Offshore Wind
One of the key drivers for the Energy Transition in Asia-Pacific

16th June 2023
Outline

• Introduction
• APAC Offshore Wind Maturing
• Paving the Way
• Outlook for South-East Asia
NIRAS in APAC

Current Activities in the region

- Offshore Energy & Infrastructure
- Environment & Nature
- Ports & Harbors
- International Development
- Process Industry

NIRAS Offices

Project Areas
Offshore Wind, a matured technology, enjoys a comparable higher capacity factor 35% - 45% and can be built at large scales (1GW+ per site) on the sea.

In installed capacity China is leading the region and globally with 26.5GW of installed capacity in 2022 (World Forum Offshore Wind), followed by one mature market in the region that reached 1GW with 3.7GW starting or already in construction. Japan with 140MW is on the verge of creating a larger market. Vietnam has achieved 396MW with nearshore projects.

APAC will play one of the leading roles in construction activity over the next 7 years. (Bloomberg NEF, World Forum Offshore Wind).

APAC is also host to a large part of the supply chain, mainly concentrated in China, but also across South-East and North-East Asia.

Since 2018 we have seen North-East Asia with high activity, now joined by Southeast Asia. We expect Japan (2nd auction to end June), South Korea (Floating Wind 100MW project with financial close) to be playing a crucial role with Vietnam coming back with the passing of PDP8. Australia has introduced robust legislation end of 2021 and we see very high development activities with first auction this April. The Philippines has fast tracked their development, ignited by the World Bank Report 2022 and strong push by DoE and others. Bangladesh is running a feasibility study and India is in the starting blocks.

Source: Global Wind Atlas by World Bank Group, ESMPA, Vortex & DTU
Offshore Wind is for the majority of countries in APAC new. **It poses unique challenges to the policy environment, energy market designs, grid infrastructure, industry planning, environment and social constraints as well as finance sector.**

**Governments both central and local are key to making this a success.**

Orderly marine spatial planning, infrastructure and industry policies, understanding of timelines and a well thought through allocation and permitting process are crucial as Offshore Wind are needed for a stable support environment for project owners to proceed.
With Europe having a strong come back in Offshore Wind and the US policies, we see an **intensive global competition for resources** (supply chain bottle necks) and need to keep markets attractive for capital allocation.

New markets need to address: policy robustness, sound environmental and social frameworks, supply chain development and up-skillling.

There is significant economies of scale associated with Offshore Wind. By 2030 South, Southeast and Northeast Asia want to achieve a combined 70.1GW – excluding China, who is already far upfront – which provincial level plans already might hit similar levels. Australia could be around 2-4GW and Philippines might see similar levels (not yet announced).

The aim would be to focus on industrial strength of each country and work across the region to bring down cost – there is also a need for more vessel investments focused on the region and port upgrades.
Outlook for Southeast Asia

將者，智、信、仁、勇、嚴也。

1. **Marine Spatial Planning:**
   Project owners have a tendency to move before market designs – that helps to create momentum but also can lead to irritation for the government, stakeholders, market designs and policy plans. Strong zonal planning from government is important, to avoid later delays or even worse.

2. **Understanding of local environment and issues:**
   Build a strong understanding of current regulations, industry & infrastructure structures, stakeholder environment and need to address them efficiently and reform, or introduce new measures.

3. **Clear regulatory path:**
   Offshore Wind has totally new demands on marine users, environment and other regulations – while it can’t be fully front loaded the framework needs to be set and guidelines given. This will have a very positive effect on investment security.

4. **Work with Good International Industry Practice:**
   E.g. environment IFC PS considerations should be included as early as possible – same applies for HSE and other international standards.

5. **Capacity Building, Collaboration and Transparency:**
   New markets have a need of capacity building that needs to be supported by both government, industry associations and private sector. New markets also have a need for stronger collaboration to help uplift industry standards and build supply chains. Transparency on market developments and outlooks will help to steer investments of the supply chain.

6. **Mobilize development banks and finance:**
   In light of economic structures there is a strong need to have regional and global development banks to start de-risking the investment environment, make transitional funds available and support / guarantee loans.
Thank You
謝謝 | Salamat!

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NIRAS Taiwan Ltd.

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NIRAS Global Perspective
A Leading Global Multidisciplinary Engineering Consultant

59 Offices in 34 countries

2600 Professionals +43,000 external experts in our network

In Offshore Wind:
75 dedicated staff are fully dedicated to Offshore Wind across Engineering and Environment working on project delivery in Europe and APAC region.

+400 Projects/year delivered across 120 countries
Working with NIRAS

An integrated, holistic and cross-disciplinary approach is in our DNA

"Cooperation across sectors and locations provides our partners and clients with access to the latest knowledge."
NIRAS in the Philippines

Serves as the **Regional Hub** for NIRAS’ APAC presence with a specialized offshore wind office in **Taipei** and an energy consulting office in **Viet Nam**

Recognized as the **Top 2 Consulting Firm** by the **Asian Development Bank** for Consulting Services in the Philippines for Loans, Grants and Technical Assistance Projects

The office also hosts NIRAS’ **International Infrastructure Unit** that provides Filipino engineering expertise to our projects worldwide
With support from NIRAS' global team of 2,600 experts

Our Team
- Policy and Economic Specialist
- Project Development Specialist
- Licensed Civil / Structural Engineer (P.E.)
- Foundation Specialist
- Project Engineers / Project Managers
- Foundation Fabrication Experts
- Environmental Engineers (P.E.)
- GIS Specialist
- Marine Scientists
- EIA/ESIA Managers and Consultants
- ESG Strategy and Planning Consultants

Our Services
- Technical Advisory
- Owner’s Engineer
- Due Diligence
- Marine Environment
- EIA / ESIA
- Biodiversity (net gain)
- Critical Habitat
- ESG
Environmental & Consenting Services

Our experience in APAC

Specialist advisory and assessment including:
- Ornithology
- Marine Mammals
- Underwater Noise Modelling
- Fisheries Economics
- Benthic Ecology
- Met-ocean

Environmental Impact Assessment
- Delivery of EIA to local laws or the management of this process
- Consent management

Bankable Environmental and Social Impact Assessment (ESIA) related work including:
- EIA Due Diligence and Gap Analysis (PS1)
- Biodiversity and Ecosystem Impact Assessment (PS6)
- Cumulative Impact Assessment (CIA) (PS1)
- Critical Habitats Assessment (CHA) (PS6)
- Fisheries Livelihood and Restoration Plan (FLRP) (PS5)

Environmental survey / monitoring support including:
- Survey and Monitoring Specifications
- Management of Survey and Monitoring
- Offshore Supervision
- Remote Monitoring System Solutions

NIRAS provided specialist advisory including bird collision modelling, underwater noise modelling, met-ocean assessment etc to projects in Asia Pacific.

NIRAS supported two offshore wind projects’ in completing ESIA documents to IFC standards required to successfully achieve financial close.

NIRAS performing offshore supervision of marine ecological surveys.
In-house and technical support

Development, Design and Procurement Phase:
- Feasibility studies
- Strategy (auction, market, timelines)
- CAPEX, OPEX, LCOE
- Wind and metocean assessment
- Geotechnical and UXO assessment
- Concept design and design management
- Tender support
- EPC package management

NIRAS provided Owner’s Engineering services.
NIRAS’ roles include:
- Package management
- Technical review and assurance
- EPC contractor management
- Technical supervision of the installation of
  - Foundation and pin piles
  - Offshore cables
  - Wind turbines
- HSE and technical trainings

Manufacturing & Construction Phase:
- Fabrication management
- Installation supervision

O&M Phase:
- Foundation structural health monitoring
- Remote monitoring systems

Example reference: Owner’s Engineering for Taiwan Power Company’s Offshore Wind Farm (109 MW) that just start commercial operation (2021)
NIRAS has over 40 years experience in port and harbour projects and is experienced in engineering for offshore wind related ports.

NIRAS provides planning, tender, design, and construction supervision support for both construction/pre-assembly ports and O&M ports for offshore wind and other marine projects.

Our experience throughout the whole life cycle of offshore wind farm development (from planning to design, construction, operations, and decommissioning) complements with the port engineering needs.

Our services related to ports and harbour engineering include:

- Owner’s engineering
- Concept design and FEED
- Detailed design
- Tender preparation and contract negotiation
- Construction supervision
- Prepare onshore and offshore logistics operational setup

Solid experience in engineering for design/upgrade of port infrastructure to support renewable energy / green port development.
Training and Transfer of Know-how

For example, as early as 2012-2013, NIRAS provide offshore wind technology transfer to government, local consultants and developers in North-East Asia.
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<thead>
<tr>
<th>Region</th>
<th>Client/Project</th>
<th>Works</th>
<th>Year</th>
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</thead>
<tbody>
<tr>
<td>Taiwan</td>
<td>Developer</td>
<td>Technical advisory to support project development of Round 3 offshore wind farm</td>
<td>2022</td>
</tr>
<tr>
<td>Taiwan</td>
<td>Developer</td>
<td>EIA for several Round 3 offshore wind farms</td>
<td>2021 –</td>
</tr>
<tr>
<td>Taiwan</td>
<td>Developer (Under Construction)</td>
<td>• Substation package management</td>
<td>2019 – ongoing</td>
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<td></td>
<td></td>
<td>• Foundation fabrication management support</td>
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<td></td>
<td></td>
<td>• O&amp;M Harbour accessibility and feasibility study</td>
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<tr>
<td></td>
<td></td>
<td>• Support in consenting and Environmental &amp; Social Impact Assessment documents</td>
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<tr>
<td>Taiwan</td>
<td>Developer (Under Construction)</td>
<td>• Foundation fabrication management support and supervision</td>
<td>2017 – ongoing</td>
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<tr>
<td></td>
<td></td>
<td>• EPC tender support</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• O&amp;M Harbour accessibility and feasibility study</td>
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<tr>
<td></td>
<td></td>
<td>• Design management support for offshore foundation design</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Support in EIA/consenting and Environmental &amp; Social Impact Assessment documents</td>
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<td></td>
<td></td>
<td>• Fisheries social-economic studies</td>
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<td></td>
<td></td>
<td>• Support in proposal preparation and panel review of government selection/auction</td>
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<tr>
<td>Taiwan</td>
<td>Chu Feng OWF</td>
<td>To support wind measurements for a planned offshore wind farm, NIRAS provided technical scope and requirement to the installation of LiDAR onshore and FLiDAR offshore.</td>
<td>2018</td>
</tr>
<tr>
<td>Taiwan</td>
<td>Taipower &amp; Sinotech</td>
<td>Owner’s engineering for Taiwan Power Company’s Phase I Offshore wind farm:</td>
<td>2016 - 2022</td>
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<td></td>
<td></td>
<td>• Technical review and assurance of EPCI con-tractor’s documentation</td>
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<tr>
<td></td>
<td></td>
<td>• Technical supervision of</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>- Offshore foundation installation</td>
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<tr>
<td></td>
<td></td>
<td>- Offshore cable installation</td>
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<tr>
<td></td>
<td></td>
<td>- Wind turbine installation, commissioning, test run</td>
<td></td>
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<tr>
<td>Taiwan</td>
<td>Semco Maritime</td>
<td>FEED for Offshore Substation of Hai Long Offshore Wind Farm</td>
<td>2018</td>
</tr>
<tr>
<td>Taiwan</td>
<td>Changhua Offshore Pilot Project</td>
<td>Metocean report, foundation design, and owner’s engineering</td>
<td>2014- 2017</td>
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</tbody>
</table>
### Selected References | Offshore Wind

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<tr>
<td>Japan</td>
<td>Investor</td>
<td>Red flag due diligence review to support M&amp;A process for the buyer.</td>
<td>2021</td>
</tr>
</tbody>
</table>
| Japan  | Kajima Corporation | Design of Tower Stands for Offshore Wind Farm:  
  - Basic and detailed design of temporary support steel structures for wind turbine towers of a commercial 140MW offshore windfarm in Akita | 2020 – 2021 |
| Korea  | Developer      | Regulatory overview for offshore wind project development | 2021 |
| Korea  | Developer      | Environmental Due Diligence Support for offshore wind project | 2020 |
| Japan  | Developer      | Studies for a Potential Offshore Wind Site in Japan:  
  - Wind resource assessment and Site Assessment  
  - Wind Farm Layout  
  - Calculation of CAPEX, OPEX and LCOE | 2020 |
| Japan  | Developer      | Pre-feasibility Study for Potential Offshore Wind Sites in Hokkaido:  
  - Wind resource and metocean assessment  
  - Seabed conditions  
  - Environmental issues and stakeholder concerns  
  - Grid availability & capacity  
  - Overview of permitting process and associated timeline | 2019 |
| Japan  | Developer      | Turbine contract for a commercial-scale offshore wind farm:  
  - Review of Turbine Supply Agreement (TSA)  
  - Review of Service Availability Agreement (SAA)  
  - Drafting of Employer’s Requirements for TSA and SAA  
  - Support negotiations with turbine supplier | 2018 |
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| USA    | Developer      | NIRAS provided geotechnical experts to support Offshore Wind Project:  
• Review the site investigation contractors’ factual reports  
• Prepare Geotechnical Interpretative Reports which will form the basis for the subsequent design of foundations for wind turbine and substation. | 2018 – |
| UK     | Kincardine Floating Offshore Wind Ltd | Consent and environment management for entire project life cycle (site selection through to post construction monitoring). | 2018 - |
| Denmark | Vattenfall | Kriegers Flak and Vesterhav Nord & Syd offshore wind projects:  
• Managed EIA investigations  
• EIA reports for Vesterhav Nord, VesterhavSyd and Bornholm OWF  
• FEED for foundations  
• Detailed design of secondary and tertiary structures | 2013 - 2018 |
| UK     | Smart Wind / Dong Energy (Ørsted) | Hornsea Project Two Offshore Wind Farms: Provided in-house support as lead for birds and marine mammals | 2013 - 2016 |
| NL     | Jan De Nul    | BORSSELE III & IV offshore wind farm  
• Basic design of monopiles | 2016 |
| UK     | SSE           | Greater Gabbard Offshore Wind Farm: support in Marine ecology, consenting and monitoring from EIA scoping phase to post construction monitoring. | 2004 - 2018 |
| Belgium | Northwind    | Northwind Offshore Wind Farm: foundation design | 2012-2015 |
| UK     | DONG Energy (Ørsted) | West Of Duddon Sands offshore wind farm:  
• Construction management  
• Support in project management from planning to commissioning phase | 2010-2015 |

More references can be provided upon request.
Our mission is to deliver sustainable solutions to our customers, and we have integrated UN’s Sustainable Development Goals (SDGs) in our forward strategy. In every sector, we ask ourselves whether we can introduce new services so that, together with clients, we can contribute to the development goals.