EPC Contract

Multi vs. Turnkey

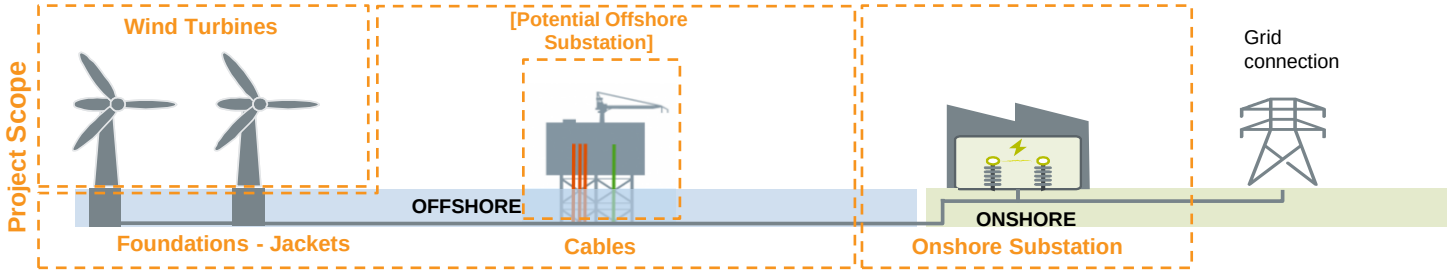
Kimberly Cram

22 June 2018

Sample Technical Solution Overview

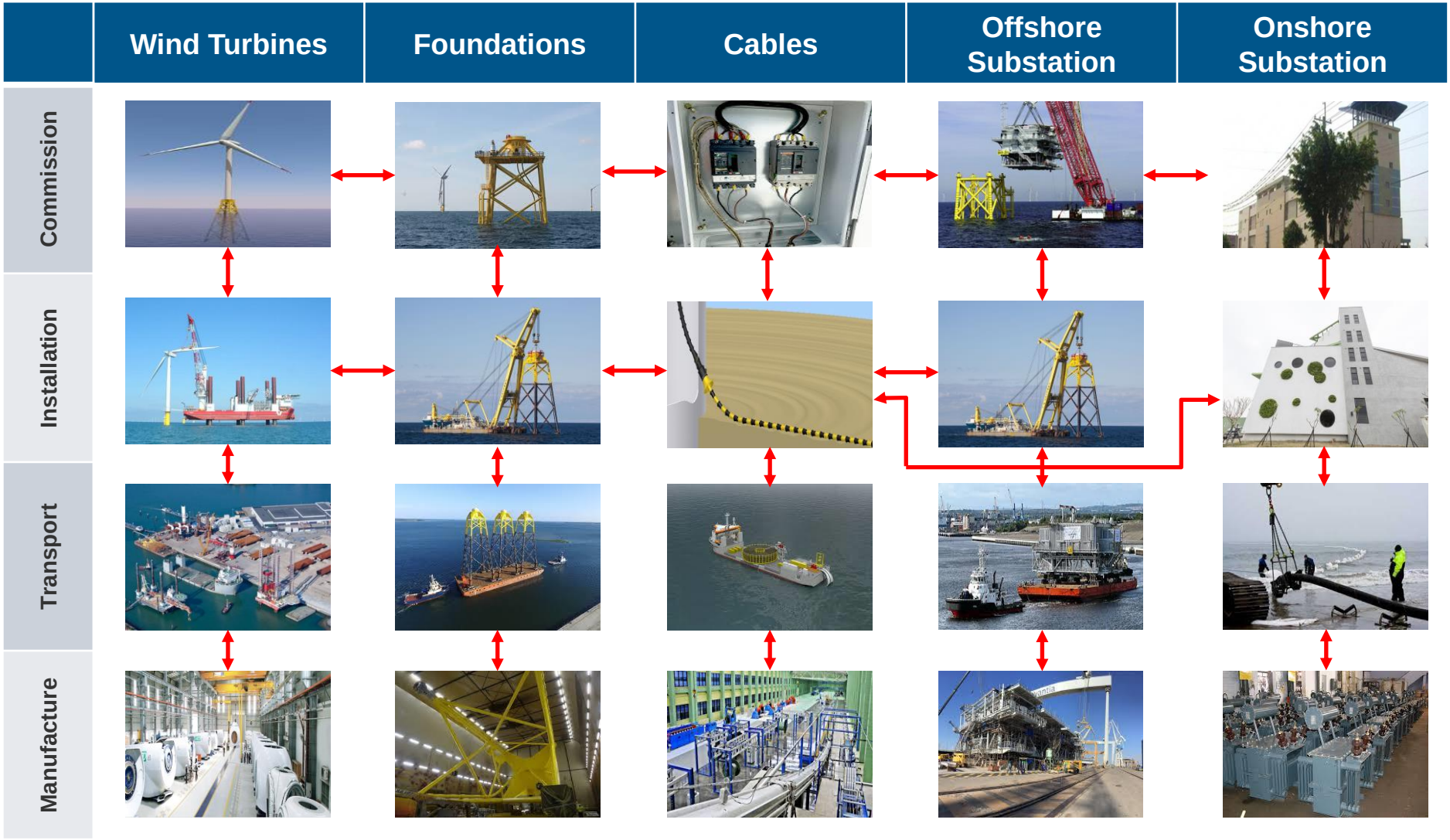
Simplified technical structure

Technical Solution



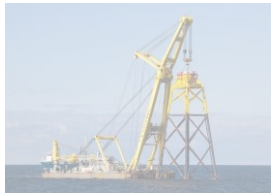
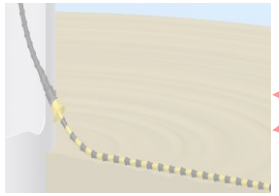
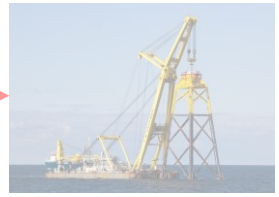
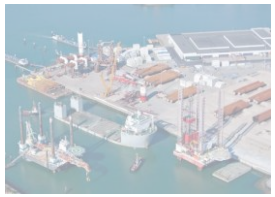
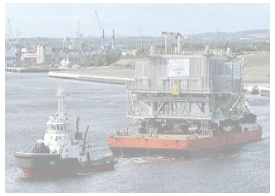
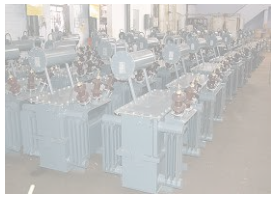
	Turbine supply and installation	Foundations and subsea cables	Onshore cables and Offshore substation
Solutions	— Single supplier for WTG — Manufacture, transport, install — Commissioning — Maintenance — Availability guarantee	— Monopiles or jacket foundation — Grouting — Scour protection — Array cables — Export cables — Installation vessels — Harbours	— Offshore substation depends on various technical requirements — If required, needs jacket, topside and electrical equipment — Onshore civils to build substation, fit out electrical equipment and provide connection to grid transmission system

Multi-contracting: high volume of packages



Interface

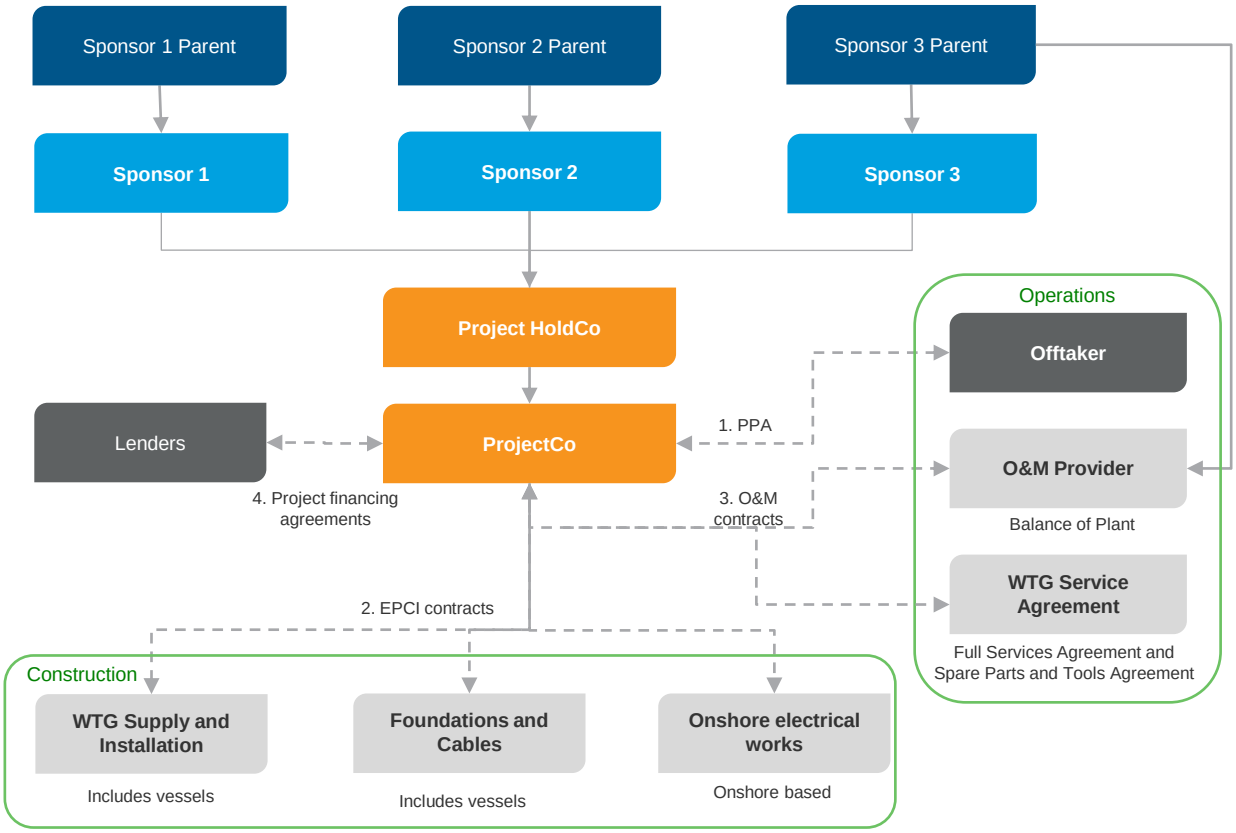
EPC: simplified structure

	Wind Turbines	Balance of Plant		Offshore Substation	Onshore Substation
Commission					
Installation					
Transport					
Manufacture					

Interface

Contractual framework: Taiwan EPC

Potential contractual structure for EPC



1 Power Purchase Agreement

- Long-term fixed price agreement with grid offtaker
- Feed in tariff for energy generated

2 EPCI contracts

- Multi-contract construction strategy for (i) turbine supply/ installation, (ii) foundation and cables supply/ installation, and (iii) onshore works
- Closely managed by ProjectCo and Sponsors
- Vessel availability, weather risk and logistics wrapped under contracts
- Risk allocation, interfaces, delay scenarios all considered and allocated

3 O&M contracts

- Service Agreement with WTG Provider
- Coverage for the Defects Warranty Period under the TSA
- Vessel availability and weather risk wrapped under contracts
- Balance of Plant ("**BoP**") contract with third party to manage the Service Agreement and Balance of Plant

4 Project financing agreements

- Club of local and international lenders
- Strong financing terms, consistent with international transactions

EPCI contracts: Taiwan experience

How this has been procured in Taiwan

	Siemens Turbine Supply and Installation Agreement	Jan de Nul WTG Foundation and Subsea Cable Supply and Installation Agreement	Fortune Electric Onshore Works Agreement
Main scope	— Manufacture, transport and install WTGs	— Design, fabrication, transportation and installation of monopile foundations, transition pieces, array and export cables	— Onshore substation built in previous phase — Electrical upgrades: transformers, switchgear, GIS — Onshore cable upgrade to grid
Vessels	— Transport to Taiwan — Installation vessel — Commissioning and crew transfer vessel — Seafastenings, blade rack and grilliage	— Transport to Taiwan — Installation vessels — Commissioning and crew transfer vessel	— Transport of GIS from Europe
Harbours	— Pre-assembly harbour — Commissioning harbour — O&M harbour	— Marshalling area for monopiles — Crew transfer harbour	— Arrival to offloading port in Taiwan for GIS
Components	— SCADA, davit cranes, temporary power generators	— Steel and aluminium, monopiles, grouting, scour, array cables, export cables, accessories, jointing, spares	— Switchgear, transformers, harmonic filters, power quality systems, onshore civils, HDD
Contracts: EPC v multi-contracting	— 1 single EPC contract — If multi-contracting, this could be up to **10 contracts**	— 1 single EPC contract — If multi-contracting, this could be up to **20 contracts**	— 1 single EPC contract — If multi-contracting, this could be up to **30 contracts if including Offshore Substation**

EPC still means some additional contracts

Contracts to consider, whether EPC or multi-contracting

Project support and regulatory

- Yield assessment
- Consultant engineering support
- Provision of personnel
- Marine warranty surveyor
- Joint venture agreement
- Operator Agreements
- PPA, EIA, Construction Permit

Site investigation

- Geohysical
- Geotechncial
- Siesmic
- UXO
- Metocean
- Wind resource
- Marine mammal observer

Advisers

- Sponsors
  - —legal
  - —insurance
  - —financial adviser
  - —tax
  - —accountancy
  - —technical
  - —regulatory
- Lenders
  - —legal
  - —insurance
  - —technical

How to determine the best option?

EPC and Multi-Contracting both work well. Successfully project-financed a 3 package EPC structure for offshore wind in Taiwan

Funding structure	• Banks and insurers were comfortable with the EPC structure: lending group of local and international banks will provide long term non-recourse project financing • Project has successfully completed financial close in Taiwan • Multi-contracting offers more flexibility for projects funded off balance sheet
Sponsor team experience	• Combination of offshore wind experts through procurement, construction and operations • Highly skilled in project finance deals for offshore wind • Strong local networks, industry knowledge and overseas technical expertise • 50+ team of experts across technical, contractually and financing requirements
Interface management	• Multi-contracting requires a hands-on experienced team to manage the allocated interfaces • More risks rest with the ProjectCo • Smaller, individual packages can't compensate fully for delays to larger packages. Wrapping gives more covenant strength • EPC results in a premium to be paid for minimising interfaces. Cleaner allocation of interfaces with smaller number of packages
Risk allocation	• How well are the risks known and identified? Multi-contracting requires detailed knowledge of every risk and knowing specifically where it is allocated and where the gaps could be • Is it better for ProjectCo to pay a premium to pass more risks to the Contractor? • Design risk: can be progressed by ProjectCo but has a risk of contractors rejecting novation and liability. EPC can allocate this to Contractors • Contractors can design for earthquake risk and suitability for typhoon conditions • Delivery risk: a larger package means access to larger value LDs and larger securities • Who secures all permits on time for the works? • Site investigations: in either case, detailed knowledge of site/ seabed conditions will assist in risk allocation • Vessels: high day rates can mean ProjectCo takes a higher risk on delay consequences if ProjectCo manages individually
Programme	• What is the construction period? A short procurement period may mean limited time to negotiate multiple contracts at the same time • Lead time on key components: to be secured early • Certainty on delivering on time: experienced contractors, and active management, regardless of structure
Supply chain	• Some Contractors (WTG suppliers) will not support multi-contracting of WTG components. Multi-contracting options focus on vessels and harbours • Foundations design is often progressed to accelerate the programme but can impact on liability assumed by the supply chain • Less experienced supply chain may mean that multi-contracting offers more opportunities to have visibility and transparency on progress • Quality and Health and Safety should be managed actively for multi-contracting and EPC

Design and site investigations

Detailed design process for project and key packages

- Foundation design strategy – three options due to the compressed programme:
  - Instigate a foundations concept design by consultants and novate across to the preferred foundations supplier (potential risk that novation is not accepted)
  - Run a design competition with all Foundations bidders to engage at an early stage (additional cost with multiple parties), or
  - Select a preferred partner for foundations and cables early to take full responsibility for design (limited competition)
- Jacket design and fabrication will be on the critical path, due to the long lead time to fabricate jackets
- Selecting WTG supplier and WTG type to focus on single design
- Early site investigations are crucial:
  - Geophysical campaign
  - Geotechnical campaign

Key Points for Korean Market

Ability to learn from the Taiwan market and achieve the best result for the Korean OSW

1. **Undertake site investigations as early as possible**

   — Assists in having known data about the site to identify risks and potential mitigations, as well as progressing design

2. **Bankability**

   — Contract strategy must be acceptable to lenders. Preference for small number of EPC contracts

3. **Interfaces and risks**

   — Determine the interfaces between packages, how to allocate responsibility and what the known gaps are

4. **Team**

   — Source reliable contractors who can deliver safely, with the required quality, on time and on budget, which ever strategy

5. **The right fit**

   — Thoroughly assess the risks and how to achieve the key milestones for the PPA, grid connection agreement, and lenders. Create a contracting strategy that suits the project needs