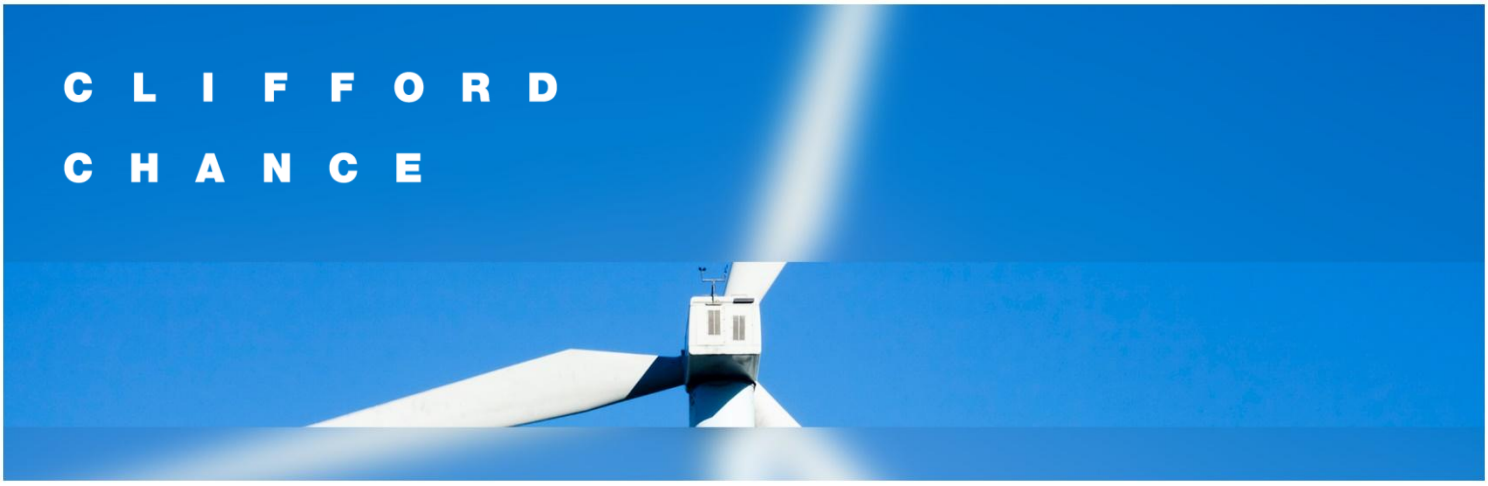

OFFSHORE WIND: OPERATION AND MAINTENANCE (O&M) AGREEMENTS

This paper discusses the key issues relating to O&M agreements for wind turbines on offshore wind farm projects in the current market.

Introduction

In many energy sectors, O&M agreements were traditionally greeted as second-tier citizens alongside construction and other procurement contracts. That position has certainly developed over the last decade with increasing attention being applied to these agreements but it has never been the case with wind projects where industry studies suggest that O&M costs can account for up to 25% of the levelised cost of energy and contracts set out important servicing and availability arrangements. Indeed, O&M contracts on offshore wind projects often travel under different names including service and warranty/availability agreements and long-term services agreements.

This briefing assumes, as is common during the early years of operation, that the O&M contractor (**OMC**) is affiliated to the supplier of the wind turbine generators (**WTGs**) at the relevant wind farm.

Scope of services

The services required under O&M agreements generally fall into three categories: scheduled maintenance, unscheduled maintenance and additional services.

OMCs may resist a general obligation to perform additional services unless agreed on a case by case basis. In such cases, it is important to establish that all essential services are included in the scope of scheduled and unscheduled maintenance or, at the very least, to pre-agree pricing for such essential services if they are required.

Owners should be entitled to carry out scheduled and unscheduled maintenance using other contractors in certain circumstances, e.g. where a health and safety risk occurs due to non-performance by the OMC.

It is usual to agree that certain events will temporarily or permanently relieve the OMC from its obligations to perform or meet warranted availability levels and/or allow it to receive additional payments to carry out affected services. Common examples of relief events include:

- force majeure
- changes in site conditions (e.g. assumed wave heights, current speeds, wind speeds or subsea soil conditions) that adversely affect the carrying out of the services

Key issues

- Scope of services
- Spare parts
- Technological advances
- Grid Code compliance
- Owner's obligations
- Interface risk
- Fees and payment
- Availability warranties
- Limitations on liability
- Term, termination and expiry

- third party interference with the WTGs, including by other contractors employed by the owner, or failure of the works supplied by those other contractors.

Spare parts

The owner and its funders will wish to ensure that the OMC is obliged to supply spares including, if achievable, for a period following termination or expiry of the O&M agreement. The interrelationship between obligations and liabilities under the O&M agreement and the defects protection under the WTG supply agreement (**TSA**) is of crucial importance. Issues which commonly arise in respect of spare parts include:

- **duration of the defects liability period (DLP)** – OMCs typically offer shorter DLPs than those offered under the TSA. Unlike in other power sectors, evergreen warranties on spare parts are not usually available.
- **DLP commencement** – does it start on supply of the spare part to the owner, or on installation of the part?
- **latency and seriality coverage** – latent defects liability is usually excluded unless mandatory in the jurisdiction of the site. OMCs will also commonly seek to exclude serial defect liability, or at least the duty to carry out root cause analysis and redesign where serial defects arise.
- **spares restrictions** – can the spares only be used in relation to the project?
- **termination** – OMCs commonly require spares supply obligations to cease on O&M agreement termination for owner default.
- **market availability** – if a part is not generic (and thus widely available), the owner will want to ensure its long term availability.
- **pricing** – can prices be agreed in advance (subject to indexation) or will the OMC insist on applying its prevailing market rates?
- **quality** – the OMC may require the ability to use refurbished parts, subject to certain conditions (for example, the refurbished spare parts not affecting the original 'type certification' given to the WTGs). Consideration should also be given as to who will own the replaced parts after their removal, as the OMC is likely to want to retain parts for refurbishment and reuse.

Technological advances

Offshore wind technology is constantly advancing. As a result, the technology in the original WTGs and the techniques employed to maintain the WTGs will be updated, upgraded or replaced during the life of the wind farm.

OMCs may therefore require the ability to include updated technology in the WTGs or adopt new maintenance techniques. Owners will want to benefit from the most efficient technology and techniques, subject to certain conditions (e.g. compliance with permits), and the ability to update, upgrade and replace is generally considered to be mutually beneficial.

IPR licences in the O&M agreement must enable owners to update and maintain licensed IP during the life of the wind farm and, where required for the owner's business, allow use of the output data from licensed software beyond the particular wind farm to allow the owner to compare data across projects.

Grid Code compliance

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

Owner's obligations

Owners may have obligations beyond those typical on onshore power projects, such as:

- making available to the OMC facilities in or near the harbour used to access the offshore site. These facilities will generally need to accord with the OMC's minimum standards set out in the O&M agreement
- provision of mooring space for the OMC's crew vessels
- site-specific issues, such as maintenance of boat landings.

OMCs are generally willing to accept responsibility for the provision of their own crew transfer and maintenance vessels – these vessels are generally much smaller and more readily available than those required for installation.

Interface risk

Where separate contractors from the OMC are responsible for the operation and maintenance of the foundation bases and the offshore sub-station, interface concerns arise. These will need to be managed by the owner (or its appointee). Some OMCs may be willing to take on this co-ordination role themselves.

Mitigation of interface risks tends to (correctly) focus on the wider maintenance programme and strategy rather than contractual provisions, e.g. by minimising the number of contractual and physical interfaces, enhancing liaison and planning procedures. Aside from allowing for consolidation of disputes across contracts it is not common to see extensive provision for sharing interface risks between OMCs.

Fees and payment

O&M agreements usually cater for the following:

- an **annual base fee** – payable for the provision of core services, paid in advance on a quarterly or monthly basis. The annual base fee will generally include the cost of all consumables and spare parts for scheduled and unscheduled maintenance, save where required as a result of certain relief events.
- **fees for additional services** – ideally these will be pre-agreed, at least for likely categories of additional services, in the O&M agreement. Generally payment will be made following completion of the services in question, although, where the value of additional services is high, a proportion of the overall cost may be required to be paid up front.
- **incentive payments** – some O&M agreements include incentive payments if wind farm availability exceeds a pre-agreed yearly level. Owners should be wary of incentive proposals, as they can lead to the OMC prioritising short-term yield over the long-term health of the WTGs.

Yield/availability warranties

The WTG yield or availability warranty is one of the most important parts of any O&M agreement. Traditionally this took the form of an availability warranty measuring the outages, or downtime, of the WTGs comprising the wind farm. In recent years, there has been a trend away from this measure of availability to one based on the output yield of the WTGs.

If the minimum yield levels are not met, the OMC will be liable for availability liquidated damages (LDs). The warranted minimum level of availability will vary from project to project and will be based on a number of factors, such as the owner's wish to ensure sufficient headroom over and above the availability level used in calculating the financial base case, site and climatic conditions and the findings of the owner's wind distribution studies.

The O&M agreement will normally include a list of relief events including those described in the *Scope of services* section above. These need to be considered carefully and it can be problematic if these are delivered late in the day within technical documentation as is sometimes the case. A question which is often heavily negotiated is whether, during periods of deemed availability, WTGs should be taken as being 100% available or whether their deemed availability should be calculated by reference to past performance, or some other measure.

There are various long term factors outside the OMC's control that could affect a wind farm's overall availability, for instance:

- development of adjacent structures, including other wind farms (this is of growing concern to OMCs given the recent tendency for developments to be constructed in several phases)
- actual average wind speeds being outside the range contained within the owner's wind distribution studies.

The O&M agreement may therefore contain provisions governing how the adverse impact of such external factors will be dealt with. The owner's/funders' technical adviser will need to be consulted as to which factors will be relevant on a case by case basis and over what period of time the effects should be measured so as to be meaningful.

The O&M agreement should also contain provisions dealing with a change to the overall number of WTGs in the wind farm, and the impact of such a change on the availability warranty. The change in WTG numbers could be due to several factors, such as the owner's breach of the TSA or a variation of the TSA to increase or decrease the number of WTGs to be constructed. Careful consideration of what will and will not lead to an amendment of the availability warranty will be needed.

See our Client Briefing *Offshore Wind: Procurement and Construction in a Changing Market* in relation to the power curve test conducted under the TSA and the damages flowing from a failure of the WTGs to meet the guaranteed power curve.

Limitations on liability

OMCs usually cap their aggregate liability under O&M agreements, and that cap can be structured in a number of ways, for instance:

- a straight percentage of the annual base fee multiplied by the term of the O&M agreement
- annually refreshed limits based on the annual base fee
- limits applicable to a block of years that are refreshed at the expiry of each block.

Any caps calibrated against the amount of the annual base fee should ideally actually be calibrated against the greater of the base fee or actual payments made, to ensure the owner optimises its position. Certain OMCs will be reluctant to offer a cap of 100% of the annual fee, and some require separate annual sub-caps on availability LD liability. Availability LD liability caps are also sometimes subsumed into aggregated LD caps with performance and delay LDs under the Turbine Supply Agreement.

Careful consideration should be given as to which liabilities are carved out of the aggregate cap on liability so as to avoid exhausting it, including rework. Many of these are now standardised such as fraud, wilful default, IPR and third party claims.

Often OMCs will also insist on an exclusive remedies clause being included in the O&M agreement, effectively limiting the owner's right to claim for non-performance of O&M services to a claim for availability LDs. Such provisions need analysis as availability LDs are unlikely to cover the owner's actual long term losses - the owner's priority is well-serviced, well-functioning WTGs for the full design life of 20 years or so, rather than exclusive protection in an initial period corresponding to the term of the O&M agreement. Exclusive remedies clauses are therefore also often subject to a number of unrelated carve-outs. For example, OMC failure to remedy TSA defects (where this is part of the scope) would not be considered to be compensated by the availability LDs and it is not uncommon for owners to take strict approaches to such non-performance (or non-performance in the agreed time slots), such as withholding of parts of the base fee and a reserved right to perform the required work itself or with others.

Term, termination and expiry

The expected operational life of an offshore wind farm is now around 20 years, but a typical O&M agreement will run for between 5 and 10 years, with 5-year O&M agreements often containing a right for the owner to elect to extend towards the end of the initial term. It remains unlikely that any of the leading OMCs would be willing to enter into an O&M agreement for a 20-year term and therefore owners will invariably find themselves, prior to the expiry of the O&M agreement term, having to renegotiate terms with the same OMC, take over maintenance obligations itself or find a replacement contractor capable of maintaining the WTGs for the remainder of the operational life of the wind farm.

Termination events under the O&M agreement are generally similar to those encountered on other types of power project. WTG OMCs used to resist an owner right to terminate for convenience but this has softened in recent years, provided that the OMC is adequately compensated.

Cross-default terminations under the O&M agreement and TSA need to be considered on a case by case basis, e.g. if the TSA is terminated before construction of the wind farm is complete, should the O&M agreement continue for any parts completed?

On termination or expiry of the O&M agreement, the following key considerations arise:

- **compensation on termination** – in default scenarios, the liability of the owner for balance of term profit or conversely of the OMC for the additional costs of the owner procuring a replacement contractor can be contested topics.
- **vessels and special tools** – consideration will need to be given as to whether any vessels, specialist tools or equipment should be made available for purchase by the owner where the O&M agreement is terminated or expires.
- **handover processes** – these can include a period of working together and mandatory training for replacement maintenance teams. Any incoming O&M contractor should be able to access all the relevant data and information required to perform the O&M services.

Where will the winds blow us next?

O&M services in the offshore wind industry face many challenges. Service providers are under considerable industry pressure to assist in the drive to reduce the levelised cost of energy but perhaps more critically to reduce the proportion of issues which are encountered through unscheduled maintenance interventions. This is leading to smarter use of data as well as improving condition-based monitoring systems (to better anticipate equipment failures) and weather forecasting (in order to reduce maintenance downtime). Well-publicised issues with cables are also leading owners, investors and funders to upgrade cable monitoring.

At the contractual level, there has been concern that controls and remedies are directed on an individual turbine basis and do not take account of overall wind farm factors (such as wake effects, variations in degradation and grid requests). Just as owners are seeking more flexible control at the overall wind farm level (optimising performance across all turbines taking into account the impact on service life) they are also seeking contractual remedies which reflect that approach. This is likely to mean that yield-based warranties are here to stay.

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CONTACTS

David Metzger
Partner, Head of Construction Group

T +44 20 7006 4240
E david.metzger@cliffordchance.com

Sandy Hall
Partner

T +44 20 7006 6806
E sandy.hall@cliffordchance.com

Tim Steadman
Director

T +44 20 7006 4012
E tim.steadman@cliffordchance.com

Matthew Buchanan
Partner

T +65 9177 3126
E matthew.buchanan@cliffordchance.com

Inaamul Laher
Senior Associate

T +971 2613 2433
E inaamul.laher@cliffordchance.com

James Pay
Partner, Head of Global Renewables Group

T +44 20 7006 2625
E james.pay@cliffordchance.com

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