Engineering study offerings

	In-house	Strategic partners
Layout and equipment (offshore)		
Overall wind farm Single Line Diagram	x	
Preliminary offshore substation topside layout inclusive clarification of equipment and systems required (for example reactors, black start diesel, Helideck, CCTV, firefighting communication etc.)	x	x
Preliminary evaluation of number and type offshore substation solutions	x	x
Redundancy philosophy	x	
Master equipment list	x	
Technical specification of equipment	x	
3D model	x	x
Grid study and cables		
Preliminary grid study analyze to ensure Grid compliance (cover for example load flow, reactive power compensation, losses, short circuit, optimization etc.	x	
Optimal array and export cable lay-out and voltage level	x	x
Control system		
SCADA Architecture	x	
Relay protection philosophy	x	
Operational philosophy	x	
Cyber security	x	
Optimal export cable lay-out and optimum voltage level	x	x
Layout and equipment (onshore)		
Substation layout	x	
List of onshore equipment including land cables / transmission lines	x	x
Preliminary civil and building designs	x	x
Enviroment and structures		
Sea bed load possibility		x
Geotechnics		x
Metocean		x
Seismic loads		x
First estimate of dimensions and masses of structures based on experience	x	x
Preliminary OSS foundation and pile design		x
Review of designs basis or creation of pre design basis	x	x
General		
CAPEX and OPEX optimization	x	
Project schedule	x	
Design parameters based on European experience and local requirements	x	
Employer's technical requirements	x	
O&M philosophy	x	
Tender package documentation	x	
Conceptual report	x	
Fire risk assessment	x	x
Material handling	x	x
HAZOP/HAZID	x	x