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Energy Entrepreneurs

State of the Market Report

December 2021

Executive Summary

Is the UK on track to hit net-zero targets by 2050?

There's a huge challenge ahead, and with that, opportunity

As the dust settles following the COP26 summit in Glasgow, it's time to take stock and look at whether the UK is on course to hit its ambitious targets.

Although last year saw a 13% fall in emissions, the Climate Change Committee's (CCC's) 2021 progress report warned that it was due mainly to reduced travel during the coronavirus pandemic, and that levels are expected to rise during the current year. While the CCC said that ambitions in the UK Government's Net Zero Strategy put the country on course to hit its 2035 and 2050 targets, the committee warned there were still "strategic gaps" that needed clearer policies, including around heating, transport and tax.

The market share of electric vehicles (EVs) is now accelerating fast – albeit from a low base – but there are significant concerns that the development of charging infrastructure is not keeping pace. The opportunities for V2G technologies to benefit EV users, fleet operators and the grid are exciting, but it remains very much a nascent sector.

The Net Zero Strategy has committed the UK to decarbonising its power sector by 2035, creating opportunities for renewable energy generators and those right across the smart energy space including battery developers.

Every possible path to net-zero will require a huge increase in renewable generation. National Grid ESO's latest Future Energy Scenarios Report forecasts that the UK will need between 34GW and 77GW of additional solar and wind by 2050, coupled with 13GW of further storage, and 6GW of residential flexibility.

Our analysis highlights that reaching such figures will require a significant acceleration of capacity development. The UK's renewable energy generation capacity has edged up by only 168MW or 0.4% to date during 2021 to just under 44GW, with the independent sector accounting for 86MW to take its contribution to 24GW. While the overall figures can vary markedly from year-to-year depending on the timing of major offshore wind capacity being connected, the underlying trend has been for a smaller amount of independent capacity to be added each year since changes to the subsidy regime in 2015.

While the UK Government's Net Zero Strategy highlighted technologies such as offshore wind and nuclear power, the independent sector still has an important role to play in deploying a range of technologies – from solar and onshore wind, through to biomass and energy from waste, along with accompanying storage capacity – if the UK is to remain on track to meet its climate change commitments.

To make the necessary progress on long-term targets, action is needed to tackle the barriers which exist for investors and developers looking to make their contribution. From dealing with planning bottlenecks to developing new mechanisms to underpin revenues, Government and regulators need to work closely with the industry to ensure a supportive policy framework able to adapt to a rapidly evolving environment.

Angus Widdowson, Head of Smart Generation Sales

Deployment of UK independent renewable and flexible generation

During 2021, the UK's renewable energy generation capacity reached 43.78GW, edging up from 43.62GW in 2020, a rise of just 0.4%.

A total of 168MW of renewables capacity was added during 2021, down from the 2.13GW brought online during 2020, which included a significant contribution from Ørsted's 1.2GW Hornsea One offshore wind farm. Some 55% of the UK's total capacity – or 24.08GW – now comes from the independent sector, accounting for 2,416 of the UK's 2,706 renewable energy sites.

Slowed development caused by COVID-19

The amount of additional independent generation capacity brought online fell to 86MW in 2021 from 164MW in 2020, likely due at least in part to a lag caused by the coronavirus pandemic, with the slower pace of development work during 2020 having an impact on 2021's figure.

The UK Government's Department for Business, Energy & Industrial Strategy (BEIS) noted that pandemic restrictions may have delayed some renewables projects[1]. The International Energy Agency warned about the impact on projects from disruption to global supply chains, although it also expects a rapid recovery as restrictions ease[2].

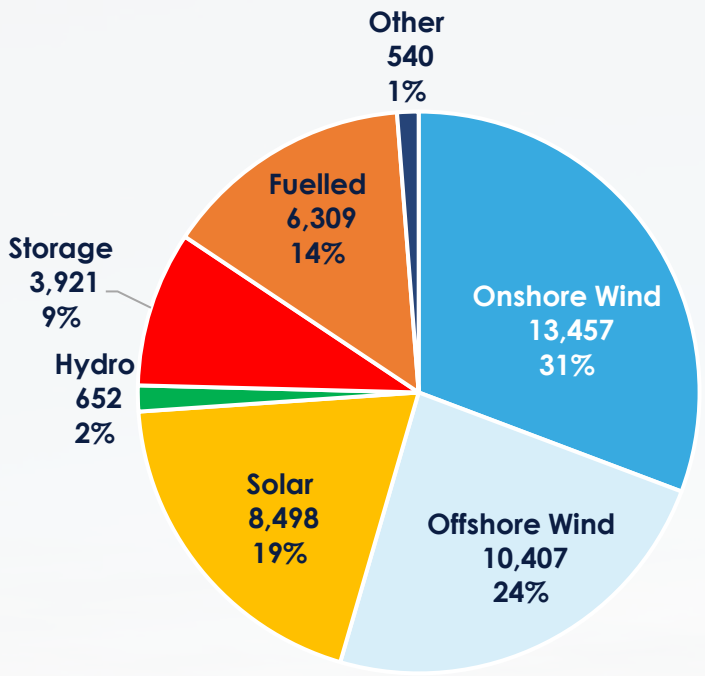
55%

of the UK's total generation capacity now comes from the independent sector

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1021952/Energy_Trends_September_2021.pdf
[2] https://www.iea.org/reports/renewables-2020/covid-19-and-the-resilience-of-renewables

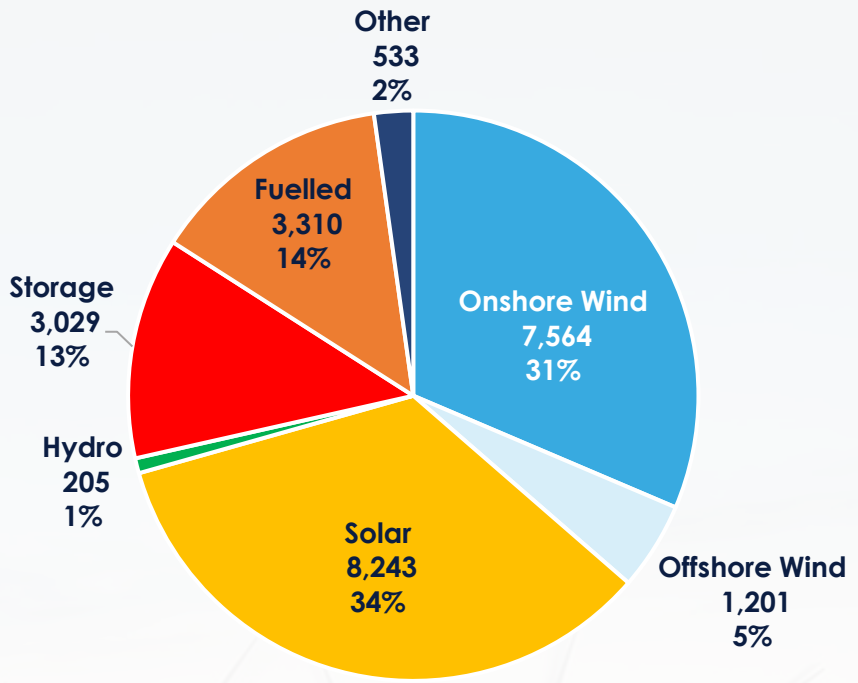
Total UK generation market

Total technology breakdown (MW)



Independent UK generation market

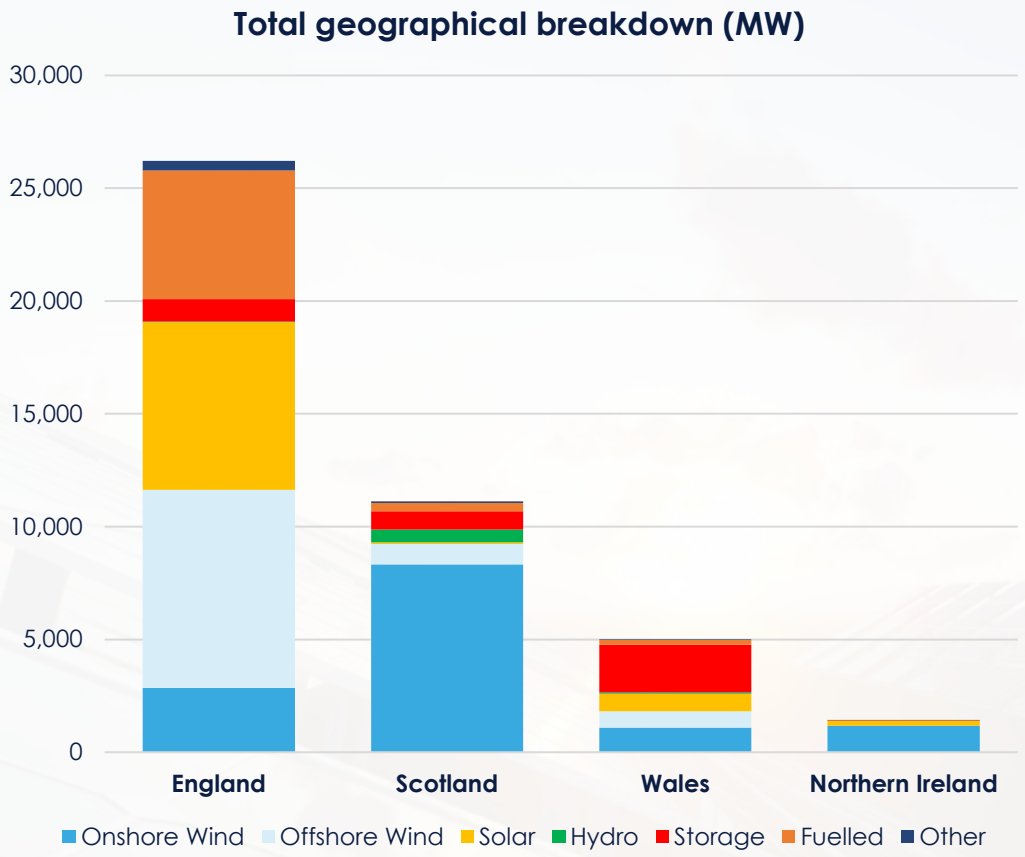
Independent technology breakdown (MW)



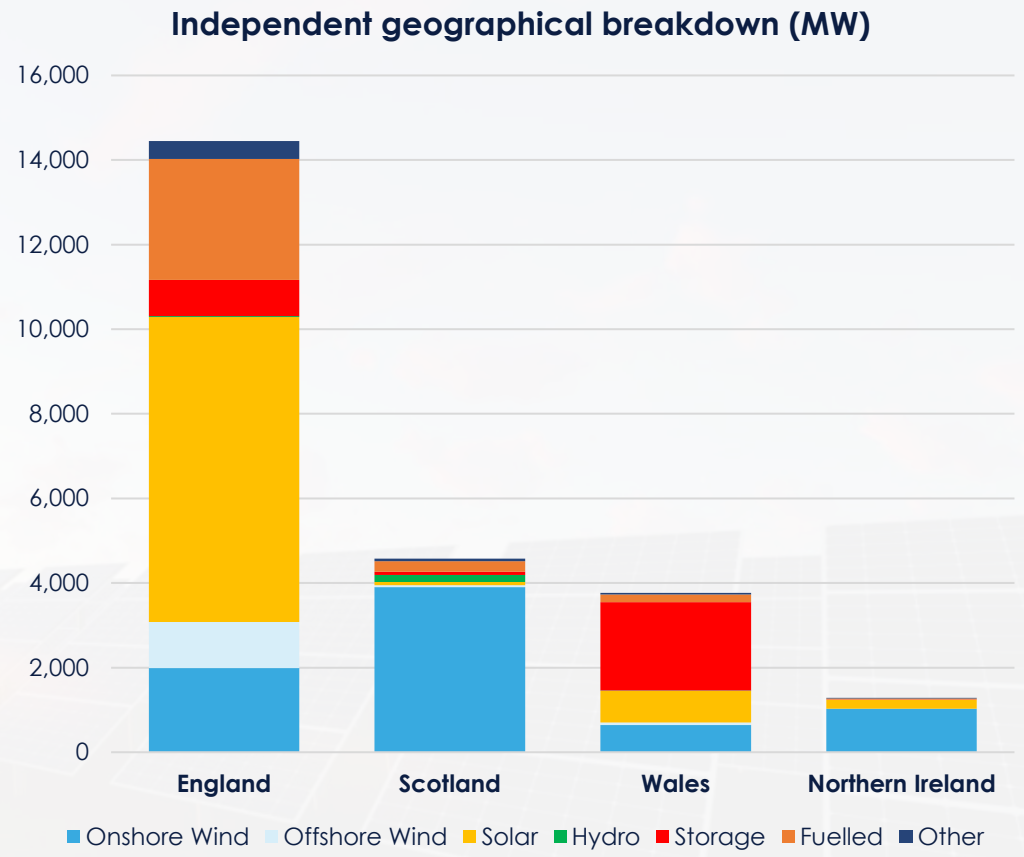
Other includes technologies such as: Advanced Conversion Technologies; Air Source Heat Pumps; Anaerobic Digestion; Ground Source Heat Pumps; and Hot Dry Rocks (HDR)

Source: Renewable Energy Planning Database, September 2021

Total UK generation market



Independent UK generation market



While Scotland has a larger number of utility-scale renewables sites, Wales has a proportionally larger number of independent sites.

Other includes technologies such as: Advanced Conversion Technologies; Air Source Heat Pumps; Anaerobic Digestion; Ground Source Heat Pumps; and Hot Dry Rocks (HDR)

Source: Renewable Energy Planning Database, September 2021

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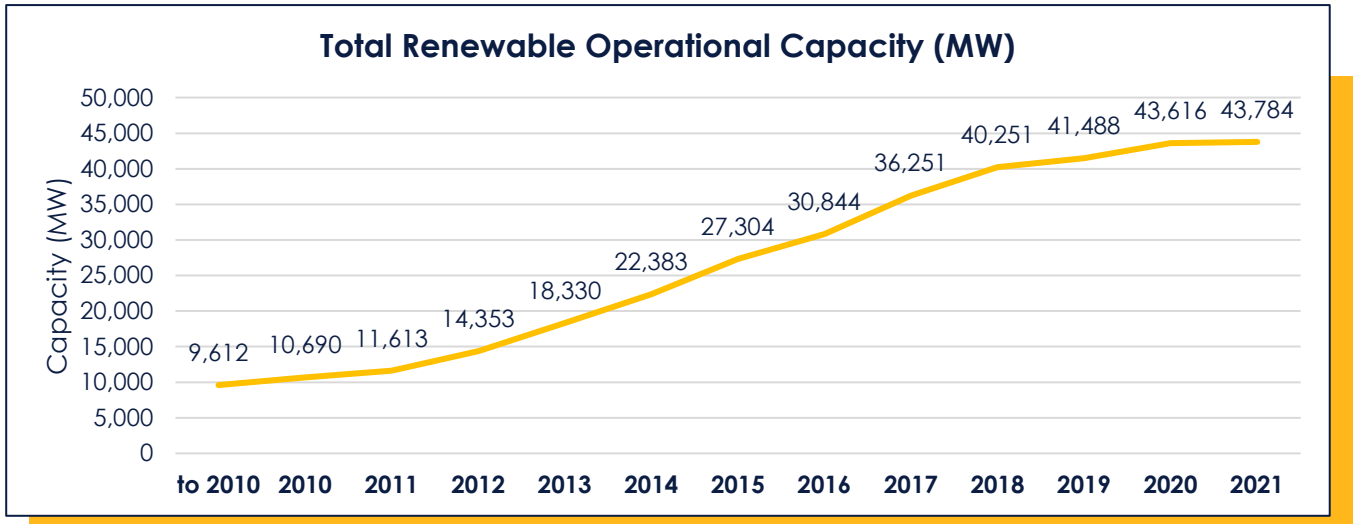
Total Renewable Growth

UK



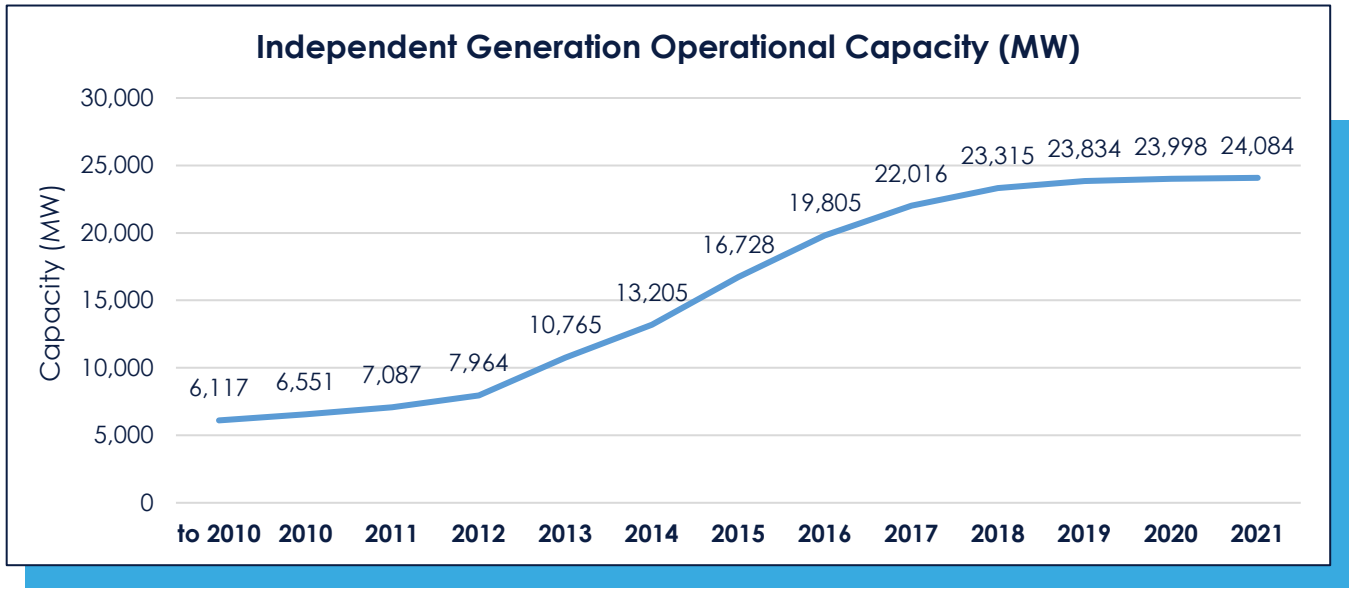
Since 2017, total renewable capacity has slowly increased from 36.25GW to the current 43.78GW, a rise of only 20.8% in the last four years.

2017 reported the largest growth in capacity with 5.41GW being added to the grid, taking the cumulative operational capacity up to 36.25GW. This included a raft of offshore wind farms being connected to the grid, such as the Burbo Bank extension and Dudgeon East.

Independent Growth UK

Capacity in the independent sector has increased at a slower pace, increasing by 9.4% from 22.02GW in 2017 to the present 24.08GW.

Although total renewable figures are dominated by offshore wind's contribution, the independent data focuses on a larger number of smaller projects, including onshore wind, solar PV and fuelled projects like biomass and energy from waste.



Source: Renewable Energy Planning Database, September 2021

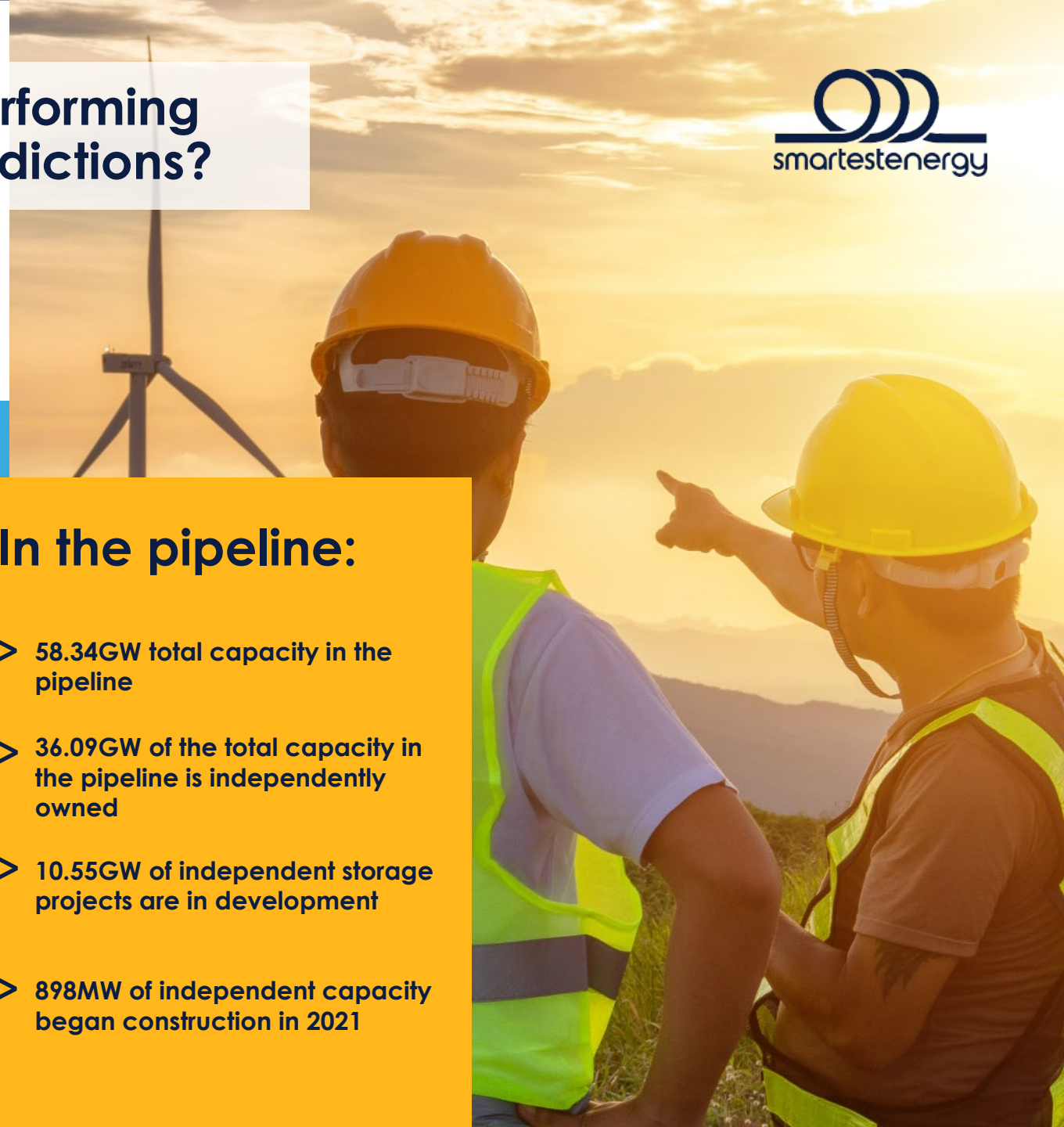
How is the UK generation market performing against Future Energy Scenarios predictions?

In its 2021 Future Energy Scenarios (FES), National Grid ESO predicts Great Britain will need 248GW of generation capacity and 71GW of storage – 319GW in total – by 2050 to hit its ambitious 'Leading the Way' scenario, which includes reaching net-zero in 2047.

Even if the record 5.4GW of capacity brought online in 2017 was added during each of the 25 years between 2022 and 2047, only 135GW would be commissioned, falling short of the 275GW needed to grow from 44GW at present to the required 319GW.

While large offshore wind projects mean capacity additions aren't spread equally between years, the pace of growth clearly must accelerate to meet predicted demand from electric vehicles and heat pumps to decarbonise transport and heating.

A total of 58.34GW of capacity spread across 1,784 sites is in the development pipeline, including 18.65GW of offshore wind, 13.95GW of storage, 12.03GW of onshore wind, and 8.69GW of solar. The independent sector accounts for 36.09GW of capacity from 1,653 sites.



In the pipeline:

- **58.34GW total capacity in the pipeline**
- **36.09GW of the total capacity in the pipeline is independently owned**
- **10.55GW of independent storage projects are in development**
- **898MW of independent capacity began construction in 2021**

Enabling entrepreneurs to adapt to a changing landscape

The falling away of support mechanisms have significantly changed the landscape for independent players in recent years and made the commercial case for funding and investment more challenging.

With the majority of generator revenues linked to the wholesale power price, access to longer-term wholesale markets and a robust hedging strategy are critical to deliver required project returns.

Those energy entrepreneurs able to effectively stack revenues from multiple sources to make the business case for their assets, trade volatile markets, and make the most of innovative commercial structures are well placed to thrive in this new environment.

The huge volatility in prices seen this year has highlighted how dynamic and fast-moving energy markets are becoming. Low wind speeds and high gas prices contributed to UK day-ahead prices hitting a record £2,500/MWh in September and system prices reaching £4,037.80/MWh.

For operators of assets such as gas peakers and battery storage, these high levels of volatility present opportunities to benefit from increased revenues from the Balancing Mechanism.

As ever more renewable capacity comes on stream, the system operator is also developing further balancing tools and services, providing new revenue streams for independents.

Dynamic Containment (DC) was launched at the end of 2020 to help regulate frequency and the potential significance of such new services was highlighted by investor Gore Street Energy Storage Fund, which said DC had led to a 65% increase in average revenues of its portfolio compared to previous forecasts[3].

New contract structures are gaining traction in response to market conditions. While some generators continue to prefer the certainty provided by fixed agreements, Flexible PPAs offer greater control over how and when power is sold onto the wholesale market and enable them to take advantage of opportunities.

Technology is helping drive greater adoption of these contract structures with developments such as **SmartestEnergy's online trading portal SmartFlex** which enables generators to track the market, react to price opportunities and trade instantly at the click of a button.

[3] https://www.rns-pdf.londonstockexchange.com/rns/2897F_1-2021-7-14.pdf

Although the UK has so far seen a relatively slow adoption of Corporate PPAs, there is growing evidence that this is also changing.

A record 27.3GW of clean energy was sourced globally through CPPAs in 2020 despite the impact of the Covid-19 pandemic[4], and deals such as Amazon's purchase of the output from Scottish wind farm Beinn an Tuirc 3 served to further raise the profile of such agreements in the UK during 2021.

The shift to an increasingly decentralised and decarbonised energy system will require more energy entrepreneurs to participate, but barriers to entry remain across areas such as unpredictability of revenues, planning constraints and participation in markets which continue to be dominated by traditional players.

Steps are being made to improve access, specifically for smaller players. For example, a new IT interface has been developed by National Grid ESO to help more providers to connect and communicate in real-time with its systems and the Balancing Mechanism[5].

Industry body RenewableUK believes the design and implementation of all flexibility markets and services should now have a benchmark of making a "material contribution to achieving the net-zero target" to help ensure greater involvement from non-traditional players.

[4] https://about.bnef.com/blog/corporate-clean-energy-buying-grew-18-in-2020-despite-mountain-of-adversity/
[5] https://www.nationalgrideso.com/news/new-it-interface-widens-balancing-mechanism-access-smaller-generators

Businesses step up commitments to accelerate CO2 reduction

The Climate Change Committee (CCC), the UK's independent advisor, said the country's greenhouse gas emissions in 2020 were nearly 50% below 1990's level, with lockdown measures leading to a record 13% year-on-year drop, driven by reductions in aviation, shipping, and surface transport.

Further analysis by Carbon Brief showed the fall compares with decreases of 4% in 2019, 2% in both 2018 and 2017, and 5% in 2016.

The CCC expects emissions to rise as the economy recovers and warned: **"The fall in emissions in 2020 will have practically zero impact on the UK's past and future contribution to global warming."**

In the run-up to COP26 in Glasgow, the UK Government updated its greenhouse gas emission reduction targets.

The UK's first nationally-determined contribution enhanced its 2030 target from a cut of 57% from 1990 levels to 68%.

The Climate Action Tracker said the new 2030 goal was aligned with the UK's 2050 net-zero target and would make the UK one of the first countries to match Paris Agreement's 1.5°C limit if it puts the necessary ambitious policies in place.

While the 2030 goal would take emissions to 251 metric tons of carbon dioxide equivalent (MtCO2e) – compared to 1990's 862 MtCO2e – the UK Government later unveiled its sixth carbon budget, which covers 2033 to 2037, and amounts to 965 MtCO2e. The legally-binding budget required a 78% cut from 1990 levels by 2035 and included emissions from international aviation and shipping for the first time.

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Businesses unveiled commitments as COP26 approached, with 60 of the companies in the FTSE100 joining the United Nation's "Race to Zero" campaign.

330 companies also committed to buying renewable energy through the RE100 global campaign and 277 businesses made it onto this year's Carbon Disclosure Project "A-List" of companies "leading the way to a more sustainable future".

More than 2,000 small businesses have joined the 'Together For Our Planet Business Climate Leaders" campaign.

63 leading retailers support the Climate Action Roadmap to bring the retail industry and its supply chains to **net-zero by 2040**, with UK stores and warehouses powered by **net-zero electricity by 2030**

British Retail Consortium, November 2020

Revolution on the roads

The market for hybrid and electric vehicles (EVs) has been relatively slow burning in recent years, but is now rapidly gaining traction. In 2019, EVs still only accounted for 1% of UK new car sales[6] but this jumped to 6.5% last year, and further growth in 2021 means that by October there were 345,000 EVs on the road.

The expected acceleration in the years ahead will represent something of a revolution on Britain's roads. While vehicles have become more fuel efficient and there has been growing take-up of EVs, emissions from transport have remained largely flat since 1990 due to increasing travel demand. The potential contribution to net-zero from a major shift to EVs is significant given that cars comprise 13% of the UK's GHG emissions, vans 4% and HGVs 4%[7].

With over 60% of new car and van registrations accounted for by fleet operators, the business sector can play a pivotal role in driving demand which will help accelerate the rollout of charging infrastructure and lead to faster public adoption.

There are also huge opportunities for businesses to exploit vehicle-to-grid (V2G) technologies, earning money by exporting electricity back from batteries to the grid which will also help reduce the amount of electricity generation needed at peak times.

Ofgem estimates V2G, combined with an uptake of smart charging, could reduce peak demand equivalent to the generation capacity of up to 10 large nuclear power stations[8].

Although a growing number of fleet operators are looking at electrification, the market is still at an early stage of exploring the wider potential benefits that EV battery flexibility can bring to businesses, including the integration with onsite renewables and vehicle-to-building (V2B) technologies.

By 2030, it is estimated that the number of EVs on UK roads will be between 2.7m and 10.6m and could reach up to 36m by 2040.

[6]https://obr.uk/box/the-transition-to-electric-vehicles/
[7]https://www.theccc.org.uk/wp-content/uploads/2020/12/The-UKs-transition-to-electric-vehicles.pdf
[8]https://www.ofgem.gov.uk/publications/ofgem-ensure-electric-car-revolution-unlocks-full-benefits-consumers

Case study

Together with a number of other key players, SmartestEnergy is currently involved in a future energy project exploring how UK businesses can leverage advanced EV charging capabilities.

It will look at areas including how to optimise on-site solar photovoltaic (PV) generation and EV charging whilst accounting for site demand, energy tariffs and connection constraints.

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Looking ahead…

In the months leading up to the COP26 summit in Glasgow, the Intergovernmental Panel on Climate Change (IPCC) warned that the planet is warming faster than previously thought, with every region facing increasing levels of change.

After the Glasgow Climate Pact, UN secretary-general António Guterres said the world now needs to go into "emergency mode", describing the deal as a compromise that didn't go far enough to cut emissions.

There is now a greater sense of urgency around climate change than ever before, and businesses are increasingly looking to – and being expected to – play their part. As part of the UN 'Race to Zero; campaign, companies have committed to the '2030 Breakthroughs', a series of international clean energy plans. Make UK, the manufacturers' organisation, said its members would be among the first to feel the impact of the transformation caused by breakthroughs and urged its members to commit to reducing their emissions. A report from management consultancy McKinsey highlighted the opportunities for businesses across a wide variety of sectors to save money and cut emissions by reducing work journeys and switching to electric vehicles (EVs).

With governments continuing to set targets and outline emission reduction plans, businesses also face new rules on disclosing climate change targets. From April 2022, the Treasury has confirmed that more than 1,300 large UK-registered businesses and financial institutions must disclose climate-related financial data, following on from rules introduced by the Financial Conduct Authority for large stock market-listed companies.

The UK Government's Net Zero Strategy has outlined how the country will reach its 2050 target, including measures to generate all electricity from low-carbon sources by 2035, while also increasing electricity generation capacity to meet rising demand from EVs, heat pumps, and other devices.

Although policy gaps remain, such an ambitious commitment to low-carbon power creates significant opportunities for energy entrepreneurs, underlined by National Grid ESO's Future Energy Scenarios report that highlights the significant growth in renewables, electricity and flexible demand response it believes will be needed to achieve net-zero targets.

Sources and methodology

For the purpose of this report, independent generation schemes are those with a capacity of >50kW that are not owned by a utility company

Renewable project and battery storage figures have been compiled from the BEIS Renewable Energy Planning Database

The Renewable Energy Planning Database includes projects of >150kW and runs up to September 2021

Key information sources:

BEIS Renewable Energy Planning Database
BEIS Energy Trends
National Grid ESO Future Energy Scenarios

Contact us

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