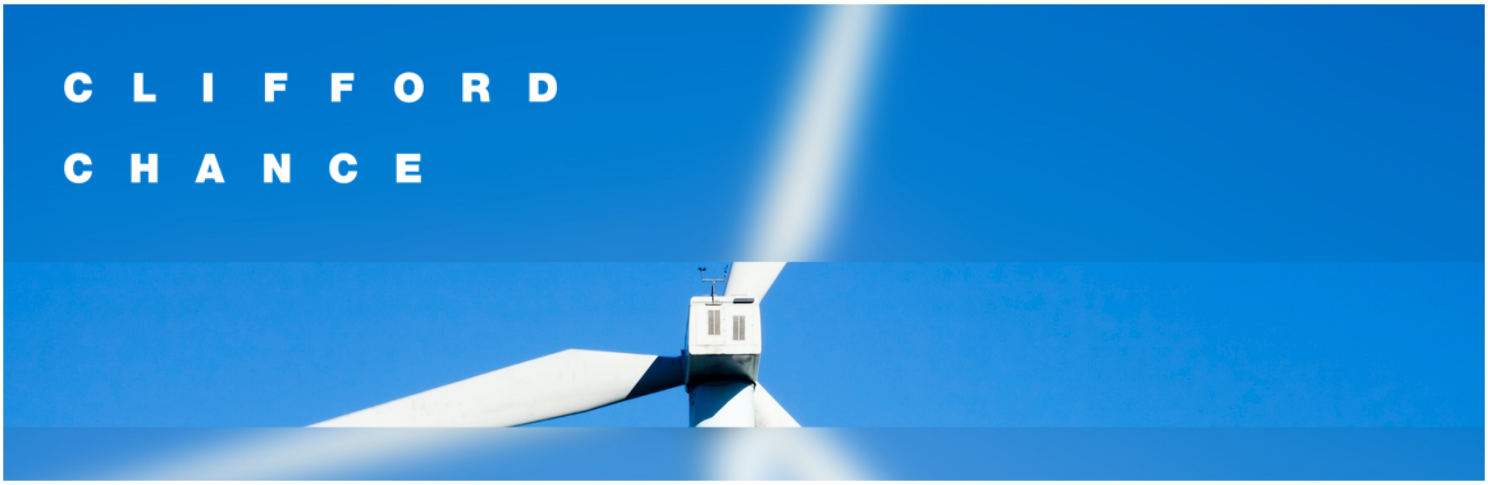


OFFSHORE WIND: PROCUREMENT AND CONSTRUCTION IN A CHANGING MARKET

This paper discusses the key issues relating to design, supply and installation agreements specific to offshore wind farm projects in the current market.

Key issues

- Disaggregated procurement and bankability
- New technology
- Installation vessels
- Turbine Supply Agreement (TSA) – scoping and warranties
- Taking Over
- Performance remedies, caps and security
- Termination remedies

Disaggregated procurement and bankability

Contractual package

The offshore wind industry has been dominated in past years by 'disaggregated' procurements featuring multiple (typically 8-20) contracts.

The reasons for this range from resistance by equipment manufacturers to taking risk on other contractors, to deliberate choices from clients and project managers (not least given the unavailability of project finance for heavily disaggregated offshore procurements until relatively recently). In addition to avoiding the risk-premium associated with turnkey/EPC contracting, disaggregated procurement has enabled developers to control and reduce price fluctuation and schedule risk in respect of critical long lead items such as the wind turbine generators (**WTG**).

Whilst some smaller wind farms are now being developed using a single contractor on a quasi-EPC basis, the trend for larger schemes has been a reduction in the level of disaggregation down to 2-6 large contracts. This has helped enable (and also benefitted from) the recent appetite of project finance lenders for these schemes. The typical packages include:

- **Turbine supply agreement (TSA)** – for the supply of the WTGs and the supervisory control and data acquisition system (SCADA system). This often now includes provision of the installation vessel and installation.
- **Civil works/foundations contract** – for the design and construction of the foundations for the WTGs and other miscellaneous civil works, sometimes sub-divided into design, manufacture and installation contracts – albeit not typically where pre-construction project financing or institutional investment is sought.
- **Inter-array cables contract** – for connecting the WTG strings to each other and to the offshore substation.
- **Electrical works agreement** – for offshore and/or onshore substation works.
- **Export cables contract** – in most countries this needs to be arranged with the relevant transmission utility. In the UK, however, developers can self-procure and follow a regulated process for transferring the completed assets to the offshore transmission operator (OFTO) and invariably do so.

In some projects, the foundations, electrical and inter-array cables works will be wrapped into a single balance of plant (**BOP**) contract, which may also include vessel procurement for the TSA. This 'wrap' is sometimes enhanced for institutional investors and/or lenders by the developer itself acting as the BOP contractor to mitigate interface and recourse issues.

Finally, there is usually an operation and maintenance (**O&M**) agreement for the WTGs (otherwise called a long term services agreement, service and warranty agreement or service and availability agreement) with the WTG supplier. This contains not only the O&M obligations but also the WTG availability warranties. These obligations and warranties may instead sit within the TSA, however, this is increasingly uncommon as the major suppliers tend to have separate business units dealing with supply and service respectively. O&M arrangements are also needed for the BOP.

Consequences of disaggregation

The key consequences of disaggregation are:

- **Reduced liability** – contractor liability is notionally lower than in an EPC-scenario as caps on liability and performance security levels will usually be expressed as percentages of individual contract prices (and not overall capital expenditure).
- **Recourse** – disaggregation can more directly expose developers and funders to 'lesser' contractor covenants and greater insolvency risks than they might experience with EPC (or TSA plus BOP) contract arrangements. It can also lead to greater complexity in establishing and allocating fault to any particular contractor.
- **Interface risks** – developers are left managing interface risks, including the risk of contractor-on-contractor delay, which can have severe consequences affecting e.g. redesign, weather windows, vessel/port availability and storage costs.

Funders and investors will wish to see strong management and mitigation of interface risks but the focus of this should be on the project and programme management team and strategy rather than contractual provisions *per se*, e.g. by minimising the number of contractual and physical interfaces, enhancing liaison procedures and prioritising key interface deliverables in the schedule rather than delaying activities to flatter the financial model. Contractual provisions will reflects this priority and provide for dispute consolidation, but risk-sharing across packages is not usual. Deeds of mutual indemnity and waivers of recourse which are commonly seen in offshore oil and gas projects are not currently used in offshore wind.

New technology

New technology may be obvious (e.g. a new WTG model, or floating technology), but may also be more subtle and unannounced (e.g. new gearbox components, handling equipment on vessels or foundation techniques). Technical advice is needed to ensure that the rationale for using new technology is robust as this will be a key concern for funders.

Deployment of new technology triggers a corresponding demand for enhanced contractual protection from contractors, including:

- **Extended/latent defect protection** – until relatively recently, WTG suppliers would limit defects liability periods (DLPs) to 2-3 years and accept no liability for latent defects, except where required by law. Five-

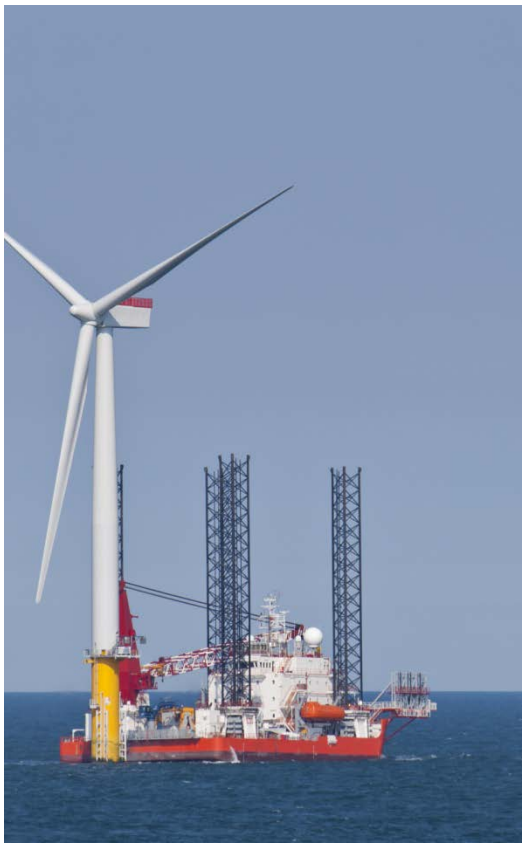
year DLPs are now common (even with proven technology), especially where there is an associated O&M arrangement.

- **Serial defect protection** – similarly, WTG suppliers would previously not usually accept liability for serial defects, particularly if root cause analysis with redesign obligations were included. The promotion of new WTG models and requirements of funders mean that some level of serial defect protection is now standard, although it remains unusual for it to extend beyond the project itself (i.e. on a fleet basis).
- **Insurance substitution/enhancement** – developers should ensure that insurance cover will be unaffected by the use of new technology. Whilst in other energy sectors, contractors and suppliers have been willing to enhance insurance arrangements in order to deploy new technology, this has not been a feature of the offshore wind market to date.
- **O&M extension** – it is common with new WTGs for developers to ask for an option to extend the O&M warranties.

WTG suppliers usually require 'black box' technology to be escrowed, for release only in limited circumstances.

Installation vessels

Developers and funders prefer the offshore contractors to retain installation vessel risk given supply constraints on appropriate installation vessels and the delay risk tied to weather and interface issues. BOP contractors commonly accept vessel risk, but WTG suppliers prefer the opposite, often for the above reasons or, in some cases, because they strategically prefer to adopt a supplier-only business model.



The requirements relating to the installation vessel need to be examined in detail on each project including:

- **Technical specification** – this will include weather and sea condition limits and suitability for the relevant WTG model.
- **Separation of supply and installation** – who is responsible for the design of WTG handling equipment, installation methodology and supervision?
- **Availability** – when installation vessels are required (and whether this is a fixed or a shifting window).
- **Additional costs** – the apportionment of costs arising where the vessels are required for longer than originally envisaged.
- **Remedies** – if an installation vessel does not function or is not available as required.
- **In-vessel damage** – responsibility for equipment whilst on-board (because of maritime convention limits on liability).

Given specialist vessel supply constraints, some developers will consider use of conversions and other non-traditional vessels. Technical advice should be sought to confirm suitability of these alternatives given the specifics of the project. The technical challenges of dealing with increased foundation depths, longer trip times and more extreme environmental and climactic conditions, coupled with growth in demand, makes what was an existing problem even more acute and may well require developers to enter into long lead reservation agreements for installation vessels.

Marine Warranty

Insurers to offshore projects will require the appointment by the developers of a marine warranty surveyor (MWS) in order to mitigate insured risks by evaluating the methodology of transportation, load-out and installation procedures, checking marine equipment condition and performing on-site surveillance. Compliance with MWS recommendations is typically an insurance requirement with developers seeking matching contractual remedies in the event of non-compliance (especially if this leads to uninsured damage).

Traditionally, contractors sought protection (by way of a variation or extension of time event) for 'unjustified' MWS interventions, i.e. where the contractor establishes that the original methodology is not unsafe or defective. More recently we have seen contractors become more comfortable with accepting the risk of MWS interventions, unless they do not follow the agreed assessment methodology. The identity and early involvement of the MWS with contractors is often critical in reducing the temperature of the debate and length of negotiations over who should bear the risk of MWS interventions.

Turbine Supply Agreement (TSA) – scoping and warranties

Variations

WTG suppliers usually insist upon restrictions on the developer's right to order variations (which is perhaps not surprising given the specialist and proprietary nature of WTGs). However, these restrictions are generally becoming more narrowly focused on changes in WTG numbers and the technical/logistical feasibility of the variation request.

Quality warranties

The well-documented dispute about a 'design life' warranty on the Robin Rigg offshore wind farm led to a resurgence in attention to whether an express overall fitness for purpose warranty should be required, at least in English law contracts. Given the other protections typically available in TSAs and O&M agreements (including availability and power curve warranties and defect obligations) the absence of such a warranty is generally not problematic for developers or funders.

Noise emissions

Developers usually take the risk of compliance with laws and permits insofar as these relate to noise emissions. This can be contrasted with onshore projects where excessive noise emissions may be subject to liquidated damages (LDs) regimes.

Grid code compliance

WTG suppliers usually accept grid code compliance risk in countries where there are a number of operational wind farms.

Defects rectification

The interrelationship between defects protection under the TSA and the O&M agreement is crucial. Although a 5-year TSA DLP is now relatively common, we sometimes see even longer DLPs if an associated O&M agreement is also in place. Depending upon the structure of the TSA and foundations/cables contracts, it may be that DLPs across the packages are co-terminous, or that they apply on a package-by-package, or even an individual-WTG, basis.

In other sectors, a DLP will often be extended if a part is replaced during the DLP. On a wind farm, the DLP will usually only be extended in respect of that replaced part.

In some jurisdictions, the foundations, WTG tower and offshore substation could all be considered civil structures with mandatory decennial liability or limitation periods under the relevant code. Whether this risk can then be insured needs to be investigated in each jurisdiction.

Taking Over

There is no standard approach to Taking Over requirements although at least the following are always required:

- Each WTG to be mechanically complete and commissioned.
- Pass/fail performance tests showing stipulated minimum performance over an agreed period to have been attained.

Taking Over may occur on an individual WTG basis, or in strings, or on a whole plant basis. Developers and funders will wish to see Taking Over tied to revenue commencement so that the contractor is not released from delay LDs on (say) a specific string, only to be subject to a subsequent delay – unless that is also protected by delay LDs at an appropriate level. The chosen approach to will also impact on how any early generation revenue might be shared with the WTG supplier.

Although the WTGs can operate without the SCADA system, developers and funders will generally require that it is installed and tested prior to the whole of the wind farm achieving Taking Over.

Taking Over of foundations is again commonly done on an individual basis or by string.

Cables are also typically subject to pass/fail tests before Taking Over, which can occur by cable, by string or by site sector.

Funders will expect that failure to reach guaranteed performance levels will trigger performance LDs/contract price reduction rights. Final completion testing can only be performed once the export cable is connected and the wind farm is energised. Contractors are usually reluctant to accept the risk of a long gap between readiness for testing and testing commencement.

Performance remedies, caps and security

Performance remedies

WTG power curve tests are typically performed over an extended period after Taking Over to allow for seasonal variations. Broadly, the power curve tests determine whether actual power output meets or exceeds the warranted level, with power curve LDs compensating shortfalls. The developer usually conducts the power curve tests with the WTG supplier in attendance.

Developers should consider:

- the period for the developer to notify the WTG supplier that it wishes to carry out a power curve test
- the number of retests allowed and over what period
- the events giving rise to adjustments in the warranted power curve or any deeming provisions

- how many WTGs are included in the testing sample to be representative of the whole wind farm
- the duration of the tests
- the basis for calculation of LDs.

Unlike thermal power projects, where they are generally used only where there is an element of new technology, availability tests/warranties are relatively standard for wind farms. These are key elements of the O&M agreement – for further details see our Client Briefing *Offshore Wind: Operation and Maintenance Agreements*.

Availability LDs on the electrical systems are not standard, so particular care needs to be given to DLP response times and the consequences of contractor failure to remediate. The developer will benefit from the option to claim back some of the contract price for unremedied defects which impact on transmission.

For cables, there are typically no performance LDs. However, after Taking Over the reduction in transmission capacity of a cable could be included as a "Defect" during the DLP. Contractors tend to resist this, especially if the reduction is due to external factors, such as changing subsea soil conditions or fluctuations in water or oil temperature. Given that remediation of defects may be problematic or uneconomic, it is not unusual to see developers reserve the right to recover a portion of the contract price for unremedied defects which impact on transmission.

Caps

Unlike other energy sectors, aggregate liability caps for TSA and foundations packages are usually much lower than 100% of the respective contract price, with limited carve-outs. On cables contracts, the norm is an aggregate cap of 100% of the contract price, with the standard carve-outs. All LDs are typically sub-capped.

The risk of these 'low' TSA and foundations caps is partly mitigated by the multi-asset/string nature of offshore wind farms and partly through analysis that even 100% caps will not protect against worst-case scenarios with a disaggregated structure. As rejection remedies tend not be available (see *Termination remedies* below), the focus is on agreeing appropriate carve-outs from the caps and the adequacy of caps to cover LD and defects liabilities and/or replacement contractor costs. Recent projects show a sub-100% cap can be banked with appropriate carve-outs.

Performance Security

Parent guarantees will be utilised where contractors have weak financial covenants, along with the usual bonding options. Some suppliers resist requests for on-demand performance bonding and analysis may be required as to whether this is really necessary given, e.g., the timing of transfer of title to equipment.

Advance payments are normal for offshore wind projects in return for on-demand bonding, typically with a faster repayment curve than on other projects, reflecting the significant costs of WTG manufacture. WTG suppliers may also sometimes require payment security, particularly if developers are set up as special purpose vehicles, at least until there is evidence of committed finance for the project.

Termination remedies – rejection or cost to complete?

Rejection and full repayment remedies are not usually achievable in TSAs for default terminations (unlike on thermal power projects where they are typically available if minimum performance requirements have not been attained by a long-stop date). This is partly a function of market forces but also a consequence of disaggregation and the fact that critical performance testing takes place only after Taking Over. Accordingly, WTG suppliers will usually only accept an additional cost to complete/rectification cost termination liability.

Historic WTG supplier positions in respect of e.g. performance warranty/ defect period relief for developer defaults, termination rights for extensive no-fault delays, and developers' ability to terminate for convenience (if adequately compensated) have all softened in recent years. TSA/O&M agreement cross termination should be considered on a case by case basis.

Other features

Developer's information

It is common in wind farm projects for developers to carry/retain the risk of certain information, such as design information regarding other contractors, as well as site data, to the extent contractors cannot verify it and/or it is provided to them late. Risk allocation for sea bed conditions is particularly critical for cabling contracts, where the nature of the seabed will dictate, for example, equipment selection, installation routes and techniques and cable protection solutions.

Weather risk

It seems obvious to say it, but weather conditions affect not only the wind farm's potential future cash flows, but also the approach to risk allocation during construction and the DLP. The allocation of risk needs to be assessed on a case by case basis over the various phases of the project as will any programme allowances to be made by the contractors for 'weather' days when work is not possible.

The (Near) Future?

Whilst disaggregated procurement is likely to remain a market constant on larger schemes, the possibility of new entrants disrupting the market and offering EPC 'wraps' cannot be discounted.

'Floating' turbine technology may help mitigate some of the risks referred to in this paper but will also bring new challenges and, as windfarms move progressively further distances away from the shoreline, projects will need to consider accommodation requirements for construction and service personnel. Contractual arrangements will also need to take into account sharing of export facilities and port facilities with other neighbouring projects.

As with other renewable technologies, we can anticipate storage technologies being increasingly utilised to mitigate intermittency and optimise response times and output, for both competitive reasons and, particularly in merchant markets, where price arbitrage should be feasible.

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