THE CROWN ESTATE

UK Offshore Wind Report 2024

Contents

This report is produced annually by The Crown Estate to provide an overview of the UK offshore wind industry, using our own and publicly available data.

The Crown Estate's role is to work in the long-term national interest.

Established by an Act of Parliament, we are an independent and commercial business. We manage a diverse £16 billion portfolio of land, property and the seabed across England, Wales and Northern Ireland. Our profits, which have totalled more than £4 billion over the last ten years, are returned to the Treasury for public spending.

Through our activities and investments we are growing our portfolio's value and using it to positively impact climate, nature and communities both now and for future generations.

Our purpose, to create lasting and shared prosperity for the nation, guides us and underpins our strategy to focus on addressing key national challenges where we can make a meaningful impact. This includes investing and playing a significant role in delivering net zero and energy security; nature recovery and biodiversity; and inclusive communities and economic growth, all while generating financial returns for the UK.

To learn more about the work we do, and the causes we support, visit **Home I The Crown Estate.**

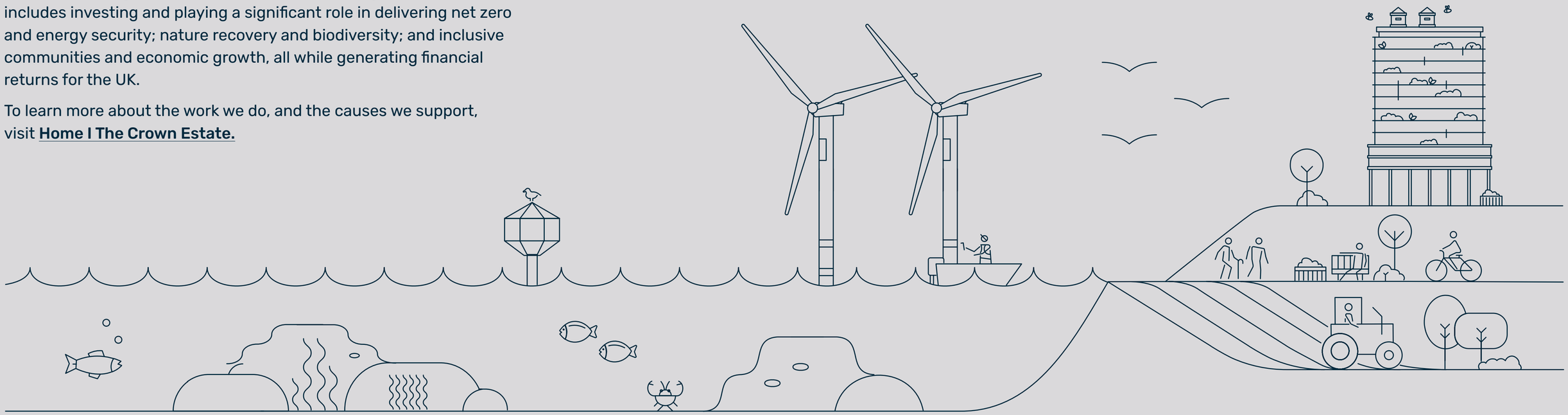
Crown Estate Scotland is a public corporation which manages a range of property, including the seabed, to deliver lasting, valuable benefits to Scotland and its people. Crown Estate Scotland's revenue profits are paid to the Scottish Government for use in public spending. Part of our role is awarding the rights to build and operate renewable energy projects in Scottish waters, and we are committed both to supporting the development of Scotland's blue economy and the Scottish Government's target of reaching net zero emissions by 2045.

To learn more about the work we do and the causes we support, visit **crownestatescotland.com**

Acknowledgements

Our thanks to all those who have provided content, in particular:

Atanas Petrov; Balfour Beatty; Ben Barden Photography; Blue Gem Wind / Eolos; Crown Estate Scotland; Dan Bolt; Diamond Transmission Partners; DESNZ; Dogger Bank Wind Farm; Equitix; Frontier Power; Global Energy Group; Jason Hawkes; Kate Harvey (G+); Mark Bolton; Offshore Wind Industry Council (OWIC); Ofgem; Ørsted; Scott Young (Renewable UK / OWIC); Sofia Offshore Wind Farm Ltd; Siemens; The Bristol Port Company; World Forum Offshore Wind.



Foreword

From where we started 25 years ago, with just a few turbines, the UK has built an entirely new sector with the second biggest installed capacity in the world.

Gus Jaspert CMG
Managing Director, Marine

I am delighted to share the 2024 Offshore Wind Report as we celebrate the 25th anniversary since the UK's first demonstration offshore wind farm in Blyth on the north-east coast.

Over the last 25 years, the UK has turned visionary ambition into a success story to be proud of. From just a few turbines and no offshore wind market, the UK has built an entirely new sector with the second biggest installed capacity in the world. In this remarkably short time, UK offshore wind has grown rapidly and now comprises 15.9GW of grid connected capacity, capable of powering more than half of UK homes. With a strong pipeline of 95GW, the sector is gearing up to play a pivotal role in the country's future; supporting the UK's ambition to deliver clean power by 2030 and net zero by 2050, as well as creating energy security, thousands of new jobs and economic opportunity.

This year's new-look report, which sets out the headlines and highlights from 2024 in a more concise and data-led way, is packed with examples of how the industry is gearing up for another 25 years of extraordinary success.

The Crown Estate's purpose is to create lasting and shared prosperity for the nation, with a vision to build a thriving marine environment for generations to come. Collaboration, long-term planning and co-ordination lies at the heart of this and in 2024 we were pleased to announce plans to develop a ground-breaking Marine Delivery Routemap – a holistic and long-term view of how the seabed could be used to support the accelerated delivery of nature recovery and the transition to clean energy. This will provide a plan for long-term visibility for the sector about future areas of opportunity and help to de-risk future development.

During the year we also set out thinking on the future of offshore wind in the UK, outlining how the next 20-30GW of offshore wind capacity can be brought to market by the end of this decade and how The Crown Estate could play a greater role in investing to support the associated infrastructure and supply chain. The new Crown Estate Act 2025, which modernises the way The Crown Estate can borrow and invest, will play an important role in this.

A strong supply chain is fundamental to the long-term stability of the sector; in 2024 the first £5 million of funds of The Crown Estate's innovative £50 million Supply Chain Accelerator were awarded to UK projects that could support floating offshore wind in the Celtic Sea. This and subsequent awards, including funding for the development of manufacturing facilities and port infrastructure, will act as a catalyst for the UK supply chain capability, and help ensure the wider economic benefits of this industrial revolution are felt here in the UK.

In 2024, the new UK Government quickly established its Mission Control for Clean Power 2030, followed by its 2030 Action Plan to achieve its clean power goal of generating at least 95 per cent of Great Britain's electricity consumption from clean sources by 2030, with offshore wind having a pivotal role. It also published proposals to reform the Contracts for Difference scheme, to remove planning barriers and other measures to help bring clean power online faster. Alongside this, The Crown Estate partnered to form Great British Energy: The Crown Estate, a strategic partnership to accelerate the energy transition. These are all vital measures to support the anticipated increase in projects progressing into construction in the coming years.

The tender process for Offshore Wind Leasing Round 5, which could add up to 4.5GW to the UK pipeline, continued to progress, helping to further cement the UK's opportunity to lead the world in the development of floating offshore wind.

All of this sets the scene for a busy year and decade ahead, with new leasing opportunities on the horizon, and a significant pipeline of projects looking to move into consenting, building and operation.

As we gear up to accelerate the growth of the sector, we need to tackle multiple challenges, including ongoing global volatility continuing to disrupt energy markets and supply chains. We are operating in a complex energy system and to keep new projects moving through the system at scale and pace, collaboration is fundamental. An appetite for more, and closer, collaboration between governments, nature conservation bodies, developers, investors and the energy system operator is evident.

We're entering into an exciting new era where we are seeing investment on a scale not seen before, pioneering innovations and commitments to doing things differently, strategic planning for the long-term health of the sector and ambition which matches, or even exceeds, that of 25 years ago.

I hope you enjoy reflecting on another year in this vital sector, and here's to the next 25 years of extraordinary progress.

Gus Jaspert CMG
Managing Director, Marine

Amongst the key activities and progress we report on for 2024, are:

For an at-a-glance view of the 2024 offshore wind year in numbers - **page 6.**

49.2TWh

More about the floating offshore wind opportunity - **page 11.**

A strong pipeline for the future

More about our Marine Delivery Routemap and Future of Offshore Wind publications - **page 31.**

Catalysing UK value through the Supply Chain Accelerator fund - **page 32**.

For an update on our activities in pursuit of protecting nature and the environment - **page 34.**

Helping nature to thrive

2024 UK Offshore Wind Highlights

49.2TWh
UK offshore wind electricity produced in 2024

28
Offshore Transmission Owners

15.9GW
Grid connected offshore wind capacity

52
Offshore wind farms in the UK

41%
Of European offshore wind capacity hosted within UK waters

52%
UK offshore wind supplied the equivalent electricity needs of 52% of UK households in 2024[1]

19.1m
Tonnes CO_2 displaced by the use of offshore wind energy

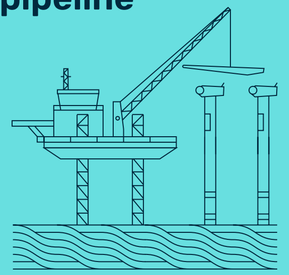
32k+
Total offshore wind workforce, growing to c.100,000 by 2030[2]

94.4%
Fleet Performance Index – total wind farm output vs annual wind energy resource available to the operational fleet

£50m
Supply Chain Accelerator fund launched by The Crown Estate

1. 49.2TWh of power generated is the equivalent of the annual electricity needs of 52% of UK homes.
2. **OWIC – Offshore Wind Skills Intelligence Report June 2023**.
3. **https://www.theccc.org.uk/publication/the-seventh-carbon-budget/**.
4. See **page 28** of this report for more detailed explanation on the offshore wind development pipeline.
5. Up to 4.5GW – part of the overall 95GW pipeline.

Looking forward: A strong pipeline of offshore wind capacity



125GW
2050 UK offshore wind capacity 'Balanced Pathway' recommendation[3]

95GW
Pipeline of fixed and floating offshore wind capacity in the UK including operational, committed, under development, pre-planning and identified potential[4]

Up to
4.5GW
Capacity of floating offshore wind on offer through Leasing Round 5[5]

c.268,000km²
Of seabed under management, equating to approximately twice the land area of England, Wales and Northern Ireland

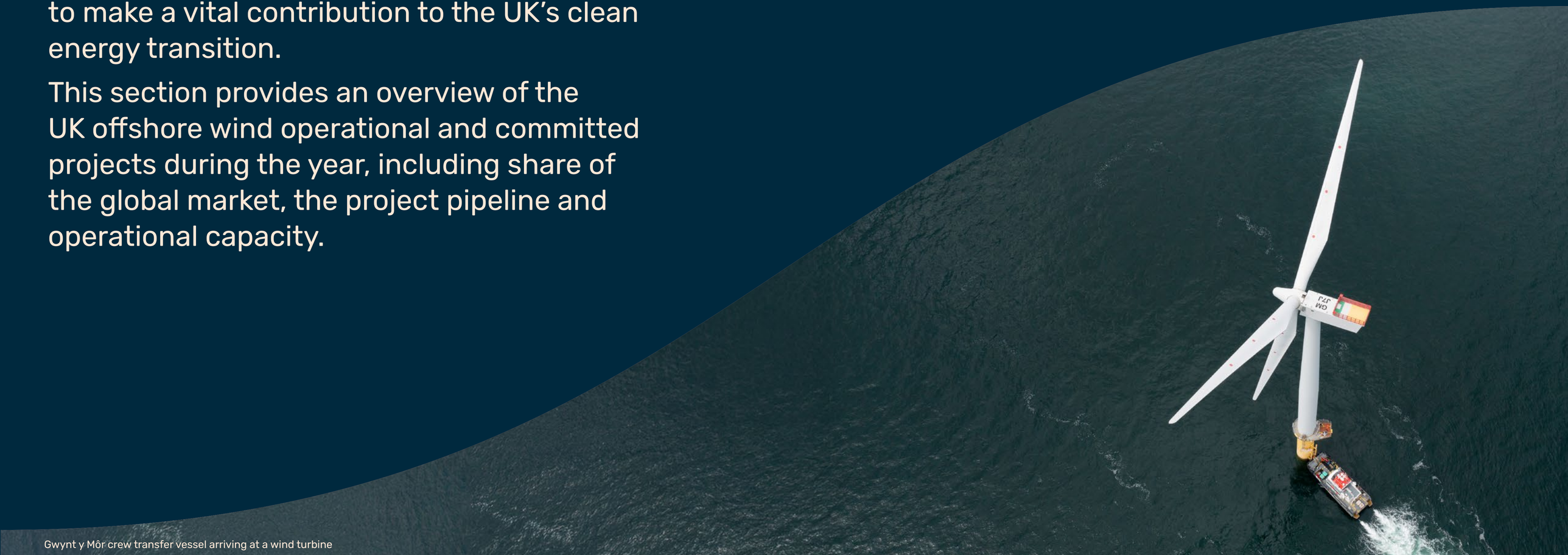
Offshore wind overview

In 2024 the UK offshore wind industry continued to make a vital contribution to the UK's clean energy transition.

This section provides an overview of the UK offshore wind operational and committed projects during the year, including share of the global market, the project pipeline and operational capacity.

15.9GW

Capacity of UK offshore wind grid connected in 2024, an increase of 1.2GW on 2023



Gwynt y Môr crew transfer vessel arriving at a wind turbine

Fig 1

Increase in total global offshore wind operating capacity

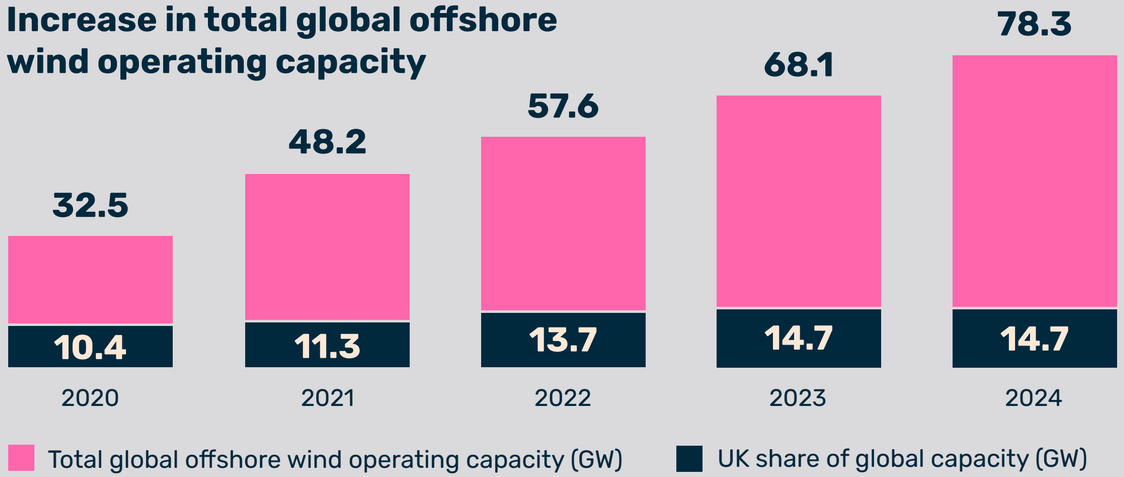


Fig 2

2024 Global offshore wind operating capacity by country

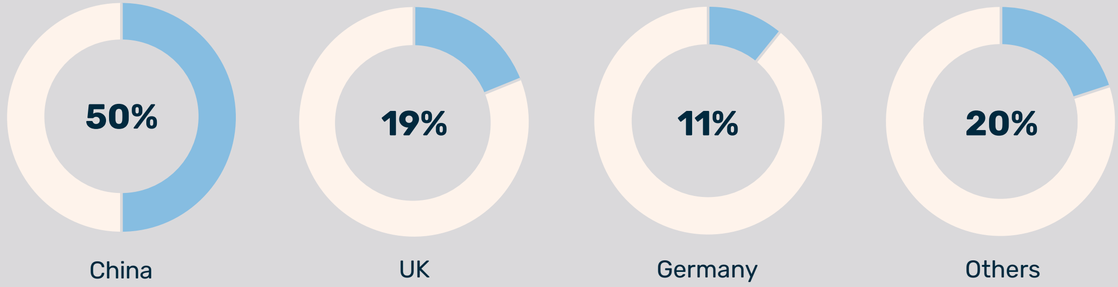
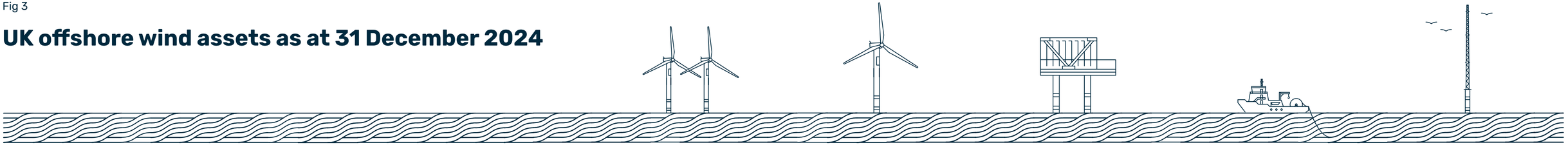


Fig 3

UK offshore wind assets as at 31 December 2024



	GW	Wind farms	Turbines	Substations	Export cables	Met masts
Operational	14.7	45	2,766	40	90	10
Under construction[1]	7.8	7	586	10	14	0
Total	**22.5**	**52**	**3,352**	**50**	**104**	**10**

1. Projects under construction but not yet fully operational.

Fig 4

UK offshore wind grid connected capacity (change from previous year)

In 2024 UK offshore wind grid connected capacity increased by 1.2GW, with two projects in Scotland – Moray West and Neart na Gaoithe – generating power for the first time.

Grid connected capacity is the measure of all the offshore wind turbines that were installed and exporting electricity at the end of December 2024, including sites under construction and partially operational. This figure will be slightly higher than the UK operational capacity, which is a sum of capacity of all projects that are fully operational.

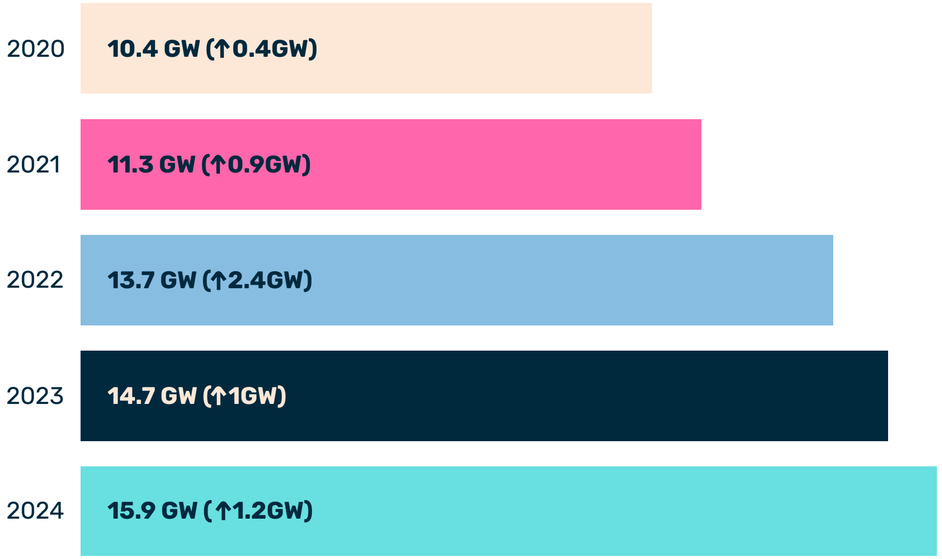


Fig 5

Percentage of UK homes' annual electricity needs that can be supplied by offshore wind

12%
2014
3.3m homes

30%
2019
8.3m homes

52%
2024
14.9m homes

59% estimated
2025
16.9m estimated homes

UK offshore wind generated **49.2TWh** last year. That's enough to supply the electricity needs of over **half of UK homes (14.9m)**, and **18%** of the UK's total electricity needs.

Fig 6

Asset activity in 2024

Wind farms achieving Final Investment Decision

Inch Cape[1]

Wind farms starting onshore construction

Hornsea 3

Inch Cape

Wind farms starting offshore construction

East Anglia THREE

Wind farms under construction

Dogger Bank A

Dogger Bank B

Dogger Bank C

East Anglia THREE

Hornsea 3

Inch Cape

Moray West

Neart na Gaoithe

Sofia

Wind farms achieving first power

Moray West

Neart na Gaoithe

1. FID announced January 2025.

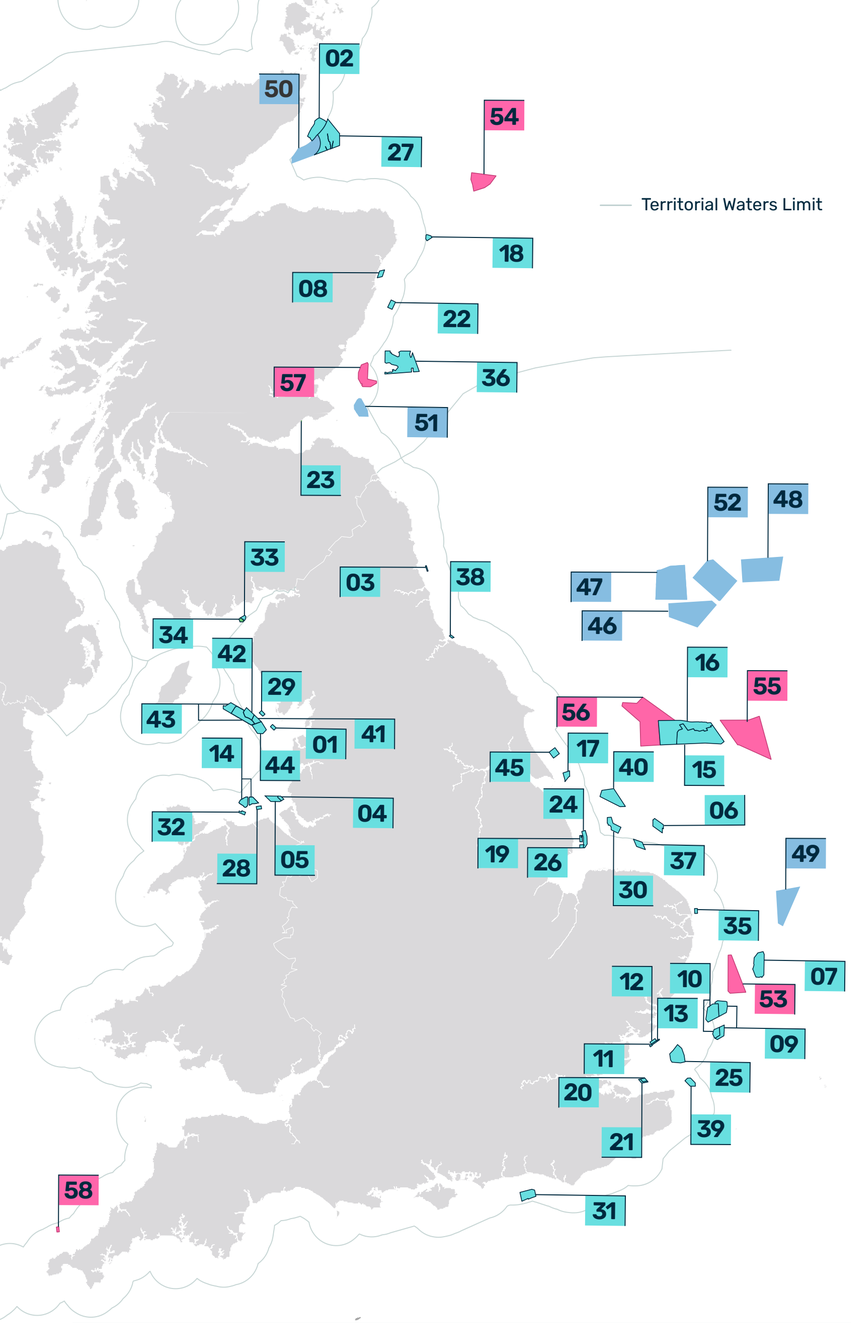


Fig 7

UK offshore wind portfolio as at December 2024

Operational

Total capacity of wind farms that are fully operational

	Capacity MW[1]
Barrow	90
Beatrice[2]	588
Blyth Demonstration Phase 1	42
Burbo Bank	90
Burbo Bank Extension	259
Dudgeon	402
East Anglia ONE	714
European Offshore Wind Deployment Centre[2]	97
Galloper	353
Greater Gabbard	504
Gunfleet Sands Demonstration	12
Gunfleet Sands I	108
Gunfleet Sands II	65

	Capacity MW[1]
Gwynt y Môr	576
Hornsea 1	1,218
Hornsea 2	1,386
Humber Gateway	219
Hywind Scotland[2]	30
Inner Dowsing	97
Kentish Flats	90
Kentish Flats Extension	50
Kincardine[2]	50
Levenmouth Demonstration[2]	7
Lincs	270
London Array	630
Lynn	97
Moray East[2]	953
North Hoyle	60
Ormonde	150
Race Bank	573

	Capacity MW[1]
Rampion	400
Rhyl Flats	90
Robin Rigg East[2]	84
Robin Rigg West[2]	90
Scroby Sands	60
Seagreen Phase 1[2]	1,075
Sheringham Shoal	317
Teesside	62
Thanet	300
Triton Knoll	857
Walney 1	184
Walney 2	184
Walney Extension	659
West of Duddon Sands	389
Westermost Rough	210
Total	**14,741**

Under construction

Total capacity of wind farms that have commenced construction but are not yet fully operational

	Up to capacity MW[1]
Dogger Bank A	1,235
Dogger Bank B	1,235
Dogger Bank C	1,200
East Anglia THREE	1,397
Moray West[2]	882
Neart na Gaoithe[2]	448
Sofia	1,400
Total	**7,797**

Supported

Total capacity of wind farms that have a Contract for Difference

		Up to capacity MW[1]
53	East Anglia TWO	980
54	Green Volt[2]	560
55	Hornsea 3	3,000
56	Hornsea 4	2,700
57	Inch Cape[2]	1,080
58	Wave Hub	30
Total		**8,350**

For an overview of UK offshore wind development pipeline capacity, including future potential and policy ambition, see **pages 27-28.**

To find out where future development sites are, please see figure 18 on **page 29**.

1. Capacities noted are rounded to the nearest whole MW.
2. Asset managed by Crown Estate Scotland.

Floating opportunity powering ahead in the Celtic Sea

Offshore Wind Leasing Round 5 in the Celtic Sea is designed to accelerate the establishment of floating offshore wind in the UK, with the potential to drive new jobs and economic opportunity in Wales, South West England and across the UK and generate enough renewable energy to power more than 4 million homes.

In 2024 The Crown Estate completed the Celtic Sea Habitats Regulations Assessment (HRA) which concluded that protected environmental sites will not be adversely affected by the Test and Demonstration (T&D) projects, and the development opportunities that will be offered as part of Leasing Round 5. This was the first time that The Crown Estate has undertaken the HRA ahead of an offshore wind leasing process, giving Bidders early visibility of the steps they will need to take to ensure conformity with the HRA (including any necessary mitigations), reducing uncertainty and helping reduce the risk of future delays.

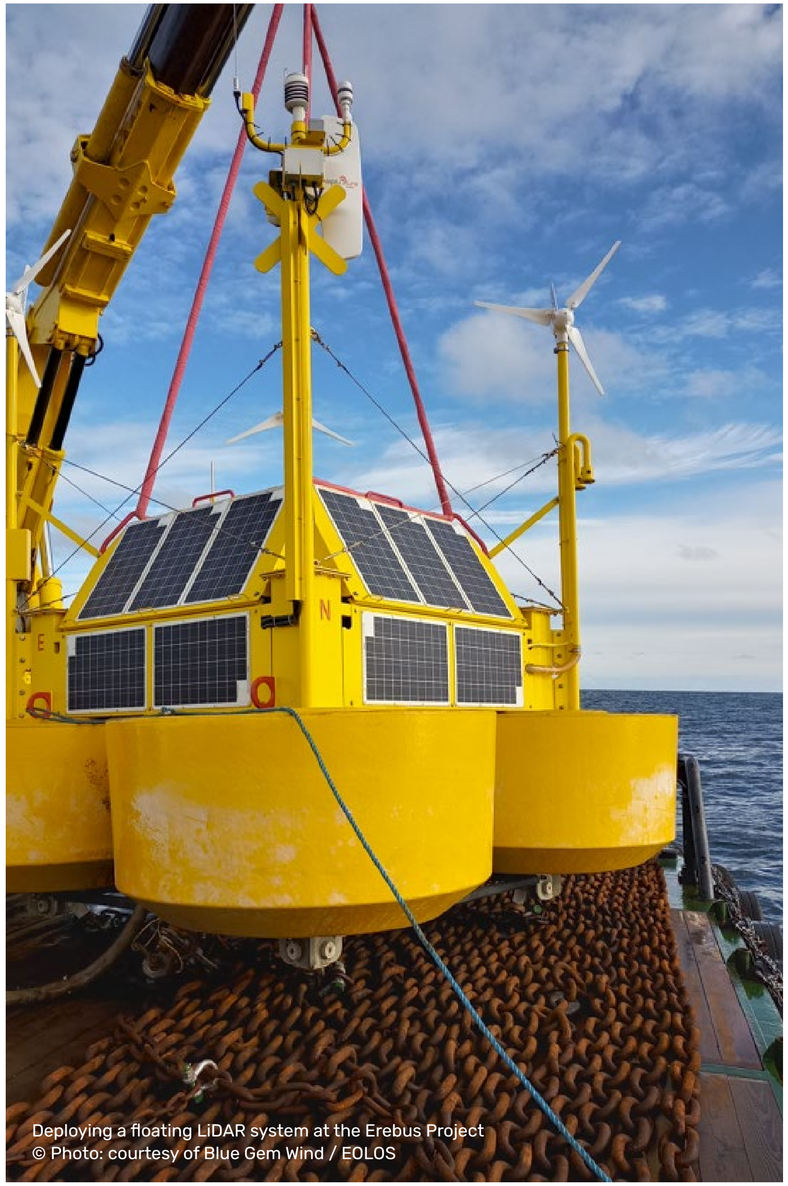
In August 2024 the Leasing Round 5 Invitation to Tender Stage 1 (ITT Stage 1) was launched, which required Bidders to set out their plans for delivering the new wind farms, as well as details on how their plans will support the delivery of wider social and economic benefits for onshore communities.

Through early collaboration with NESO, the National Energy System Operator for Great Britain, Leasing Round 5 also became the first leasing round to be brought to market with an agreed plan for connecting the new wind farms to the UK's electricity grid. The development of four floating offshore wind T&D projects in the Celtic Sea, three of which are in Welsh waters, is also progressing. Projects are either already consented or progressing through planning, and seek to secure a Contract for Difference (CfD) once eligible. The Crown Estate is supporting the development of these projects to advance floating offshore wind technology and further de-risk the delivery of Leasing Round 5 by providing new technologies and approaches to assembly and deployment.

Supply chain development in Wales received a boost with the announcement that Pembrokeshire College, NPTC Group of Colleges and Marine Power Systems, amongst others, were awarded funding from the first round of **The Crown Estate's Supply Chain Accelerator**, to support skills development and floating platform fabrication respectively.

You can read more about Leasing Round 5 and the next steps for the leasing process **here**.

Leasing Round 5 became the first leasing round to be brought to market with an agreed plan for connecting the new floating offshore wind farms to the UK's electricity grid.



Deploying a floating LiDAR system at the Erebus Project
© Photo: courtesy of Blue Gem Wind / EOLOS

Scottish offshore wind

By the end of 2024, almost 3GW of capacity was fully operational in Scottish waters, with a further 1.3GW in construction. Here Crown Estate Scotland sets out the key developments in the offshore wind pipeline in Scotland, as well as progress to support the supply chain and enabling activity.

45GW

Pipeline of capacity in Scottish waters, including operational, committed, under development, pre-planning and identified potential[1]

Crown Estate Scotland
Oighreachd a' Chrùin Alba

1. Part of the 95GW pipeline for the whole of the UK.

Port of Nigg, Moray West
© Photo: courtesy of Crown Estate Scotland

Overview

Crown Estate Scotland has 27 option agreements for offshore wind farms in Scottish waters.

Of these projects, 20 are for ScotWind projects, one is for an Innovation and Targeted Oil & Gas (INTOG) project and six predate these leasing rounds.

Pre-ScotWind projects

Berwick Bank, which has an expected 4.1GW of generation capacity, secured planning permission in principle in 2024 for its onshore infrastructure and is awaiting an offshore consent decision from the Scottish Government.

The Inch Cape project ended 2024 by preparing for its financial close and step through to lease in January 2025, having successfully re-bid into Contracts for Difference (CfD) Allocation Round 6 (AR6) for 25 per cent of the project capacity.

ScotWind leasing round

The year ended with four projects having submitted S36 consent applications to Scottish Ministers.

The 2GW West of Orkney project secured planning permission in principle for its onshore infrastructure.

Consultation events for projects are being held across the country so that communities can better understand the projects and have some input to their implementation.

However, uncertainty around grid connections and associated network design has continued to present a challenge; the picture should be clearer in 2025.

Innovation and Targeted Oil & Gas (INTOG)

The timing of Innovation (IN) projects from this leasing round is crucial if they are to play a role in enabling the pipeline of floating offshore wind projects from the ScotWind round.

The Salamander project submitted its consent application to Scottish Ministers with determination expected in 2025. Collectively, innovation projects continue to work together via the ORE Catapult and Net Zero Technology Centre led Innovation Network to facilitate research, development, and engagement for all five innovation projects.

Targeted Oil & Gas (TOG) projects continued to make good progress:

- Greenvolt stepped into an Option Agreement after securing consent and bidding successfully in the latest CfD round.
- Cerulean Winds and Cenos progressed development work in the Exclusivity Period.
- The Culzean single turbine decarbonisation project secured a marine licence.

Inch Cape Offshore Wind Farm. Smulders - Jacket Lift-14
© Photo: courtesy of Inch Cape Offshore Wind Farm

Supply Chain and Enabling

Crown Estate Scotland continues to support the strategic supply chain and enabling activity and socio-economic development necessary to help Scotland maximise the benefits of offshore wind development.

Crown Estate Scotland is collaborating with The Crown Estate to extend its **Whole of Seabed programme** to include Scottish waters, giving long-term insights into wind potential in Scotland. It has also provided funding to the Floating Wind Centre of Excellence's Environmental Interactions Strategic Programme, and continues to fund a number of key projects as part of its support for the Scottish Offshore Wind Energy Council (SOWEC), including a major project on nature-inclusive design and the Scottish innovation prospectus.

Notably the Strategic Investment Model (SIM) laid the groundwork for the investment of up to £6.5 billion of capital expenditure in the offshore wind supply chain. It has provided a pathway for the development of key infrastructure projects with 37 projects progressed to Stage 2 of the initiative.

Investments in energy ports remain a key focus for Crown Estate Scotland, as they will play a vital role in enabling the development of Scotland's wider offshore wind industry.

In 2024, Crown Estate Scotland completed the purchase of land adjacent to the Port of Nigg in the Cromarty Firth. This land will be leased to enable the construction of a factory which will produce cables suitable for use by Scotland's pipeline of offshore wind projects.

Performance in Scotland

Construction of Neart na Gaoithe offshore wind farm continued throughout 2024, with 35 turbines fully installed and 27 of these fully commissioned and operational by year end. First power was reached in October 2024. Once fully operational Neart na Gaoithe will produce up to 450MW.

Construction of Moray West offshore wind farm also continued. All 60 turbines have now been installed and by the end of the year 59 turbines were fully commissioned. First power was reached in July 2024. Moray West will have a generating capacity of 882MW and full operation of the wind farm is anticipated by summer 2025.

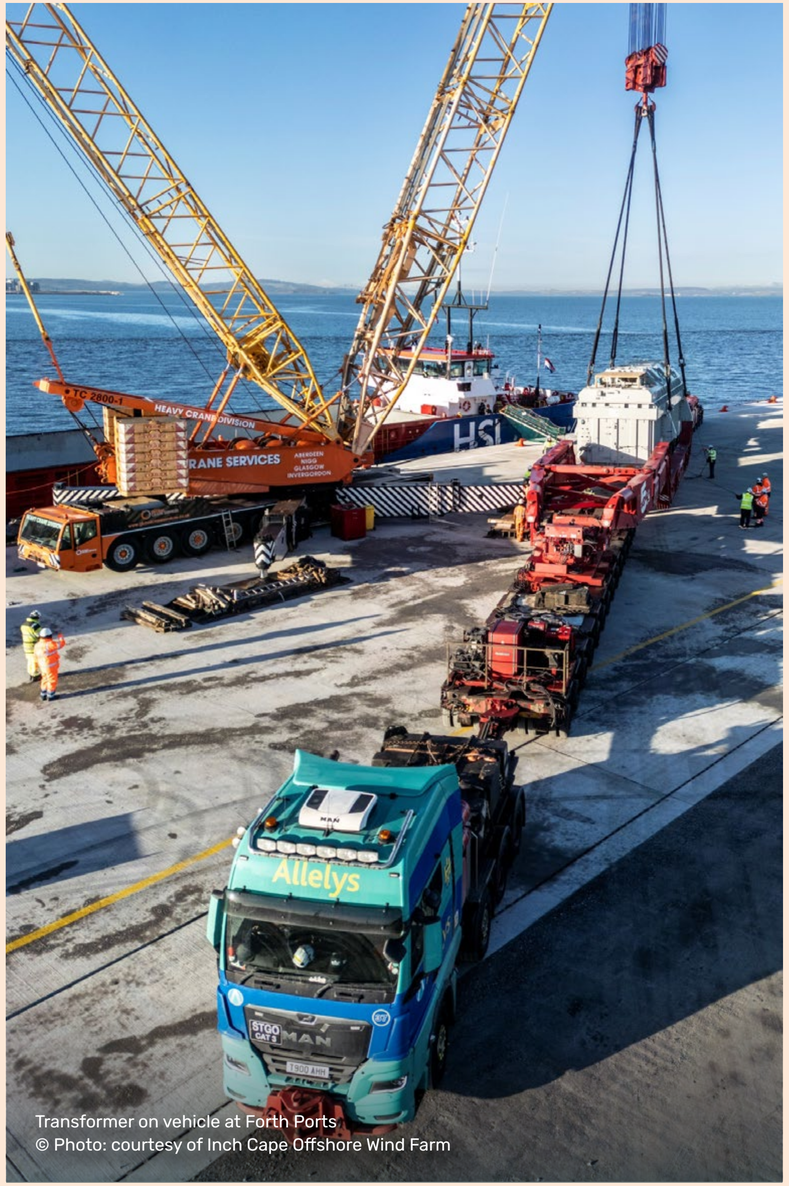
At the end of 2024, almost 3GW of capacity was fully operational with a further 1.3GW in construction.

Grid capacity continues to be a significant challenge for certain assets within the Scottish portfolio, with further curtailment constraining the wind energy produced as more wind farms move into operation. In 2024 the offshore wind portfolio was also challenged with significant maintenance on some of the assets. Across the portfolio wind speeds varied, with an annual energy deviation two per cent below the long-term average in the Moray Firth region, compared to 2.1 per cent above the long-term average on the east coast.

c. 24GW

Pipeline of capacity from floating offshore wind[1]

1. Part of the overall 45GW total capacity pipeline in Scottish waters.



Transformer on vehicle at Forth Ports
© Photo: courtesy of Inch Cape Offshore Wind Farm

Offshore wind farm performance and ownership

In 2024 the UK offshore wind farm fleet produced enough renewable electricity to power more than half of UK homes. However, overall performance was below that of recent years, driven by challenges from lower than average wind speeds, unplanned outages and supply chain constraints.

This section looks at the contribution of offshore wind compared to other electricity sources, as well as the performance and ownership of UK offshore wind farms in 2024.

94.4%

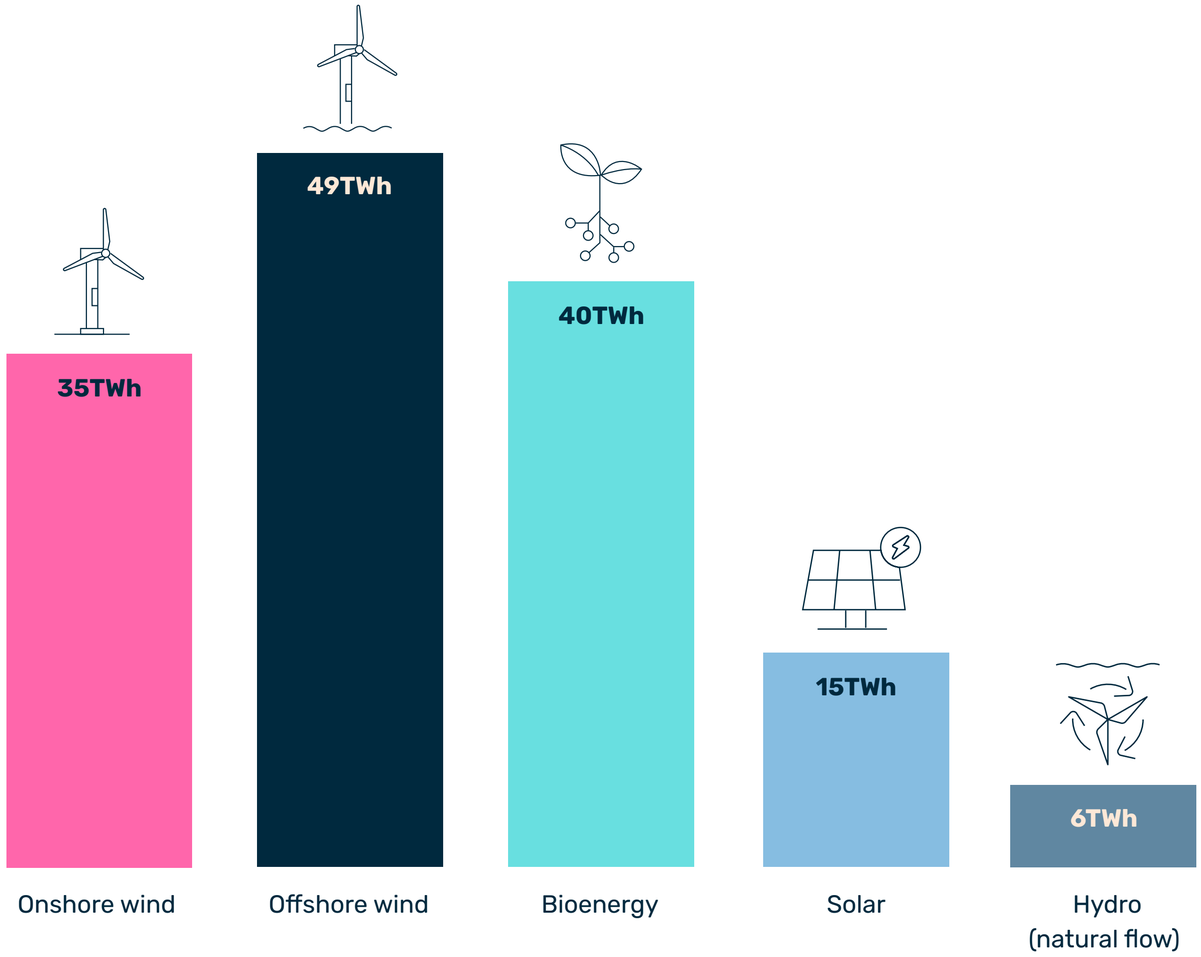
Fleet Performance Index – 2024 total wind farm output vs annual wind energy resource available to the operational fleet

The HVDC offshore converter platform at Sofia Offshore Wind Farm

Fig 8

2024 renewable energy generated by fuel type[1]

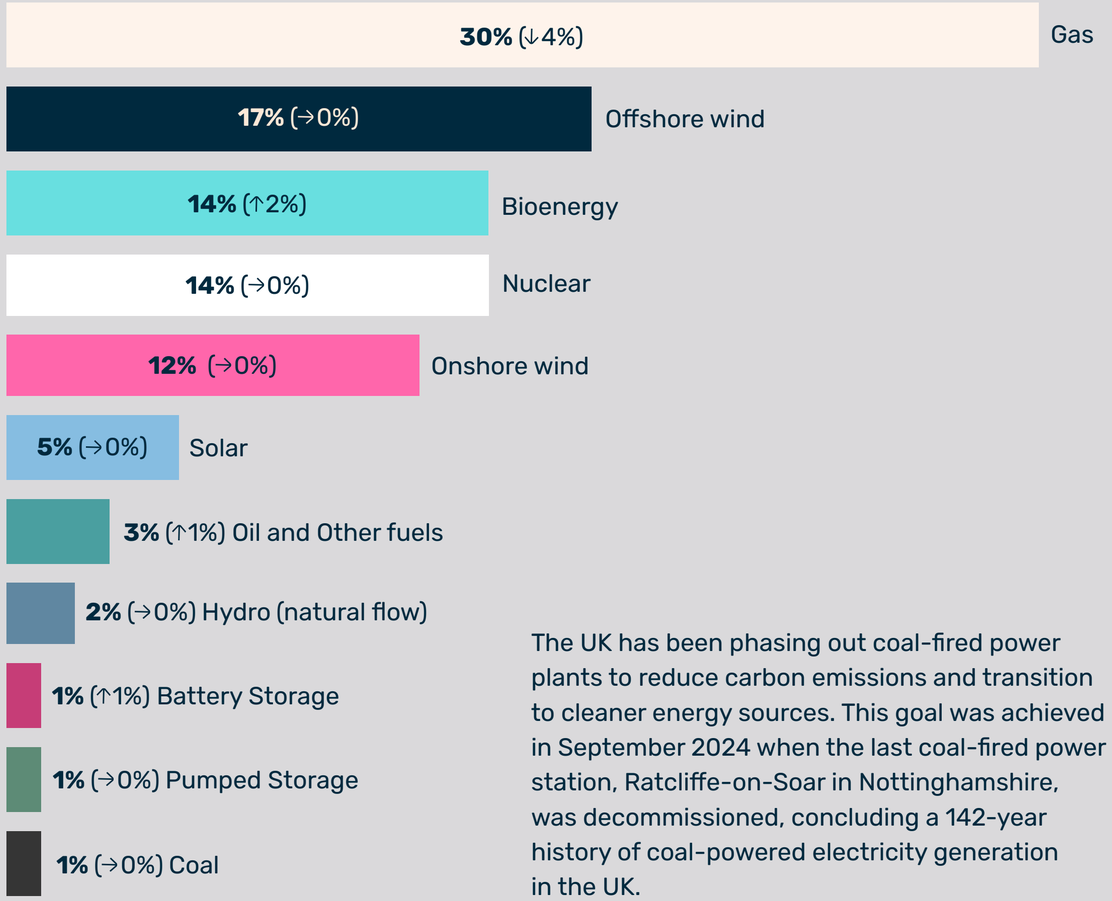
Offshore wind continues to be the cornerstone of renewable energy generation for the UK, producing more green electricity in 2024 than any other renewable source.



1. Data source: Department for Energy Security and Net Zero (DESNZ) Energy Trends. Capacities are rounded to the nearest terawatt hour.

Fig 9

2024 UK electricity generation mix[2] (2023 comparison)



The UK has been phasing out coal-fired power plants to reduce carbon emissions and transition to cleaner energy sources. This goal was achieved in September 2024 when the last coal-fired power station, Ratcliffe-on-Soar in Nottinghamshire, was decommissioned, concluding a 142-year history of coal-powered electricity generation in the UK.

2. Data source: DESNZ Energy Trends.

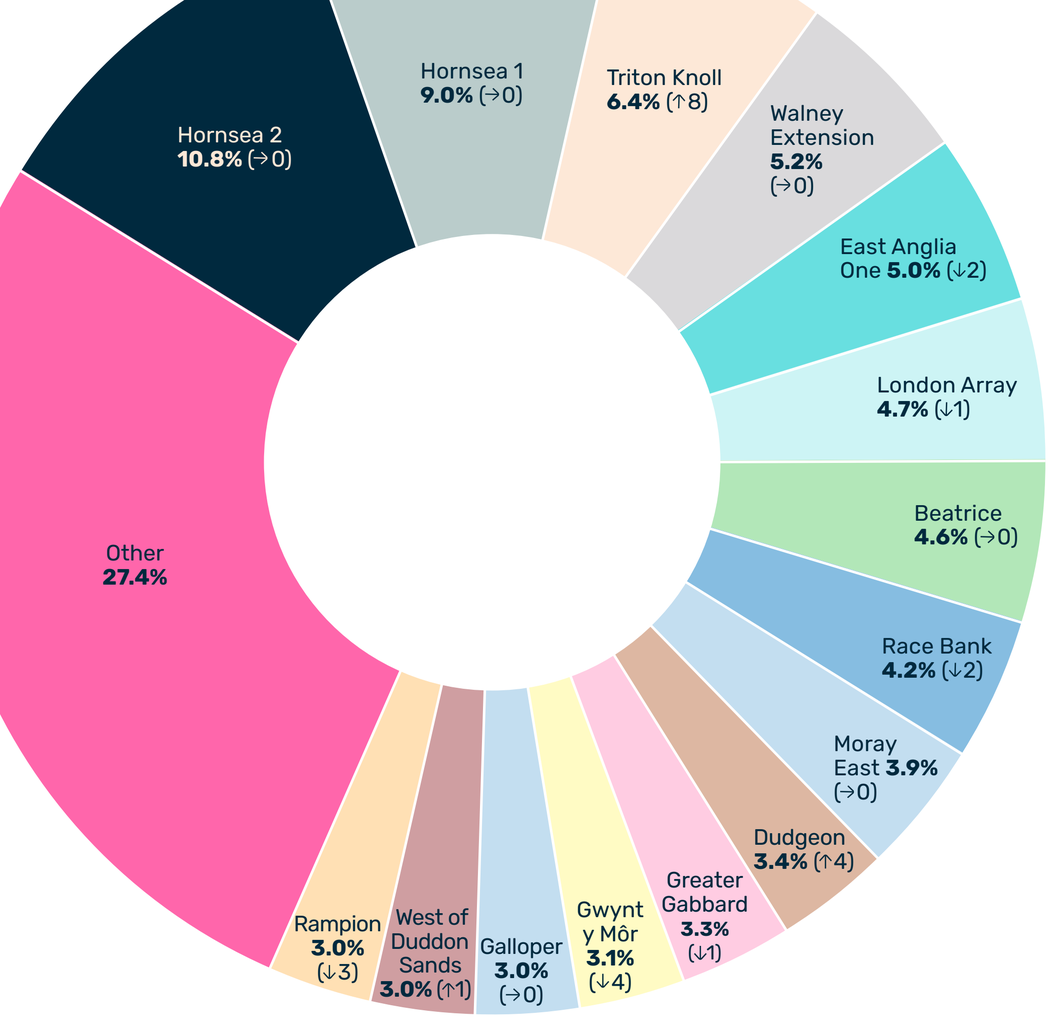


Fig 10

Offshore Wind generation by wind farm

As a percentage of total generation in 2024 (position change from 2023)

Overall performance in 2024 was lower than in previous years due to slightly lower than expected wind speeds, unplanned outages and supply chain constraints impacting generation.

Fig 11

Monthly UK wind variability in 2024

Variability in UK wind speeds can considerably impact offshore wind generation. Across 2024 the wind followed the normal trend of UK seasonality with decreased windiness due to slightly lower (-0.3 per cent) than the long-term average wind speeds for the UK.

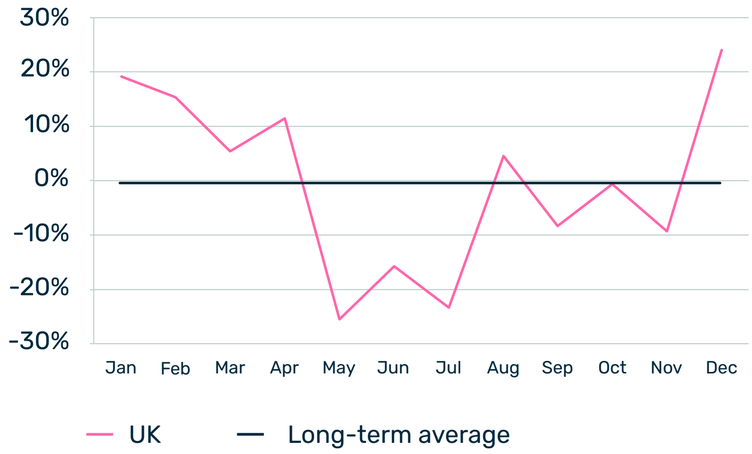
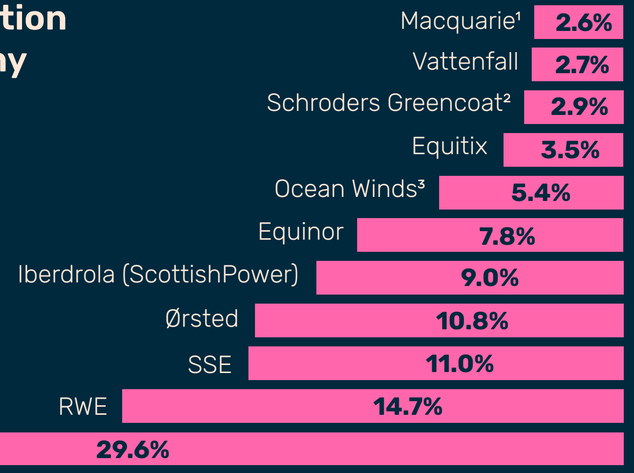


Fig 12

Operational and under construction wind farm ownership by company

(As a percentage of total capacity in 2024)

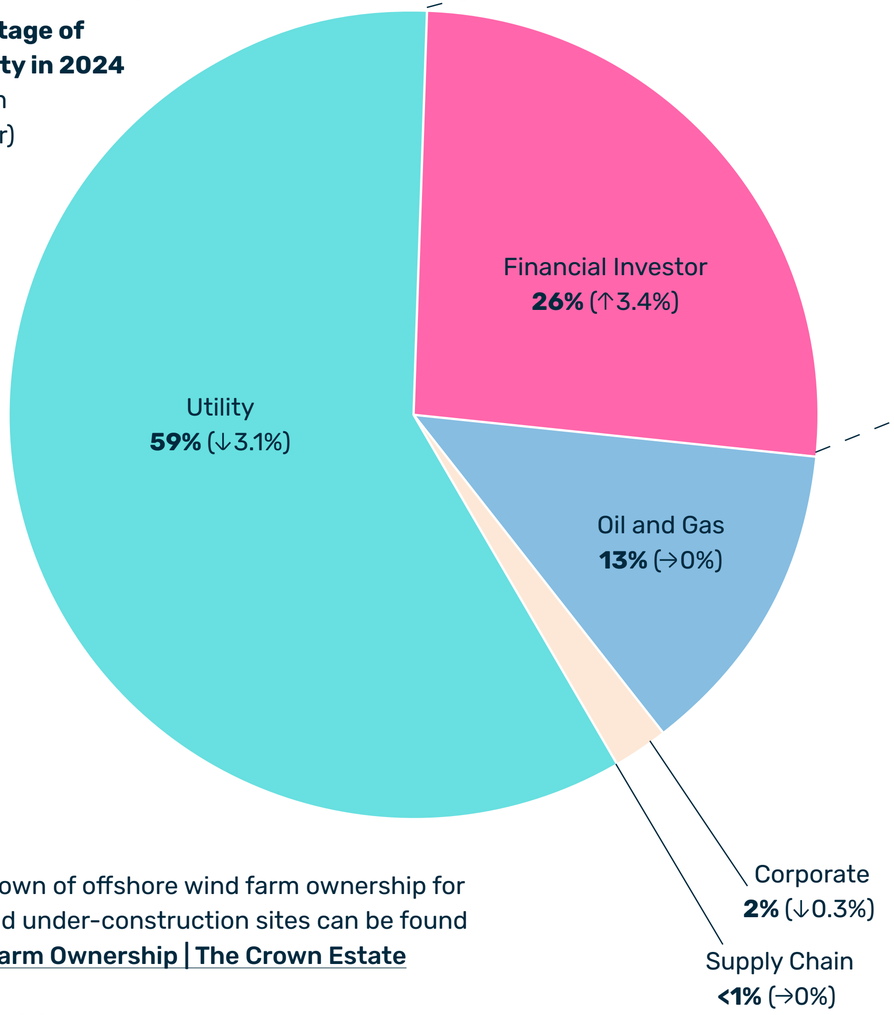


1. Green Investment Group (GIG), GIG Renewable Energy Fund, Macquarie Infrastructure and Real Assets. 2. Greencoat UK Wind, Greencoat Renewable Income LP, other Schroders Greencoat Funds. 3. Joint venture between EDP Renewables and ENGIE.

Fig 13

Ownership of wind farm during operational and development stage by investor category[1]

As a percentage of total capacity in 2024 (change from previous year)



A full breakdown of offshore wind farm ownership for operating and under-construction sites can be found here: **Wind Farm Ownership | The Crown Estate**

1. Percentages rounded.

Fig 14

Breakdown of financial investor by type

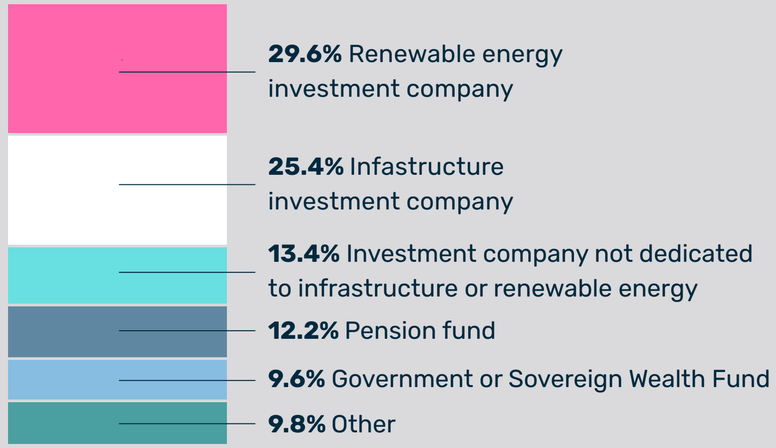
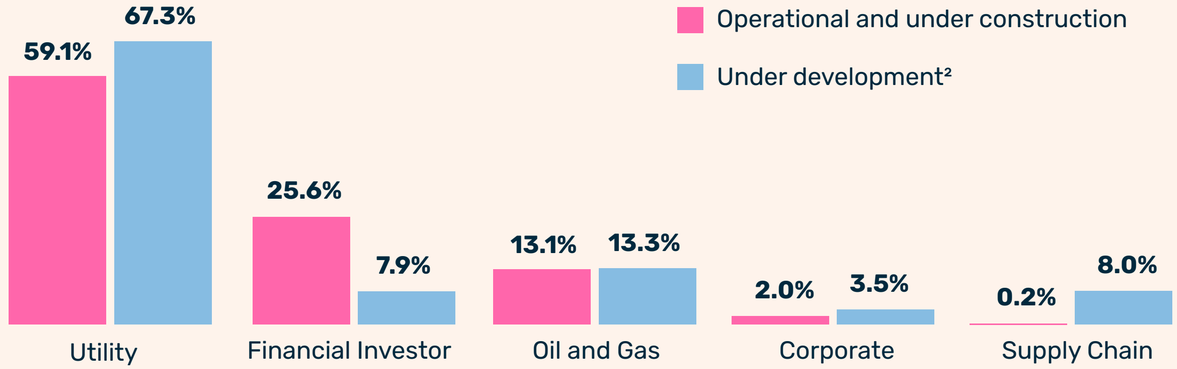


Fig 15

Capacity ownership by category and lifecycle stage in 2024



2. Projects with government support on offer, consented, in planning or pre-planning.

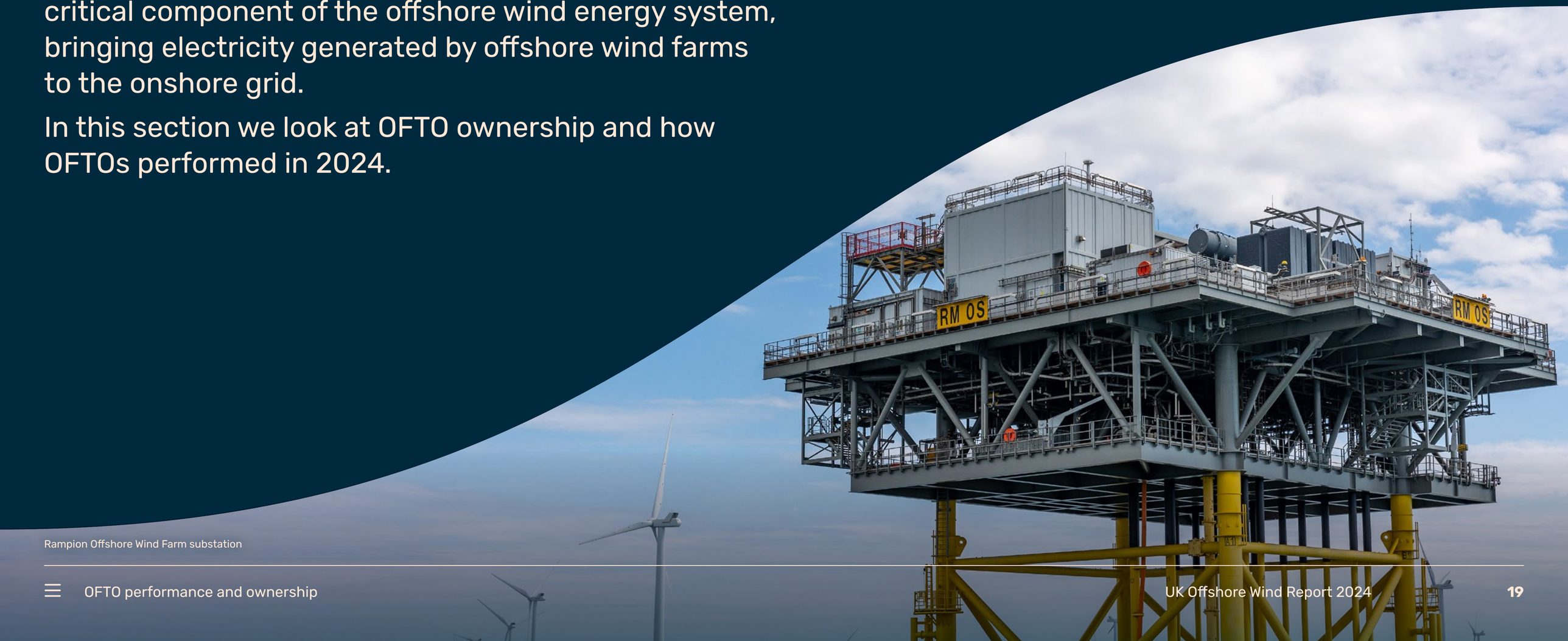
OFTO performance and ownership

The Offshore Transmission Owner (OFTO) network is a critical component of the offshore wind energy system, bringing electricity generated by offshore wind farms to the onshore grid.

In this section we look at OFTO ownership and how OFTOs performed in 2024.

3,991km

Of circuit within the OFTO network. That's equivalent to approximately three times the length of the UK.



Rampion Offshore Wind Farm substation

Overview

An OFTO licence was awarded to Moray East in 2024 and to Seagreen Phase 1 in early 2025. The network now comprises 3,991 kilometres of export cable circuits, connecting to 28 offshore substations and supporting over 13.8GW of grid capacity[1].

OFTO ownership details can be found here: **OFTO Ownership | The Crown Estate.**

Fig 16

Average OFTO availability

Whilst average availability fell slightly below the minimum level target of 98%, almost half of OFTOs achieved 100% availability, a significant uplift on 2023.

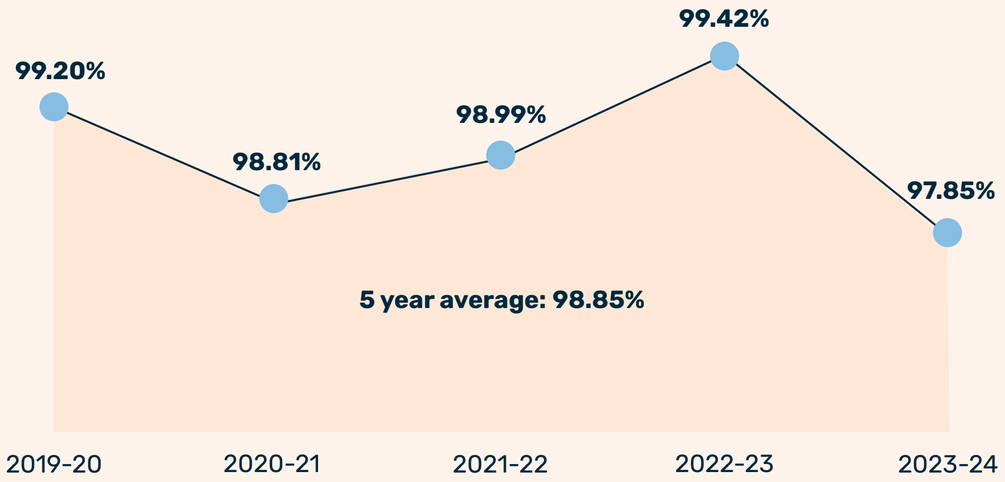


Fig 17

UK OFTO ownership in 2024 by company

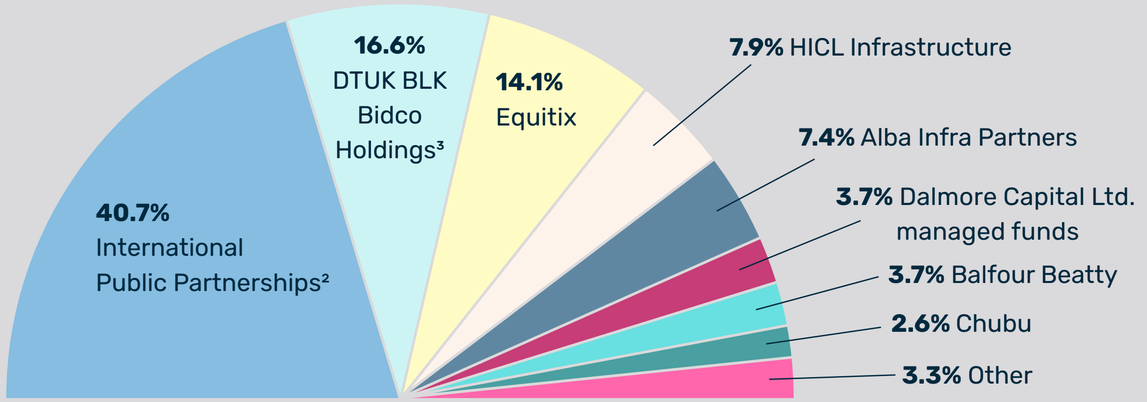
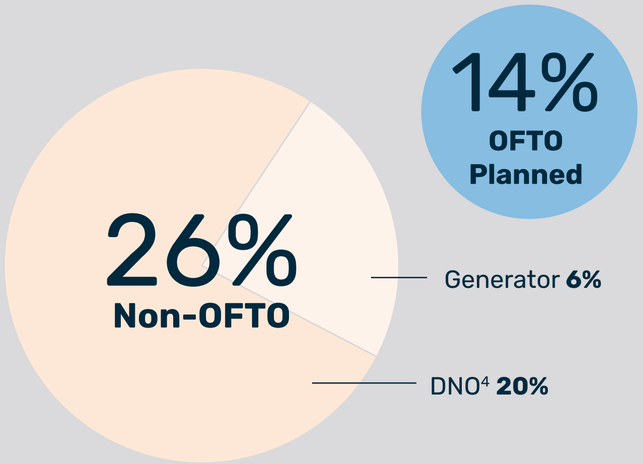


Fig 18

Causes of OFTO system unavailability

Split by cause of OFTO outages during 2023/2024



60% OFTO Unplanned

1. An OFTO licence was granted in March 2025 to Seagreen Phase 1 OFTO limited. This is reflected in the statistics on this page, but not in Figures 16 and 18, which are taken from the annual NETS performance report produced by National Grid. The full report can be found here **www.neso.energy/document/324226/download**
2. OFTOs operated by Transmission Capital Partners.
3. OFTOs operated by DTUK or Frontier Power.
4. DNO - Distribution Network Operators

Diversity and skills

This section covers some of the key initiatives launched in 2024 to build the diverse, skilled and resilient future workforce which will be a critical factor in the sector meeting its long-term growth potential.

100,000

Estimated number of jobs in the offshore wind sector by 2030

Offshore wind farm technician at work
© Photo: courtesy of Siemens

Overview

The future success of the UK offshore wind industry relies on a diverse, skilled and resilient future workforce which can fill the estimated 100,000 jobs in the sector by 2030[1].

Galvanizing supply chain opportunities is key to realising this opportunity. See **page 32** for progress over the year in this area.

Initiatives to inspire and upskill people across the country continue. In 2023 the Offshore Wind Industry Council (OWIC) published a **People and Skills Plan** which sets out a vision for the sector to be "among the most attractive, equitable, diverse and inclusive sectors… in the UK economy."

Throughout 2024 the focus has been putting that plan into action in partnership with industry, as can be seen in Figure 20 on **page 23**.

Other initiatives during the year sought to drive awareness of career opportunities amongst young people. RWE's new offshore virtual work experience programme aims to give 13-18 year olds an insight into careers in the offshore wind sector, including valuable information about careers and pathways into RWE and the wider sector. By making it available online, the content is accessible regardless of location, opening up opportunities to a wider audience of young people.

Following 2023's launch of Minecraft Education's 'Offshore Wind Power Challenge', a collaboration between The Crown Estate and Microsoft UK, the game has now had over 1.3 million downloads and continues to inspire the next generation to consider a future career in the sector.

In 2024 The Crown Estate commissioned research to identify and map areas in the south west which could benefit from the social value that Leasing Round 5 developers are required to deliver as part of their projects. The aim is to give developers a shared and holistic understanding of the needs of local communities in which they will operate and maximise the social and economic impact they can deliver.

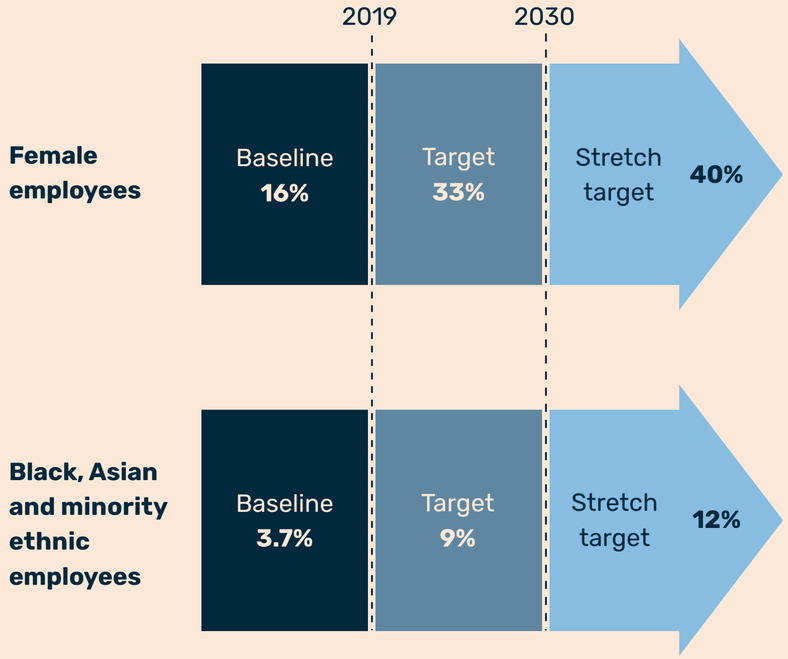
The Crown Estate is exploring ways in which it can help develop a skills pipeline linked to the clean energy transition. This includes seed-funding an innovative GCSE-equivalent qualification focused on engineering skills for renewable energy at Falmouth Marine School in Cornwall, which is based in an area set to benefit from the offshore wind development planned for the Celtic Sea. In 2024 the first cohort of students began the two-year course which, if successful, could be adopted more widely.

In Wales, The Crown Estate has awarded funding from its Supply Chain Accelerator (see **page 32**) to Pembrokeshire College and NPTC Group of Colleges to support skills development.

A wind farm technician at Rampion wind farm

Fig 19

Offshore Wind Sector Deal workforce target



The Offshore Wind Sector Deal[3] reflects the deepening partnership between the Government and the sector, with workforce targets reflecting the optimism and confidence in the ongoing growth of offshore wind. Building the capability and increasing diversity within the workforce are fundamental and the sector is committed to taking action to reach the targets set out above.

1. Offshore Wind Industry Council (June 2023): Offshore Wind Skills Intelligence Report.
2. Percentages rounded; no comparative data for 2023.
3. Policy Paper - **Offshore Wind Sector Deal.**

Fig 20

OWIC People and Skills Plan – 2024 progress across key themes and priorities

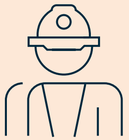
Support priority occupations:
Identification of 16 scarce and critical occupations within the Offshore Wind sector, using data insights from OWIC's skills intelligence report and industry insights. Energy and Utility Skills was commissioned to produce an occupational map for each of these roles, detailing the core tasks and duties, routes to competency across the four nations of the UK, salaries, feeder and progression occupations and entry points into these roles for new entrants to the labour market or career switchers. This work, due for completion in 2025, will form the basis of industry collaboration to attract and recruit to key roles.

Cluster-based partnerships:
OWIC's reformed Clusters Forum broadens cluster engagement to include a new focus on skills, as well as supply chain and innovation, to ensure responsiveness to local needs and demographics. In 2024 OWIC agreed to undertake further work to support the development of regional skills hubs in partnership with industry and offshore wind clusters.

A just transition:
A new Wind Sector Industrial Relations Collaboration Forum was established in early 2024, bringing together industry figures with representatives from the Unite, GMB, Unison and Prospect trade unions. The forum, a joint OWIC and RenewableUK initiative, has set out an agreed work programme for 2025 focused on skills, employment practices, health safety and welfare, supply chain growth and joint policy work.

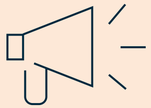
A diverse and inclusive sector:
OWIC's diversity and inclusion working group has explored actions to improve inclusion in the sector and is now working to update OWIC's Diversity & Inclusion best practice guide. Details on the sector's demographics are expected to be published in the upcoming OWIC Skills Intelligence Report due for publication in June 2025.

Attraction and recruitment:
Following a commitment to increase apprenticeships to five per cent of the workforce by 2030, a number of developers worked with Energy and Utility Skills to create the new wind Turbine Technician Apprenticeship standard during 2024.



Retention and upskilling:
Jointly with Offshore Energies UK, RenewableUK led industry efforts by launching the energy skills passport to help oil and gas workers access opportunities in clean energy jobs.

Training provision:
In 2024, work was undertaken with National Skills Academy for Rail to enhance OWIC's labour forecasting approach. This will inform an update to the OWIC Skills Intelligence Report in June 2025. For the first time, the report will include estimates of onshore wind demand alongside offshore forecasts, labour demand estimates against Clean Power Action Plan power output scenarios, and publish an update on the representation of women and ethnic minorities in the sector.



Educational outreach:
Throughout 2024 development work on a single careers portal has taken place, with a view to supporting those seeking information on careers and training in the sector, including through resources to inform teachers, carers, parents, students, workers and careers advisors about opportunities. Further steps to launch this will be progressed in 2025.

Health, safety and wellbeing

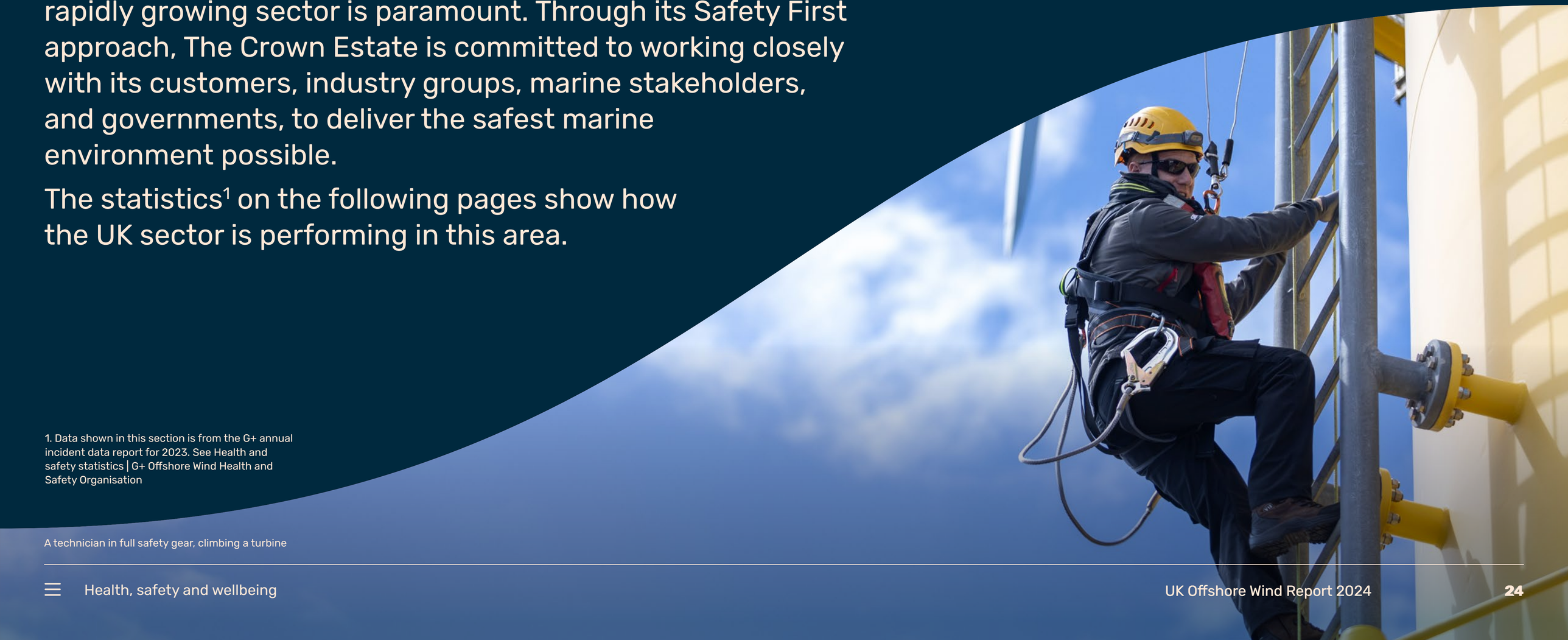
8%

Reduction in 2023 restricted work day injuries

The health, safety and wellbeing of the people who work in this rapidly growing sector is paramount. Through its Safety First approach, The Crown Estate is committed to working closely with its customers, industry groups, marine stakeholders, and governments, to deliver the safest marine environment possible.

The statistics[1] on the following pages show how the UK sector is performing in this area.

1. Data shown in this section is from the G+ annual incident data report for 2023. See Health and safety statistics | G+ Offshore Wind Health and Safety Organisation



A technician in full safety gear, climbing a turbine

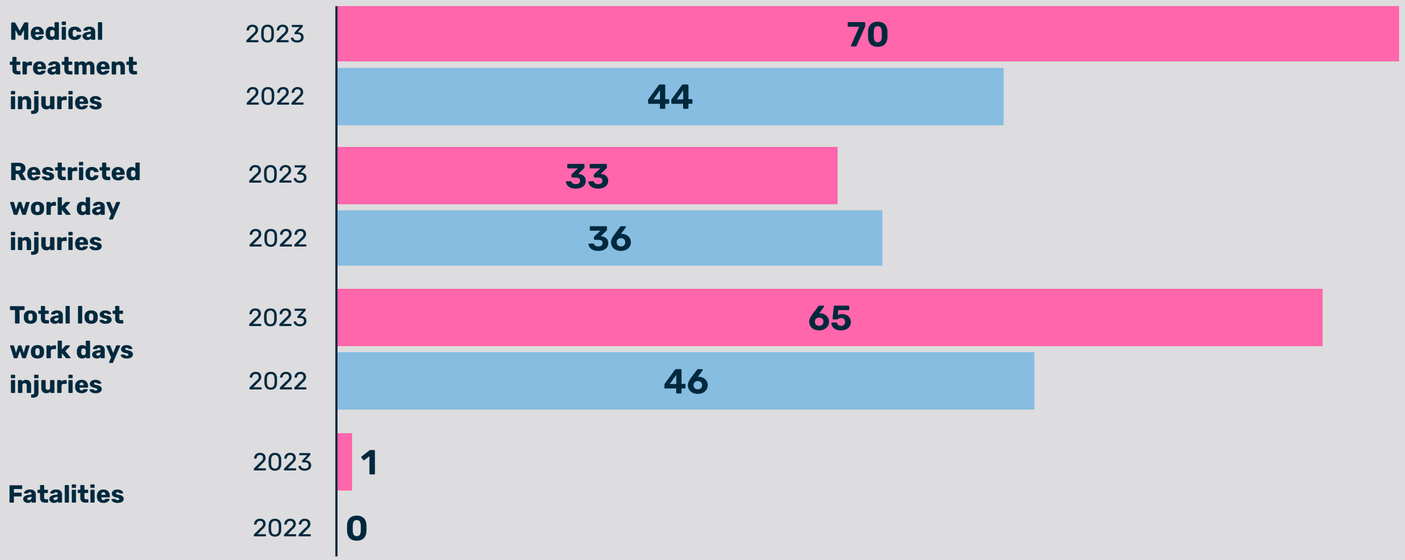
Overview

Data in this section is from the G+2023 Incident data report; their next report is due for publication in June 2025.

Figure 21 shows number of incidents per million hours. An increase of 39% in the number of hours worked globally during 2023 has impacted safety performance as shown by the increase in recordable incidents in Figure 21 and the safety metrics in Figure 22. The rise in LTIF and TRIR percentages in the UK highlights the importance of maintaining the industry's high safety standards as larger projects are constructed further offshore and offshore activity ramps up.

Fig 21

Global offshore wind industry recordable injuries (2022 v 2023)[1]



1. Source: G+ 2023 incident data report (2024 data expected June 2025) – to download the 2023 report, visit the **G+ website.**

Fig 22

LTIF and TRIR percentage values (2022 v 2023)

Lost Time Injury Frequency (LTIF)[2] and Total Recordable Injury Rate (TRIR)[3] are key indicators of the effectiveness of health and safety procedures.

2. The number of fatalities and lost work day injuries per million hours worked.
3. The number of fatalities, lost work day injuries, restricted work day injuries and medical treatment injuries per million hours worked.

Fig 23

UK top three work processes causing most incidents in 2023

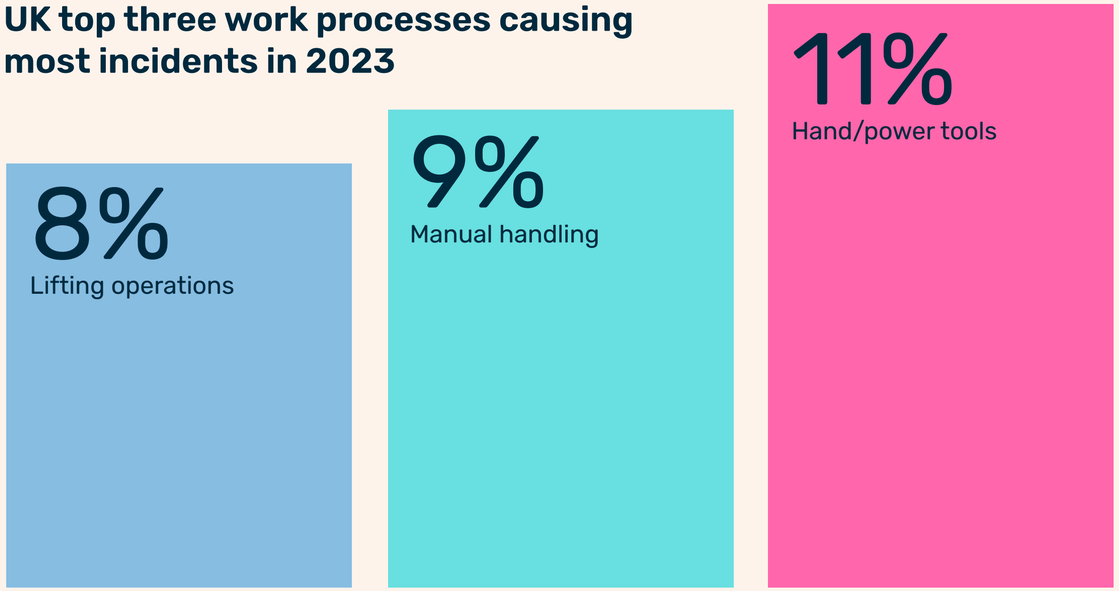


Fig 24

UK incident consequence profile 2023

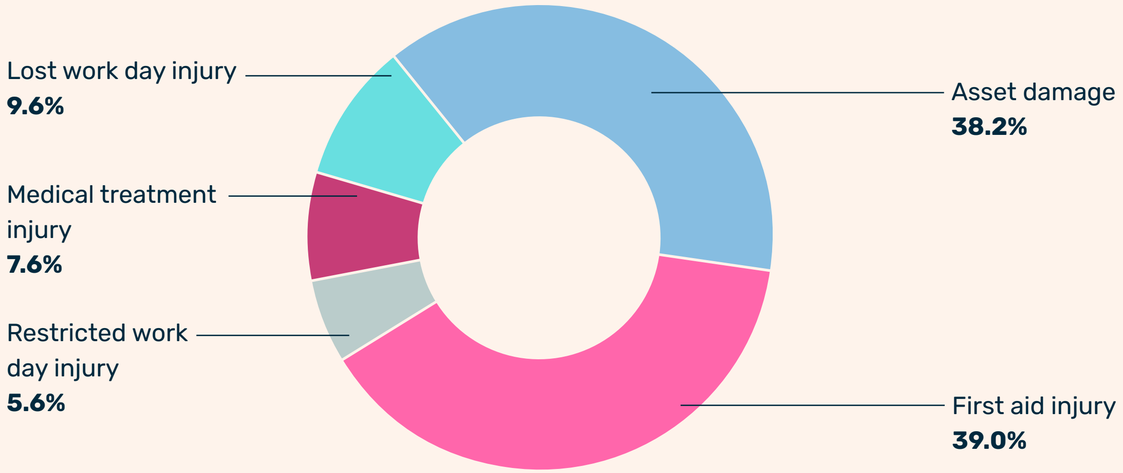
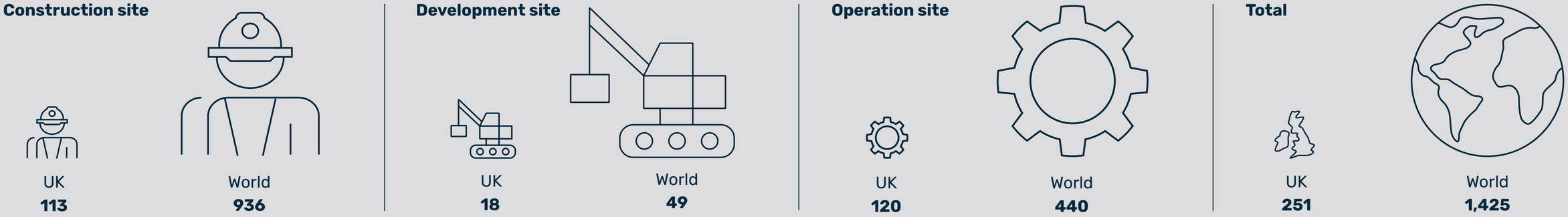


Fig 25

Incident by site type 2023 – UK v rest of the world



Offshore wind development pipeline

The UK offshore wind pipeline now stands at 95GW. Moving projects through the pipeline to become fully operational is critical to maximising the sector’s contribution to net zero. In this section we share a breakdown of the current pipeline and notable movements within it during 2024.

95GW

pipeline of UK offshore wind capacity

A jack up vessel, used in wind farm installation, alongside a wind turbine

UK offshore wind development pipeline

In 2024 the UK offshore wind pipeline increased from 93GW to 95GW, driven by capacity adjustments to several existing projects in Scotland. Two offshore wind farms in Scotland achieved first power, and development consent was awarded to Dudgeon Extension, Sheringham Shoal Extension and Green Volt. Eleven projects – including all Offshore Wind Leasing Round 4 projects – submitted planning consent applications, representing a total of approximately 15GW of potential capacity.

Allocation Round 6 in the Contracts for Difference (CfD) scheme marked a return of developer interest, boosted by the UK Government increasing the budget to a record high. CfDs were awarded to seven offshore wind projects for a total capacity of 5.3GW, helping major projects secure routes to market, including Hornsea Project 4, East Anglia TWO and Green Volt, the first commercial-scale floating offshore wind farm in Europe.

Further progress was seen with the installation of the final wind turbine on the 882MW Moray West project in Scotland. Turbine foundation installation started at Dogger Bank B, part of what is expected to become the world's largest offshore wind farm, and RWE unveiled the first of the turbine blades being made at the Siemens Gamesa factory in Hull for the 1,400MW Sofia offshore wind project.

1. Projects under construction or projects that have government support on offer.
2. **Clean Power 2030 Action Plan (2024)**.
3. Potential from current leasing rounds and additional capacity requests, including Innovation and Targeted Oil & Gas (INTOG) and Leasing Round 5.
4. 'Balanced Pathway' recommendation: The Seventh Carbon Budget: The UK's Path to Net Zero.
5. ROC - Renewables Obligation Certificate.

Fig 26

UK offshore wind development pipeline capacity

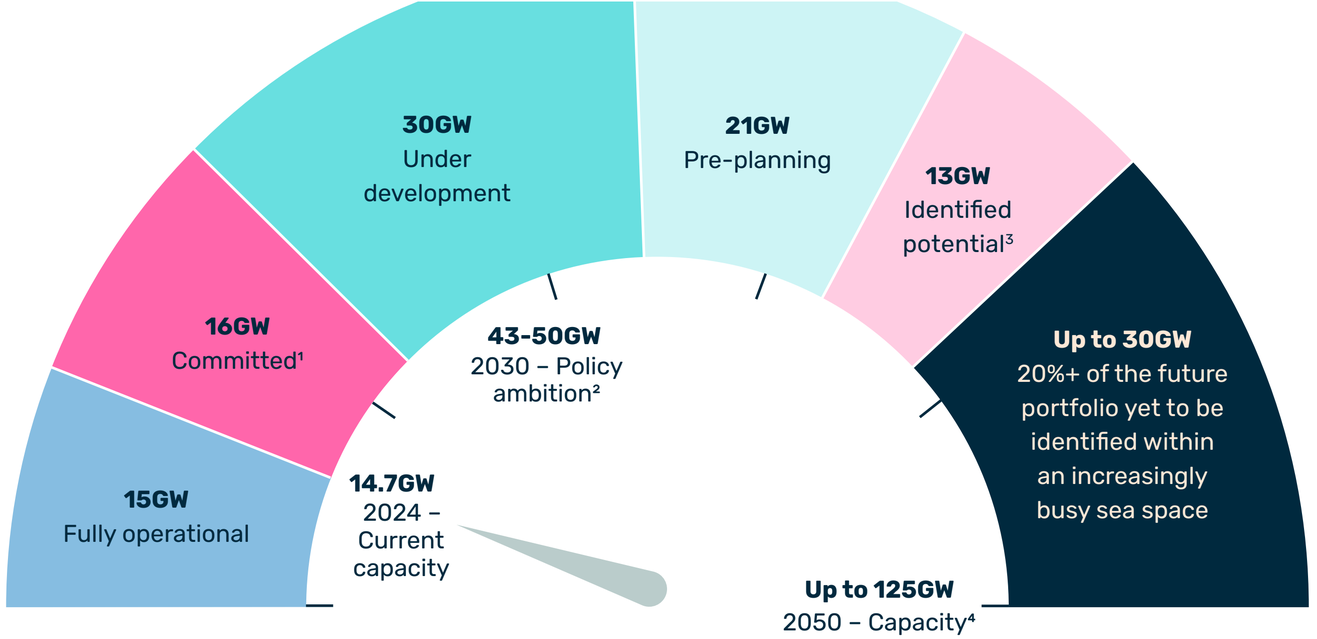
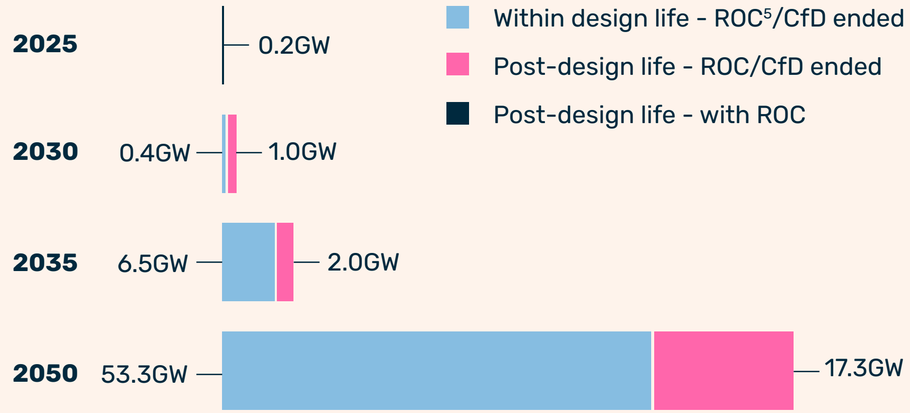


Fig 27

Consented and leased capacity expected to be post-design life/subsidy 2025-2050

While the development pipeline will continue to grow in the coming years, the scale of mature operating capacity is also expected to increase. It is critical for the sector to maintain focus on keeping existing offshore wind capacity online, through exploring opportunities for efficient late-life operation, wind farm life extension, and repowering.



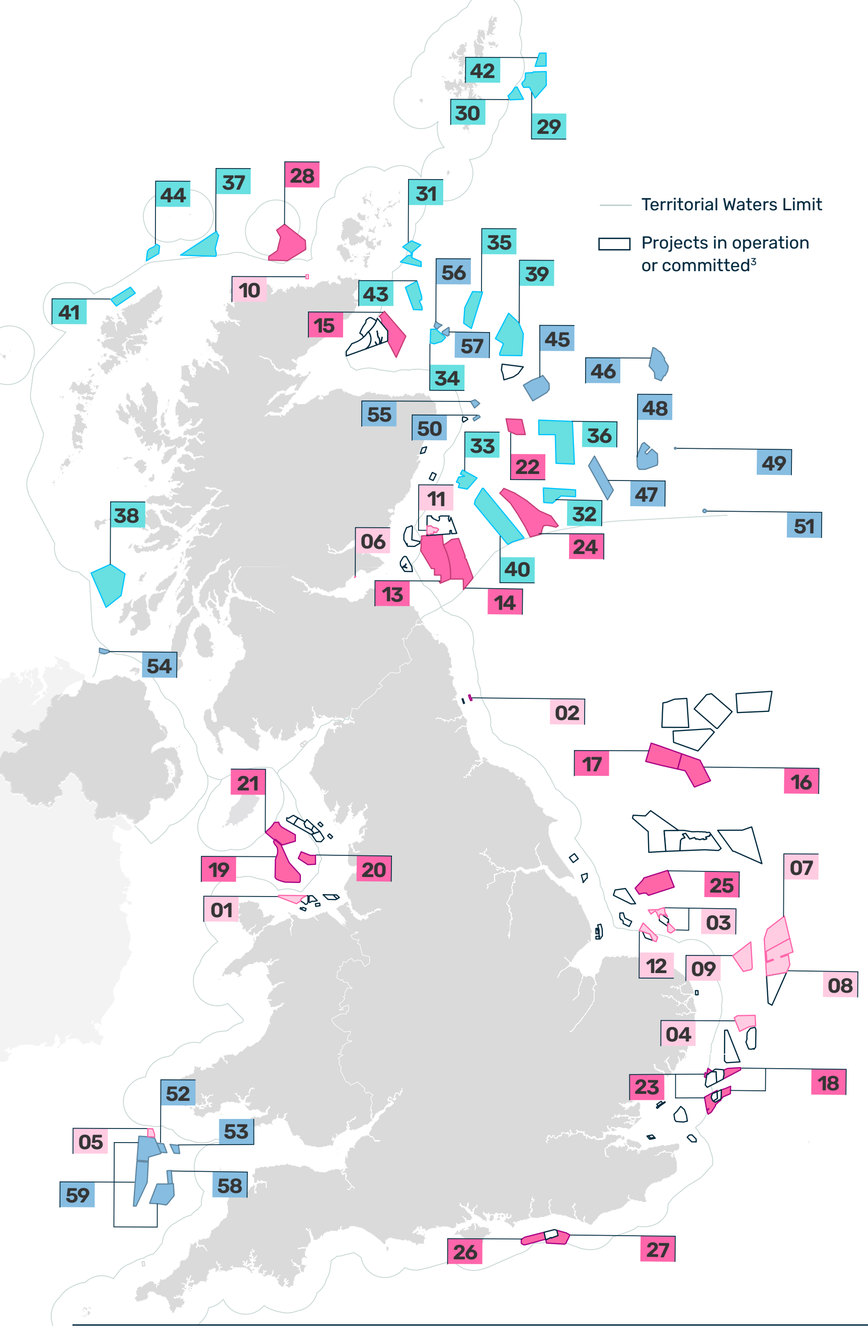


Fig 28

UK offshore wind development pipeline as at 31 December 2024

Consented

Wind farms that have received consent but not yet secured a Contract for Difference

		Up to capacity MW[1]
01	Awel y Môr[Ext]	576
02	Blyth Demonstration Phase 3[T&D]	58
03	Dudgeon Extension[Ext]	402
04	East Anglia ONE NORTH[R3]	950
05	Erebus[T&D]	100
06	Forthwind[T&D, 2]	20
07	Norfolk Boreas[R3]	1,400
08	Norfolk Vanguard East[R3]	1,400
09	Norfolk Vanguard West[R3]	1,400
10	Pentland[T&D, 2]	100
11	Seagreen Phase 1a[R3,2]	500
12	Sheringham Shoal Extension[Ext]	317
Total		**7,223**

In planning

Wind farms for which a consent application has been submitted

		Up to capacity MW[1]
	Berwick Bank[R3, 2]	4,100
	Marr Bank[R3,2]	
	Caledonia[SW, 2]	2,000
	Dogger Bank South (East)[R4]	1,500
	Dogger Bank South (West)[R4]	1,500
	Five Estuaries[Ext]	353
	Mona[R4]	1,500
	Morecambe[R4]	480
	Morgan[R4]	1,500
	Muir Mhòr[SW, 2]	798
	North Falls[Ext]	504
	Ossian[SW, 2]	3,528
	Outer Dowsing[R4]	1,500
	Rampion 2 (Rampion Extension)[Ext]	400
	Rampion 2 (Zone 6)[R3]	800
	West of Orkney[SW, 2]	2,000
Total		**22,463**

Pre-planning

Wind farms for which a consent application has not yet been submitted

		Up to capacity MW[1]
29	Arven[SW, 2]	1,800
30	Arven South[SW, 2]	500
31	Ayre[SW, 2]	1,008
32	Bellrock[SW, 2]	1,200
33	Bowdun[SW, 2]	1,008
34	Broadshore[SW, 2]	500
35	Buchan[SW, 2]	960
36	CampionWind[SW, 2]	2,000
37	Havbredey[SW, 2]	1,500
38	MachairWind[SW, 2]	2,000
39	MarramWind[SW, 2]	3,000
40	Morven[SW, 2]	2,907
41	Spiorad na Mara[SW, 2]	840
42	Stoura[SW, 2]	500
43	Stromar[SW, 2]	1,000
44	Talisk[SW, 2]	495
Total		**21,218**

Current potential

Projects, leasing rounds and additional capacity subject to AfL, plan-level Habitats Regulations Assessment (HRA), INTOG Sectoral Marine Plan or other pre-conditions

		Up to capacity MW[1]
45	Aspen[TOG, 2]	1,008
46	Beech[TOG, 2]	1,008
47	Cedar[TOG, 2]	1,008
48	Cenos[TOG, 2]	1,350
49	Culzean[TOG, 2]	3
50	Flora[IN, 2]	50
51	Judy[TOG, 2]	15
52	Llŷr 1[T&D]	100
53	Llŷr 2[T&D]	100
54	Malin Sea Wind[IN, 2]	100
55	Salamander[IN, 2]	100
56	Scaraben[IN, 2]	99
57	Sinclair[IN, 2]	99
58	White Cross[T&D]	100
59	Leasing Round 5	4,500
	Additional capacity requests[Ext/R3]	4,000
Total		**13,640**

For the UK offshore wind pipeline as at 31 December 2024, see **page 10**.

1. Capacities noted are rounded to the nearest whole MW.
2. Managed by Crown Estate Scotland.
3. Under construction or government support on offer.

Ext 2017 Extensions Round project
IN Innovation project, INTOG Leasing Round
R3 Leasing Round 3 project
R4 Leasing Round 4 project

SW ScotWind project
T&D Test & Demonstration scale wind project
TOG Targeted Oil & Gas project, INTOG Leasing Round

Paving the way for future growth

To maximise the industry's contribution to net zero, development is required on a scale never seen before. This section covers activity in 2024 which will help the sector accelerate growth by increasing the pipeline, building supply chain capability, and ensuring that growth is achieved in a way which allows other industries and nature to thrive.

£50m
Supply Chain Accelerator fund launched by The Crown Estate

Turbine blades at the Siemens Gamesa offshore wind turbine blade factory, Hull

Shaping future offshore wind opportunity

In 2024, The Crown Estate published two reports that will help shape the future of UK offshore wind.

Marine Delivery Routemap

Marine Delivery Routemap: Towards a shared vision for our seabed and coastline – a collaborative initiative with partners and stakeholders to develop a long-term delivery plan to support growing demands on the marine space. The Routemap will seek to ensure sector demands and nature are fully represented in all decision making, combining data-driven insights and collaboration with industry, government and wider stakeholders.

It works within statutory planning frameworks and policies to deliver for net zero, economic growth, revitalised nature and thriving communities. Its advanced spatial analysis will link offshore development to supply chain opportunities, providing visibility to address delivery challenges, and creating confidence and certainty for investors and decision-makers.

It is envisaged that the Routemap will support identification of spatial pathways and plans towards 2050, inform management of the seabed and coastline, and provide forward visibility on key enabling investments required, for example, ports, supply chain, grid and nature.

Future of offshore wind: Considerations for development and leasing to 2030 and beyond. This report sets out thinking on the Future of Offshore Wind on behalf of the Great British Energy: The Crown Estate partnership, and outlines how the next 20-30GW of offshore wind capacity can be brought to market by the end of this decade, alongside all other marine interests as represented in the Marine Delivery Routemap.

By providing longer-term visibility of the details of future offshore wind leasing rounds and inviting views on a range of discussion points, the aim is to enable the accelerated and sustainable delivery of vital new projects and further increase confidence in the long-term stability of the UK market.

20-30GW

of new offshore wind leasing opportunity could be brought to market by 2030

Great British ENERGY

During the year the UK Government launched Great British Energy, a publicly-owned, operationally independent company headquartered in Scotland.

In July it announced a partnership with The Crown Estate which brings together Great British Energy's ability to invest and critical strategic industrial policy, with The Crown Estate's long-established expertise in bringing forward the UK's world leading offshore wind sector. The Bill creating Great British Energy is nearing completion.

The partnership, supported by the new borrowing and investment powers given to The Crown Estate by the Crown Estate Act 2025, could lead to up to 20-30GW of new offshore wind developments reaching seabed lease stage by 2030 and see the public sector taking on a new role undertaking additional early development work for offshore wind projects. This will ensure that future offshore wind development has lower risk for developers, enabling projects to build out faster after leasing and crowding in private sector investment.

For further information visit **www.gbe.gov.uk**

Supply Chain Accelerator

The Crown Estate launched its £50 million Supply Chain Accelerator fund in 2024 to help catalyse the UK supply chain capacity and capability for offshore wind.

Nearly £5 million of initial funding was announced in December, targeting UK projects that could support floating offshore wind in the Celtic Sea, as identified by The Crown Estate's Celtic Sea Blueprint. Projects will enable floating wind platforms, anchoring and mooring systems, operations and maintenance facilities, recycling facilities, test facilities, and support the skills transition.

£5m

13 organisations across England, Wales and Scotland are set to share nearly £5 million from the first funding round

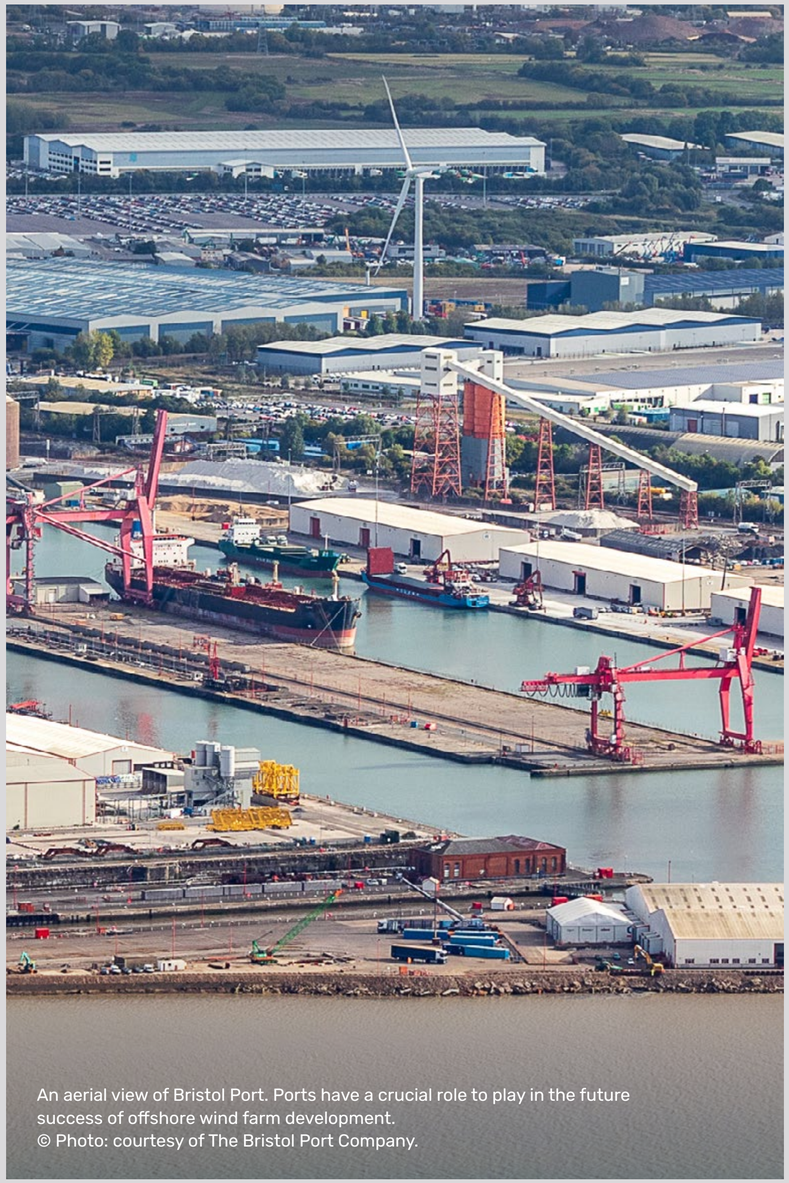
£400m

Potential to lead to more than £400 million of capital investment

£9m

The Crown Estate's match funding will contribute to a combined development investment of over £9 million

To find out more about the Supply Chain Accelerator and to see the full list of awardees from the initial funding round, visit: **Supply Chain Accelerator Fund | The Crown Estate.**



An aerial view of Bristol Port. Ports have a crucial role to play in the future success of offshore wind farm development.
© Photo: courtesy of The Bristol Port Company.

Key supply chain announcements in 2024

- The Crown Estate, RenewableUK, the Offshore Wind Industry Council and Crown Estate Scotland published the Industrial Growth Plan, setting out how to triple offshore wind manufacturing capacity over the next ten years, creating an additional 10,000 jobs a year and boosting the UK economy by £25 billion.
- The UK Government launched its Clean Industry Bonus, making up to £200 million of financial support available for offshore wind developers who prioritise investment in areas that need it most, including traditional oil and gas communities.
- ORE Catapult opened a new round of the Fit For Offshore Renewables (F4OR) programme to support UK companies preparing to bid for supply chain opportunities in the offshore renewable energy sector.
- The Crown Estate launched the Invitation to Tender Stage 1 (ITT Stage 1) for Offshore Wind Leasing Round 5 which required Bidders to set out their plans for working with ports, as well as delivering wider economic and social benefits.
- The UK Government announced the expansion of the blade test site at the Catapult National Renewable Energy Centre in Blyth in the north east, to allow testing of the largest blades on the market and in near-future development.
- Three suppliers in the north of England were selected to produce components and services for the Hornsea 3 wind farm, helping support more than 300 jobs.
- The Siemens Gamesa factory in Hull secured a £1 billion contract to manufacture the blades for the East Anglia TWO wind farm. Over 1,300 people are now employed at the site.
- ScottishPower Renewables invested c.£8 million to acquire and develop a site in Lowestoft to create a permanent base to support the delivery of offshore wind projects.

Data and evidence

With an increasingly busy seabed and the dual crisis of climate change and biodiversity loss, it is critical that development decisions are based on data and evidence to maximise growth in secure, affordable green energy, whilst also protecting and restoring the UK's thriving marine ecosystems. This is reflected in the Marine Delivery Routemap (see **page 31**), the development of which is underpinned by data and evidence. By sharing pioneering research, data and spatial mapping, we can help speed up the consenting process, de-risk projects from the start and pave the way for the accelerated and sustainable growth of the UK offshore wind industry.

Using data to accelerate project delivery

In 2024 The Crown Estate continued to commission geotechnical, geophysical, metocean and digital aerial survey work to gather evidence to facilitate the accelerated delivery of Offshore Wind Leasing Round 5 projects. The aim is to make it easier for developers to take early decisions, manage development risk and support future project-level Environmental Impact Assessments (EIAs) as part of the consenting process.

A Storm Petrel seabird in flight
© Photo: courtesy of Mark Bolton

A crab standing guard from an anchor block and chain hideout
© Photo: courtesy of Dan Bolt, Underwater Photographer of the Year, 2025

Marine Data Exchange

The Marine Data Exchange (MDE) is a world-leading collection of free-to-access offshore marine industry data and evidence. In 2024, data covering Scottish waters was added to the MDE as a result of an agreement with Crown Estate Scotland, making the MDE the home for offshore wind industry data from across the UK. This allows developers working in UK waters to benefit from a more streamlined and comprehensive dataset to inform offshore developments, supporting the faster, more sustainable roll-out of offshore technologies that are critical to the UK's energy transition, while protecting and restoring the biodiversity of our seas and the marine environment. Read more on the Marine Data Exchange.

Offshore Wind Evidence + Change Programme

The £50 million Offshore Wind Evidence and Change (OWEC) programme funds a range of projects to de-risk and accelerate the delivery of clean offshore technologies and support the UK's position as one of the most attractive places to invest in offshore renewables, whilst enabling our marine and coastal ecosystems to thrive.

In 2024 £7.3 million was invested in five new projects to fill evidence gaps around the impacts of offshore wind farms on marine ecosystems, advance solutions to reduce those impacts, enhance access to marine data and explore the opportunity for co-location of fisheries and offshore wind farms.

For more information about the work of OWEC in 2024, read the annual report **here.**

A male Corkwing Wrasse exhibiting parental care behaviour
© Atanas Petrov, Underwater Photographer of the Year, 2025

Helping nature to thrive whilst accelerating offshore wind

The Crown Estate is committed to investing in research and evidence that supports marine conservation and sustainable renewable energy projects. In 2024, The Crown Estate partnered with the Plymouth Marine Laboratory, University of Bangor and University of Aberdeen, to better understand the relationship between ocean fronts and biodiversity hotspots.

Ocean fronts are narrow zones in the ocean where bodies of water with different characteristics meet. These conditions often create an ideal environment for plankton to grow. In turn, this supports and attracts an abundance of other marine life, including fish and birds which prey on them, making these areas rich in biodiversity.

The aim of the project, called **Frontward** (Fronts for Marine Wildlife Assessment for Renewable Developments), is to proactively enhance the current use of ocean front data in the future planning of marine sectors, including offshore wind.

Data from this project will allow us to further integrate mobile species into our planning, ensuring that our projects align with broader ecosystem health and nature recovery goals.

Further information about the project can be found on the Marine Data Exchange.

Carbon dioxide displacement due to renewable energy

Displaced CO_2: represents the carbon dioxide that would have been emitted by traditional power stations to generate electricity, in the absence of renewable energy.

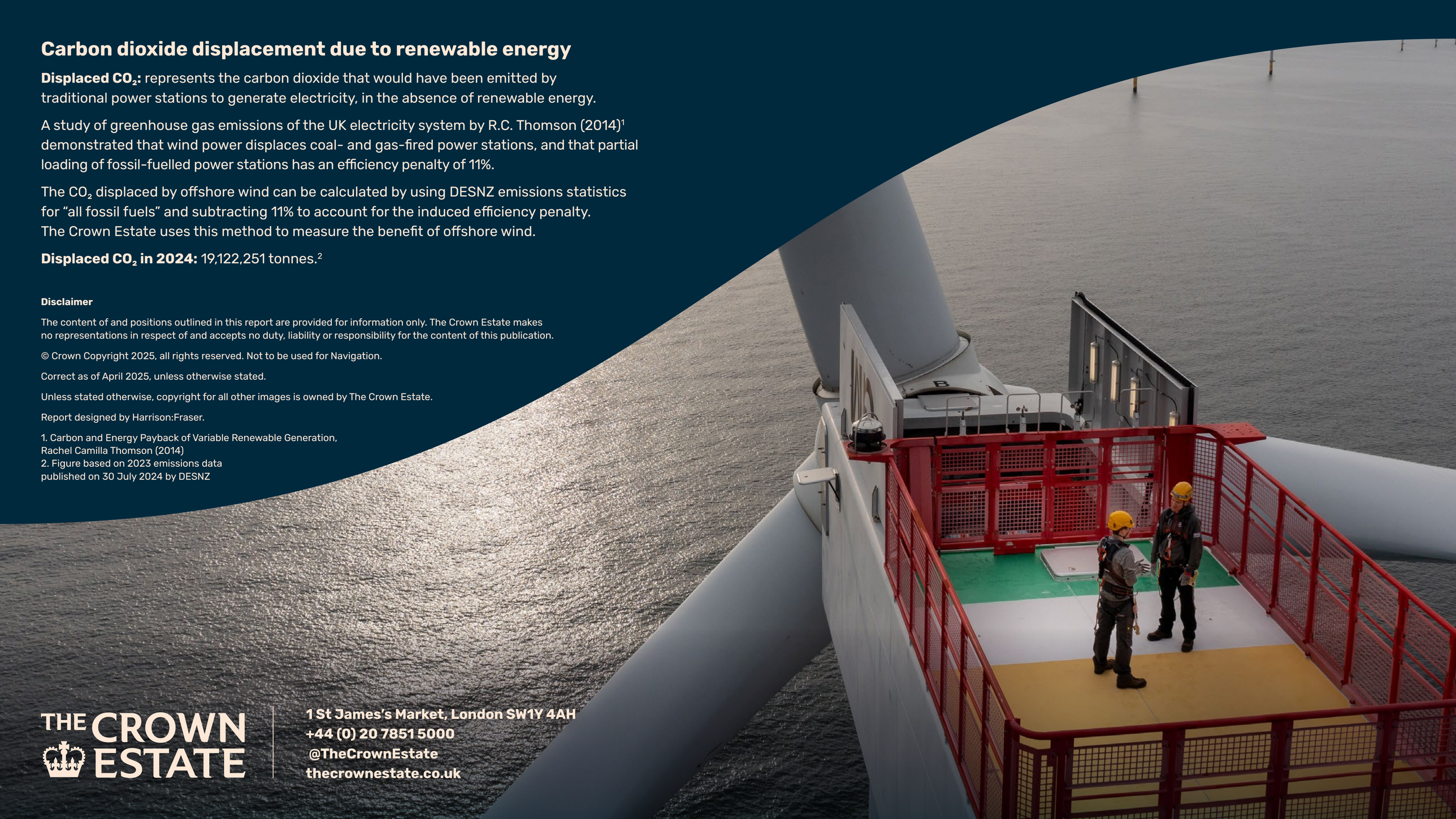
A study of greenhouse gas emissions of the UK electricity system by R.C. Thomson (2014)[1] demonstrated that wind power displaces coal- and gas-fired power stations, and that partial loading of fossil-fuelled power stations has an efficiency penalty of 11%.

The CO_2 displaced by offshore wind can be calculated by using DESNZ emissions statistics for “all fossil fuels” and subtracting 11% to account for the induced efficiency penalty. The Crown Estate uses this method to measure the benefit of offshore wind.

Displaced CO_2 in 2024: 19,122,251 tonnes.[2]

Report designed by Harrison:Fraser.

1. Carbon and Energy Payback of Variable Renewable Generation, Rachel Camilla Thomson (2014)
2. Figure based on 2023 emissions data published on 30 July 2024 by DESNZ



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