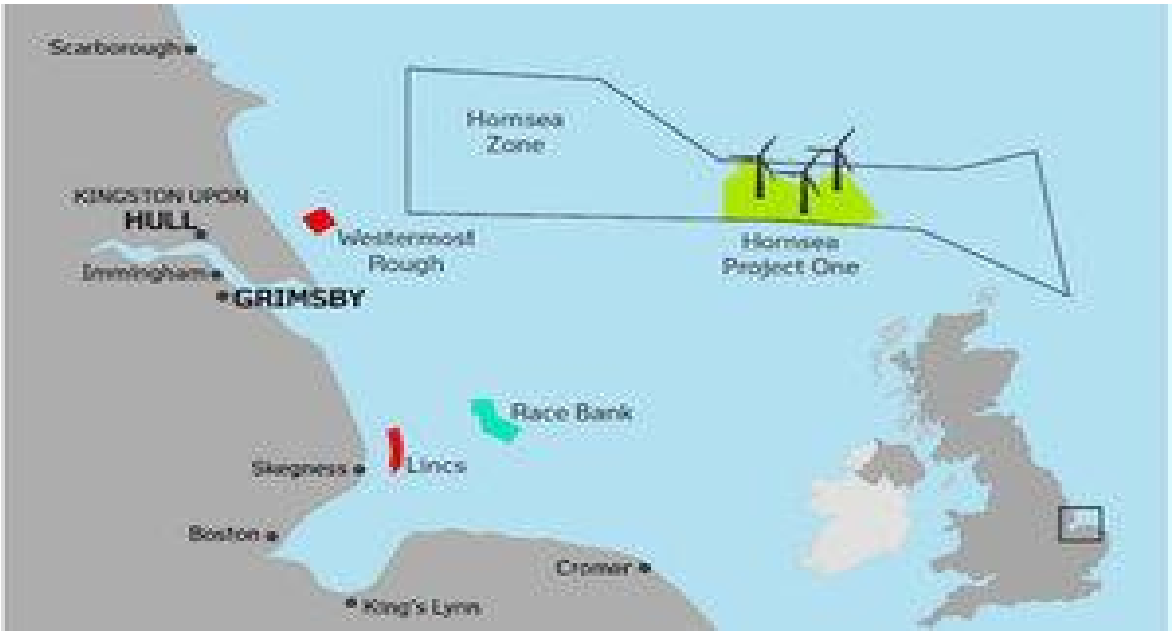
Technical Report 6: Hornsea comparative study – research report



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https://doi.org/10.24384/dxc3-vq65

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Dec 2019

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Executive summary

The Hornsea comparative study is one of two research studies that provide comparators and contrasts for the small main 96MW EOWDC (Aberdeen OWF) case study. The other comparative study is for the 588 MW Beatrice OWF, off the NE coast of Scotland. The Hornsea array includes Hornsea 1-4. Hornsea 1 is now operational and Hornsea 2 is under construction. Hornsea 3 and 4 are at various stages of planning and assessment. In total, they provide an example of a major OWF programme on a large scale, with a potential capacity of 7GW. This research study draws on a detailed review of publicly available application, consent and review documentation. However, it does not have the same level of primary analysis as the main EOWDC case study.

Some conclusions: There is good recognition of socio-economic impacts in the initial ES assessments and in project implementation. The focus is on key economic issues (especially employment and GVA). For the operational Hornsea One Project social issues only emerge significantly in the evolution of the East Coast Community Fund (ECCF); the latest Hornsea 4 Project Scoping Report scopes out many social impacts. The economic predictions for both Hornsea 1&2 use a wide range of impact scenarios; however, there has been some shift to a medium scenario for both the construction and O&M stages, after PINS examinations.

However, in combination, the Hornsea OWF developments and linked onshore investments all enhance the identification of the Humber as a major OWF hub. This has supported/ and been supported by major enhanced skills provision in an area with previously a shortage of higher level skills than nationally. The development of the Hornsea OWF array harmonizes with, and aids the implementation, of the strategic objectives of the Humberside LAs and the Local Enterprise Partnership (LEP): *'The Humber LEP's strategic plan (Humber LEP, 2012) points towards an anticipation that renewable energy will play a central role in the economic development of the area'.*

The ECCF focuses on a long coastal strip, and will currently provide £9.3m (£465,000 pa), for local projects over a 20 year period. The Fund covers two projects, Race Bank and Hornsea 1. The annual value of the Fund is currently about £260 per MW, which is low in comparison with Beatrice at c£500 per MW pa and especially Aberdeen at c£1500 per MW pa. Recent allocations of the ECCF focus on community services, community buildings, sport, and recreation. There may be an update of the Fund as more Hornsea projects become operational

Good practice lessons: There is a commitment through a specific requirement in the Development Consent Order (DCO) for an OWF Employment and Skills Plan, with the developer working together with the LEP, local authorities, education and training agencies, and business organisations, to support a whole range of education and training, and supply chain initiatives for the Humberside area. A detailed disaggregation of contracts shows that the UK appears to have about 50% of Hornsea 1 construction contracts, and the local area has about 10-15% of local contracts, but this provides no indication of their cumulative value.

The Hornsea array also provides a clear example of the in-combination effects of a pipeline of OWF developments and linked onshore investments (e.g. Siemens investment in a new turbine-blade facility in Hull, and Orsted investment in Grimsby as an Operations and Maintenance service base) in creating the Humber area as a major OWF hub. These developments are perceived as making an important socio-economic contribution, in terms of raising the confidence and aspirations of the region. There is some strategic level 'monitoring' of socio-economic impacts from the Dong/Orsted 2015 overview study, although this is at quite a general level with little hard monitoring evidence.

1. Research approach

The Hornsea comparative study is one of two studies that were researched to provide comparators and contrasts for the small main 96MW EOWDC (Aberdeen OWF) case study. The other comparative study is for the Beatrice OWF, off the NE coast of Scotland. The Hornsea array includes Hornsea 1-4. Hornsea 1 is now operational and Hornsea 2 is under construction. Hornsea 3 and 4 are at various stages of planning and assessment. In total they provide an example of a major OWF programme on a large scale, with a potential capacity of 7GW. The Beatrice project is a medium size project of almost 600MW, sitting in size between the Aberdeen and Hornsea developments.

The Hornsea case study data draws on a detailed review of relevant application and consent documentation and secondary data that are publicly available or easily accessible. It is not intended that this case study will have the same level of depth of analysis as the main EOWDC case study. Where possible it will include information from the key developers (in particular Orsted) and local authorities, especially in relation to project specific quantitative data on employment and contract expenditure during the construction and employment stages of the Hornsea projects. The case study also draws on data from other relevant stakeholders, including Humberside local authorities, and the Humberside LEP.

The structure of the report is as follows:

1. *Research approach*
2. *Project characteristics – context and background*
3. *Socio-economic content in application process*
4. *Socio-economic issues in application documentation*
5. *Socio-economic issues in project examination: economic*
6. *Socio-economic issues in project examination: social*
7. *Mitigation and enhancement*
8. *Actual impacts during project construction*
9. *Actual impacts during project O&M*
10. *Some conclusions and project(s) good practice lessons*

2. Project characteristics – context and background

The former Hornsea Zone was one of nine offshore wind generation zones around the UK coast identified by The Crown Estate (TCE) during its third round of offshore wind licensing. SMart Wind Ltd., a 50/50 joint venture between International Mainstream Renewable Power (Offshore) Ltd and Siemens Project Ventures GmbH, acquired the rights to the development of the former Hornsea Zone by entering into a Zone Development Agreement (ZDA) with TCE in 2009. DONG Energy Wind Power A/S (now Ørsted Wind Power A/S) acquired the development rights to Hornsea Project 1 in 2015 and later DONG Energy Power (UK) Ltd. acquired SMart Wind Ltd and the then Hornsea Zone, together with the development rights for Hornsea Project Two, Hornsea Project Three and Hornsea Four. In 2016, the Hornsea ZDA was terminated and project specific agreements, Agreement for Leases (AfLs), were

agreed with TCE for Hornsea Project One, Hornsea Project Two, Hornsea Project Three and Hornsea Project Four. The Hornsea Zone was subsequently dissolved.

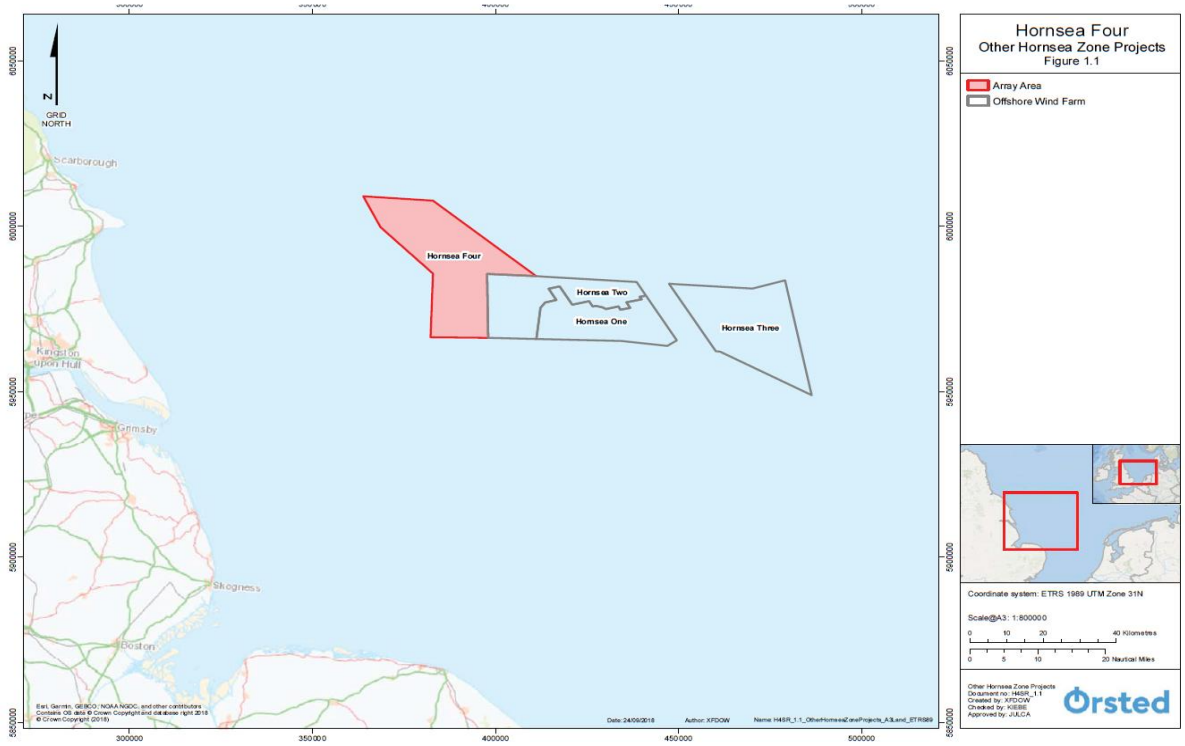
Taken together, the four Hornsea projects, as and when fully developed, will constitute one of the largest clusters of OWF energy worldwide, with potentially up to 900 very large turbines, and around 7GW of power. They provide a major contrast to the single c600MW Beatrice project, and the small 96MW Aberdeen project. They also lie in an area of the North Sea where there are many more large OWFs at various stages of development. They also lie off a major port and industrialised coast, including the ports of Hull, Grimsby and Immingham. As such, the Hornsea case study provides an example of offshore wind farm development on a large scale, with the potential for substantial supply chain development, associated production/fabrication initiatives, and cumulative impacts. The key features of the four projects are set out in Table 1.

Figure 1 provides an outline of the spatial extent of the four Hornsea offshore windfarms. Spatial representations of each OWF turbine area and cable corridor are set out in Figures 2a to 2c. These show that the cable corridors affect a range of spatial locations along the English North Sea coast from North Norfolk to North Yorkshire. Figures 3a and 3b show the anticipated timelines from the government granting of the Development Consent Order (DCO) to the operational project of 6 years in both cases, with Hornsea Project 2 running two years behind Hornsea Project 1.

Project	Key features
Hornsea 1	Hornsea 1 - 170 turbines of 7MW, 1.2GW, 103km offshore. The project was consented in Dec 2014, following an Examination under the English national infrastructure regime. Onshore construction began in early 2016; offshore construction is also underway and by late 2018, about one third of the offshore foundations and monopiles had been installed. The cable connection comes ashore south of Grimsby and runs for c 40miles to a sub-station at Killingholme on the Humber Estuary. The project began producing electricity in Feb 2019 and expects to be fully operational by Q1 2020.
Hornsea 2	Hornsea 2 - 165 turbines of 8.4 MW, 1.4GW, 89km offshore. This project followed the same examination process and received development consent in Aug 2016. Onshore sub-station construction works began in 2018. The cable route follows that for Hornsea 1, to the same sub-station.
Hornsea 3	Hornsea 3 – 2.4GW, up to 400 turbines, 120km offshore. This is the largest proposed UK OWF to date; the developer submitted an ES with an application for development consent in 2018. The examination was completed in April 2019 by PINS National Infrastructure, and a decision is awaited. Unlike the first two projects, the 120km offshore cable corridor for Hornsea 3 runs to the North Norfolk coast.
Hornsea 4	Hornsea 4 – will have a maximum of 180 turbines. This most recent of the Hornsea projects is currently (in 2018) at the scoping stage of the planning and application process. The provisional cable corridor is routed to come ashore south of Bridlington in Yorkshire.

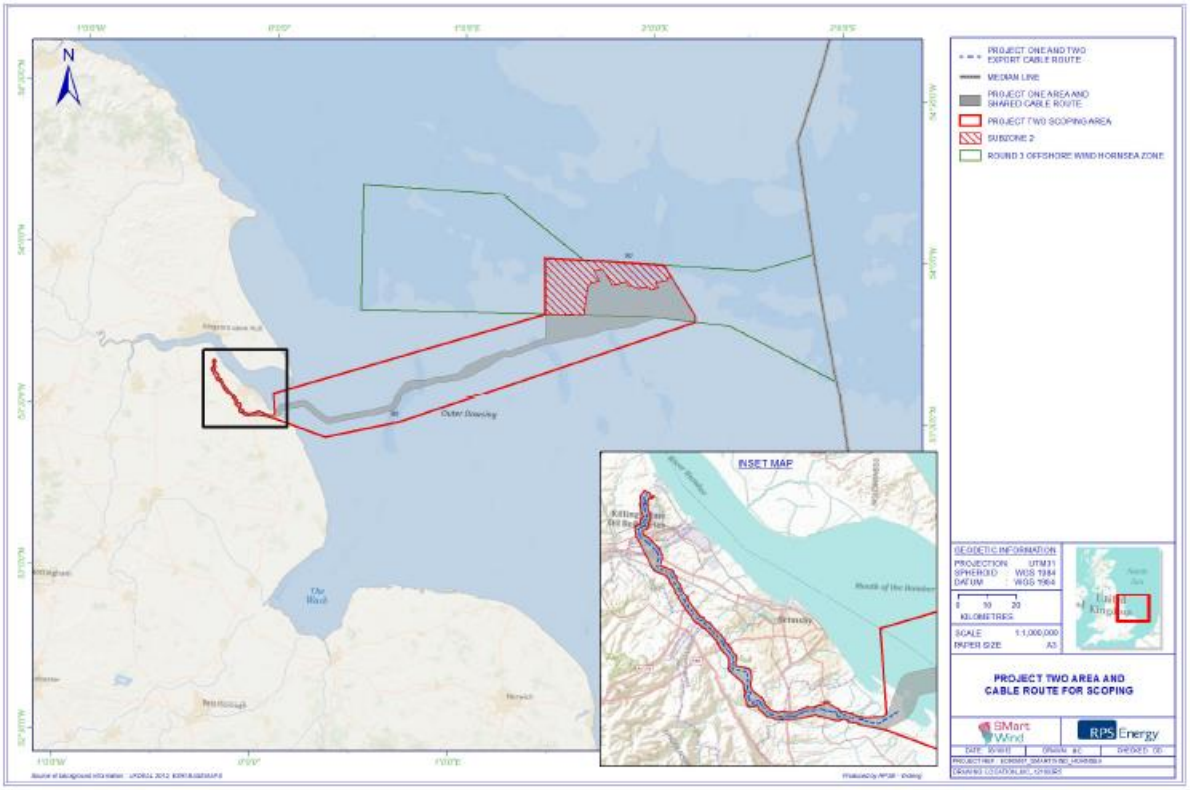
Table 1: The set of Hornsea OWFS

Figure 1: Location of the Hornsea projects



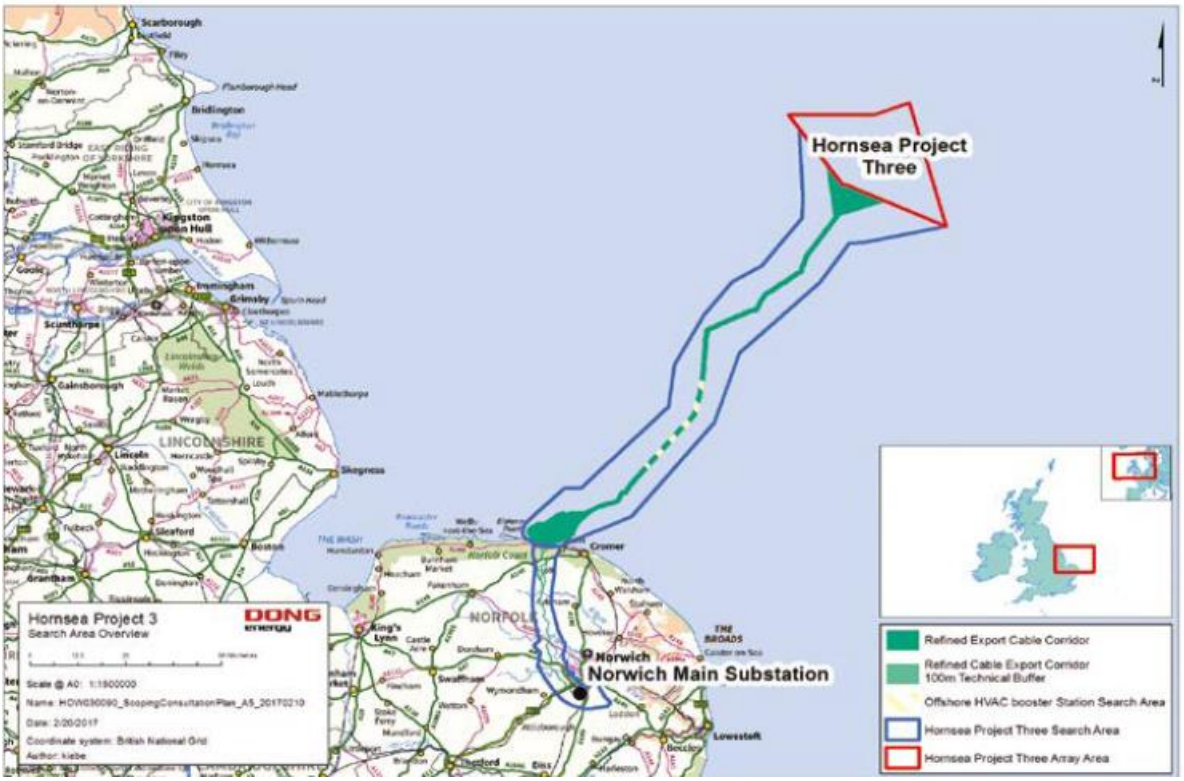
Source: Orsted

Figure 2a: Location and cable route for Hornsea Projects One and Two



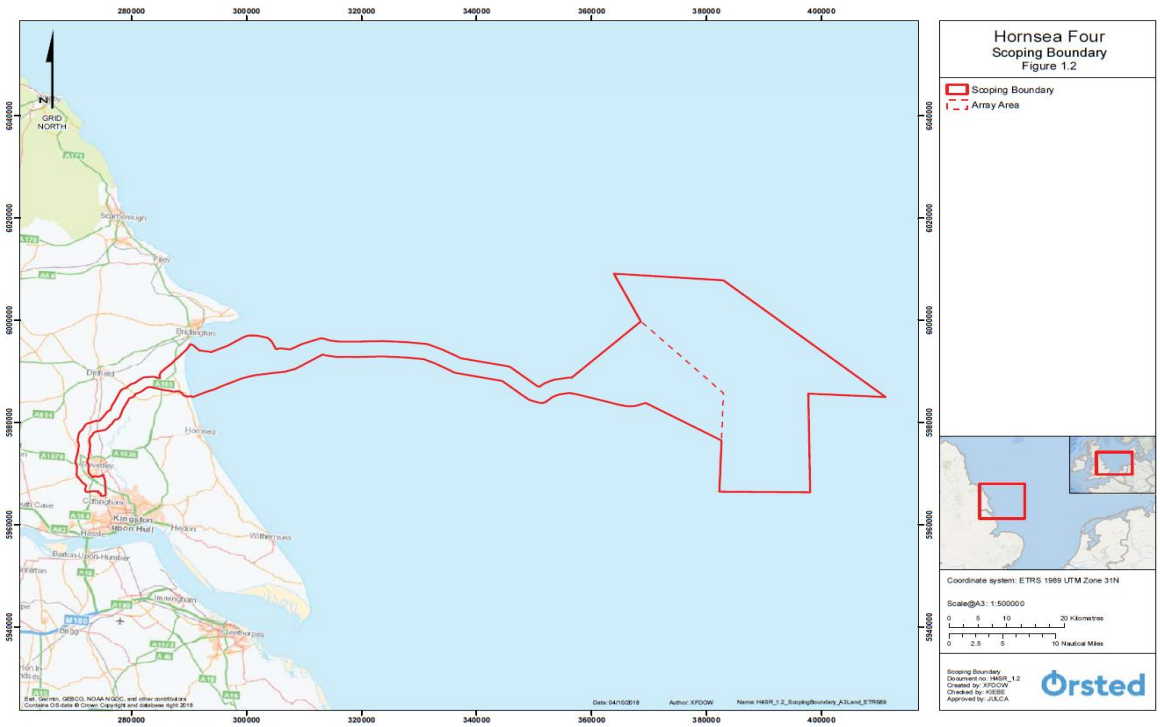
Source: Smartwind

Figure 2b: Location and cable route for Hornsea Project Three



Source: Dong

Figure 2c: Provisional spatial extent of Hornsea Project Four



Source: Orsted

Figure 3a: Hornsea Project 1 timeline

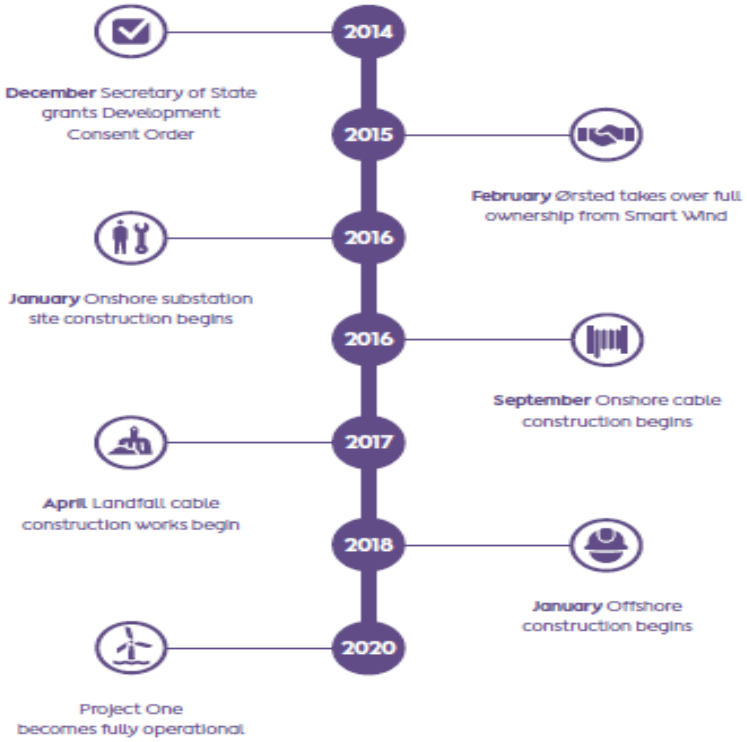
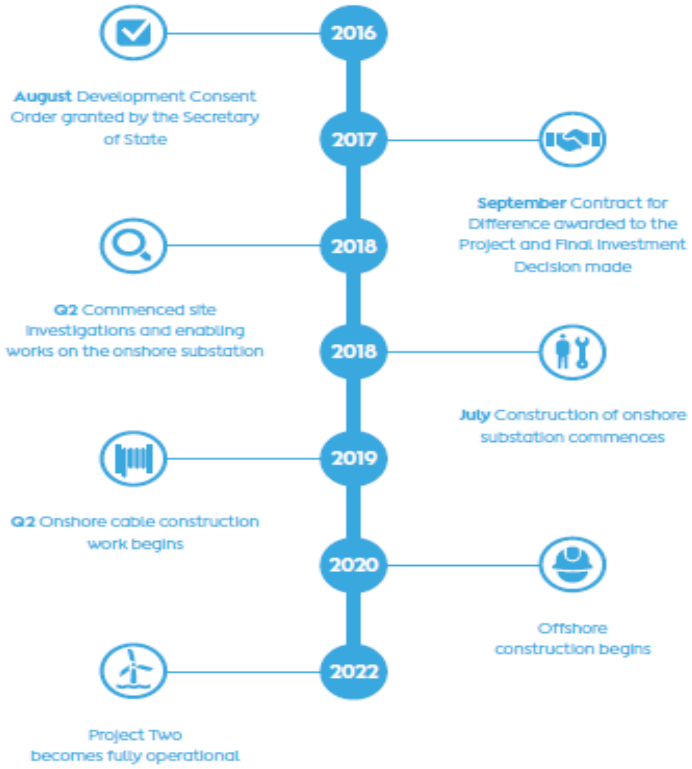


Figure 3b: Hornsea Project 2 timeline



3. Socio-economic content in application and consent process

As noted in Table 1, all of the Hornsea projects are subject to the English national infrastructure-planning regime, managed by the National Infrastructure Directorate of the Planning Inspectorate (PINS). Hornsea 1 and 2 have received development consent; Hornsea 3 is awaiting decision after the completion of the examination (as at Autumn 2019) and Hornsea 4 is at the initial scoping stage. The planning and examination regime involves the production of a range of pre-application reports, including -- Scoping Report, Preliminary Environmental Impact Reports (PEIR), and Statements of Community Consultation (SCC). Table 2 illustrates the anticipated coverage of socio-economic impacts in the Hornsea 2 Scoping Report. There is a focus on the construction stage impacts, with a distinction between onshore and offshore impacts. Onshore are mainly economic and recreation; offshore are mainly fishing and shipping. Table 3 sets out the anticipated coverage in a much fuller way in the most recent Scoping Report, for Hornsea Project 4. What is particularly noticeable here is the scoping out of many socio-economic impacts, especially the more social/community impacts. There is a narrow focus on economic impacts, including an anticipation of recruitment of much of the substantial construction workforce from the local and regional community.

Potential project impacts

8.11.20 The potential impacts of the construction, operation and maintenance of a project of this size are potentially significant at both a local and national scale.

Construction phase

8.11.21 The identified potential impacts on the socio-economics of the study area resulting from the construction of Project Two are as follows:

- Increased direct employment of local people and associated GVA;
- Increased expenditure through local businesses involved in the project's supply chain may generate indirect employment and GVA through economic multiplier effects;
- Disruption to tourism and other businesses, particularly during the construction phase;
- Potential upgrades to port infrastructure may allow for new business opportunities;
- Effects on housing, local services and infrastructure associated with any large scale influx of new workers;
- Temporary disruption to the recreational use of publicly accessible spaces (e.g. beaches), recreational facilities and businesses which may be temporarily disrupted through access route diversions, as a result of construction work;
- Temporary disruption to public rights of way (PROW) closures and diversions may be necessary in which case they will be undertaken in consultation with the Council's Rights of Way department;
- Indirect impacts arising from changes in amenity, for example from noise, dust or changes in views

8.11.22 Offshore impacts may accrue to commercial fisheries, ferries, other commercial shipping and leisure yachts. The assessment of these impacts will build upon the individual Commercial Fisheries, Ports, Shipping, Navigation, and Landscape, Seascape and Visual Amenity assessments being undertaken in parallel with the socio-economic assessment. Potential impacts could include:

- Increased steaming time for vessels;
- Loss of access to fishing grounds; and
- Disruption to traditional shipping routes.

Operation and maintenance phase

8.11.23 Impacts arising during operation and maintenance phase are expected to be similar to those experienced during the construction phase

Table 2: Anticipated coverage of socio-economic impacts in the Hornsea 2 Scoping Report
Source: Adapted from Smartwind (2012)

Valued socio-economic aspects	Typical issues	Comment onshore	Comment offshore
Health and wellbeing	Could H4 affect individual and community/population health group cohesion?	No likely significant effects. While there will be a large construction workforce, much of it will be drawn from local and regional resources and no single community will be exposed to large scale temporary inmigration of workers.	Not applicable
	Could H4 affect community safety?	Will be addressed in the Traffic and Transport assessment. Other community safety factors (such as fencing and security of working areas) will be addressed in a CoCP.	Will be addressed in Shipping and Navigation, to the extent applicable.
	Could H4 affect family cohesion?	No likely significant effects, not relevant to H4	
	Could H4 affect cultural maintenance?	No likely significant effects, not relevant to H4	
Sustainable natural resource harvesting	Could H4 affect hunting and gathering activities (noting that this mainly applies in traditional economies onshore) but offshore does apply to commercial fisheries?	No likely significant effects, not relevant to H4	Will be addressed under Commercial Fisheries.
	Could H4 affect the recreational and traditional economy (eg. through interrupting access to land and sea)?	Will be addressed under 'Land Use and Agriculture', together with landowner and land user consultations.	Will be addressed under Commercial Fisheries, and Other Marine Users.
	Could H4 affect the value of alternative land uses (eg. tourism vs fishing vs industry)?	Not applicable to H4 as alternative land or sea uses will be compensated	
Protected heritage and cultural resources	Could H4 affect the aesthetic, cultural, archaeological and/or spiritual value of places?	Will be addressed under Cultural Heritage	Will be addressed under Marine Archaeology
	Could H4 affect the maintenance of traditional language, education, laws and traditions?	No likely significant effects, not relevant to H4	
Equitable business and employment opportunities	Could H4 affect local, regional and national business competitiveness?	Relevant given Humber region context and supply chain. See s 7.10.7 below	
	Could H4 provide employment opportunities for local, regional and national residents?	Relevant given Humber region context and supply chain. See s 7.10.7 below	
	Could H4 facilitate training and career development for local and regional residents?	Relevant given Humber region context and supply chain. See s 7.10.7 below	
	Avoidance of boom and bust cycles (via economic diversification)?	No likely significant effects, not relevant to H4	
Population sustainability	Could H4 cause or exacerbate in- and out- migration effects?	No likely significant effects. While there will be a large construction workforce, much of it will be drawn from local and regional resources and no single community will be exposed to large scale temporary inmigration of workers.	
	Could H4 cause changes in the social and cultural make-up of affected communities?	No likely significant effects, not relevant to H4	
	Could H4 lead to pressure on social services, such as health care, education and justice?	No likely significant effects. While there will be a large construction workforce, much of it will be drawn from local and regional resources and no single community	

Adequate services and infrastructure		social service will be exposed to large scale demand from workers.
	Could H4 cause or exacerbate housing pressures eg. Affordability, availability and appropriateness?	No likely significant effects. While there will be a large construction workforce, much of it will be drawn from local and regional resources and demand for temporary accommodation by those hired from outside the region will be distributed over a relatively wide area and unlikely to compete with others (eg. domestic or tourism) for availability.

Table 3: Anticipated coverage of socio-economic impacts in the Hornsea 4 Scoping Report
Source: Adapted from Orsted 2018. *Hornsea Project 4—EIA Scoping Report*

4. Socio-economic content in application documentation (especially in ES, and LIR) – overview

As noted above from the examples of Hornsea Project 2 and Hornsea Project 4, the Scoping Reports identified some of the socio-economic impacts of the proposed windfarms as likely to be significant. For those projects that have gone through examination, there are socio-economic chapters in the relevant Environmental Statements (ES). The local authority Local Impact Reports (LIR) also include some reference to potential socio-economic impacts. The predicted ES and LIR socio-economic content for the Hornsea Projects 1 , 2 and 3 are now outlined in general below and then in more detail for economic impacts in Section 5, and for impacts in Section 6.

4.1 For the Hornsea Project 1 ES, the applicant (Smartwind**)** employed RPS as the consultants. The assessment included a main Socio-economic chapter of 72 pages (Smartwind 2013). There is an economic focus to the assessment, including coverage of employment creation, Gross Value Added (GVA), and impact on specific business sectors – including tourism, fishing and agriculture. There is some limited consideration of social impacts, including accommodation and local services.

The spatial focus was on a Local Impact Area (LIA) made up of six local authority areas which immediately border the coastline adjacent to the Hornsea Project 1 development area and which surround the Humber Estuary. The LIA contains the entirety of the Humber Local Economic Partnership (LEP) area. The study also used a much wider UK Impact Area to assess the national significance of effects. The assessment of the baseline showed that the LIA faces many socio-economic challenges. It has higher unemployment rates and lower skill levels than the UK; the level of earnings of those in employment and the level of (GVA) per head are both substantially lower than the national average. However, the assessment of the policy context also reflects on the changing industrial structure of the area, and on the potential opportunities provided by the renewable energy sector. For example:

'The Humber LEP's strategic plan (Humber LEP, 2012) points towards an anticipation that renewable energy will play a central role in the economic development of the area. The Humber LEP notes that taking advantage of major growth opportunities such as renewable energy will be critical to realising the true potential of the Humber Estuary.'

The boosting of local economies, employment and skills feature strongly in the strategic aims of local authorities in the LIA, and the importance of the renewable energy sector to local

economic development objectives is reflected in the economic development strategies of some of the LAs in the area. However, such issues did not feature strongly in the LIRs of those authorities.

The methodology employed a wide range of three construction impact scenarios. The key driver of the scale of impacts is the location of the construction ports, which determines, largely, the location of manufacture and assembly of the turbines. The low impact scenario assumes that the main construction ports will be outside the UK. The medium impact scenario assumes that ports within the LIA would be used extensively during the construction stage. The high impact scenario is as for the medium scenario, but assumes that at least 50% of the construction goods and services will be provided by UK based firms, with the use of local steel and new local assembly and manufacturing facilities leading to an increased level of sourcing from within the LIA.

The project ES included consideration of cumulative impacts of overlap with the Hornsea 2 and Dogger Bank OWF projects, in relation to labour demand and resultant pressure on accommodation and other community facilities. The monitoring of socio-economic impacts was not well covered in the ES, but its importance was stressed in the Examination process

4.2 For the Hornsea Project 2 ES, *the applicant (Smartwind, then DONG Energy*) employed RPS as the consultants. They in turn employed sub-consultants, Regeneris Consulting, to undertake the socio-economic assessment. The assessment included a main Socio-economic chapter of 94 pages (Smartwind 2015a), supported by a Socio-economic Methodology Information chapter of 25 pages (Smartwind 2015b). There is an economic focus to the assessment, including coverage of employment creation, Gross Value Added (GVA), and impact on specific business sectors –including tourism, fishing and agriculture. There is some limited consideration of social impacts, including measures of community vitality and viability (e.g., changes in demand for local housing, accommodation and services).

As for Hornsea Project 1, the spatial focus was on the Local Impact Area (LIA) made up of the same six local authority areas to assess local impacts, and the much wider UK Impact Area to assess the national significance of effects. The applicant's assessment of potential impacts, further detailed in the Methodology Socio-Economic Annex (Smartwind 2015b), considered three impact scenarios (low, medium and high impact) across the construction and O&M stages of the project. There was considerable uncertainty attached to the relative likelihood of the scenarios, partly caused by the lack of clarity on the key issue of the likely main port(s) for the construction and O&M stages of the project, and partly by the approach used in the assessment. In general, the initial position of the applicant on the potential socio-economic impacts scenarios for the LIA appeared to be the low scenario for the construction stage and low/medium for the O&M stage. During the Hornsea Project 2 examination there was a small shift in the applicant's position on likely local socio-economic impact scenario outcomes towards a medium/low socio-economic impact scenario for the construction stage, and a medium socio-economic impact scenario for the O&M stage (Examining Inspectors' Report on Hornsea Project 2 Examination, PINS/NI 2016). Relevant factors in the shift were some support by DONG for Grimsby as an O&M base, recent supply initiatives in the LIA such as the Siemens investment at Alexandra Dock Hull, and the growth of renewal energy targeted training initiatives in the area.

A consideration of cumulative impacts included potential overlap with Hornsea 1 and Dogger Bank OWF projects, with regard to labour demand and resultant pressure on accommodation and other community facilities – but the degree of potential impacts depends on whether the project developments are concurrent. The ES and DCO made no provision for monitoring socio-economic impacts, but the Examining Authority subsequently required this, although it was only weakly covered in the DCO.

A review of the strategic aims of *local authorities in the LIA* shows strong support for initiatives to boost the local economy, increasing employment and skills, plus a clear recognition of the importance of the renewable energy sector in delivering economic development objectives. Further support is contained in the Local Impact Reports (LIRs) produced by various local authorities; for example North Lincolnshire state [LIR-001]:

'The generation of employment is a strategic aim of North Lincolnshire Council in this location and the benefits associated with this clearly outweigh the negative impact on tourism and public rights of way resulting in an overall moderate positive impact. This development will have long-term beneficial economic impacts in terms of job creation and inward investment into North Lincolnshire and the UK'.

Similarly, North East Lincolnshire Council notes in its LIR [LIR-002]:
'The further potential for investment and jobs created in Grimsby is welcomed fitting within the overall regeneration/economic development targets of the Council Partnership with renewables a key sector for development and growth'.

In their letter of support [AS-008, Appendix B], the Humber LEP notes:
'*The Humber LEP supports the DCO application by Smartwind for the Hornsea Project 2 offshore wind farm. The Humber Estuary is developing as a national centre for energy, with a primary focus on the offshore wind sector. The project fits within the overall priority sectors which have been identified by the Humber Local Enterprise, where Energy and Renewables is the most important sector in delivering local growth through investment and new employment. Energy and Renewables has been the primary focus for strategy and funding applications by the Humber Local Enterprise Partnership.'*

4.3 ***For the Hornsea Project 3 ES***, **the applicant (Orsted**) again employed RPS as the consultants. They in turn again employed sub-consultants, Regeneris Consulting, to undertake the socio-economic assessment. The main socio-economic content, in Chapter 10 of the ES, covers 94 pages (Orsted 2018). The focus of this chapter is still primarily economic. However, the scope of the socio-economic impact for this potentially huge OWF can be seen to extend over many other topics including landscape and visual impacts to historical environment, land use, agriculture and recreation, traffic and transport, noise and vibration, air quality and health, within the study area—Humberside and New Anglia LEP areas. As for Hornsea Project 2, the economic content of the main socio-economic chapter includes employment creation, GVA, and impact on specific business sectors – including tourism, fishing and agriculture. The limited social content includes potential changes in demand for local housing, accommodation and services, which only becomes significant if all the project related employment is filled by non-local people, which is seen to be very unlikely.

The Socio-economic chapter provides good coverage of the three project stages. These relate to mainly two spatial levels (Humber and New Anglia LEPS Local level) and National level. The Humber and New Anglia alternatives relate to potential alternative main port locations. The study uses three impact scenarios (Low/Medium/High). Low involves no use of local ports; Medium involves considerable use of local ports including for laydown; and High involves considerable use of Humber ports, including for local sourcing (fabrication and supply chain). The project ES sets out a commitment to design-in-measures to increase the level of socio-economic benefit captured in the local economic development areas. Measures to mitigate the lack of skills for offshore windfarm in the local areas include a partnership with Teach First, supporting/collaborating with University Technical Colleges, establishing an apprenticeship scheme and, ring-fencing funds for skills. There will also be Science, Technology, Engineering, and Maths initiatives through Ørsted's voluntary Community Benefit Funds.

The study involves an interesting approach to cumulative impacts, in the increasingly busy OWF environment of the North Sea off Humberside and East Anglia. The cumulative assessment methodology advises the use of tiers for the assessment to reflect the differing potential for projects to come forward. While there are 21 projects identified for the assessment, only six (tier 1) have the potential to overlap with Hornsea Project 3 during the construction phase. Within the southern North Sea, these projects could act collectively with Hornsea Project 3 to affect shipping and navigation receptors. The use of ports in the area for O&M is another issue that may require focused analysis to underscore the possible changes the increased movement and activities in the location may bring. In economic terms, the cumulative impact is reported as major and beneficial. With regard to monitoring impacts, there is no provision at all in the ES socio-economic chapter.

In terms of LIR reviews, local comments are positive on the potential socio-economic impacts. For example, Norfolk CC (2018) note potentially significant economic benefits in terms of local employment creation, business sectors affected by construction, and the O&M opportunities. It notes that:
'The County Council is working with all energy companies and the New Anglia LEP to promote this sector and develop a Skills Strategy for the types of skills required for young people in schools and colleges. In addition, the County Council would like to see: apprenticeships, work experience; and internship opportunities at an appropriate stage. The County Council is working with Orsted to further develop the above Strategy and ensure that there is a skills legacy to the project'.

The authority also welcomed Orsted commitment to establishing a Community Benefits Fund (CBF); the developer had established voluntary CBFs for a number of its projects that were currently under construction.

Similarly, South Norfolk Council (2018) notes:
Re Socio-economic and community matters. In general, the Council is supportive of the project, recognizing its importance in relation to the diversification of UK energy supplies and potential contribution to the national and local economy. The economic benefits in terms of investment and job creation are welcomed.

5. Socio-economic issues in project examination: economic (with focus on methods and predictions)

As noted above, the economic focus of the offshore elements is on employment, GVA and tourism and recreation impacts. This section covers these impacts, summarising the predictions made for Hornsea Projects 1, 2 and 3.

5.1 Hornsea Project 1

Tables 4 to 9 set out some of the key economic predictions for Hornsea Project 1 under three scenarios.

	Low Impact		Medium Impact		High Impact	
Phase	Local Impact Area	UK	Local Impact Area	UK	Local Impact Area	UK
1. Design and development	£14	£130	£14	£130	£43	£144
2. Wind turbine manufacture	-	-	-	£173	£144	£288
3. Balance of plant	-	£276	£96	£636	£120	£744
4. Installation & commissioning	£10	£115	£144	£518	£202	£682
Total	£24	£521	£254	£1,457	£509	£1,858

Table 4: Summary of sourcing scenarios for construction stage
Source: Smartwind 2013; impact calculations by Regeneris Consulting

	Person Years of Employment			Average Annual Employment Impact During Construction Period (FTEs)		
Impact type	Low Scenario	Medium Scenario	High Scenario	Low Scenario	Medium Scenario	High Scenario
Direct	160	1,240	3,150	50	350	900
Indirect	240	2,280	4,670	70	650	1,330
Total	400	3,520	7,820	120	1,000	2,230

Table 5: Predicted levels of local employment during construction period
Source: Smartwind 2013; impact calculations by Regeneris Consulting

	Low Scenario (£ millions)	Medium Scenario (£ millions)	High Scenario (£ millions)
Direct	£12	£85	£173
Indirect	£11	£113	£230
Total	£23	£198	£403

Table 6: Summary of construction impact on GVA at the local level
Source: Smartwind 2013; impact calculations by Regeneris Consulting

Phase	Low Impact		Medium Impact		High Impact	
	Local Impact Area	UK	Local Impact Area	UK	Local Impact Area	UK
Direct employment: admin and management	£0.0	£0.7	£0.0	£0.7	£0.7	£0.7
Direct Employment: technical	£0.1	£7.2	£7.2	£7.2	£7.2	£7.2
Professional services, business rates, insurances, administrative overheads etc.	£0.2	£2.9	£0.6	£3.0	£1.1	£3.0
Fuel and utilities	£0.1	£0.6	£0.3	£0.8	£0.6	£1.0
Technical and equipment transfer	£0.0	£0.5	£0.2	£0.6	£0.3	£0.8
Large component replacement	£0.0	£7.2	£3.6	£13.0	£7.2	£23.8
Total	£0.4	£19.1	£11.9	£25.3	£17.1	£36.5

Table 7: Summary of sourcing scenarios for O&M stage
Source: Smartwind 2013; impact calculations by Regeneris Consulting

Impact type	Annual Employment Impact During O&M Phase (FTEs)		
	Low Scenario	Medium Scenario	High Scenario
Direct	4	223	242
Indirect	4	85	125
Total	8	308	367

Table 8: Summary of predicted levels of O&M employment at the local level
Source: Smartwind 2013; impact calculations by Regeneris Consulting

Impact type	Low Scenario (£ millions)	Medium Scenario (£ millions)	High Scenario (£ millions)
Direct	£1	£39	£43
Indirect	£0	£4	£6
Total	£1	£43	£49

Table 9: Summary of O&M stage impact on GVA at the local level
Source: Smartwind 2013; impact calculations by Regeneris Consulting

The tables display the variability and uncertainty of the predictions. For the construction stage in total, the low impact for the local area is only about one tenth of the medium impact for sourcing, employment and GVA. The outcome from the examination was a shift towards a low/medium scenario, so the predictions are somewhere in the wide range between the two sets of predictions. The level of indirect employment is notable, at about 1.5 x the level of direct employment. For O&M, annual predictions, the relative differences between the low and medium scenarios are even larger. However, here there was some tendency towards the medium scenario giving, for example, a quite substantial annual local employment of 308. The predicted relative level of indirect employment is much lower for the O&M stage.

5.2 Hornsea Project 2

Tables 10 to 15 set out some of the key economic predictions for Hornsea Project 2 under three impact scenarios.

	Low Impact		Medium Impact		High Impact	
Phase	Local Impact Area	UK	Local Impact Area	UK	Local Impact Area	UK
1. Design and development	£22	£173	£22	£173	£65	£216
2. Wind turbine manufacture	-	-	-	£259	£216	£432
3. Balance of plant	-	£409	£139	£949	£172	£1,113
4. Installation and commissioning	£18	£1800	£210	£782	£304	£1,020
Total	£39	£762	£371	£2,163	£757	£2,780

Table 10: Summary of sourcing scenarios for construction stage - local and UK levels
Source: Smartwind 2015; impact calculations by Regeneris Consulting

	Person Years of Employment			Average Annual Employment Impact During Construction Period (FTEs)		
Impact type	Low Scenario	Medium Scenario	High Scenario	Low Scenario	Medium Scenario	High Scenario
Direct	240	1,850	4,730	40	310	790
Indirect	360	3,430	7,010	60	570	1,170
Total	600	5,280	11,740	100	880	1,960

Table 11: Predicted levels of local employment during construction period
Source: Smartwind 2015; impact calculations by Regeneris Consulting

	Low Scenario (£ millions)	Medium Scenario (£ millions)	High Scenario (£ millions)
Direct	£17	£127	£260
Indirect	£17	£169	£346
Total	£34	£296	£606

Table 12: Summary of construction impact on GVA at the local level
Source: Smartwind 2015; impact calculations by Regeneris Consulting

Phase	Low Impact		Medium Impact		High Impact	
	Local Impact Area	UK	Local Impact Area	UK	Local Impact Area	UK
Direct employment: administration and management	£0	£0.9	£0	£0.9	£0.9	£0.9
Direct Employment: technical	£0.1	£9.1	£9.1	£9.1	£9.1	£9.1
Professional services, business rates, insurances, administrative overheads etc.	£0.2	£2.7	£0.6	£2.9	£1.1	£2.9
Fuel and utilities	£0.1	£0.6	£0.3	£0.8	£0.6	£1.0
Technical and equipment transfer	£0	£0.3	£0.1	£0.3	£0.2	£0.4
Large component replacement	£0	£7.2	£3.6	£13.2	£7.2	£24.0
Total	£0.3	£20.8	£13.2	£27.2	£18.3	£38.3

Table 13: Summary of sourcing scenarios for O&M stage
Source: Smartwind 2015; impact calculations by Regeneris Consulting

Impact type	Annual Employment Impact During O&M Phase (FTEs)		
	Low Scenario	Medium Scenario	High Scenario
Direct	5	335	365
Indirect	4	115	215
Total	9	450	580

Table 14: Summary of predicted levels of O&M employment at the local level
Source: Smartwind 2015; impact calculations by Regeneris Consulting

Impact type	Low Scenario (£ millions)	Medium Scenario (£ millions)	High Scenario (£ millions)
Direct	£1	£59	£64
Indirect	£0	£5	£10
Total	£1	£64	£74

Table 15: Summary of O&M stage impact on GVA at the local level
Source: Smartwind 2015; impact calculations by Regeneris Consulting

Tables 10-12 display the same variability and uncertainty of the predictions for the construction stage, as for Hornsea Project 1. Overall, the figures are about 50% larger than for HP1, although the project MW size increase is only of the order of 17%. Tables 13-15 again show even higher relative differences between the low and medium impact scenarios for the O&M stage. The examination outcomes, in terms of likely scenarios, are as for HP1—that is low/medium for the construction stage and medium for the O&M stage. As for HP1, the levels of employment predicted for the medium O&M scenario are quite significant annually over the operational lifetime of the project, if they materialise in practice.

5.3 Hornsea Project 3

Tables 16 to 21 set out some of the key economic predictions for Hornsea Project 2 under three impact scenarios.

Phase	Estimated Value (£m)	Low: % of Total Value Sourced from Humber LEP	Medium: % of Total Value Sourced from Humber LEP	High: % of Total Value Sourced from Humber LEP
1. Design and development	288	10%	10%	20%
2. Wind turbine manufacture	3,032	0%	20%	20%
3. Balance of plant	1,894	0%	5%	10%
4. Installation and commissioning	1,050	1%	10%	26%
Total	**6,264**	1%	13%	18%
Note: Sourcing assumptions underpinning the impact analysis were made by Regeneris Consulting in consultation with the Applicant.				

Table 16: Summary of sourcing scenarios for construction stage for Humber LEP area
Source: Orsted 2018; impact calculations by Regeneris Consulting

Impact type	Person years of employment			Average annual employment (FTE)		
	Low Scenario	Medium Scenario	High Scenario	Low Scenario	Medium Scenario	High Scenario
Direct	270	4,400	8,630	60	980	1,920
Indirect	250	5,230	9,640	60	1,160	2,140
Total	**520**	**9,630**	**18,270**	**120**	**2,140**	**4,060**
Note: Sourcing assumptions underpinning the impact analysis were made by Regeneris Consulting in consultation with the Applicant. Figures may not sum due to rounding.						

Table 17: Predicted levels of local employment in Humber LEP area during construction period Source: Orsted 2018; impact calculations by Regeneris Consulting

Impact Type	Low Scenario (GVA £millions)	Medium Scenario (GVA £millions)	High Scenario (GVA £millions)
Direct	£20	£260	£510
Indirect	£20	£340	£630
Total	£40	£600	£1,140
Source: ONS, Sub-regional GVA (ONS, 2016). Impact calculations by Regeneris Consulting, 2017. Figures may not sum due to rounding.			

Table 18: Summary of construction impact on GVA for the Humber LEP area
Source: Orsted 2018; impact calculations by Regeneris Consulting

Phase	Estimated Value (£m)	Low: Sourced from Humber (FTE jobs and % Value)	High: Sourced from Humber (FTE jobs and % Value)
Direct employment: administration and management (FTE jobs)	n/a	0	20
Direct Employment: technical (FTE Jobs)	n/a	0	100
Total Direct FTE Jobs	**n/a**	**0**	**120**
Professional services, business rates, insurances, administrative overheads etc. (£m)	£6	0%	13%
Fuel and utilities (£m)	£2	9%	61%
Technical and equipment transfer (£m)	£1	10%	30%
Large component replacement (£m)	£144	0%	23%
Total Value	**£152**	**0.2%**	**23%**
Note: Sourcing assumptions underpinning the impact analysis were made by Regeneris Consulting in consultation with the Applicant.			

Table 19: Summary of sourcing scenarios for O&M stage for Humber LEP area
Source: Orsted 2018; impact calculations by Regeneris Consulting

Impact type	Annual employment during O&M	
	Low scenario	High Scenario
Direct	0	120
Indirect	3	500
Total	**3**	**620**
Note: Sourcing assumptions underpinning the impact analysis were made by Regeneris Consulting in consultation with the Applicant. Figures may not sum due to rounding.		

Table 20: Summary of predicted levels of O&M employment for the Humber LEP area
Source: Orsted 2018; impact calculations by Regeneris Consulting

Impact type	GVA (£millions)	
	Low scenario	High Scenario
Direct	0	20
Indirect	0	30
Total	**0**	**50**
Note: Impact calculations by Regeneris Consulting. Figures may not sum due to rounding.		

Table 21: Summary of O&M stage impact on GVA for the Humber LEP area
Source: Orsted 2018; impact calculations by Regeneris Consulting

The socio-economic assessment for HP3 distinguishes between potential local impacts on the Humber LEP area and on the alternative New Anglia LEP area. Tables 16-21 presented here take only the example of the Humber LEP area for showing predicted local impacts of this £6bn, 2.4 GW, project. Again, for construction, there are massive differences between the low impact and the medium and high impact scenarios for both employment and GVA. For O&M, there are only two predictions, including an unrealistically low scenario. The high scenario includes a very high level of indirect impact, in marked contrast with the predictions for HP1 and HP2—perhaps reflecting the recent development of ancillary fabrication and other OWF support facilities on Humberside .

5.4 Overall assessment of significance

For HP1 the assessment of the significance of the predicted construction economic impacts on the local area is minor beneficial for all scenarios, set in the context of the baseline conditions of a substantial local economy. This is still somewhat surprising given the predictions for the medium and high scenarios. For the O&M stage, the assessment of significance is negligible/minor beneficial. The significance assessments are similar for HP2. For the very large HP3 the predicted economic impact on the Humber LEP area does stretch to medium beneficial for the high impact scenario.

5.5 Impacts on tourism and recreation

The economic assessments also included an examination of the potential impact on local tourism and recreation. For both the construction and O&M stages, the potential impacts included visual, noise and vibration and the disruption to onshore and offshore recreational activities. The assessment draws on material from other ES chapters, especially Landscape and Visual. Given the distance of the Hornsea projects from the coast, offshore impacts are unlikely to have an impact on visual amenity of the study areas. Assessments of onshore

impacts did not reveal any significant effects on visual receptors during construction. As such, for both construction and operation, the predictions were for negligible adverse impacts for HP1 and HP2, and minor adverse impacts for HP3.

6. Socio-economic issues in project examination: social

As noted earlier, the Humber LEP/ LIA faces many socio-economic challenges. It has higher unemployment rates and lower skill levels than the UK; the level of earnings of those in employment and the level of (GVA) per head are both substantially lower than the national average. Levels of employment, education, skills and relative deprivation reflect this baseline context. In terms of the potential social impacts of the development, while there is initial reference to effects on other social indicators, these are very thinly covered.

All the studies consider very briefly the potential impacts on accommodation and local services. Taking the extreme impact, of the construction stage of the very large HP3, the predictions are that whilst there might be some requirement for temporary accommodation, this would not stimulate unserviceable demand in the relatively large economies of the alternative impact areas (either Humber LEP with 1.6m population, or New Anglia LEP with 0.9m). As such, the significance assessment is negligible impact.

7. Mitigation and enhancement

Working together with the LEP, local authorities, education and training agencies, and business organisations, Dong/Orsted has shown a commitment to support a whole range of education and training, and supply chain initiatives for the Humberside area. This commitment was reinforced for Hornsea 2 through a specific requirement in the DCO for an Employment and Skills Plan, as set out in Table 22.

Employment and Skills plan — Hornsea 2 DCO Requirement 17 (PINS 2015)

(1) No part of the authorised development may be commenced until an employment and skills plan based on the outline employment and skills plan has been submitted to and approved by North Lincolnshire Council in consultation with North East Lincolnshire Council, East Lindsey District Council and the Humber Local Enterprise Partnership.

(2) The plan must include:

(a) proposals for the provision of information to the Humber Local Enterprise Partnership on the employment and supply chain opportunities associated with the construction, operation and maintenance of the authorised development including details of the core qualifications and skillsets required to access those opportunities;

(b) proposals for local advertising of employment and supply chain opportunities during the construction of the authorised development; and

(c) proposals for the undertaker to provide outreach employment presentations during the period of construction of the authorised development at appropriate times and locations; and (d) proposals for local advertising of employment and supply chain opportunities during the operation of the authorised development.

(3) The approved employment and skills plan must be implemented and maintained during the construction and operation of the authorised development

(4) In this Requirement, "Humber Local Enterprise Partnership" means the local enterprise partnership established in June 2011 with the objective of promoting and developing the natural economic area surrounding the Humber estuary.

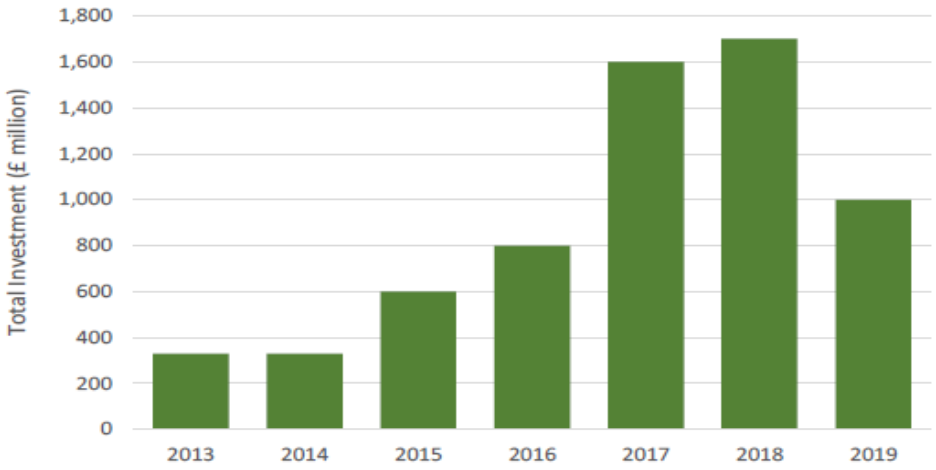
Table 22: Employment and Skills plan — Hornsea 2 DCO Requirement 17 on and operation of the authorised development.
Source: PINS/NI (2016)

8. Actual impacts during project construction

Economic—strategic overview

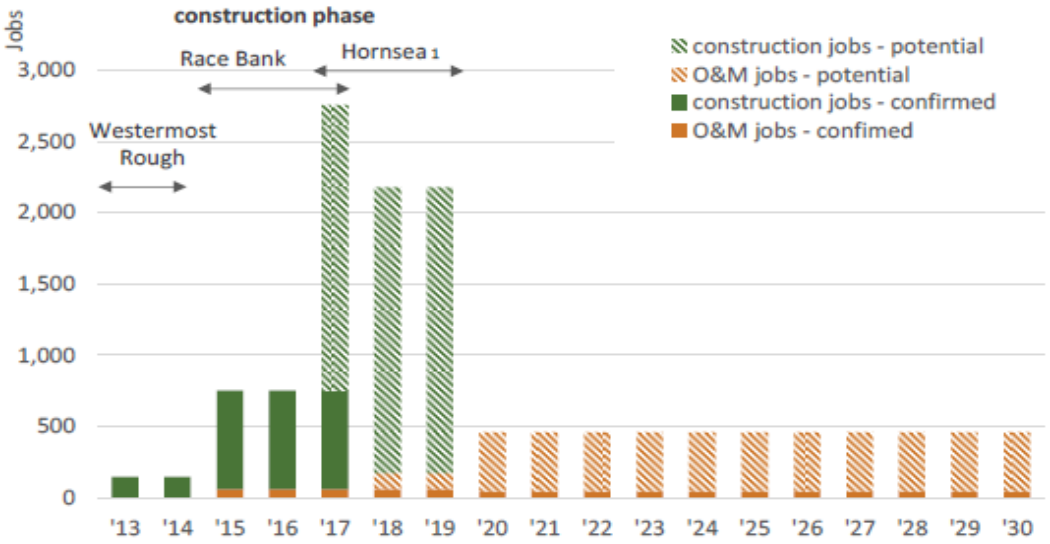
A useful strategic overview of the economic impacts of Dong/Orsted and other OWF developments on Humberside is provided in a document submitted to the PINS/NI examination of the Hornsea 2 project --- *Report on the impact of DONG Energy Investments in the Humber Area – Nov 2015: Application Reference EN010053 (Smartwind/Regeneris)* (2015). This short report, based primarily on a desk analysis, estimates investment, GVA and employment impacts on Humberside from Dong projects at that time; these included Hornsea One, plus the smaller developments at Westermost Rough, Race Bank and Lincolnshire. Figures 4 and 5 set out the anticipated investment and employment impacts.

Figure 4: Scale of annual investment by Dong Energy in Humber OWFs



Source: Smartwind /Regeneris (2015)

Figure 5: Humber employment supported by Dong Energy investments
Figures include direct, indirect and induced employment.



Source: Smartwind /Regeneris (2015)

These are estimates only, but probably more informed by practice than the original ES estimates. A conclusion in the report notes: *Assuming Dong Energy continues to use Humber ports to support local offshore wind farms, its investments will support an average of 1,600 jobs in the Humber over the period 2015-20 (ranging between 700-2,700 each year), and almost 500 long-term operational jobs after 2020. This will generate around £1.2bn of gross value added in the Humber economy by 2030.*

Subsequent to this report, there has been approval and start of construction of both Hornsea One and Two, with Hornsea Projects Three and Four also in the planning pipeline. If the local medium impacts scenarios from all of the ESs were to be fulfilled, the average number of local Humberside (LEP area) construction jobs over the period to 2025 could be more likely 2000-2500pa.

This strategic overview report also notes the critical significance of the Dong/Orsted pipeline of projects in providing a sustainable economic benefit. '*In order for the offshore wind sector to have a sustainable economic benefit in the Humber Region a series of investments over a long period is critical. The nature of the sector is such that there is a large level of activity during the construction phase including manufacture and installation of components (typically over one to three years), followed by a smaller, sustained level of activity in the ongoing O&M of the wind farm. This means that a one-off wind farm development in an area would have limited sustained economic impact, because workers based temporarily in the area, who would move on once the construction was completed, would deliver most of the local construction phase activity. In the Humber, however, the group of wind farm developments over 10+ years has provided the area with the opportunity to establish a stronger foothold in the sector, secure inward investment and enable local businesses to access supply chain opportunities'* (Smartwind/Regeneris, 2015).

This pipeline of projects has led to confidence in inward investing in the supply chain, including for example:

- Siemens £310m investment in a new wind turbine blade facility in Hull which, as well as creating an expected 1100 new direct jobs, will create further supply chain opportunities (Figure 6).
- Approval of the Able Marine Energy Park on the Humber, a bespoke £450m port facility for the renewable energy sector, particularly offshore wind.

Figure 6: Siemens wind turbine blade facility, Hull

Source: Wikimedia/Siemens

In combination, the OWF developments and linked onshore investments all enhance the identification of the Humber as a major OWF hub. This has supported/ and been supported by major enhanced skills provision in an area with previously a shortage of higher level skills than nationally. These for example include:

- University of Hull provision of new Masters programme in renewable energy.
- Hull College provision of a Digital and Green Energy Centre to provide relevant qualifications and support local businesses looking to grow into the rewnewable energy sector.
- An £11m investment in the University Technical College (UTC) in Scunthorpe specialising in engineering and renewable energy.
- Support in the LEP Regional Growth Fund for 380 local apprenticeships in priority sectors, including renewable energy.

All such OWF developments have contributed to a raising of confidence and aspiration in both the public and private sectors on Humberside, with one reflection being Hull's success in winning the competition to be UK City of Culture 2017.

Economic – some detailed actual impacts

Economic impacts from contract sources – A picture of the many contracts involved in the project, especially the local (Study Area, and more local/specific locations) employment, and local supply chain benefits (tier 1, 2 contracts etc) can be gleaned by monitoring the placing of such contracts, plus any data on their associated employment and expenditure. Unlike the main AOWFL (Aberdeen) project, our research has less access to the detailed Hornsea contracts. As such, the use of this contract-by-contract approach is very limited in terms of comprehensiveness of coverage, and in the accuracy of spatial implications, but it is rich in terms of actual contracts placed, many of which are clearly beneficial to the UK and to various local economies associated with the project. A summary of recent contracts is set out in Table 23.

Contracts – a 4C Listing of organisations working on the Hornsea Project One supply chain divides them into the following categories	**Spatial Impacts— (broad focus only)** L=Local LEP Study Area UK= Rest of UK O= overseas
Turbines (4 contractors) • Windhoist Ltd – pre-assembly of turbines in Hull • Olsen Windcarrier – transport/install half of the turbines • A2SEA A/S -- transport/install half of the turbines • Siemens – supply all 7MW turbines	L O O O

Substations(10 contractors) • Ramboll – design work for offshore reactive compensation station • Atkins – offshore substation design work • Saipem – offshore sub-station installation • Semco Maritime – maintenance of reactive compensation station (RCS) • Balfour Beattie -- £25m contract for onshore sub-station • Babcock International – make offshore RCS • Nexans Deutschland – install internal wiring of transformer stations • Semco Maritime – sub-station topsides • ABZ Aggregate Bau – emergency generating sets • Bladt Industries – also sub-station topsides	UK UK UK O UK UK O O O O
Foundations (20 contractors) • ALE Heavylift BV – specialist offshore transport/fastening • Orsted – detailed design of turbine foundations • Saipem – installation of offshore sub-station • GeoSea NV – *Innovation* vessel for monopiles installation • GeoSea NV – *Innovation* vessel for transition pieces installation • A2SEAA/S – *Sea Installer* vessel for transition pieces installation • Dragados Offshore – jackets for offshore sub-station and RCS • EEW special pipe Gmbh -- 2 additional monopile foundations • EEW special pipe Gmbh – supply all 8m wide steel monopiles • Steelwind Nordenham Gmbh – 20 transition pieces, finished by Wilton Engineering Teesside • EEW Offshore Structures (UK) – make 86 transition pieces • Bladt Industries A/S – supply 124 transition pieces (56 by EEW Offshore Structures (UK)) • Steelwind Nordenham Gmbh -- 20 transition pieces, finished by Wilton Engineering Teesside • Wilton Engineering – finishing transition pieces • Mech-Tool Engineering Ltd – fabricate 20 internal support structures • Imenco AS – corrosion protection for foundations and conductors • Granada Material Handling Ltd – foundation platform davit cranes • IKM Testing Spain – manufacture sheet metal panels • Royal Boskalis NV – foundation installation for part of project	O O UK O O O O O O O/UK UK O/UK O/UK UK UK O UK O O
Array Cabling (10 contractors) • DeepOcean1 UK Ltd – install and trench array cables • Seaway Offshore Cables Gmbh – install submarine composite cables • Sparrow Group Cable and Pipe – equipment for nearshore cabling • Canyon Offshore Ltd – trenching for offshore cables • Briggs Marine and Environmental Services -- export cable repair • JDR Cable Systems Ltd – design and manufacture array cables • Nexans Deutschland Gmbh – cable supply • First Subsea Ltd – supply cable protection units • Seaproof Solutions – supply of cable protection systems • Tekmar Energy Ltd – supply of cable protection systems	UK/L O UK/L UK/L UK UK/L? O UK/L? O UK/L?

Export Cabling (8 contractors) • Boskalis Subsea – assist nearshore cable installation • Tideway BV – use of *Living Stone* vessel for cable laying • Sparrow group Cable and Pipe -- equipment for nearshore cabling • J Murphy and Sons Ltd – lay 38 km of onshore cabling • Briggs Marine and Environmental Services -- export cable repair • ABB A/S – manufacture 285km of submarine cables • nkt Cables Group A/S – 170km of cable • LS Cable and System – supply onshore high voltage cables	O O UK/L? UK S O O UK
Met Masts (10 contractors) • Densit ApS—twisted jacket pile/sleeve • Keystone Engineering Inc • Hochtiel Construction (now GeoSea) (5) – met mast, twisted jackets • Bladt Industries A/S (2) – fabrication of twisted jacket foundation • Carl.C A/S – triangular lattice met mast tower	O O O O O
Consultants (8 contractors) • ABS Consulting – quality assurance • RPS Group – planning and EIA • Shepherd and Wedderburn – legal services • Garrad Hassan Ltd –independent engineer • Intertek Caleb Brett Germany –advice on export cable route • DHI Group – Metocean study • Cn4Mare GmbH -- marine warranty surveyor • Specialist Marine Consultants Ltd -- marine coordination services	UK UK UK UK O UK O L

Consultants (31)	
• NFFO – onshore fishery liaison	L
• Fugro Structural Monitoring – monitoring foundation design	UK
• UCD – instrumentation for Fugro	O
• Seamar Services BV – port admin for OWF vessels	O
• Conbit – specialist engineering for ALE company	O
• Ecosse Subsea Systems – seabed clearance	UK
• AMS No-Dig Ltd – coastal cable ducts	L
• BIC Electric – subcontractor to Bladt on transition pieces	UK
• Crown Estate – planning and consent financial support	UK
• Aviva Investors -- £400m investment in project	UK
• RES Offshore – metal mast maintenance checking	UK
• GOTECH – fabrication of anode cages	UK
• Able UK Ltd – installation base	L
• ABP – blade storage site at Port of Hull	L
• K2 Management – director of HVDC transmission system	O
• Searoc UK Ltd – met mast project management	UK
• CHC helicopters – aviation shore to wind farm services	UK
• Resolux Group – joint subcontractors to Bladt on transition pieces	UK
• Wartsila and Aker – switchboard design	O
• Semco Maritime A/S – telecoms kits	O
• Tampnet AS – 4G network	O
• EGS (International) Ltd – seabed surveys	UK
• Neptune ehf – geophysical survey	O
• Fugro GeoConsulting Ltd – geotechnical survey	UK
• Anatec Ltd – shipping and navigation services	UK
• ABP Marine Environmental Research Ltd – sediment mobility survey	UK
• Waves Group – marine warranty surveyor services	UK
• Fugro GB Marine Ltd – environmental surveys	UK
• RPS – noise surveys	UK
• Spectrum Offshore Ltd – offshore construction support survey	UK
• Ordtek Ltd – risk management	UK

Table 23: Hornsea Project One construction contracts
Source: adapted from 4C internet listing

It is difficult to make any precise spatial distribution of the 93 contracts noted above as many companies sub-contract and have multiple offices and manufacturing bases across many countries. Further, contracts vary greatly in value. However, it can be noted that much of the heavy infrastructure – especially turbines and foundations – is manufactured overseas in mainland Europe (especially in Denmark, Netherlands and Germany), although there is some UK presence. The UK appears to have a substantial involvement in cabling, and a very substantial consultancy role, with about 75% of the consultancy contracts. Overall, the UK may have about 50% of the total number of contracts, but the value cannot be ascertained from this information. It is difficult to identify local Humberside contracts, but they are likely to be no more than about 10-15% of the total number, and in value – this may be much less. There are likely to be many more small local sub-contracts for goods and services not reflected in the listing above.

Social

Specific Hornsea Projects One and Two social impacts information is not easily available, other than the overlaps with economic impacts. These include the education and training initiatives noted in the economic impacts, and especially the Community Benefits initiatives noted in the actual O&M impacts in s 9 below. There are also substantial local employment benefits, both directly from project construction and from the supply chain, with indirect and induced impacts. Employment, and a reduction in unemployment, have important knock-on social and welfare benefits for communities in the Humber LEP area that, as noted in s6, faces many socio-economic challenges.

9. Actual impacts during project O&M stage

Economic—strategic overview

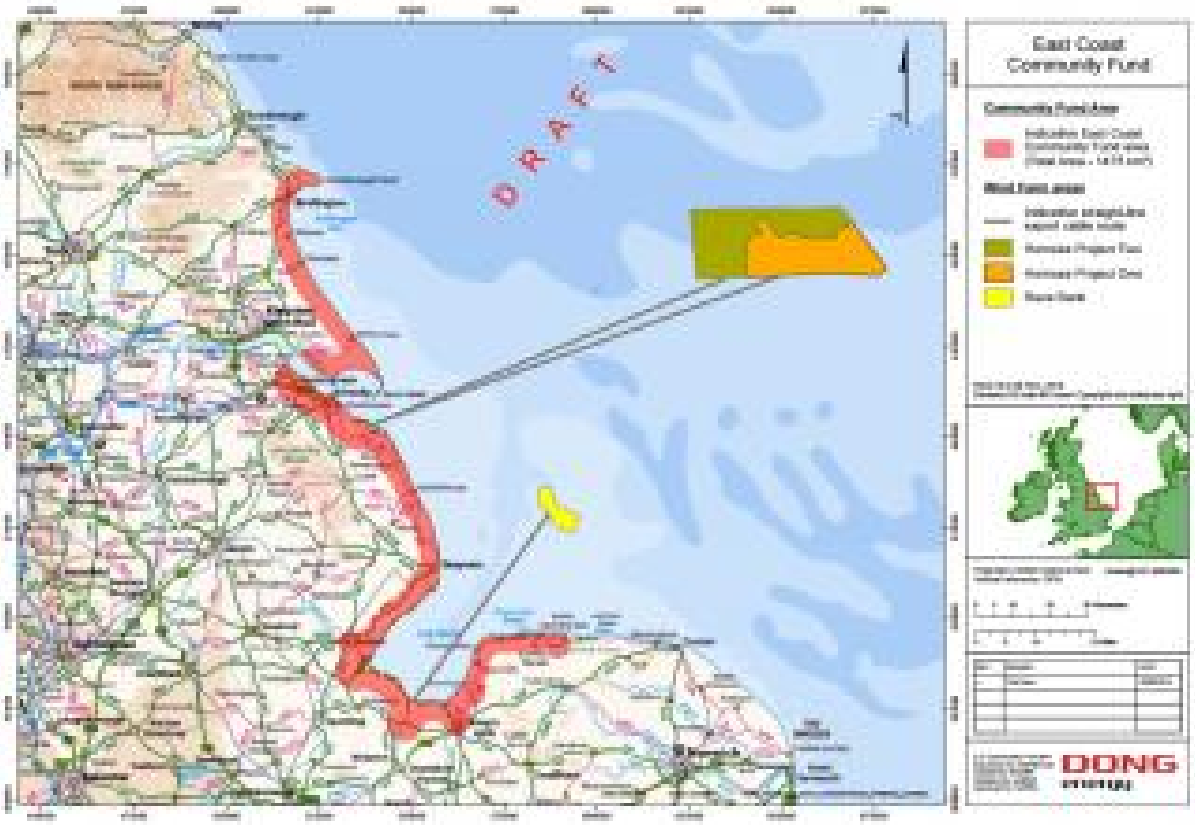
If the local medium impacts scenarios from all of the ESs were to be fulfilled, the average number of local O&M jobs for the Humberside (LEP area) would be at least 1000 O&M jobs for the next 20-25 years. Dong/Orsted has also invested £200m in the establishment of a major OWF O&M servicing base in Grimsby Docks which became operational in Spring 2018, creating at least a further 200 jobs (Figure 7).

Figure 7: Orsted's Grimsby O&M base

Source: Wikimedia/Orsted

Social

Figure 8: East Coast Community Fund – eligible areas



Source: Grantscape ECCF (website)

The East Coast Community Fund is set up to ensure that local people benefit from the operation of two of DONG's offshore wind farms – the 580MW Race Bank, the 1.2GW Hornsea Project One and the 1.8GW Hornsea Project Two, with the first two projects currently under construction. UK community fund administrator GrantScape, on behalf of DONG Energy, manages the Fund. GrantScape issued a preliminary map showing which coastal communities in Yorkshire, Lincolnshire and North Norfolk Coast stand to benefit from the total £9.3m East Coast Community Fund. Following public consultation, the agreed benefit area map shows that the coastal communities from Wells-next-the-Sea to the south, and Flamborough Head to the north, are eligible to apply for funds. .

The Fund will distribute around £465,000 a year to help a wide range of local community and environmental initiatives for each of the next 20 years. £75,000 of the Fund each year is reserved for a "Skills Fund". Grants from £1000 to £50,000 are available for:

- community buildings and facilities (eg: improvement to village halls, community centres etc);
- community activities and services (eg: projects addressing health and wellbeing, community cohesion etc);
- environmental and public open space projects (eg: for parks, nature reserves, community growing schemes); and
- sports, recreation and play (eg: playgrounds, sports equipment etc).

The East Coast Community Fund was launched for applications in early 2017, with a closing date for the first round of applications in March 2017. Eligible organisations include voluntary and community groups, charities, parish and town councils, local authorities (working with community organisations, and social enterprises. There have now been five rounds of applications and allocations (ie: two rounds pa). Table 24 shows the fund allocations in the most recent round 5. Allocations to community services and buildings are dominant.

Table 24: East Coast Community Fund – Round 5 Allocations

Organisation	Project	Funding amount
Long Sutton Bowls Club	Replace old equipment	£1400
Kings Lynn Winter night Shelter	Kings Lynn winter night shelter	£10,000
Boston Sea Cadets	New champ engine	£4,500
Keelby Sports Association	Improvement to sports ground	£2,880
Favour Foundation Ltd	Grimsby, Oasis Garden Buddy Scheme	£18,400
Anderby Parish Council	Disabled beach access improvement	£17,000
Zion Methodist Church, Boston	Maintenance	£2,000
Wrangle Parish Council, Boston	Toilet block refurbishment	£5,000
Withernsea Pier and Promenade Association Ltd	Pier Viewing Gallery	£38, 600
St John and St Stephen Church, NE Lincs	Soup Kitchen	£9,900
SASH	Resettlement of homeless young people on East Riding Coast	£17,200
Citizens Advice Lindsey	Coastal Advice in Skegness and Mablethorpe	£35,000
Somercotes Stars Ltd	Technology for Pre School and After School Club	£3,500
Community Learning in Partnership	Mablethorpe Multi-Use Skills Unit	£29,600

Source: Adapted from GrantScape (2019)

10. Some conclusions and project good practice lessons

Some conclusions

- Good recognition of importance of socio-economic impacts, but little focus on social dimension in the initial ES assessments and in project implementation (social issues are largely scoped out in the latest Hornsea Four Project Scoping Report). For the now operational Hornsea One Project social issues only emerge significantly in the

evolution of the East Coast Community Fund. There is little on community impacts, perception issues and stability and cohesion, although the significance of OWF projects for raising the aspirations and confidence of the long-term depressed Humberside coastal region is well recognised.

- Strong economic focus on GVA and employment, but use of wide range of scenarios results in a very wide range of impacts and great uncertainty in predicted impacts; however, there has been some shift to the medium scenario as an outcome from two PINS/NI examinations – for both the construction and O&M stages.
- Good spatial disaggregation of predicted impacts in the ESs (Humberside LEP area, UK etc), but difficult to follow through into monitoring to compare with predictions. There are some strategic overview estimates only. A detailed disaggregation of contracts suggests no more than 10-15% local contracts, with no indication of their value.
- In combination, the OWF developments and linked onshore investments all enhance the identification of the Humber as a major OWF hub. This has supported/ and been supported by major enhanced skills provision in an area with previously a shortage of higher level skills than nationally.
- There does not appear to be a consistent approach to monitoring the actual socio-economic impacts through the various project stages, with no monitoring of key stakeholders (and especially the workforce – opportunity foregone), and of social impacts (other than the impacts of the East Coast Community Fund).
- The development of the Hornsea OWF array harmonizes with, and aids the implementation, of the strategic objectives of the Humberside LAs and the LEP: *The Humber LEP's strategic plan (Humber LEP, 2012) points towards an anticipation that renewable energy will play a central role in the economic development of the area. The Humber LEP notes that taking advantage of major growth opportunities such as renewable energy will be critical to realizing the true potential of the Humber Estuary*.'

Good practice lessons

- Commitment through a specific requirement in the DCO for an OWF Employment and Skills Plan, with the developer working together with the LEP, local authorities, education and training agencies, and business organisations, to support a whole range of education and training, and supply chain initiatives for the Humberside area.
- Some strategic level 'monitoring' from the Dong/Orsted 2015 overview study, but very general with little hard monitoring evidence.
- Clear exemplification of the critical significance of a pipeline of projects in providing a sustainable economic benefit, and generating substantial inward investment in the supply chain.
- Similarly, clear exemplification of the in-combination effects of the OWF developments and linked onshore investments in creating the Humber area as a major OWF hub.
- Good development of an array of linked education and training initiatives in the local area.
- Important argument noted (although not particularly well followed through in terms of data), is that the large Humber area OWF projects are making an important socio-economic contribution, in terms of raising the confidence and aspirations of the region.
- Introduction of an East Coast Community Fund, focused on the coastal strip. The total fund over 20 years is approximately £9.3m (£465,000 pa), and has been operational

in advance of the Hornsea One O&M stage. The Fund covers two projects, Race Bank and Hornsea One, with a combined 1800 MW output. As such, the annual value of the Fund is about £260 per MW. This is low compared with Beatrice at c£500 per MW pa and especially Aberdeen at c£1500 per MW pa. However, all are well below the Scottish on-shore norm of c£5,000 per MW pa. Recent allocations of the East Coast Community Fund show a focus on community services, community buildings and sport and recreation.

- A detailed disaggregation of contracts shows that the UK does appear to have about 50% of Hornsea One construction contracts, but this provides no indication of their cumulative value.

Key references

GrantScape 2019**.** *East Coast Community Fund – Round 5 Allocations* (Internet access – August 2019)

Humber Local Economic Partnership (LEP) 2012. *A Plan for the Humber 2012-2017*.

Norfolk CC 2018. *Hornsea Project 3 OWF: Local Impact Report*

North Lincolnshire Council 2015. *Hornsea Project 2: Local Impact Report*.

North-East Lincolnshire Council 2015. *Hornsea Project 2*: *Local Impact Report*.

Orsted 2018. *Hornsea Project 3 OWF; Chapter 10-Socio-economics* (prepared by Regeneris Consulting for RPS).

Orsted 2018. *Hornsea Project 4—EIA Scoping Report* (prepared by ERM)

PINS/NI 2016. *Examining Inspectors' Report on Hornsea Project 2 Examination*, PINS/NI: Bristol

Smartwind 2012. *Hornsea Project 2—EIA Scoping Report* (prepared by RPS).

Smartwind 2013. *Hornsea OWF Project 1: ES Chapter 10—Socio-economics*.

Smartwind 2015. *Hornsea OWF Project 2: ES Volume 3, Chapter 11 —Socio-economics, and Appendix*.

Smartwind/Regeneris Consulting Ltd 2015. *Report on the impact of DONG Energy Investments in the Humber Area – Nov 2015 Application Reference EN010053*

South Norfolk Council 2018. *Hornsea Project 3 OWF: Local Impact Report*

4C Listing of organisations working on the Hornsea Project One supply chain (Internet access—August 2019)

JG 031219