WIND FARMS... What's it all about?

1. Some years ago, the government decided to lease out parts of the sea bed for offshore wind farms. So far, there have been three leasing rounds, each one including larger projects than the one before. The rent is paid to the Crown Estate, which hands it over to the government as tax income.

2. The Round 1 wind farms are quite small, and were connected into the grid locally. There is an example of a Round 1 project at Scroby Sands (60MW), built off the coast of Cromer in 2004.

3. The Round 2 projects are much larger, and they have to be connected into the high voltage transmission network:

Project	Capacity	Grid connection point
Lincs	270MW	Walpole, near Kings Lynn
Race Bank	600MW	Walpole, near Kings Lynn
Dudgeon	400MW	Necton, North Norfolk
Sheringham Shoal	320MW	Salle, North Norfolk
Greater Gabbard	500MW	Sizewell, Suffolk
Total:	2,090MW	

4. For comparison, Norwich uses 600MW of electricity, and the existing nuclear power station at Sizewell produces 1,200MW. This means that Norfolk already has enough green energy supplies, even allowing for the fact that the wind only blows 50% of the time in winter, and 25% in summer.

So, what's the problem?

5. The total UK peak demand for electricity is about 40,000MW, so the UK needs a lot more renewable energy. The main centres of demand for electricity are in London and the south east.

6. In 2007 the government decided to go ahead with the Round 3 projects. Shortly afterwards, they added a few Round 2 extension projects as well, including the Dudgeon and Sheringham Shoal extensions (720MW), and these two projects are being brought forward by a firm called Equinor.

7. Equinor would like to connect the extension projects to the grid at Necton. This would mean making the existing substation at Necton three times bigger – from 400MW up to 1,120MW – but it may be possible to put the new substation buildings on some of the lower ground nearby.

That's all OK, then?

8. No, because Equinor are not being allowed to connect to the grid at Necton. They have been told by National Grid that they have to run their cables all the way from the North Norfolk Coast to Norwich Main, at Dunston, so they are looking to build their new substation in or near **Mulbarton**.

Why can't Equinor connect at Necton?

9. National Grid has decided to use Necton for connecting up two very large Round 3 projects, called Norfolk Vanguard (1,800MW) and Norfolk Boreas (1,800MW), out in the North Sea. These projects are being brought forward by a firm called Vattenfall. This would make the Necton site about ten times larger than it is today, and that's why the village of Necton is making a protest.

10. Much of the construction traffic for Vanguard and Boreas would go through the very narrow high street at Cawston, and that's why the village of Cawston, like many others, has also objected.

Why does Vattenfall want to connect at Necton?

11. As long ago as 2015, Vattenfall was part of a feasibility study looking into the best way to connect Round 3 wind farm projects into the national grid. The study proposed new connections at Bracton and Lowestoft, and also at Bramford, in Suffolk, which is on the main route to London.

What else did the feasibility study say?

12. The feasibility study also showed the Hornsea Three wind farm connected at Walpole, near Kings Lynn, with an offshore link from the Hornsea wind farm area down to the Norfolk Vanguard and Boreas area, to form an offshore transmission loop – much like the national grid, but offshore.

13. This would make it much easier to bring more wind energy ashore, and would help to carry electricity from Scotland, and from the north of England, down to London and the south east. The study showed that this type of connection scheme could save billions of pounds for the consumer.

So, is that what's going to happen, then?

14. No. The Hornsea Three project (2,400MW) is being developed by a Danish wind energy firm called Orsted. National Grid has decided that Hornsea Three must run their own cables from the North Sea all the way to Norwich Main, at Dunston, so Orsted are looking to build their new substation in **Swardeston**, alongside the B1113, just south of the A47 Southern Bypass flyover.

15. The cables from Hornsea Three, and from the Dudgeon and Sheringham Shoal extension projects, will run from north to south. They will cross over the cables from Vanguard and Boreas, running from east to west, and the construction traffic will try to use the Norfolk country lanes.

16. The new Hornsea Three substation at Swardeston will double the amount of heavy traffic along the B1113 for quite a while, whilst it is being built. It may be up to six stories high, in a large industrial compound, visible for miles around, and possibly in breach of local planning policies. No clear explanation has been given for bringing the Hornsea Three cables all the way to Swardeston.

What about the planning enquiries?

17. All of the key decisions seem to have been made well before the planning applications were submitted, and the public enquiries are only allowed to examine the plans actually brought forward by the applicant for each separate project. There is no requirement to choose the most sensible plan.

18. The Norfolk Vanguard enquiry closed on 10th June 2019, but the report was not released to the public until 1st July this year. Most of the points raised by local communities were set aside, but the report recommended refusal because of the effects of the offshore wind turbines on sea birds.

19. The Hornsea Three enquiry closed on 2nd April 2019, and this report was also released on 1st July 2020. Again, it set aside most of the points raised by the local communities who took part in the planning enquiry, but still recommended refusal because of the effects on offshore wildlife.

So, that's it then?

20. No. The government has decided to go ahead anyway. Vanguard has been approved, with a connection to the grid at Necton, and Boreas will automatically follow. The Hornsea Three project will be approved in six months' time, subject to further information about the effects on wildlife.

21. It has been estimated that these four projects – Vanguard, Boreas, Hornsea Three, Dudgeon and Sheringham extensions – will together affect about 2,500 acres of agricultural land in Norfolk, with 1,500 acres permanently affected, as well as many homes and businesses, including tourism.

22. Figure 1 shows the principle of the connection scheme analysed in the feasibility study, and Figure 2 shows the plans that the government is now set to approve. Any excess costs will be added to consumer's bills, but the negative effects on communities and the countryside will go uncounted.

Can't we do something about it?

23. You may wish to write to your MP, either by e-mail to: richardbaconmp@parliament.uk or by post to: Richard Bacon MP, Grasmere, Denmark Street, Diss, Norfolk, IP22 4LE.

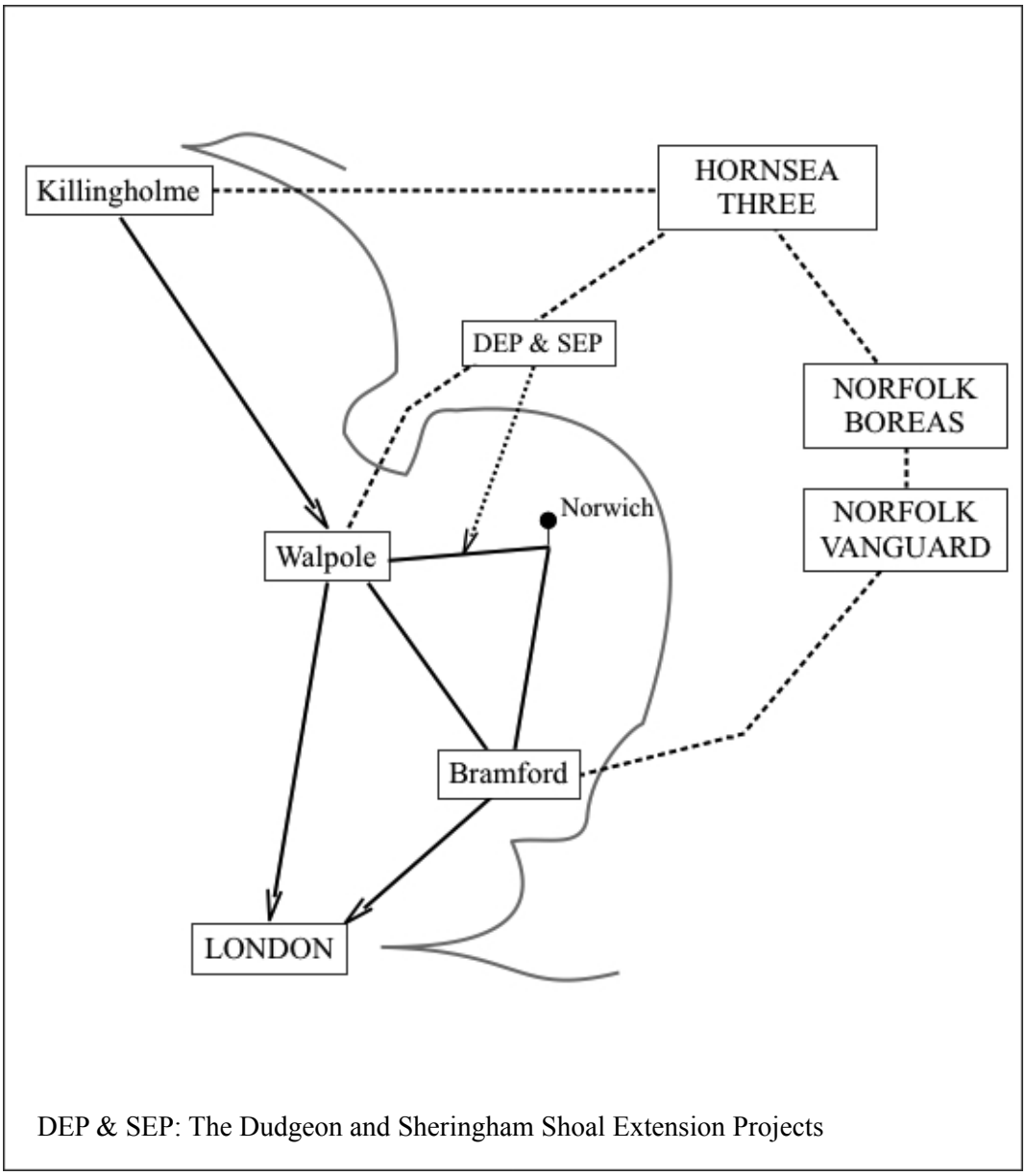

Figure 1: Feasibility study proposals (August 2015)

Notes:

In the UK the main flow of electricity is from sources of generation in the north, to the main centres of demand in London and the south east. The national grid provides the transmission capacity for this flow.

The connection for Hornsea Three is at Walpole. The Norfolk Vanguard and Boreas projects are part of a zone with connections to Bacton and Lowestoft, which were later discontinued, and to Bramford in Suffolk.

Each wind farm has an export cable large enough to carry the whole of its output, but because the wind is variable, the cables are only used for wind energy up to an average of 50% in winter, and 25% in summer.

There is an offshore cable link between the Hornsea zone, and the Norfolk Boreas and Vanguard area. If an export cable fails, then there is likely to be an alternative route available by using one of the other cables.

The Hornsea Three project shares a connection to Killingholme with Hornsea One and Two. This allows power to flow from north to south using the offshore grid. The cost of the additional connections is offset by savings made in strengthening the national grid elsewhere, and by the additional energy brought ashore.

The Dudgeon and Sheringham Shoal extension projects were not included in the 2015 feasibility study, but could share a single export cable to Necton, following the same route as the original Dudgeon project.

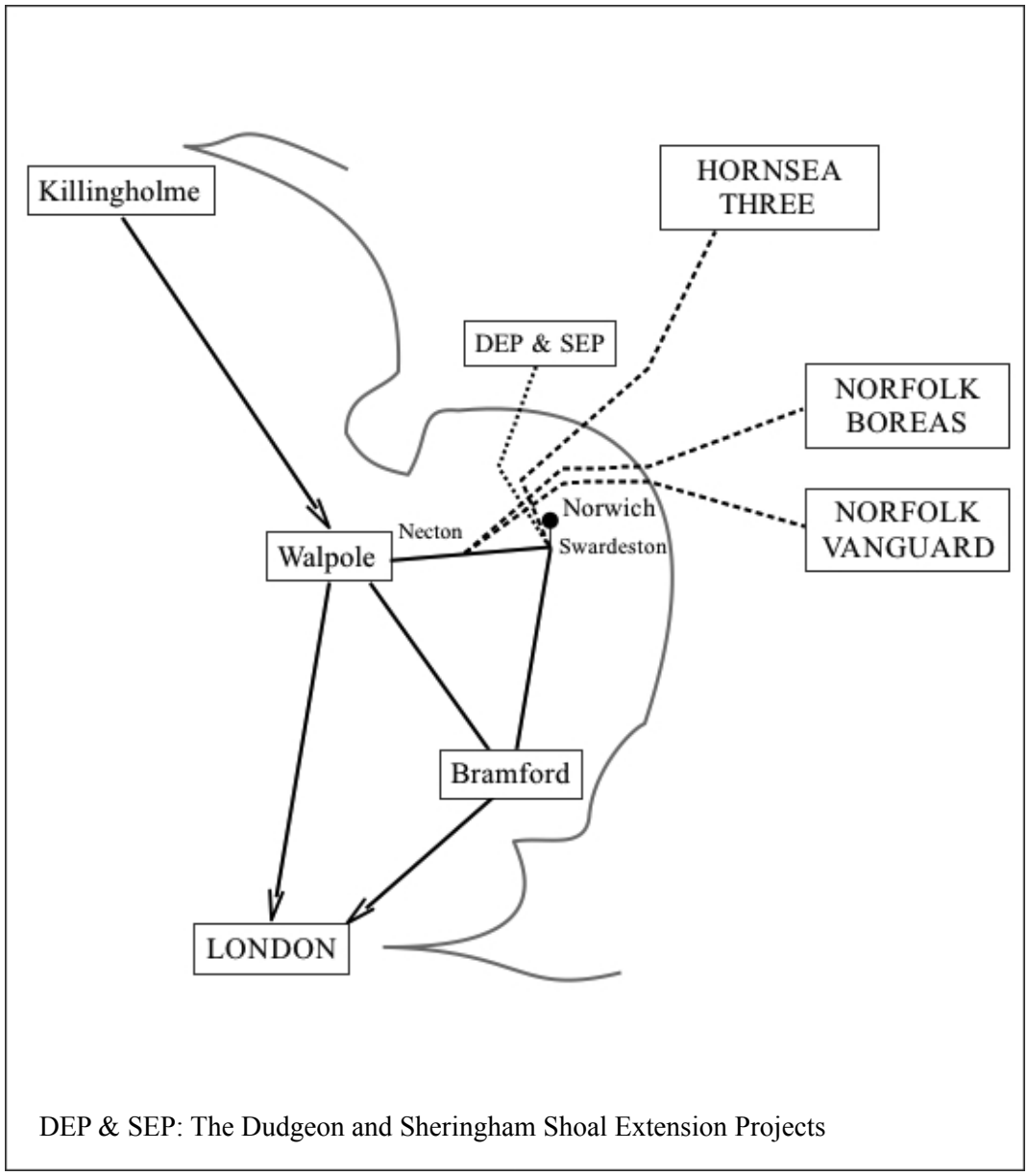

Figure 2: Planning application proposals (July 2020)

Notes:

Each individual wind farm project is allocated an onshore connection point by National Grid.

Norfolk Vanguard and Norfolk Boreas are connected to the grid at Necton, with Hornsea Three and the Dudgeon and Sheringham Shoal extension projects connected at Swardeston. Offshore wind energy then passes through Walpole and Bramford to reach the main centres of demand in London and the south east.

Each wind farm has an export cable large enough to carry the whole of its output, but if one cable fails, there is no alternative route available to bring the wind energy ashore, leading to a short-term loss of supply.

During periods of very high wind speeds, the onshore grid may be unable to accept all of the output from offshore wind farms. Other types of energy supply may then have to be used instead, and some wind energy may go to waste. To minimise this, the national grid may need to be reinforced in other parts of the UK.

Any additional costs incurred within the electricity network are likely to be passed on to the consumer, but the negative impacts on homes, businesses and the environment are not estimated, and do not seem to have been taken into account when the original grid connection point decisions were made.

14th July 2020