16A Supply Chain Assessment

Preamble

1 The following Supply Chain Assessment was carried out by BVG Associates Ltd. and should be read in conjunction with *Chapter 16: Socio- Economics* of the Environmental Impact Assessment (EIA) Report. The Supply Chain Assessment provides a high-level review of the potential of supply for each potential stage and sector of the construction and operations phase.

Inch Cape supply chain assessment

Element	Subelement	Commentary	Probability of supply within the study area	Probability of supply within the rest of Scotland	Probability of UK supply
Project management and development	Development studies	Development studies are typically undertaken by specialist consultancies. These will be in the same country as the wind farm but the location will depend on the location of offices and the suitably skilled individuals. Additional work will be undertaken by the developer	Baseline Supply will almost certainly be from a supplier within the study area	Baseline See study area comment	Baseline Supply will almost certainly be from a UK supplier
	Surveys	Wildlife, geological and metocean surveys are undertaken by specialist data acquisition companies, typically using their own equipment. The companies may be based anywhere but are likely to be located close to hubs for other offshore sectors.	High Most contractors have a presence within the study area, even if they draw on skilled people from other parts of the company	High There are multiple qualified surveyors within Scotland	High Most contractors have a significant UK presence, even if they draw on skilled people from other parts of the company.
	FEED	FEED studies may be undertaken partially in house but significant elements are subcontracted to engineering houses and in some cases tier 1 suppliers. Engineering houses tend to be located close to large metropolitan areas where they have easy access to skills	High There are multiple qualified contractors within the study area, with the possible exception of foundation design	High There are multiple qualified contractors within the study area, with the possible exception of foundation design	High Most FEED is likely to be undertaken in the UK, with the possible exception of foundation design, which is highly specialist

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	Project management and procurement	Project management and procurement is largely undertaken in house by the developer with some positions filled by sole traders or by contracts with companies.	High Preconstruction work is likely to be undertaken in the main project offices, often within corporate headquarters. Later, a construction office will be set up closer to the project.	High Preconstruction work is likely to be undertaken in the main project offices, often within corporate headquarters. Later, a construction office will be set up closer to the project.	High Most activity will take place in the UK, although some developers with a low UK footprint will draw on experienced individuals based overseas.
Turbine ex-works	Nacelle and hub	Nacelle and hub components are produced through a serial manufacturing process, as is assembly by the turbine manufacturer. The locations for this manufacture are based on long-term strategic decisions. Any new manufacturing facilities would only be built as a result of a new entrant to the market or if market growth meant that demand outstripped current capacity.	Low There is no supply of nacelle and hub components from study area and this is unlikely to change for the foreseeable future.	Low There is no supply of nacelle and hub components from the rest of Scotland and this is unlikely to change for the foreseeable future.	Low There is very little UK supply of nacelle and hub components and this is unlikely to change for the foreseeable future.
	Blades	Nacelle and hub components are produced through a serial manufacturing process, usually in house by the turbine manufacturer. The locations for this manufacture are based on long-term strategic decisions. Any new manufacturing facilities would only be built as a result of a new entrant to the market or if market growth meant that demand outstripped current capacity.	Low There is no supply of turbine blades from the study area.	Low There is no supply of turbine blades from the rest of Scotland. There is some potential for composite material supply, such as resins, although these are global commodities.	High Both Siemens Gamesa and MHI Vestas have UK blade manufacturing plants. Whether the blades for Inch Cape come from the UK will depend on how manufacturers meet demand from across Europe.

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	Tower	Towers are manufactured by specialist third parties. It is a volatile market because the low margins have meant that company failures are relatively frequent.	Low There is no supply of towers from within the study area, although there is a theoretical opportunity in the supply of internal ladders and platforms. There a possibility that there may be new UK investment in a tower factory before construction but there are no particular reasons why it would be within the supply area.	Medium There is a single UK tower factory in Campbeltown, Scotland, owned by CS Wind UK. Some turbine manufacturers may prefer UK towers to meet political pressure for local content. Given the uncertain past of the Campbeltown factory, it is difficult to speculate whether it could supply towers to Inch Cape	Medium There is no Rest of Scotland supply of towers, although there is a theoretical opportunity in the supply of internal ladders and platforms. There a possibility that there may be new UK investment in a tower factory before 2025.
Balance of plant	Foundations	It is assumed that Inch Cape will use jacket foundations. The market has matured and successful suppliers are typically those that have invested in serial manufacturing facilities. New investments are possible with the use of jackets likely to increase over the next decade.	Medium BiFab is located within the study area and is well qualified to undertake the work. This would largely be based on a final detailed design that included jacket foundations, as well as a cost effective proposal from BiFab to supply them.	Medium See comment on study area potential	Medium UK suppliers have not generally been competitive and in the longer term, UK supply is most likely to come from inward investment by the leading suppliers that wish to increase their capacity and offer greater UK content.

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	Subsea cables	Subsea cable factories have typically been built to meet specific demand from interconnector projects, and several are in the Scandinavian and Baltic areas for this reason. Manufacturers have typically chosen to expand these factories to meet demand for offshore wind rather than invest at new sites.	Low Oceaneering has the capability to produce array cables, but has not yet produced an order of this volume. There is some capability in the Aberdeenshire area for cable hang-offs and subsea connectors.	Low There is no established supply of subsea cables within the rest of Scotland.	Medium JDR Cables has been one of the leading developers of 66kV array cables, which are likely to be the industry standard in 2025. There is a therefore a reasonable chance of UK content.
	Transmission electrical	High and medium voltage electrical components are typically manufactured by global conglomerates at plants with the capacity to meet regional demand. Engineering and project management is typically undertaken in the relevant market country, with input from other locations as needed.	Low There is little capability within the study area to supply the electrical components for the electrical components of the substation	Low See study area comment	Medium Engineering and project management is highly likely to be in the UK. GE has the only significant manufacturing capacity in the UK, covering high voltage transformers and converters.

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	Transmission structural	Offshore platforms and their foundations are generally manufactured by companies with yards that have met demand from oil and gas and shipyards. The current generation of HVDC platforms are larger than most yards can accommodate and this may encourage new entrants to the market that have suitable infrastructure. Platform foundations are often supplied by a third party. Platform manufacturers have a significant supply chain, which are typically clustered around coastal infrastructure to meet demand from other offshore sectors.	Medium There is some capability for assembly of infrastructure and foundations within the study area.	Medium There is some capability for assembly of infrastructure and foundations within the study area.	Low Several UK yards have supplied AC platforms to the offshore wind market. Sembmarine SLP in Lowestoft has a track record in supplying substations but it is only one of a number of suppliers across Europe and the sector is highly competitive. HVDC technology is developing but it is unclear whether current developments to shrink DC converter platforms will have progressed sufficiently by 2025 for the company to be a viable supplier. It could be better placed to win the foundations contract.

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Installation and commissioning	Foundation installation	Foundation installation has been undertaken using a jack-up vessel or a floating heavy lift vessel. These jack-ups have typically been used for both turbine and foundation installation but in the future the high mass of foundations and the high hub height of turbines will mean that the fleets becoming increasingly distinct. Most contractors are based in Europe and they are a mixture of specialist vessel operators and larger EPCI contractors. Installers have a significant supply chain, notably for mobilisation and demobilisation services, sea fastening fabrication, staging port facilities and crewing services.	Low The study area has a number of relevant companies at tier 2 level.	Low Rest of Scotland has a number of relevant companies at tier 2 level.	Low There has been significant consolidation in the foundation installation market that is a threat to existing UK capability. Lower tier opportunities for UK companies could increase, particularly if overseas contractors seek opportunities to increase local content. Great Yarmouth Seajacks operates the largest jack-up vessel currently in operation, which is well suited to large monopile installation. The trend towards large floating heavy lift vessels for foundation installation would erode Seajacks' competitiveness without further investment.

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	Cable installation	Cable installation is provided by EPCI contractors, a small number of specialist operators and cable manufacturers that have their own vessels. The work is increasingly being undertaken using newbuild vessels designed specifically for offshore wind. There is a significant supply chain for installers, including route clearance, remotely operated vehicles, crewing services, cable storage and handling equipment and services, vessel mobilisation and demobilisation, and electrical services.	Medium Deep Ocean and Oceaneering have the potential to be able to provide cable laying service. Dependent on the size of the cumulative opportunity, other providers may decide to enter the market before construction begins.	Medium See supply chain area comment	Medium The UK is likely retain some cable laying capability to 2025. It has a strong supply chain and this is likely to be retained.
	Turbine installation	The increasing size of turbines, and particularly the hub height, will put pressure on the competiveness of the vessel fleet unless there is significant investment and/or radical innovation in installation technology. Increasing turbine supply also shrinks the vessel market per MW because the MW carrying capacity for a vessel typically increases with larger turbines. (Note: Increased turbine size also shrinks the foundation and cable installation market for similar reasons.)	Low There are no companies with vessels capable of turbine installation within the study area	Low There are no companies with vessels capable of turbine installation within the rest of Scotland	Medium Great Yarmouth Seajacks operates the largest jack-up vessel currently in operation, which may be well suited to turbine installation, possibly with some modification. MPI is also capable of provide turbine installation services, although it is expected that some investment will be required to deal with future turbines.

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	Substation installation	Substation platform installation is generally undertaken by a floating heavy lift vessel, often with a single lift from a barge. The low volume of work typically means that the operation often uses vessels used in other sectors. Self-installing substations have been developed. The substation foundation installation is a similar process to turbine foundation installation and may be undertaken by the same contractor	Low The study area has no relevant capability.	Low Rest of Scotland has no relevant capability.	Low The UK has no relevant capability.
Operations, maintenance and service	Wind farm operations	Wind farm operations is split between day-to-day activities directly concerned with the specific wind farm and asset management functions that my cover a number of wind farms. Day-to-day functions for Inch Cape are likely to be undertaken from an onshore base. It is possible that some services would be provided from either a service operation vessel (SOV) or a fixed platform. Asset management functions may be UK and/or internationally based.	High The study are has been defined around suitable ports and locations, therefore it is highly likely the majority of the opportunity will be within the study area. Although SOV operations do not require a very local base, with crew and supply changes perhaps every two weeks, onshore activity is likely to be focused in the study area.	High See comment on study area supply potential	High See comment on study area supply potential

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	Turbine maintenance and service	Turbine maintenance and service is divided into: • Planned service and regular maintenance that can be undertaken using the equipment and workforce dedicated to the wind farm • Major service, typically involving replacement of major components using jack-up vessels. Work may be undertaken by the turbine manufacturer or third party service provider, or by in house by the wind farm owner, bringing in additional technicians as needed to meet peaks in demand.	High Planned service and regular maintenance is likely to be largely focused in the study area, even if some of the activity is based offshore in SOVs or fixed platforms. For major service, components and vessels will probably be bought in from outside the region.	High Planned service and regular maintenance is likely to be largely focused in Rest of Scotland, even if much of the activity is based offshore in SOVs or fixed platforms. For major service, components and vessels will probably be bought in from outside the region.	High See Probability of Rest of Scotland supply.
	Balance of plant maintenance	Balance of plant covers: • Cable maintenance, replacement and repair • Foundation, inspection and remedial works • Substation maintenance (on and offshore) Export cables are substations will be owned by the offshore transmission owner. Array cables and foundations fall within the remit of the wind farm owners. Balance of plant maintenance is typically infrequent and therefore contractors can be widely dispersed and not necessarily close to offshore wind farms.	Medium Although, balance of plant maintenance contractors may be widely dispersed across Europe, many have built up expertise in the oil and gas sector. Scotland's heritage in this sector and the potential for a clustering effect to meet the needs of the whole of Scotland's offshore wind zone means businesses there are likely to be successful.	Medium Although, balance of plant maintenance contractors may be widely dispersed across Europe, many have built up expertise in the oil and gas sector. Scotland's heritage in this sector and the potential for a clustering effect to meet the needs of the whole of Scotland's offshore wind zone means businesses there are likely to be successful.	High There is competition from mainland Europe but UK companies should perform strongly.

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Decommissioning	Engineering and project management	Offshore wind decommissioning has so far only been undertaken for small numbers of turbines. It is likely that the decommissioning engineering and project management will be undertaken using the same model as project management and development phase. There is a good chance that a large project such as Inch Cape would be repowered.	High Much of the work will be undertaken in the corporate offices of wind farm owners and within engineering consultancies. These are likely to be based in the study area.	High See comment on study area supply potential	High See comment on study area supply potential
	Offshore works	The specific nature of the work is uncertain but it is likely to involve the same contractors as for installation (although after decades of operation, their identities will have changed in many cases).	Low The work will be undertaken by one of a number of contractors from across Europe.	Low The work will be undertaken by one of a number of contractors from across Europe.	Medium UK is likely to have competitive contractors but they will probably be up against other European contractors with cost the likely differentiator.
	Salvage and recycling	Salvage of steel offshore structures is a well established process. Recycling of turbine blades was not developed far but there are likely to be solutions at the end of Inch Cape's life. Given the volume of work fro, the mid-2030s onwards, specialist offshore wind salvage ports may develop.	Medium Ports already set up for oil and gas decommissioning may see this as a suitable continuation of their work. Although the full potential of this market is yet to be established and therefore the longevity of the sector cannot be reliably estimated.	Medium See comment on study area supply potential	High Salvage and recycling of ships and offshore structures already takes place in the UK and it could be an attractive opportunity for port owners.

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