

Wind farms allow UK to catch up on green electricity

Sentinel-2 MSI acquired on 09 April 2017 at 10:56:51 UTC
Sentinel-2 MSI L2A acquired on 08 January 2018 at 11:34:39 UTC

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Sentinel-1 CSAR IW acquired on 08 June 2019 at 17:49:20 UTC
Sentinel-1 CSAR IW acquired on 15 June 2019 from 17:40:21 to 17:40:46 UTC

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[2D Layerstack](#)

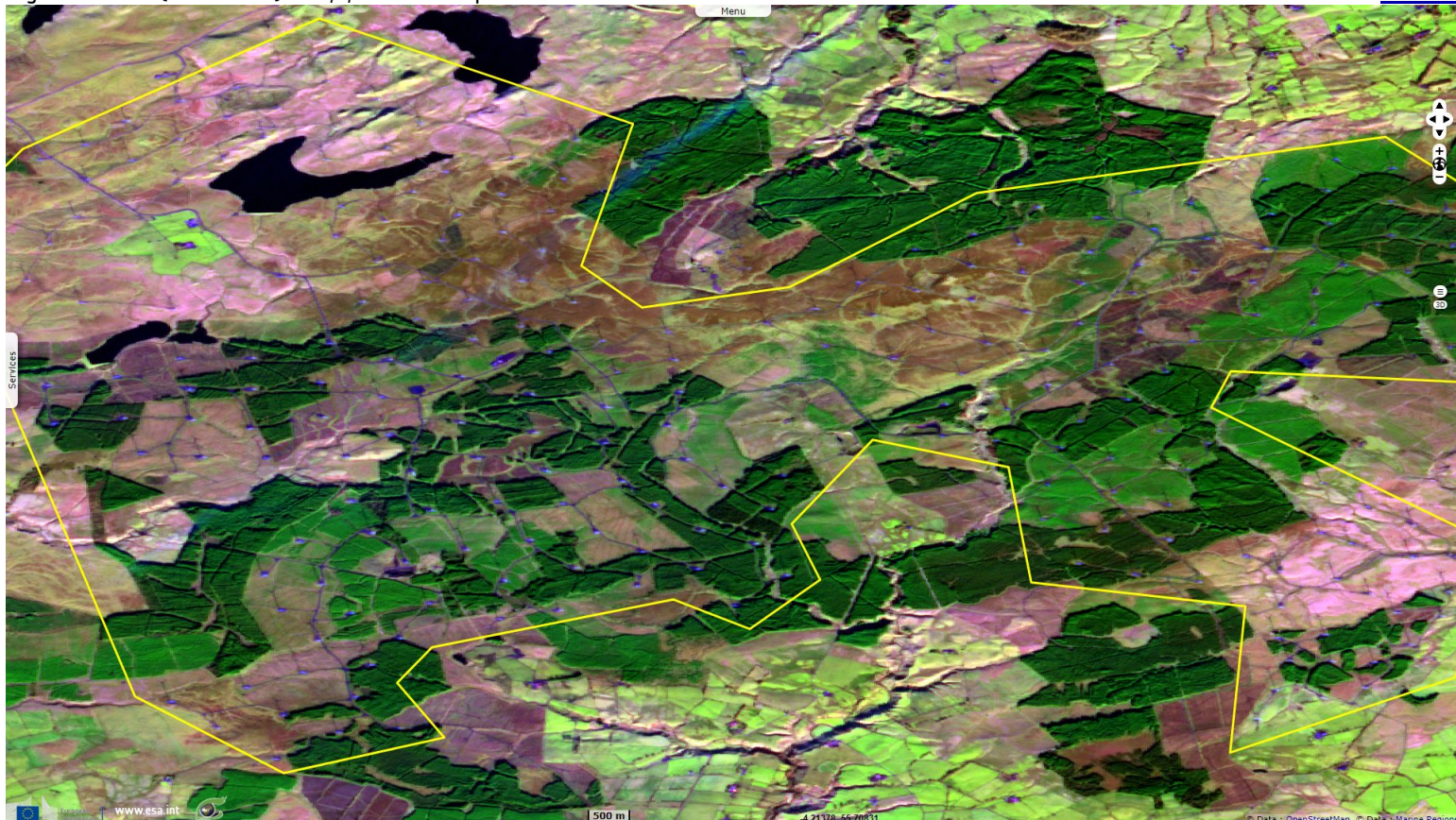
Fig. 1 - S1 + S2 - Location of some of the most important wind farms clusters in UK.

[2D view](#)



Fig. 2 - S2 L2A (15.02.2019) - 11,8,2 colour composite - Whitelee Wind Farm in Scotland.

[2D view](#)



Whitelee Wind Farm is the largest on-shore wind farm in the UK with 215 wind turbines and a total capacity of 539MW. The 7 most powerful inshore wind farms in UK are all located in Scotland.

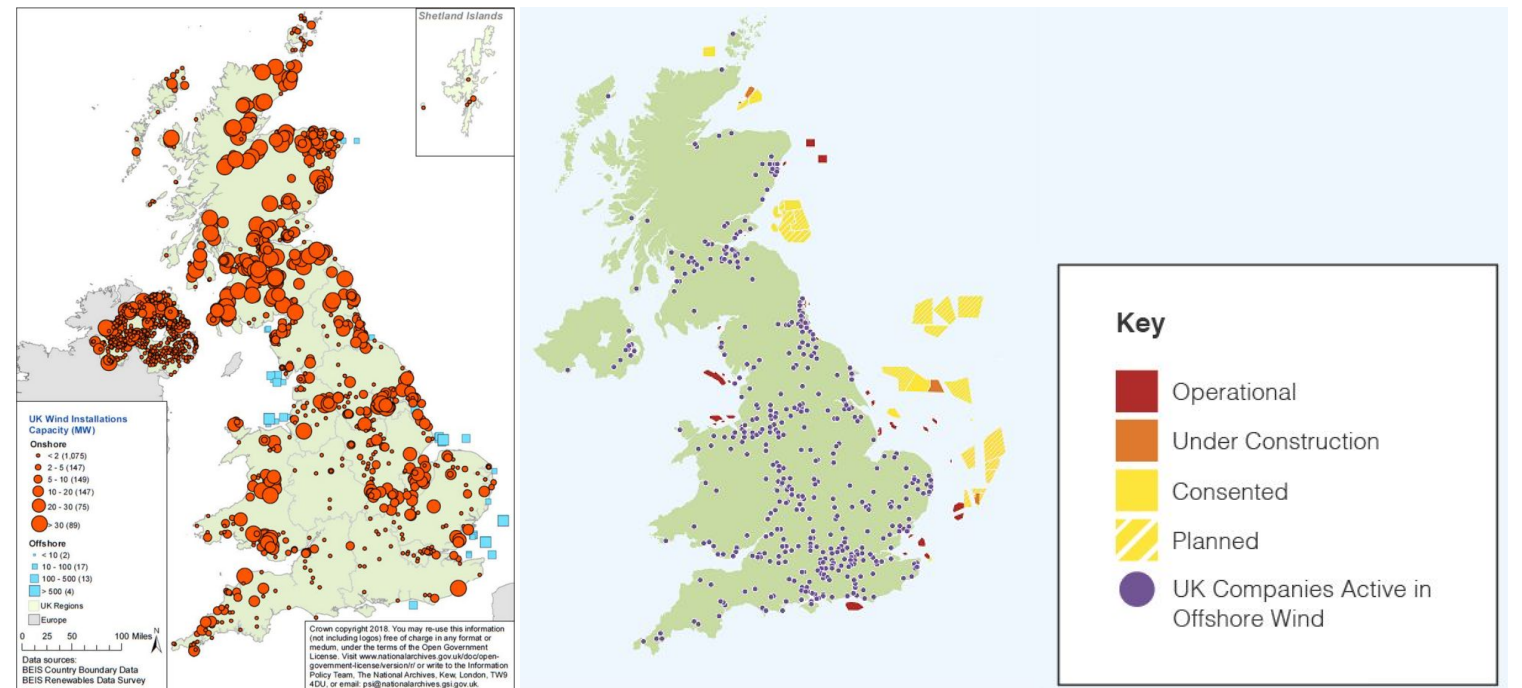


Fig. 3 - S1 (07.06.2019) - vv,vh,coefficient of variation(vh) colour composite - Two large offshore wind farm clusters lie in the Irish Sea. [2D view](#)



	Share of total capacity	Share of total generation	Load factor
Onshore wind	31.7%	29.3%	28.0%
Solar photovoltaics	31.5%	11.6%	10.7%
Offshore wind	17.2%	21.1%	38.9%
Bioenergy	14.9%	32.1%	61.5%
Hydro	4.6%	6.0%	36.5%
Total	100%	100%	

Share of generation and capacity by leading technologies - Source: [Digest of UK Energy Statistics - renewable sources of energy](#)

Electricity produced in the UK traditionally depended on fossil fuels such as domestic coal production and North-Sea oil & gas. In 1964 coal accounted for 88% of electricity, oil 11%. Renewables were still below 2% in 1990 but the share of renewables in UK's electricity generation had risen to 14.9% in 2013 and exceeded 25% in the second quarter of 2015, exceeding coal generation for the first time. In June 2017, for the first time, wind, nuclear and solar power generated more UK power than gas and coal combined. Britain has halved carbon emissions in the electricity sector since 2012 to provide the fourth cleanest power system in Europe and seventh worldwide.

Fig. 4 - S2 (08.01.2018) - 4,3,2 natural colour - Burbo Bank wind farm and its extension in Liverpool Bay, Irish Sea.

[3D view](#)

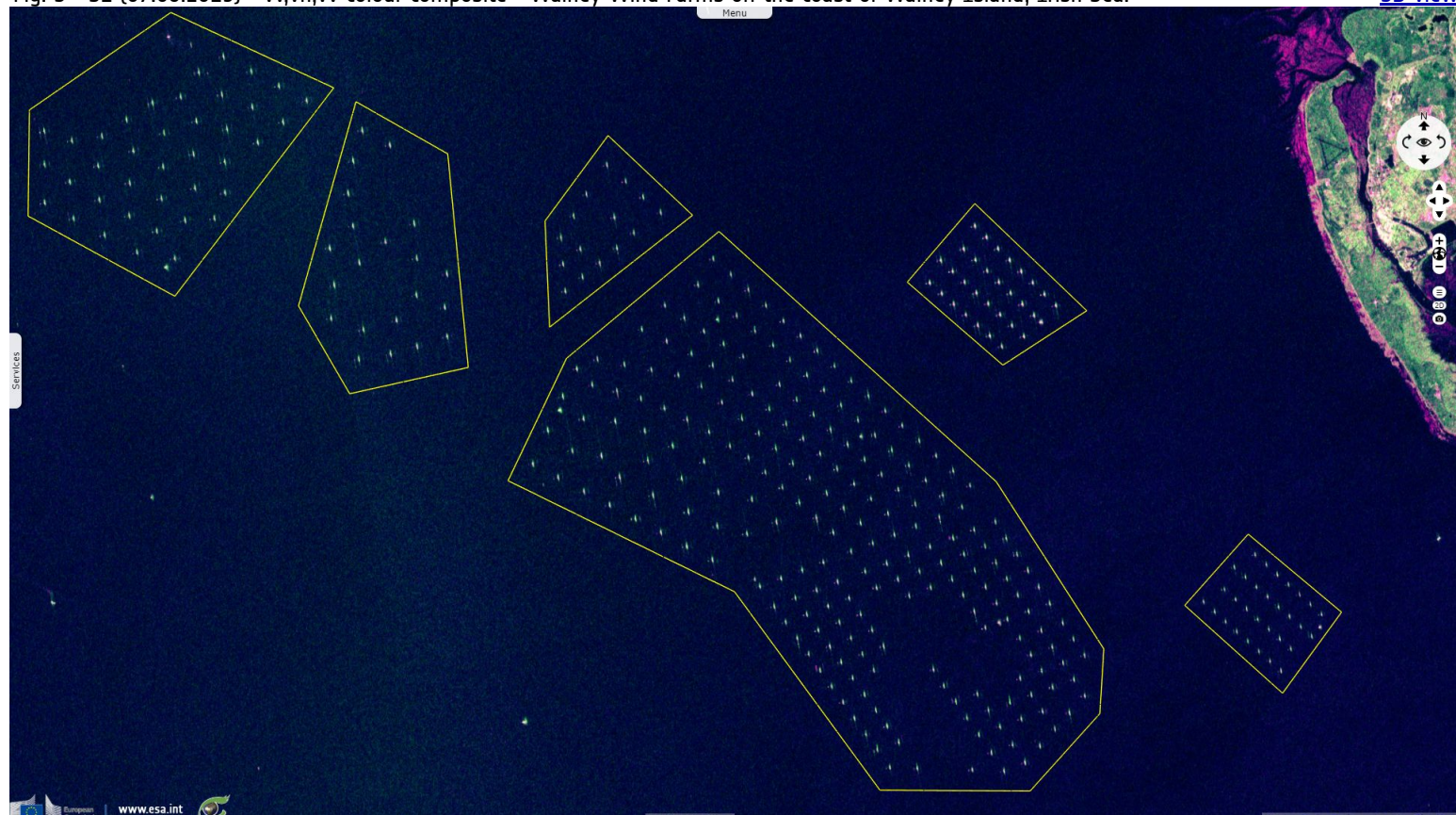


Counting energy required for heat generation and transports, renewable have already risen from 5.2% of all energy produced in the UK in 2013, to 8.3% in 2015, contributing toward the 15% reduction target by 2020 set by the 2009 EU Renewable Directive, as measured by the Directive's methodology.

A large share of the burden is delivered by wind power, its great potential being owed to its island situation, strong wind at this general location, little topography to reduce wind speed. It which produces a growing fraction of the energy in the United Kingdom using over 6000 wind turbines with a total installed capacity of just under 12 gigawatts: 8 gigawatts of onshore capacity and 4 gigawatts of offshore capacity.

Fig. 5 - S1 (07.06.2019) - vv,vh,vv colour composite - Walney Wind Farms off the coast of Walney Island, Irish Sea.

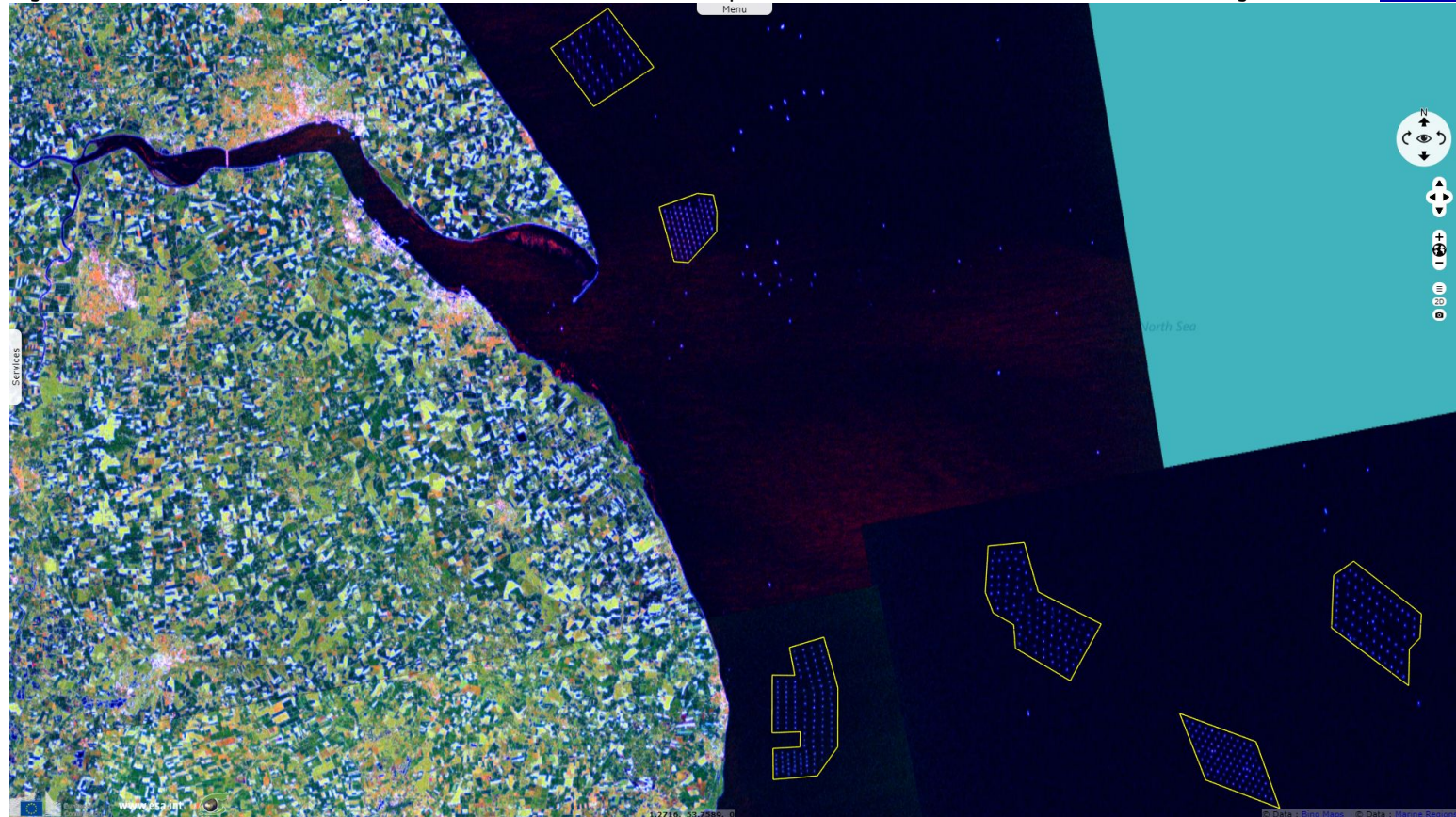
[3D view](#)



Following an important deal in the offshore windpower sector, Rt Hon Greg Clark MP, Secretary of State for Business, Energy and Industrial Strategy in the government of the United Kingdom [released](#) the following statement: "The offshore wind sector is a UK success story; we have the largest installed capacity of off shore wind in the world and costs have fallen faster than anyone could have envisaged 10 years ago. Off shore wind's share of annual UK generation increased from 0.8% in 2010 to 6.2% in 2017, and is expected to reach around 10% by 2020."

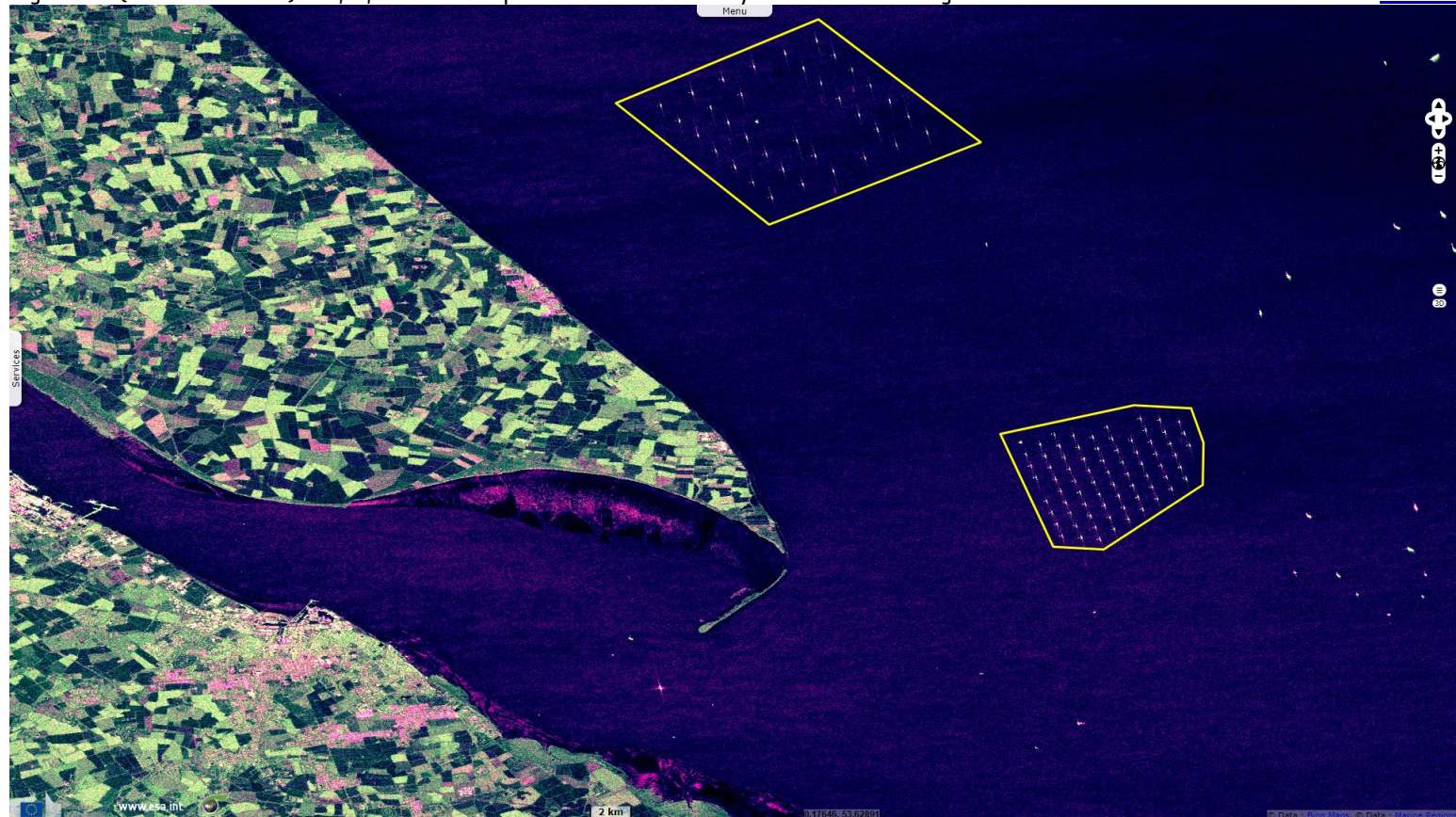
Fig. 6 - S1 (08 & 15.06.2019) - vv,vh,coefficient of variation(vh) colour composite - Offshore wind farms off the east coast of England.

[3D view](#)



"In partnership with government, the offshore wind sector has flourished, demonstrating it can deliver ever larger projects to predictable timescales, at ever lower costs while creating skilled, fulfilling, well-paid jobs in communities around the country. There are more than 430 000 jobs in low carbon businesses and their supply chains, employing people in locations right across the country and 7 200 are directly employed in offshore wind."

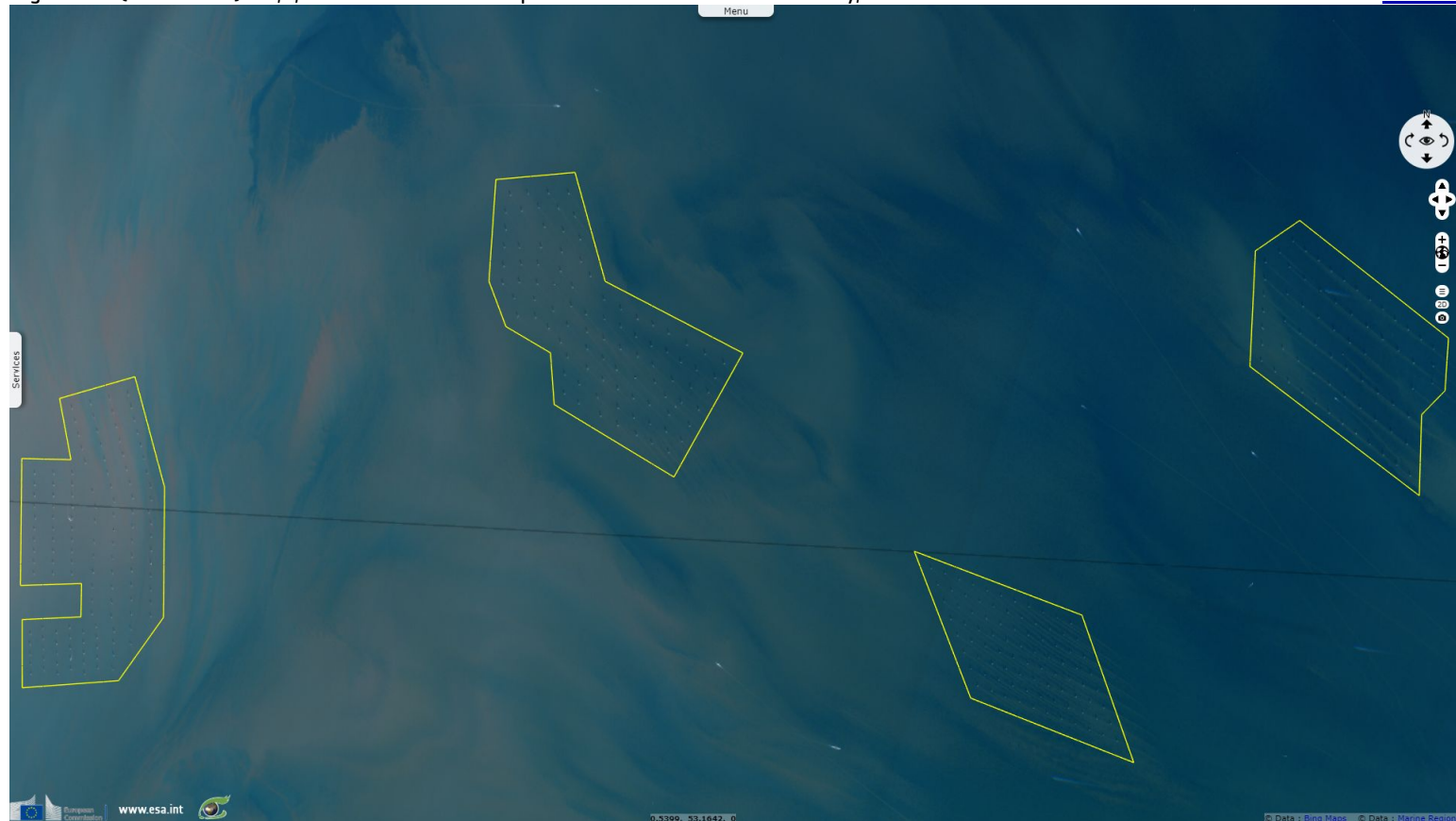
Fig. 7 - S1 (08 & 15.06.2019) - vv,vh,vv colour composite - Humber Gateway & Westernmost Rough wind farms at the mouth of the Humber. [2D view](#)



"Subject to costs coming down, this commitment could see offshore wind contributing up to 30 GW of generating capacity by 2030. In return, we expect the sector to continue cutting costs committing to lower their impact on bill payers while investing in and driving growth in the UK's manufacturing base."

Fig. 8 - S2 (26.02.2019) - 4,3,2 natural colour - Multiple wind farms near the Wash Bay, the sediment tracks show the current.

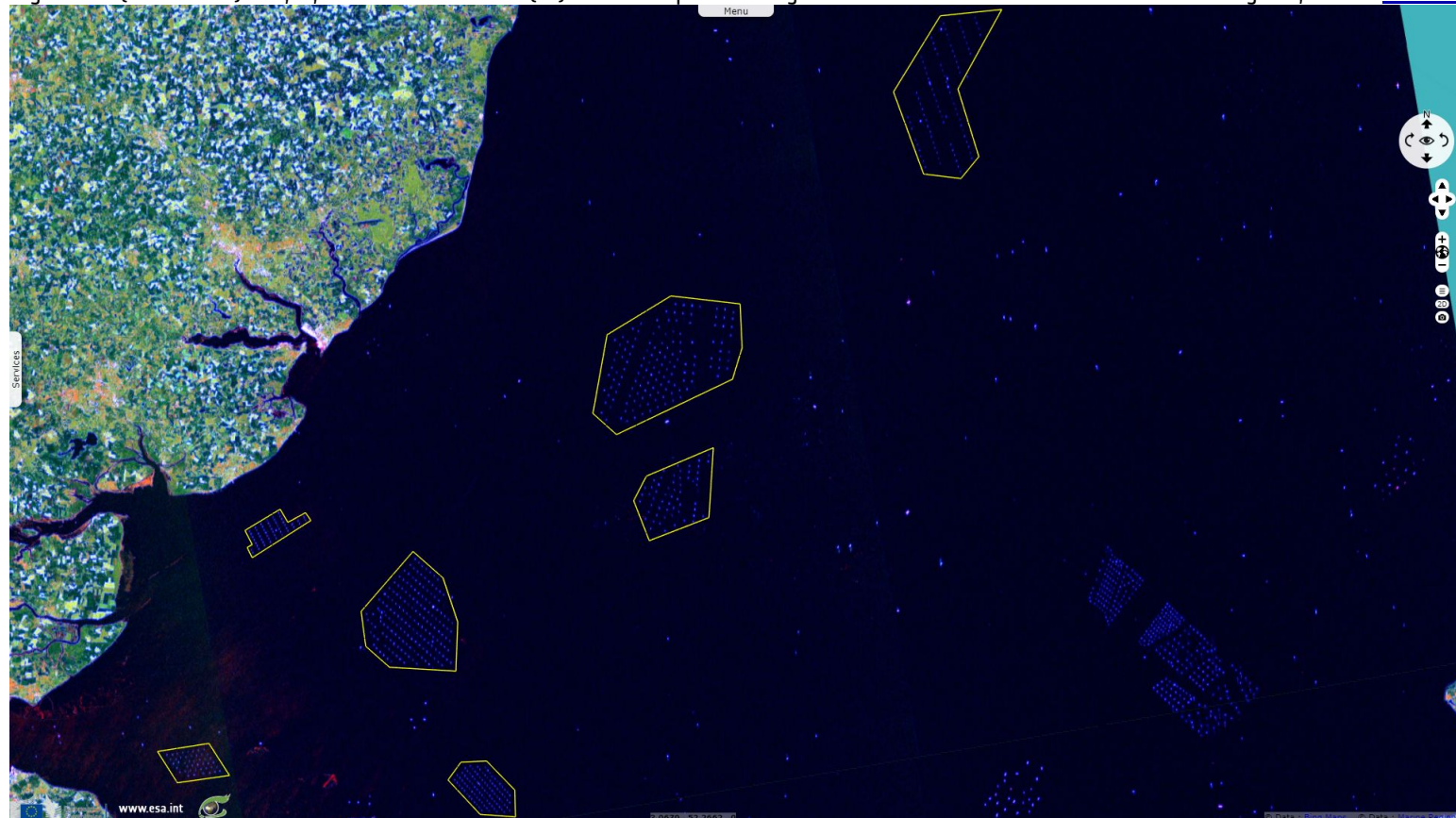
[3D view](#)



"The deal will drive the transformation of offshore wind generation, making it an integral part of a low-cost, low-carbon, flexible grid system and boost the productivity and competitiveness of the UK supply chain. This focus on building the capability of our supply chain will allow companies to play a greater role in the UK's global leadership in offshore wind generation while enhancing their competitiveness internationally. These ambitions will be realised through an industry investment into the Offshore Wind Growth Partnership of up to £250 million, supporting better, high-paying jobs right across the UK."

Fig. 9 - S1 (15.06.2019) - vv,vh,coefficient of variation(vh) colour composite - Large offshore wind farms in the south-west of England,

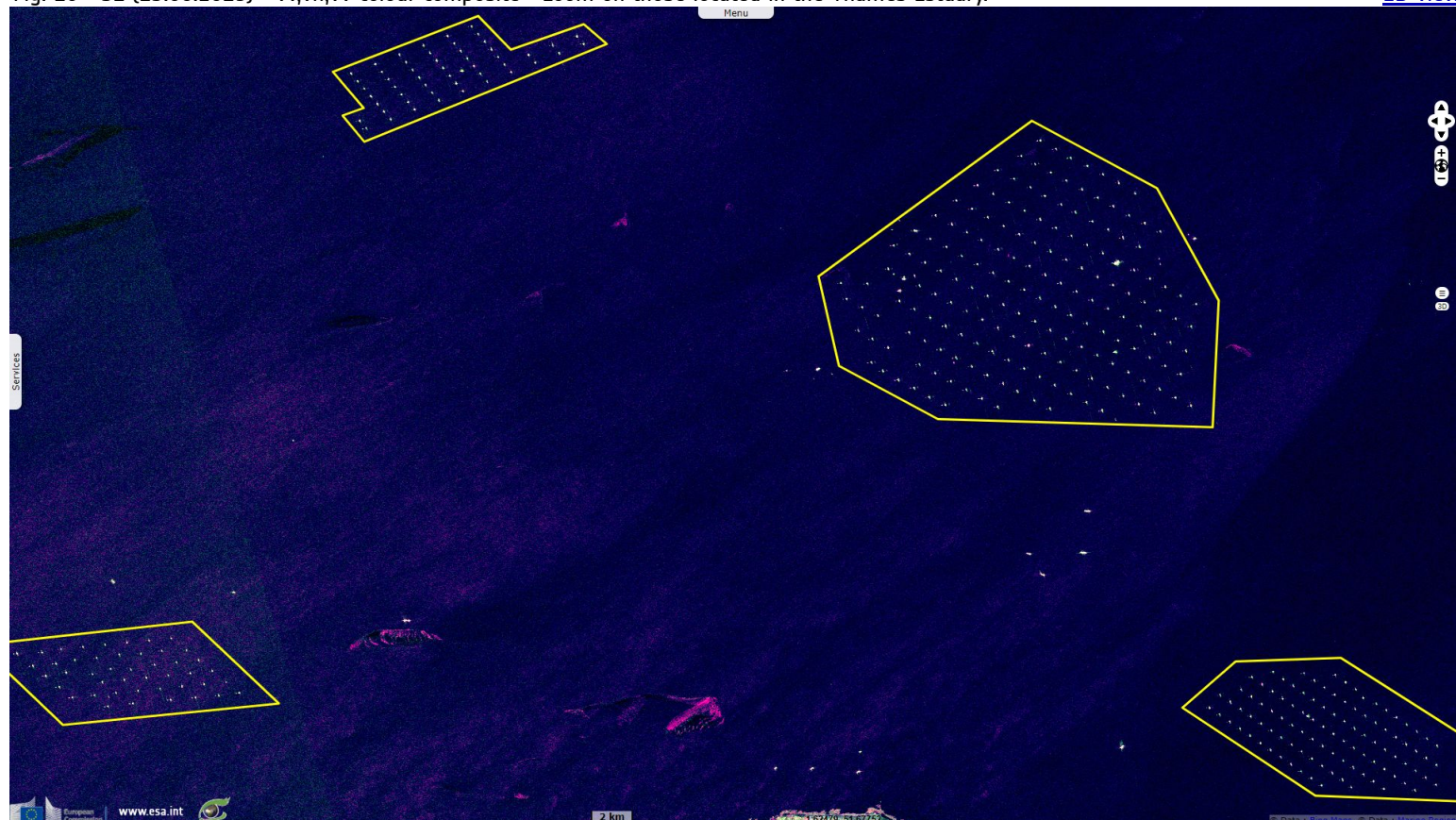
[3D view](#)



"Deployment of innovative technology has been integral to the success of offshore wind in the UK, with notable advances in turbine development leading to significant cost reduction; with turbines now five times larger than when first deployed. From 2010 to 2016, wind turbine power ratings have grown by 60%, with projects now being deployed over 100 km from the shore and in waters over 50 meters deep."

Fig. 10 - S1 (15.06.2019) - vv,vh,vv colour composite - Zoom on those located in the Thames Estuary.

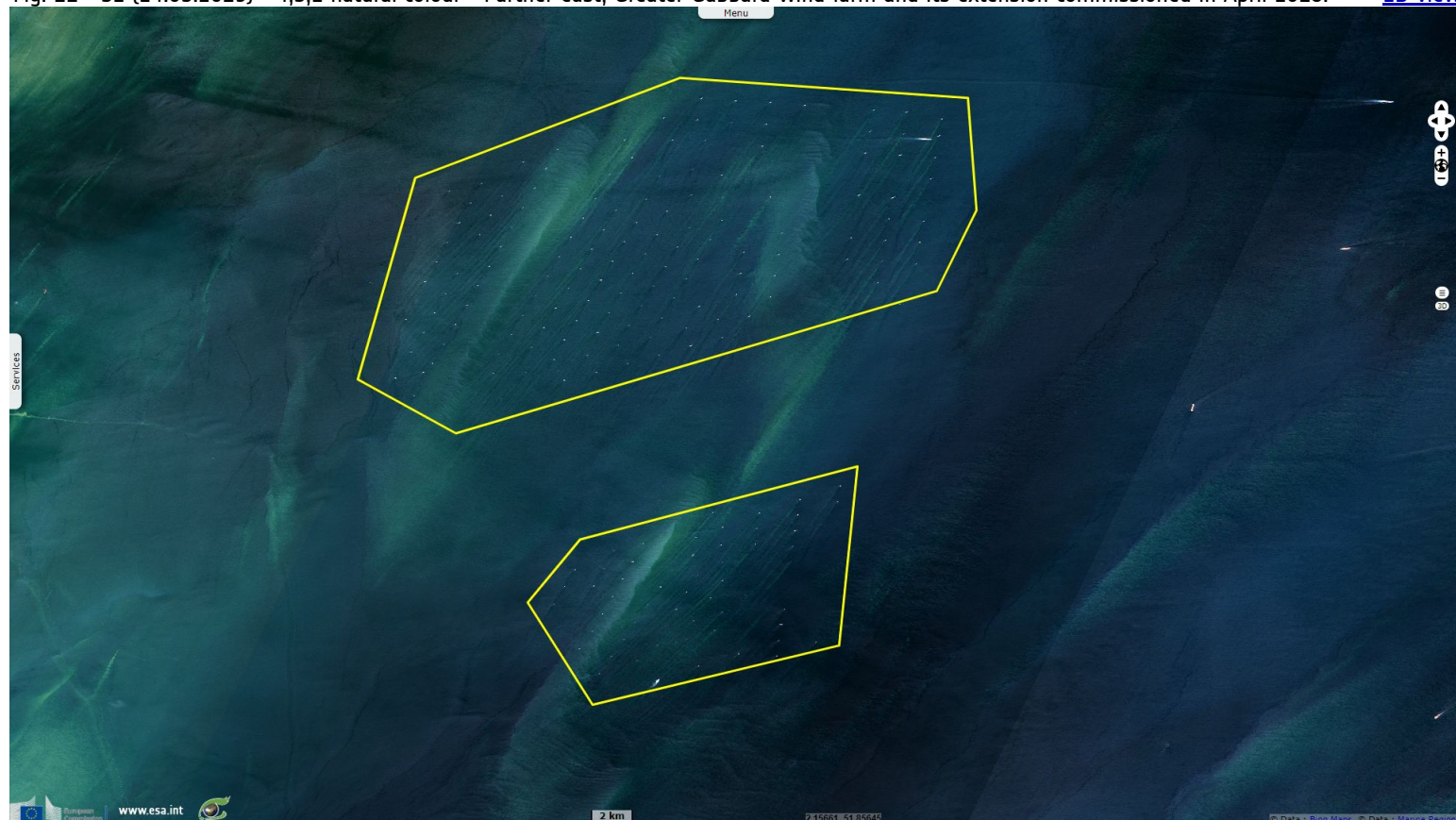
[2D view](#)



"The development of new technologies, and the innovative application of existing ones can all further reduce the costs of offshore wind. For example, the use of autonomous technologies for subsea surveys and the application of data analytics and AI to wind farm operations will help lower the cost of electricity to consumers. The sector and government will work closely to explore opportunities to build on R&D funding."

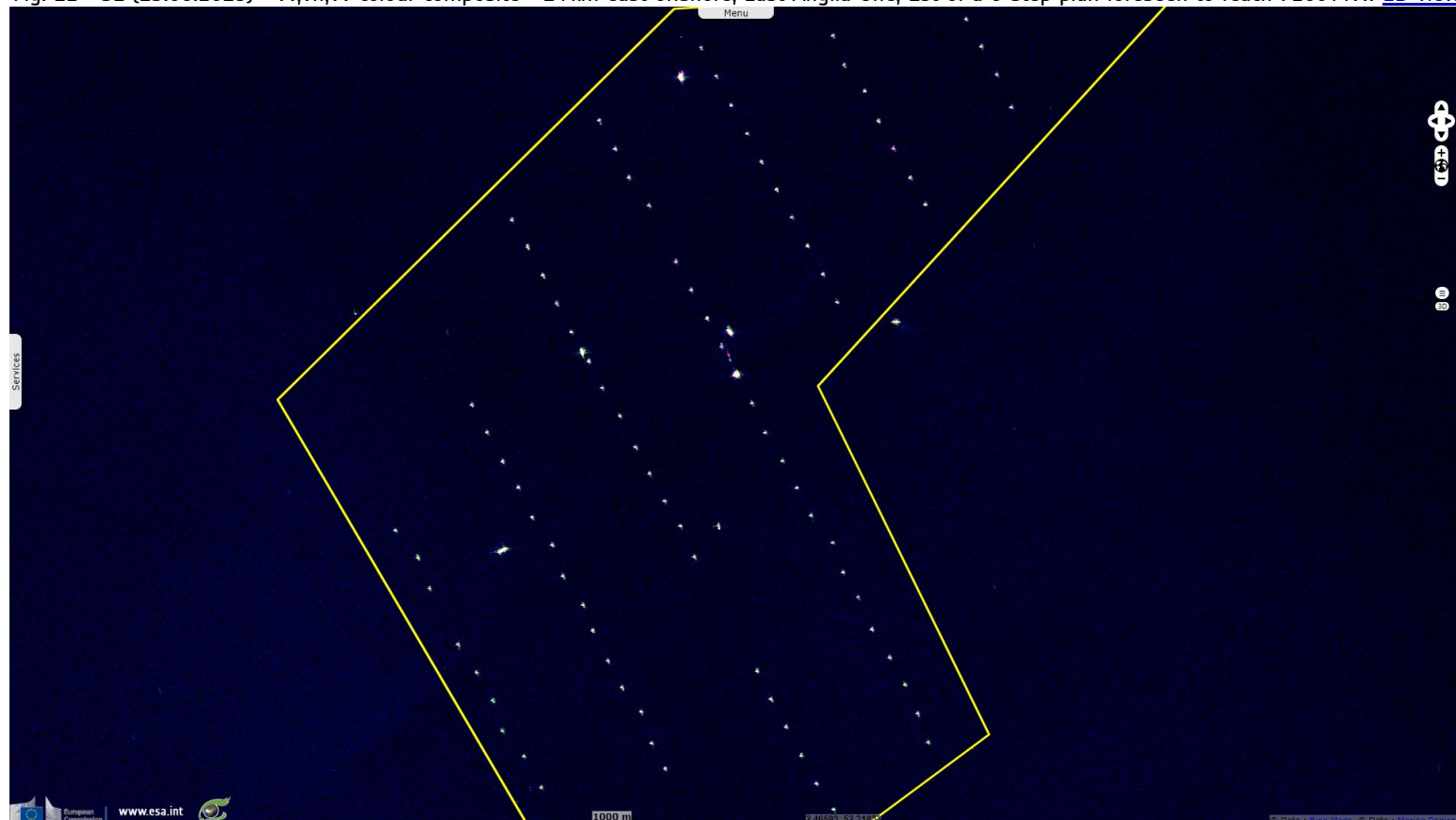
Fig. 11 - S2 (24.05.2019) - 4,3,2 natural colour - Further east, Greater Gabbard wind farm and its extension commissioned in April 2018.

[2D view](#)



"To support the cost-effective deployment of offshore wind, the sector will establish a System Management and Optimisation Task Group which will explore innovative solutions to support grid integration. This will include managing variability of demand and supply, and the potential for generation and storage of hydrogen for other key applications in a decarbonised energy system."

Fig. 12 - S1 (15.06.2019) - vv,vh,vv colour composite - 14 km east offshore, East Anglia One, 1st of a 6-step plan foreseen to reach 7200 MW. [2D view](#)



"Regional clusters are already emerging, generally located close to windfarms or areas with a strong, pre-existing manufacturing base, oil and gas or R&D presence, such as the Humber and East Anglia.

Linking the clusters with educational institutions, centres for innovation, manufacturing bases, can provide the conditions for local incubation of innovation, drive competitiveness, increase economies of scale and productivity. The deal proposes capitalising on naturally existing clusters and providing sector leadership to create more opportunities for investment and growth in local economies."

*The views expressed herein can in no way be taken to reflect the official opinion of the European Space Agency or the European Union.
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