

Towards Net Zero Emissions

The energy industry's
commitment to the climate,
customers and jobs



Our industry commitment

– delivering a net zero power system in the 2030s

“The energy industry will invest to transform our energy system with the ambition of reaching a net zero power system in the 2030s.”



Key messages

- The energy industry has led the decarbonisation of the UK economy. But we are not finished. We want to continue that leadership with an ambition to create a net zero power system in the 2030s, while keeping bills affordable for customers and maintaining security of supply. This power system will underpin the decarbonisation of the wider economy.
- As we develop the net zero power system in the 2030s the industry believes there should be no further investment in new, unabated gas generation without clear plans to access carbon capture and storage technologies, or to utilise low or zero carbon gas.
- The speed and cost of delivering on our ambition depends on government action in the coming months and years. Government needs to decide on how to allocate costs for the transition fairly, and set out markets and policies that enable capital to deliver infrastructure change at pace.
- Customers, society and our environment will benefit as we massively increase the supply of low carbon electricity, and grow sources of hydrogen. A net zero power system underpins the decarbonisation of homes, transport systems, and the wider economy. We cannot deliver Net zero without investing in a net zero power system.
- We believe that reducing the UK's greenhouse gas emissions is an economic opportunity. We will continue to invest billions into UK infrastructure, and we will also support the training, upskilling, and deployment of skilled workers in long-term jobs across the country. The UK energy industry supported over 700,000 jobs¹ and invested £12bn into the UK in 2020.²
- By delivering a net zero power system in the 2030s, our industry will look to tackle the remaining 12% share of total UK emissions that come from power generation.³ However, decarbonising the power sector will also support wider emissions reduction, with the deployment of more technologies like electric vehicles (EVs) powered by a low carbon system will help reduce emissions within sectors that currently account for nearly half of the UK's total emissions.⁴
- We believe that a net zero power system in the 2030s will include a diverse range of domestic low carbon generation, storage, and other technologies, even while we expect renewables to generate the largest proportion of our electricity. The diversity of domestic sources along with a flexible, smarter energy system also offers the chance to reduce the UK's dependency on imported gas.

¹ ONS (2021) JOBS05: Workforce jobs by region and industry, includes indirect employment as well.

² BEIS (2021) Digest of UK Energy Statistics (DUKES) 2021.

³ BEIS – Final 2019 and Provisional 2020 UK greenhouse gas emissions national statistics.

⁴ BEIS – Final 2019 UK greenhouse gas emissions, the sectors in the estimate include passenger and light duty transport, domestic and non-domestic heating and parts of industrial combustion.

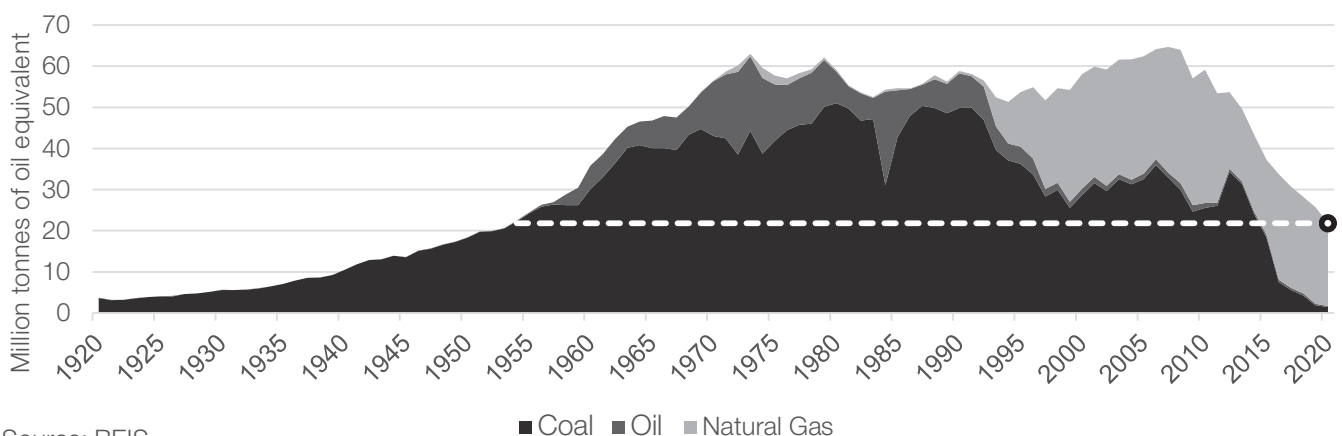
Introduction

Ahead of the UK hosting the COP26 climate change conference, the UK energy industry is reaffirming our commitment to tackling climate change, and taking action to support wider society and other sectors of the economy to move towards net zero emissions. At the same time, we're committing to keep bills affordable for customers through the transition, and continuing to secure our supplies of power – particularly as more of the activities of daily life will require abundant, low carbon electricity.⁵ The events of recent weeks have illustrated why we need to move away from our dependence on imported gas while also underlining the importance of maintaining security of supply through this transition.

The sector has been at the forefront of the UK's progress on decarbonising its economy. In the last decade we've invested over £100bn in energy infrastructure which has both provided critical power to the economy whilst also lowering greenhouse gas emissions in the power sector by 68%, representing 55% of the total UK emissions reduction⁶. In the last decade, renewables have grown from an innovative technology to provide a third of UK power, at prices in most markets which beat coal and gas. This technological transition means that we believe a Net Zero power system is a most sensible investment – as well as the right choice for tackling climate change.

We are fully committed to working in partnership with the UK Government to reach its target of achieving a 78% greenhouse gas emissions reduction by 2035 across the economy and then Net Zero by 2050.⁷ Our industry will play a central role in attaining these targets and stands ready to deliver. We are confident that, with the right policies in place, a net zero power sector can be delivered in the 2030s.⁸ This is the decade for delivery and ambitious and urgent policy action from Government will catalyse investment and keep costs for customers down. This is why we believe an Energy Bill is critical in this Parliament.

The level of fossil fuels used in power generation in the UK is at its lowest in over 60 years



⁵ Power demand is expected to double by 2050, see National Grid's Future Energy Scenarios, the CCC's Sixth Carbon Budget and BEIS' "Net Zero and the power sector scenarios" analysis for various scenarios.

⁶ BEIS – Final 2019 and Provisional 2020 UK greenhouse gas emissions national statistics.

⁷ 78% emissions reduction by 2035 in comparison with 1990 levels of emissions. The Government aims to reach net zero by 2050, and the Scottish Government by 2045.

⁸ Net zero refers to achieving a balance between the amount of greenhouse gas emissions produced and the amount removed from the atmosphere. Two different routes to achieving net zero work in tandem: reducing existing emissions and actively removing greenhouse gases.

Delivering Net Zero while maintaining supply and keeping bills down

Maintaining security of supply is vital, and will continue to remain a priority for customers and the industry throughout the energy transition and beyond. Security of supply enables the effective functioning of the economy and provides consumers with the confidence that this essential service will be there when they need it. Maintaining security of electricity supply will become even more important for customers, as we use more technologies and services which are electrically powered in our homes, transport systems and businesses.

To ensure sufficient capacity to maintain security of supply at the lowest cost to customers, it is envisaged that unabated gas will continue to have a role in the electricity system in the 2030s. It will provide the firm, flexible and dispatchable generation needed when renewable generation is low, other low carbon options are not available, or in unpredictable circumstances such as extreme weather events.

Unabated gas emissions will also reduce as more low carbon generation and supporting technologies such as storage are deployed and used widely in a more flexible power system. There will also be options to reduce any remaining emissions from gas through the use of hydrogen and/or biomethane or synthetic fuels, as well as the potential for abatement technologies such as carbon capture and storage. To keep emissions to a minimum, and ensure that unabated gas is used for generation of last resort, we will need effective carbon pricing applied to our markets.

Existing gas generation will continue to play an important role in our energy system through the transition, and it is also right that industry makes sure this is as efficient and therefore as low in carbon as possible. However, the industry also believes that we should prioritise investment in new gas generation only where there are plans for it to be compatible with a net zero power system, or in other words, fuelled with low or zero-carbon gas, or linked with Carbon Capture Usage & Storage (CCUS) to remove or reduce emissions.

The Government's Net Zero Strategy and the BEIS Impact Assessment for the UK's 2035 target to reduce its greenhouse gas emissions by 78% on 1990 levels for the 6th Carbon Budget include scenarios with gross electricity emission intensity of between 13-24gCO₂/kWh⁹. Energy UK supports this range, which would represent a 95-97% reduction on 1990 levels.

Exactly when electricity in the UK becomes net zero in the 2030s and crosses 0gCO₂/kWh to become net-negative is dependent on the Government's level of ambition, support for greenhouse gas removals and further technological developments, and how quickly it makes decisions. It has taken a decade to develop offshore wind from innovative projects to a global industry, and we can rightly assume similar timelines for other innovative and critical low carbon infrastructure.

As outlined in National Grid's Future Energy Scenarios for 2020 (FES 2020), a net zero power sector could be technically achieved by 2030, and we certainly do not discount the possibility of decarbonising earlier in the 2030s rather than later, but we are also concerned that we manage the transition at the least cost to consumers. Again, many of the concerns around affordability and fairness of the net zero transition can be mitigated by Government policy.

Other parts of the energy system will also produce residual emissions which will need to be accounted for with negative emissions to achieve Net Zero.^{10,11} Most viable negative emissions technologies so far look to come from the energy sector, via negative emissions from Bioenergy with Carbon Capture and Storage (BECCS) for power or hydrogen, alongside natural sequestration methods like tree planting. There are other proposed negative emissions and carbon removal technologies. However, in order to deliver on its potential ambition, they will require significant policy support to be deployed at the scale required to meet our net zero ambition.

⁹ Energy UK analysis of the [6th Carbon Budget Impact Assessment](#) and the [Net Zero Strategy](#)

¹⁰ The transformation of the power sector will bring in new technologies at scale. While these will provide clean electricity generation, some of the process attached to them will still carry residual emissions. Residual emissions will be matched by carbon removals.

¹¹ Offsets or removals are needed to balance out any emissions that cannot be directly brought to zero. These can take the form of offsets or carbon markets or credits, but also via actions such as afforestation (planting of new trees).

Putting customers first

Energy retailers should be the catalyst for further decarbonisation from the power sector to homes, businesses, and transport systems. They will both be developing and deploying new low carbon technologies for customers along with innovative and exciting new services, like tariffs which help people use energy when it is cheap and reward them for shifting their demand around the needs of the grid.

The first customer benefit of a net zero power system will be that it can support people with decarbonisation in their own lives through the 2030s, and beyond, by supplying low carbon electrons and fuels to the demand side, and developing a wider, flexible, and more integrated electricity grid which doesn't just accommodate new, low carbon power generation technologies but also infrastructure like EV charge points. There are further wider environmental co-benefits for society that will result from a net zero power system, and the further decarbonisation of heat and transport, such as reduced indoor and outdoor air pollution and associated health impacts.¹²

The retail energy sector, as well as providing more low carbon electricity to homes, will also use its direct relationship with customers to enable demand reduction and behaviour change. A fully decarbonised, smart and flexible energy system will provide incentives for consumers to become more actively engaged in their energy use which, along with allowing customers to make best use of cheap technologies, may also support them to reduce their demand and therefore their bills. Some estimates show these kinds of services, like Time of Use (ToU) Tariffs or Dynamic ToU Tariffs coupled with smart meters, can reduce power demand by around 3%, worth millions of pounds of savings on bills.¹³

Energy retailers already have obligations and also provide voluntary additional support to households, particularly vulnerable customers, such as installing energy efficiency measures, supporting the roll-out of smart meters and providing financial assistance through the pandemic. For industry, the transition to a decarbonised economy, including the transition to a net zero power system in the 2030s, must be fair to all consumers and the Government's Affordability Review will need to tackle the question of how to spread the investment and ensure the fair distribution of benefits.

By putting consumers first in this transition, and by focussing on their needs and services, we aim to deliver a fair and affordable energy transition, while creating cleaner air, better energy services, and tackling climate change – with a net zero power system as the backbone of our future economy.



¹² [UK Health Alliance \(2016\) A Breath of Fresh Air](#)

¹³ [Energy Systems Catapult \(2019\) Simulating Heat as a Service for Demand-Side Management](#)

Action from Government and the case for investment

Investment in new infrastructure and technologies is key if we are to complete this transformation at pace and deliver secure, affordable and clean energy. Our success in decarbonising the power sector to date has come through specific policy mechanisms that have leveraged public capital to secure private investment, rather than relying on targets. In the past decade, the sector has invested over £100bn in the power system, with tens of billions expected to be invested over the next five years.¹⁴ The Climate Change Committee (CCC) estimates that it will cost an additional £10bn per annum until 2050 to decarbonise the power sector at pace and meet the rising power demand from electrification of transport and heat.¹⁵

For example, whilst we have a coal phase out target in the UK and legislated carbon budgets to aim for, the driver for decarbonisation to date has actually been our energy policy, and specifically the competitive market frameworks that drove financing and cost reductions in innovative technologies. The Contracts for Difference (CfD) scheme dramatically reduced the cost of offshore wind by de-risking investments, for example, alongside a robust carbon price driven by the EU Emissions Trading System (EU ETS) and the UK Government's own Carbon Price Support (CPS). This approach has been cost-effective for UK customers and has given the UK a world-leading offshore wind market.

It is important that the Government continues to prioritise policy for the power sector, alongside urgent action on parts of the economy like heat and transport. A net zero power system in the 2030s will rely on the government working in partnership with the sector again and bringing forward policy that will enable industry to invest at speed. It is Government action that will determine the pace and costs with which industry can achieve our ambitions.

The UK already has a large portfolio of low carbon electricity, with renewables, nuclear and other low carbon generation making up around half of the electricity mix today. In the transition to the power system of the 2030s, we will firstly need to maximise the technologies we already have available. For example, we will need to see markets which are capable of bringing forward 40GW of offshore wind by 2030, and support for more solar and onshore wind. In that context, we welcome the size of the upcoming CfD Auction.

It is also essential that non-market barriers are addressed – from planning to network connections, to coordination with other industries like fishing or aviation, to the speed with which we can consent and license projects. In addition, we will need stable and predictable policy frameworks, an efficient market design and price signals to attract the investment needed, at the scale it's needed.

Government will also need to replicate the success at deploying renewables with the other innovative low carbon technologies we need to be able to run a net zero power system in the 2030s. Low carbon hydrogen can be used as a long duration storage option alongside other technologies like hydro pumped storage for example, which is a critical complement to the increased deployment of renewables, while CCUS has the potential to remove emissions from gas generation.

The development of hydrogen as a cost-effective solution depends on both the Government supporting CCUS and hydrogen infrastructure in industrial clusters but also in investing to drive down the costs of hydrogen made from low carbon electricity – building a market and supply chain as they have done with offshore wind. The Government's recent Hydrogen Strategy needs to move to delivery.

¹⁴ [BEIS – DUKES, Energy in Brief, in 2019 prices](#)

¹⁵ CCC (2020) Sixth Carbon Budget, Energy UK analysis of the supporting datasets, includes investment in networks and takes into account operational cost savings.

The transformation of the power sector will also require a significantly bigger role for daily management of the system, increasingly provided by a range of energy storage and demand side response services and technologies alongside interconnection with neighbouring markets. Some of this will also be enabled by our customers, through their suppliers and other intermediaries (as described earlier). Being able to predict and to match supply and demand on the future system more accurately will keep system operation and infrastructure costs as efficient as possible for customers. Flexibility, alongside open and competitive market frameworks, will be key in ensuring that the electricity system is decarbonised in the most cost-efficient way, while also opening up new business opportunities for innovators.¹⁶

Finally, on top of all this change, it is expected that the amount of low carbon electricity that we generate will need to at least double in order to accommodate the growing demand for electricity from transport and heating in buildings – as well as that needed to create low carbon hydrogen. In short, there is a lot to do in the next decade to get to where we want to be in the 2030s, and to enable the delivery of the eventual net zero economy.

Jobs, Skills and Training

This transformation towards a net zero power system in the 2030s is also a unique opportunity to set the UK on a new path of green economic growth. Green infrastructure projects tend to deliver higher economic benefits.¹⁷ Hundreds of thousands of new jobs up and down the country, will be supported by industry to help drive the energy transition – from engineers and operators of low carbon infrastructure to heat pump engineers to data scientists developing new low carbon services for customers.¹⁸

Supporting these jobs will require a review and revamp of training needs, ensuring that the energy sector retains its skilled workforce by creating new opportunities as part of its low carbon future. The Green Jobs Taskforce was a great step in the right direction and its recommendations should be fully taken forward.¹⁹

By developing a net zero power system in the 2030s, the energy sector can bring widespread and lasting benefits to our economy, environment and customers – from clean electricity to the deployment of new technologies and services that can support the post-Covid economic recovery and support jobs and opportunities right across the country. The challenge is great but so is the prize and if the right policy elements are in place, our sector stands ready to deliver.



¹⁶ [Challenging Ideas \(2021\) Powering for the future](#)

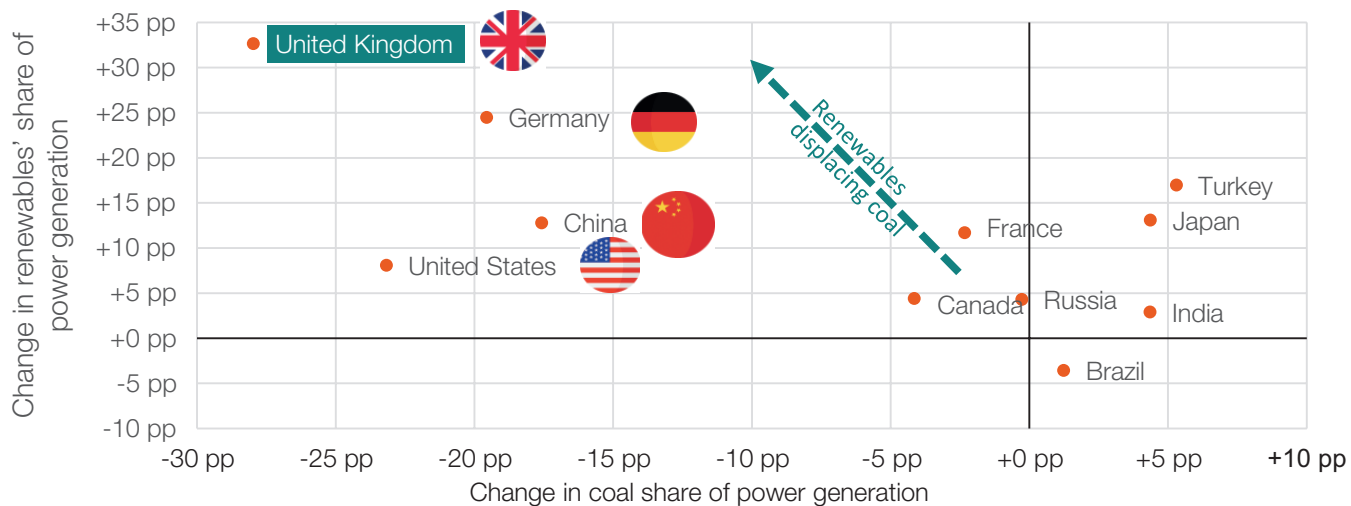
¹⁷ The CCC report - [Reducing UK emissions. 2020 Progress Report to Parliament](#)

¹⁸ National Grid's [Building the Net Zero Workforce](#) report estimates that 400,000 roles in energy will need to be filled in by 2050, of which 260,000 will be new roles and 140,000 to replace retiring workforce.

¹⁹ [Green Jobs Taskforce Report to Government, Industry and the Skills Sector](#)

The UK's decarbonisation progress in an international context

Change in the share of renewables versus coal power generation, 2010 to 2020



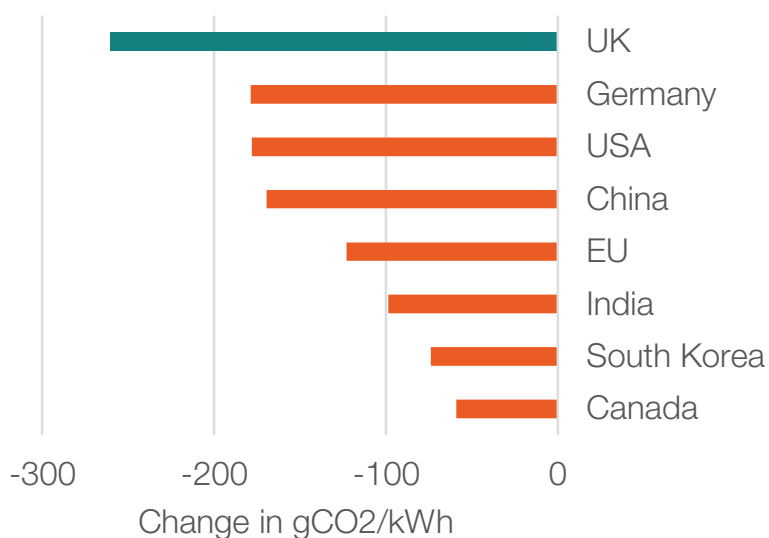
The UK's climate policy of the past decade within power has delivered greater progress than any other developed country through the phase out of coal and deployment of renewables.

The UK has reduced the carbon content of its power grid by more than 250gCO₂/kWh in a decade. It has also displaced its power generation from coal with renewables at an unmatched pace.

The dramatic decarbonisation progress of the power sector has not come at the cost of security of supply either, as the UK is still ranked among the countries with the fewest outages in the world²⁰, thanks to the Capacity Market mechanism.

The past two decades of climate and energy policy in the UK have clearly shown how government's actions in setting long term targets and ambitions as well as creating the right policy and market frameworks enables change and allows industry to play its part.

Change in carbon intensity of the power grid, 2010 to 2020



Source: IEA and Our World in Data

²⁰ The World Bank (2020) [System average interruption duration index \(SAIDI\)](#)

From commitments to delivering change

Between 1st and 12th November 2021, the UK will host more than 190 world leaders together with tens of thousands of negotiators, government representatives, businesses and citizens for ‘twelve days of talks – otherwise known as COP26. These talks will bring parties together to accelerate action towards the goals of the Paris Agreement and the UN Framework Convention on Climate Change (UNFCCC) to secure global Net Zero and keep the goal of limiting the global average temperature rise to 1.5 degrees within reach.

The 26th UNFCCC Conference of the Parties will aim to set the world on track for its long term ambition on climate change. As part of the conclusion of the first five-year ambition review process under the Paris Agreement, countries are being asked to come forward with ambitious 2030 emissions reduction targets (Nationally Determined Contributions or NDCs) that align with reaching Net Zero by the middle of the century.

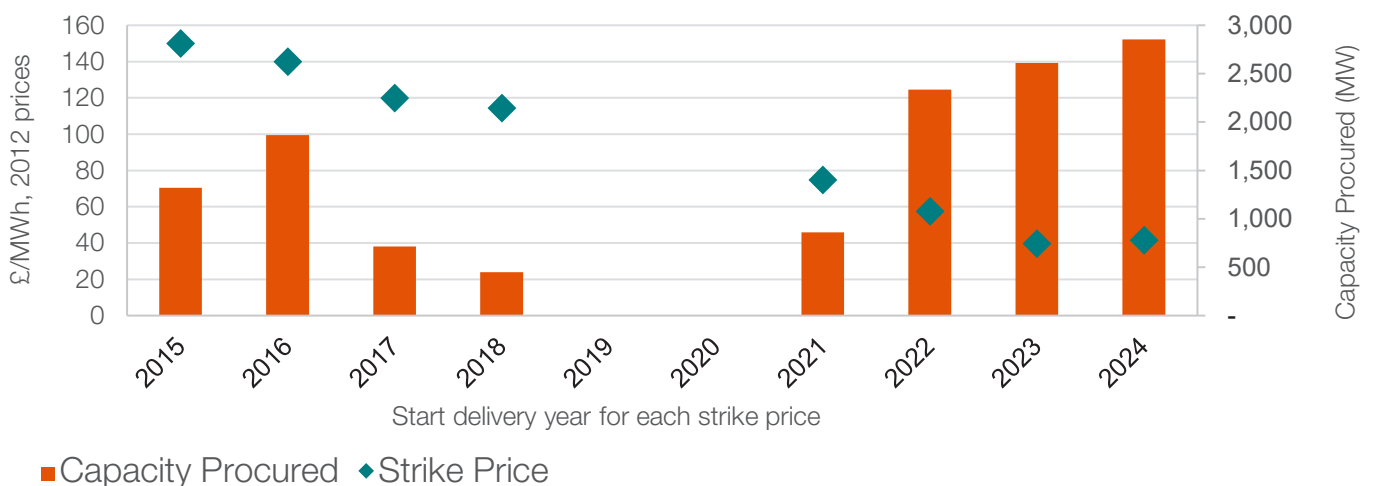
To deliver on these stretching targets, countries will need to accelerate the phase out of coal, encourage investment in renewables, curtail deforestation and speed up the switch to low carbon heat and transport technologies. What is clear from the challenge in front of us is that the decade up to 2030 will be crucial and to make the UK energy sector’s ambition a reality, all available policy levers will need to be as outlined in the following pages.



Policy and investment drive the increase in low carbon power generation

- Announce a comprehensive Energy Bill in the next Queen's Speech, given the scale of action required from Government across energy policy and regulation.
- Clear market frameworks and funding mechanisms are required to further deploy low carbon technologies at scale and to develop innovative technologies.
 - Annual CfD auctions are key to delivering 40GW of offshore wind by 2030.
 - Link the UK Emissions Trading Scheme to the EU ETS to improve liquidity, price discovery and the ability to attract abatement across a larger area.
 - Final decision on the financing model for new nuclear needed as soon as possible.
 - Implement the proposals around investment and new business models for Hydrogen and CCUS.
 - Ensure that onshore wind, solar and other renewables can deploy at scale.
- Tackle non-market barriers around consenting, network planning, planning and environmental policy and shared use of space (e.g. aviation, shipping) to ensure deployment can go at pace.
- Invest resources in improving energy market design and reforming system governance to enable the low carbon, resilient system and secure we need in the 2030s.
- Implement the proposals in the Smart Systems and Flexibility Plan moving the UK towards appropriate, stable market mechanisms and regulatory frameworks to establish an investment case for, and to enhance the integration of, flexible energy technologies and services to achieve cost-effective delivery of a net zero energy system.

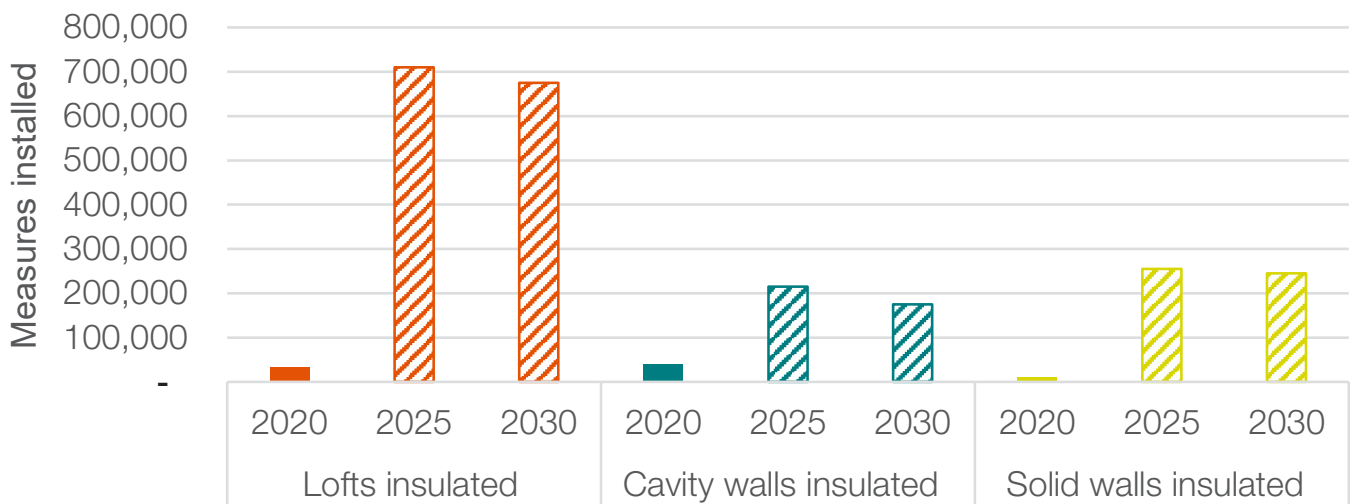
The CfD scheme has brought significant cost reductions in offshore wind



Looking after customers through the transition

- Introduce a comprehensive package of regulation, incentives and financial support for able to pay customers to enable them to decarbonise their homes by 2050, and bring forward specific and targeted support for vulnerable and fuel poor customers to ensure that the transition to low carbon homes and technologies is fair.
- Reconsider the proposals in the Retail Strategy, which will disincentivise innovation in the retail market for Net Zero, and instead bring forward retail market reforms which create a sustainable industry and enable suppliers to provide attractive propositions for technologies such as heat pumps, energy efficiency and smart tariffs to their customers.
- Review the allocation of policy costs onto electricity bills as well as wider taxation frameworks, including VAT and business rates, to ensure consumers are given clear signals when decarbonising their demand.

Home insulations installed in 2020 versus annual 2025 and 2030 targets in CCC's pathway

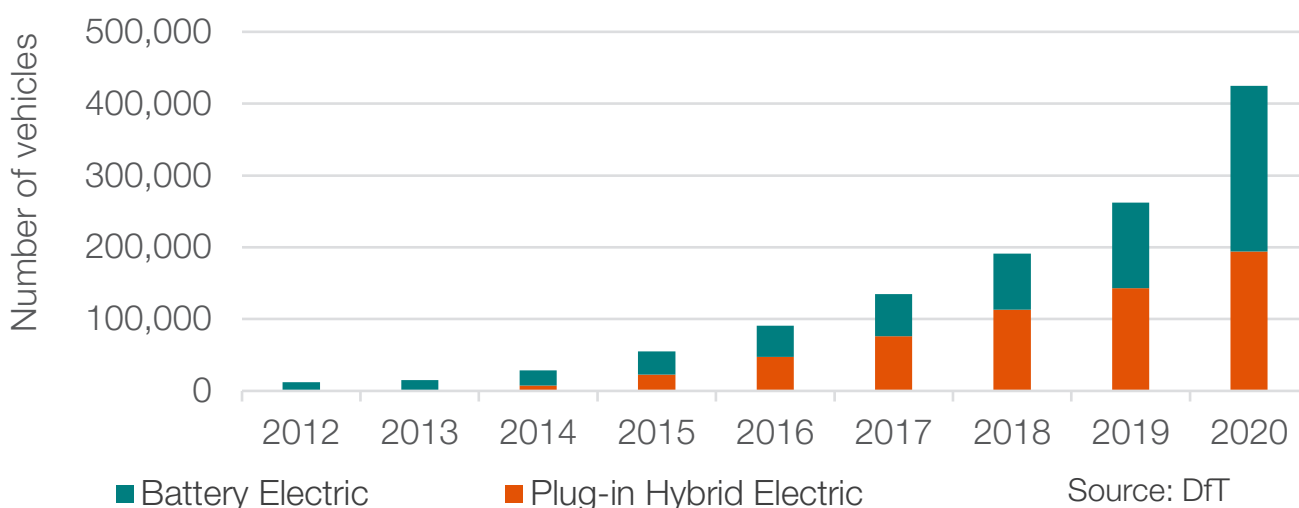


Source: The CCC

Decarbonising passenger vehicle transport

- Introduce a Zero Emission Vehicle (ZEV) mandate to provide a clear and binding trajectory for the increase in ZEV sales leading up to 2035.
- Reform the grant and vehicle taxation system so new vehicles receive either a grant (bonus) or a first-year registration tax (malus) on ICE vehicles to make ZEVs more affordable.
- Strengthen and reform vehicle CO₂ emission performance standards to ensure that emissions from non-ZEV sales continue to drop ahead of their full phase out.

Cumulative number of electric vehicles registered in the UK



Jobs and skills to support the clean energy transition and the wider economy

- Identify skills and roles now that are needed for the energy transition and reattribute existing funding streams towards those roles.
- Develop appropriate training programmes – working with the Department for Education, training providers and others – to enable UK workers to (re)skill for the future economy.
- Encourage coordination or harmonisation of standards for training across sectors (e.g. renewables and oil and gas) to help workers transition across industries.
- Bring forward specific proposals to help workers in communities or sectors that are particularly impacted by the transition successfully transition to new jobs.

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