies and services (→ opportunity for foreign / Dutch companies)

Level playing field issues

- Renewable Energy Certificates (REC): mid-2021, MOTIE issued new guidelines for offshore wind with local content requirements (LCR) for additional benefits
- It seems that foreign companies are often not winning tenders but are asked to become subcontractors to the Korean winner of the bid which may lack sufficient skills to complete the task
- Issues arise in the ability of EU companies to provide or secure services when hiring ships for surveying, installation and construction
- Other issues are non-acceptance of international qualifications, license requirements for construction service companies and consultancies and visas for foreign staff

Development of Korean supply chain: opportunities for partnerships NI/EU-Korea



Source: Accelerating South Korean Offshore Wind Through Partnerships, COWI, AEGIR, PONDERA, April 2021

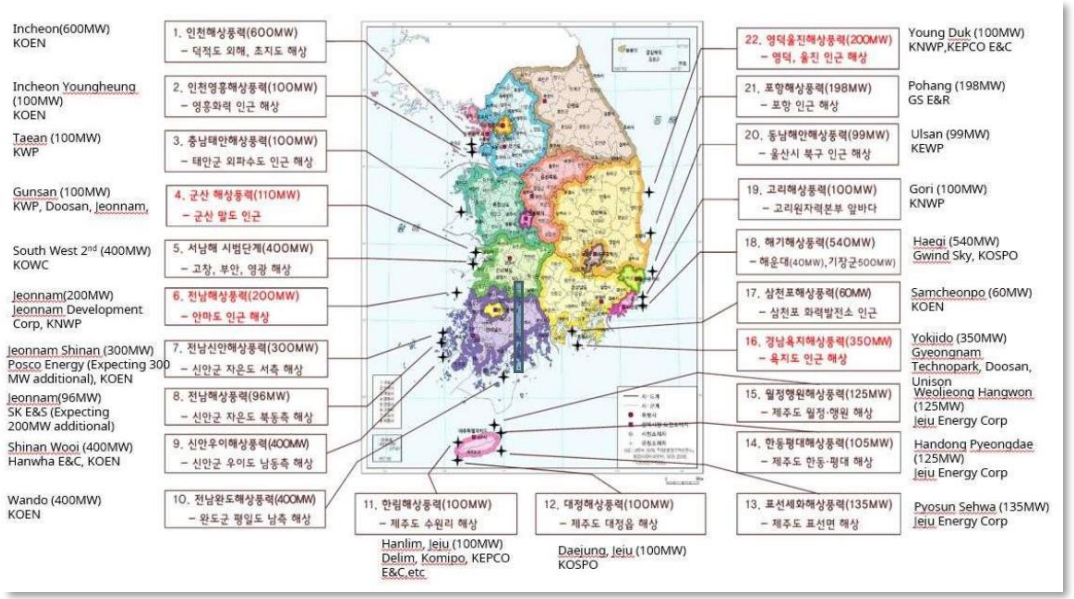
- Korea has a strong ‘we do it by ourselves mentality’ with amazing results in past decades
- Looking at the Korean offshore wind supply chain we see lots of strength and opportunities for growth
- Working in partnerships with international suppliers will strengthen and build up Korean supply chain and result in faster realization and lower costs of offshore wind energy
- It can be a two-sided cooperation: expertise flowing from the EU to Korea and from notable Korean companies with a strong international reputation to the EU (strongest argument for the removal of LCR)
- At the same time government should make permitting, grid connection, local residents' agreements etc. easier and remove obstacles regarding LCR and certification requirements

See report: Accelerating South Korean offshore wind through partnerships
https://www.rvo.nl/sites/default/files/2021/06/Accelerating%20Offshore%20Wind%20South%20Korea%20May%202021.pdf

Lessons learned Pondera Korea

- In general: Korean offshore wind is not an easy market
- Many bottlenecks in the offshore wind development process: delays in project preparation and execution (usually way too optimistic time schedules are communicated)
- Even when you got an assignment, delays in execution (and therefor payments) are very common (contract has somewhat different value compared to the Netherlands)
- Opportunities lay especially in delivering unique services or products that are difficult or time consuming to be developed by Korean companies themselves
- Partnerships with Korean companies are essential to get a better understanding of the Korean business culture, to get the right contacts and to be able to operate as subcontractor
- It takes a long time to establish good and trusted relationships

To conclude



- Pondera remains in Korea to leverage established relationships and reputation in the market
- We continue to look for opportunities to provide specific added value to projects based on EU/Dutch experience and expertise
- In addition to our own scope, we think it can be of added value to present Dutch supply chain companies directly to relevant Korean companies
- We are prepared to make these contacts and, in consultation, provide a tailor-made follow-up for a certain fee (to be determined)
- Possibly RVO has some (additional) budget for this
- If you are interested, please contact us

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