East Anglia TWO Offshore Windfarm

Chapter 2

Need for the Project

Preliminary Environmental Information
Volume 1
Document Reference: EA2-DEVWF-ENV-REP-IBR-000797

Prepared by:	Checked by:	Approved by:
Paolo Pizzolla 2019.01.09 16:45:07 Z	Julia Bolton 2019.01.11 10:05:01 Z	Helen Walker 2019.01.11 10:38:35 Z

Revision Summary					
Rev	**Date**	**Document Status**	**Prepared by**	**Checked by**	**Approved by**
01	11/01/2019	For issue	Paolo Pizzolla	Julia Bolton	Helen Walker

Description of Revisions			
Rev	**Page**	**Section**	**Description**
01	n/a	n/a	Final draft

Glossary of Acronyms

ABP	Associated British Ports
CCC	Committee on Climate Change
CfD	Contract for Difference
CO_2	Carbon Dioxide
COP	Conference of the Parties
DBEIS	Department for Business, Energy & Industrial Strategy
DCO	Development Consent Order
DECC	Department for Energy and Climate Change
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
GW	Gigawatts
LCRE	Low Carbon and Renewable Energy
LEP	Local Enterprise Partnership
NOAA	National Oceanic and Atmospheric Administration
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
O&M	Operation and Maintenance
PEIR	Preliminary Environmental Information Report
SPR	ScottishPower Renewables
STEM	Science, Technology, Engineering and Mathematics
UK	United Kingdom
UNFCCC	United Nation Framework Convention on Climate Change

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2 Need for the Project

2.1 Introduction

1. This chapter of the Preliminary Environmental Information Report (PEIR) presents the need for the proposed East Anglia TWO project and its importance in contributing to global, European Union (EU)[1] and United Kingdom (UK) policy commitments for renewable energy and wider policy objectives for UK energy security, decarbonisation and economic growth. The need for electricity Nationally Significant Infrastructure Projects (NSIPs) of this kind is established by the Overarching Energy National Policy Statement (NPS) EN1, approved by Parliament and designated by the Secretary of State in 2011 (DECC 2011). NPS EN1 makes clear that the need for new electricity NSIPs is urgent:

   "In order to secure energy supplies that enable us to meet our obligations for 2050, there is an urgent need for new (and particularly low carbon) energy NSIPs to be brought forward as soon as possible, and certainly in the next 10 to 15 years, given the crucial role of electricity as the UK decarbonises its energy sector."

2. Further detail on the relevant UK commitments and the policy and legislation designed to implement them is discussed in ***Chapter 3 Policy and Legislative Context***.

3. The UK requires a range of energy generation infrastructure in order to ensure it has a secure and affordable energy supply and can meet its binding commitments to addressing climate change and the adoption of renewable technologies as a significant proportion of our energy generation mix (15% by 2020 (Department of Energy and Climate Change (DECC[2]) (2013)). The Clean Growth Strategy (Department for Business, Energy and Industrial Strategy (DBEIS) 2017) sets out how the UK Government intends to decarbonise all sectors of the UK economy through the 2020s including innovation in the power sector (including renewables). Additionally, in March 2018, the UK offshore wind sector committed to a sector deal which will aim to increase offshore wind capacity to 30GW (an increase from the 7.1 gigawatts (GW) currently deployed in mid-2018) by 2030 (RenewableUK 2018). The 2030 vision envisages an investment of £48 billion in UK offshore wind infrastructure.

[1] There is a general commitment by the UK Government to maintain the body of environmental commitments and legislation already made following the departure of the UK from the EU (see ***Chapter 3 Policy and Legislative Context***).
[2] DECC became part of Department for Business, Energy & Industrial Strategy (DBEIS) in 2016

4. The National Infrastructure Commission's recently published National Infrastructure Assessment recommended that the UK Government should aim to deliver at least 50% renewable generation by 2030 (The National Infrastructure Commission, 2018). This is a crucial first step to enable an increasing deployment of renewables.

5. Offshore wind (such as the proposed East Anglia TWO project), as a source of renewable energy, offers the UK a wide range of benefits from an economic growth, energy security and decarbonisation perspective. The proposed East Anglia TWO project will make a significant contribution to the UK's renewable energy supply and consequently help provide the above mentioned benefits to the UK and globally. The strategic development of the proposed East Anglia TWO project would further increase this contribution to the UK energy supply and help fulfil future increasing demand for renewable energy.

2.2 The Need for Renewable Energy

6. As set out in sections 2.2 and 3.3 of NPS EN-1, the main elements comprising the need for renewable energy are:

   - The increasing demand for electricity, see ***section 2.2.2***
   - Transition to a low carbon economy, see ***section 2.2.12.2.2***
   - Addressing power sector carbon emissions, ***see section 2.2.1***
   - Electricity market reform, see ***section 2.2.2***
   - Security of supply, see ***section 2.2.3***; and
   - Need to replace closing generating stations, see ***section 2.2.2***.

7. These six elements identified in NPS EN-1 encompass the following key drivers which underpin the need for renewable energy:

   - The need to reduce greenhouse gas emissions;
   - The need to increase energy generation from low carbon sources to replace high carbon energy sources such as coal and gas;
   - The need for energy security, including:
     - The need to secure safe, affordable, reliable energy, preferably generated in the UK for the UK market; and
     - The need to replace existing ageing energy generation infrastructure.
   - The need to meet expected electricity demand whilst meeting climate change commitments;

- The need to maximise social and economic opportunities for the UK from energy infrastructure investment, as noted in the Clean Growth Strategy (DBEIS 2017); and
- The aim to increase the UK's offshore wind capacity to 30GW by 2030 (RenewableUK 2018) following the sector deal noted in ***section 2.1***.

2.2.1 The Need to Reduce Greenhouse Gas Emissions

8. In the Overarching National Policy Statement (NPS) for Energy (DECC 2011), predictions are made that a continuation of global emission trends, including emissions of greenhouse gases such as carbon dioxide (CO_2), could lead average global temperatures to rise by up to 6°C by the end of this century. The potential impacts associated with such a global temperature rise include (DECC 2014):

    - Increased frequency of extreme weather events such as floods and drought;
    - Reduced food supplies;
    - Impacts on human health;
    - Increasing difficulty in reducing poverty; and
    - Ecosystem impacts, including species extinction.

9. The UK Committee on Climate Change (CCC)[3] (2017) reported that 2016 was the UK's hottest year on record, which represents the fifth time in the 21st century a new record high annual temperature has been set (along with 2005, 2010, 2014, and 2015) (National Oceanic and Atmospheric Administration (NOAA) 2016).

10. Climate change has been greatly affecting coastal areas in recent years, including in East Anglia, where coastal erosion has become a greater problem now than in the past due to a combination of increasing storm frequency (due in part to climate change) and the already sensitive nature of the East Anglian coast to this erosion (Living with Environmental Change 2015). As such, East Anglia itself will benefit from any efforts to reduce the UK's reliance on fossil fuel based electricity production. An offshore windfarm off the coast of East Anglia would make East Anglia part of a global solution to a problem which directly impacts the area.

11. The UK is a party to the United Nations Framework Convention on Climate Change (UNFCCC), an international environmental treaty adopted in 1992. The UK made a commitment during the 21st Conference of the Parties (COP) in Paris in 2015 to

[3] The Committee on Climate Change is an independent, statutory body established to advise the UK Government on emissions targets and report on progress made in reducing greenhouse gas emissions and preparing for climate change.

pursue efforts to limit the global temperature increase to within 2°C of the pre-industrial average temperature, with an aspiration for an improved limit of 1.5°C.

12. The energy supply sector experienced the largest reduction in CO_2 emissions from 2016-2017. This reduction in power sector CO_2 emissions is driven by a change in fuel mix for electricity generation in 2017, with less use of coal and more use of renewables (DBEIS 2018a). Renewables met nearly 30% of the UK's electricity demand in 2017 (DBEIS 2018a). The UK Government's recent announcement confirming that the next Contracts for Difference allocation round for less established technologies (such as offshore wind) will open by May 2019, with another allocation round being held in 2021 and auctions every two years thereafter, reaffirms the UK Government's commitment to support renewable technologies.

13. The EU and UK legislation that has been put in place to secure a reduction in emissions is outlined in ***Chapter 3 Policy and Legislative Context***.

2.2.2 The Need to Increase Energy Generation from Low Carbon Sources

14. In order for the UK to achieve the reduction in emissions required by the EU (as stated in ***section 3.2.2*** of ***Chapter 3 Policy and Legislative Context***) the UK Government set a target to produce 15% of UK energy from renewable sources by 2020 (DECC) 2011a. This includes a sub-target of 30% of electricity to be produced from renewable sources.

15. The UK CCC, in its advice on the Fifth Carbon Budget (2015), identified that low-carbon energy generation should reach a total share of around 75% of energy generation by 2030 to meet the target of reducing carbon emissions by at least 80% of 1990 levels by 2050. The role of offshore wind in delivering this additional capacity of low carbon energy is highlighted by the committee reports, which also recognises that the offshore wind sector is now maturing and showing very significant cost reductions. The recent recommendations of the National Infrastructure Commission would require between 12 and 19GW of offshore wind being deployed by 2030 (The National Infrastructure Commission 2018). In addition, the Commission recognised that a low carbon energy system would not lead to higher bills but could meet the UK's energy needs in 2050 at the same cost to consumers (in today's prices) as they currently pay (average £1,850 per year for electricity, heating, hot water and petrol/diesel) (The National Infrastructure Commission 2018).

16. A dataset produced by the CCC (2016) calculated cumulative deployment figures (TWh/year) for different forms of electricity generation in the UK from 2015 through to 2030. For offshore wind, the fifth carbon budget target for 2020 is 36.6 TWh/year which doubles in 10 years to 72.4 TWh/year for 2030. Calculations show that the

proposed East Anglia TWO project will generate approximately 2.9TWh/year using the calculation below:

900MW x 8766h/year x 0.367 (load factor)

17. Therefore, with a total installed maximum capacity of up to 900MW, the proposed East Anglia TWO project alone has the potential to meet approximately 4% of the UK cumulative deployment target for 2030 (CCC 2018).

2.2.3 The Need for Energy Security

18. The UK has been a net importer of electricity since 2010 and imported 4.5% of its electricity in 2017 (DBEIS 2018b).

19. Key issues associated with energy security in the UK are:

- The decline in fossil fuel reserves (in particular North Sea oil and gas);
- The required ongoing closure and decommissioning of existing aging fossil fuel and nuclear electricity generating infrastructure; and
- The need for replacement sources of energy.

20. Many of the UK's older fossil fuel and nuclear plants have either reached the end of their operational life span (such as Sizewell A which is currently being decommissioned), are no longer economical to run, and/or do not meet legal air quality limits. The UK Energy Security Strategy estimated that around a fifth of the energy capacity available in 2011 will close by 2020 (DECC 2012).

21. The Clean Growth Strategy (DBEIS 2017) states that the UK Government will continue to invest in the shift towards low carbon transport, heating and business and industry and increasing energy efficiency in all these sectors. The demands on the UK's energy infrastructure will change as low carbon heating technologies take over from fossil fuels, with a greater dependence on electricity and a potential need for new infrastructure for system balancing and the generation of low carbon gases (DBEIS 2017). The NPS for Energy (EN-1) estimates that additional electricity generating infrastructure to ensure adequate supplies will require a new overall capacity of approximately 59GW by 2025, of which up to 33GW will need to be from renewable sources (DECC 2011). UK renewable electricity capacity was 41.9GW at the end of Q1 in 2018 (DBEIS 2018c).

22. Reliance on global markets for imported energy leaves the UK vulnerable to spikes in world energy market prices, political pressure and potentially physical supply disruptions.

23. The CCC identifies the amount of energy capacity that will be needed to fill the future predicted generation gaps, taking into consideration retirement of high-carbon energy sources and some nuclear sources. If there was no growth in demand during the 2020s, around 25GW of new electricity capacity would be needed, however as demand grows, more capacity will be needed. CCC suggests that if demand grows by 23% (as in the CCC central scenario for demand growth), a total of 40GW of de-rated[4] electricity capacity would be needed (CCC 2015b).

2.3 Additional Benefits and Policy Drivers

2.3.1 Maximising Economic Opportunities

24. The UK is able to continue growth in the offshore wind sector by maximising domestic energy resources and utilising the vast offshore wind resource to which the UK has access. An assessment in June 2017 of Europe's offshore wind resources found that the UK has the greatest potential for offshore wind out of all assessed EU member states in the Atlantic, North Sea, and Baltic Sea areas and at present, has the largest installed capacity in the world. The assessment looked at gross resource potential, technical resource potential and economically attractive resource potential, and found that the UK topped all other countries in all three categories (Wind Europe 2017).

25. A key commitment within the Green Paper: Building our Industrial Strategy (HM Government 2017) is to *"lead the world in delivering clean energy technology"* and to support innovation in this area. The aim is for "*the UK to be a global leader in innovation, science and research and our Industrial Strategy will help us to deliver our ambitious CO_2 reduction targets while, creating jobs and opportunities for people across the country"*. The energy sector in the UK plays a central role in the economy and renewable energy can play a major part in boosting the economy and providing new jobs and skills.

26. The UK low carbon and renewable energy (LCRE) economy grew by £2.1 billion (5%) to £42.6 billion in 2016, from £40.5 billion in 2015; it continued to account for around 1% of total UK non-financial turnover (Office for National Statistics, 2018). The UK Government's Clean Growth Strategy (DBEIS 2017) concluded that between 1990 and 2016, the UK reduced its emissions by 42% while the economy grew by 67%. Further analysis has concluded that continuing to develop on this, significant economic benefits can be captured from these decarbonising trends.

27. During Greg Clark's (Secretary of State for Business, Energy and Industrial Strategy) speech at Energy UK in November 2016 he made clear that *"the debate*

[4] De-rated capacity is the metric used to standardise electricity generation capacity across technologies with different availabilities. It reflects the probable proportion of a source of electricity which is likely to be technically available to generate (even though a company may choose not to utilise this capacity for any reason) (CCC 2015b).

about whether to reduce emissions is over" and that there is *"huge economic opportunity of climate change action for UK businesses"*. The speech also specifically referenced the east coast of England as an area where the offshore wind industry is contributing, and will continue to contribute, to the local economy.

28. The UK has a strong supply chain for offshore wind. The Green Paper: Building our Industrial Strategy (HM Government 2017) focusses on delivering affordable energy and green growth. The offshore wind supply chain plays a key role in delivering this growth strategy.

29. According to the 2017 Report on Offshore Wind UK Content (RenewableUK, 2017), 48% of the total expenditure associated with UK offshore windfarms was spent in the UK in 2015. The UK content of expenditure during the development stage and operation of offshore wind projects was 73% and 75% respectively in 2015, whereas during manufacturing and construction the UK content was 29%. (RenewableUK 2017).

30. The offshore wind industry presents an opportunity to utilise and further develop the UK's maritime engineering skills, particularly during a time when other industries are in decline (such as shipbuilding and North Sea oil), in order to secure supply chain and other employment opportunities in the UK. The importance of maximising opportunities for the involvement of local businesses and communities in offshore wind has been highlighted as a key success factor for the sector in the UK (The Crown Estate 2014). As offshore wind supply chains are developing mainly in areas of low economic productivity, which have significant socio-economic challenges, the benefit to local communities and businesses is very important.

31. The replacement of existing infrastructure with new technologies also represents significant investment in the UK economy.

32. Offshore clean energy is supported by the New Anglia Local Enterprise Partnership (LEP) for Norfolk and Suffolk (New Anglia LEP 2015) due to the economic benefits the sector brings to Norfolk and Suffolk. The aim of New Anglia LEP is to lead economic growth and job creation in these areas by 2026.

2.3.2 Benefits of Offshore Wind

33. The UK is well placed to lead the deployment of offshore wind with 53% of European offshore wind capacity coming from the UK (Wind Europe 2018) making it one of the most globally attractive locations.

34. The key benefits of offshore wind energy as a contributor to the renewable energy mix are as follows:

- Diversification and security of home-grown energy generation capacity which make use of an abundant source of energy;
- A technology with potential to make significant and rapid contributions to the national renewable energy targets;
- Economic development and job creation, both within the UK and further afield within the supply chain; and
- Very low lifetime CO_2 emissions per unit of electricity generated.

35. Currently, the UK is the largest offshore wind market in the world with a portfolio of 35.2GW (RenewableUK 2018).

36. The continued development of offshore wind within the UK is therefore seen as critical to ensuring that the UK and Europe are able to meet their binding energy and climate change targets.

2.4 Benefits Realised from Development of the East Anglia ONE Offshore Windfarm

37. As outlined in ***Chapter 1 Introduction***, SPR (of which the Applicant is a wholly owned subsidiary) is currently constructing the East Anglia ONE project (due to be fully operational in 2020) and has gained consent for East Anglia THREE. Benefits which are being realised from East Anglia ONE (and which may be enhanced upon for East Anglia ONE North) are discussed below.

2.4.1 Socio-Economics

38. Since the beginning of the East Anglia ONE project, millions of pounds have been invested into the local area of Lowestoft. In 2015, SPR agreed a 30-year contract worth £25 million for the Port of Lowestoft to be the operations and maintenance (O&M) and construction management base for East Anglia ONE, creating significant job opportunities for locals and future graduates (SPR 2018). SPR and the Associated British Ports (ABP) have awarded contracts totalling £10 million for development of the Port of Lowestoft (SPR 2018). Once the state-of the-art O&M facility has been designed and constructed, around 100 full-time jobs will be created, with thousands of contractors and supply chain operators using the site every year.

2.4.2 Skills Investment

39. As part of East Anglia ONE's skills strategy, employment and reskilling opportunities in the communities most closely associated with the development are encouraged, including graduate placements and vocational placement opportunities (East Anglia ONE Ltd, 2015).

40. In 2017, SPR donated £100,000 to the ScottishPower Foundation to fund Masters Scholarships in the UK for students wishing to continue their studies in energy engineering and environmental sciences. Additionally, four postgraduate students are being supported through their Masters courses at the University of East Anglia (SPR 2018).

41. In April 2018, SPR sponsored the Science, Technology, Engineering and Mathematics (STEM) zone at the International Festival of Learning East, attended by over 1,000 regional teachers (SPR 2018). The aim of the festival was to instil confidence and promote STEM subjects amongst young people, regardless of gender or background.

42. SPR have partnered with the Cambridge Science Centre who will promote STEM subjects to more than 6,000 schoolchildren. Over two years, they aim to reach 1,500 local children per roadshow, with two planned per year (SPR 2018). Roadshows will be aimed at stimulating young people's interest in STEM subjects at school, with the hope that they inspire a new generation of engineers, scientists and mathematicians who will lead the way in renewable energy in the future.

2.5 East Anglia TWO's Contribution to Meeting Targets

43. During its operation, the East Anglia TWO project will contribute to reaching global, European and national targets on carbon dioxide (CO_2) reduction and renewable energy production.

44. In line with the Kyoto Protocol (see ***Chapter 3 Policy and Legislative Context***), signatory states, including the UK, have developed national targets for energy generation from renewable sources. Additionally, as part of the Paris 2015 Commitments, the EU pledged (as the UK was still an EU member at the time, the UK was part of the pledge) to have at least a 40% domestic reduction in greenhouse gases by 2030 (compared to 1990 levels) (European Commission 2017) and the proposed East Anglia TWO project would contribute towards these targets.

45. European energy policy (see ***Chapter 3 Policy and Legislative Context***) recognises that the use of renewable energy contributes significantly to limiting climate change, and plays a part in securing energy supply and creating employment in Europe. Although the UK is leaving the EU, it is expected that current European policies will be transferred to UK policies, and therefore will still be relevant.

46. Targets for reduced greenhouse gas emissions and the use of renewable energy have been translated in UK policy and legislation (see ***Chapter 3 Policy and Legislative Context***) for 2020 targets, and the UK Climate Change Act provides

the main policy driver for future UK targets. These targets provided the incentive to establish the former East Anglia Zone and subsequently, the proposed East Anglia TWO project.

2.6 Summary: The Need for East Anglia TWO

47. One of the key drivers of the policies and UK Government initiatives which support the development of renewable energy in the UK, Europe and further afield is the recognition of the need to transition to low carbon economies. The generation of utility-scale quantities of electricity from renewable energy sources can have a direct and measurable effect on climate change and in meeting the UK's climate change and emissions reduction targets.

48. The proposed East Anglia TWO project would make a significant contribution to the achievement of the UK's national renewable energy targets (see ***section 2.2***) and to the UK's contribution to global efforts to reduce the effects of climate change. The proposed East Anglia TWO project has the potential to make a substantial contribution to UK 2030 energy targets by meeting approximately 4% of the UK offshore wind cumulative deployment target for 2030 (CCC 2018).

49. Moreover, the proposed East Anglia TWO project would have a direct positive impact by providing up to 900MW of renewable energy, securing renewable energy supply for up to 742,000[5] UK households. The proposed East Anglia TWO project would reduce carbon emissions and contribute to the economy by providing jobs during all phases of its lifetime.

[5] Calculated taking the number of megawatts (900) multiplied by the number of hours in one year (8,766), multiplied by the average load factor for offshore wind (36.7 %, published by the Digest of United Kingdom Energy Statistics), divided by the average annual household energy consumption (3,900 kWh), giving an equivalent of powering 742,413 homes.

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