

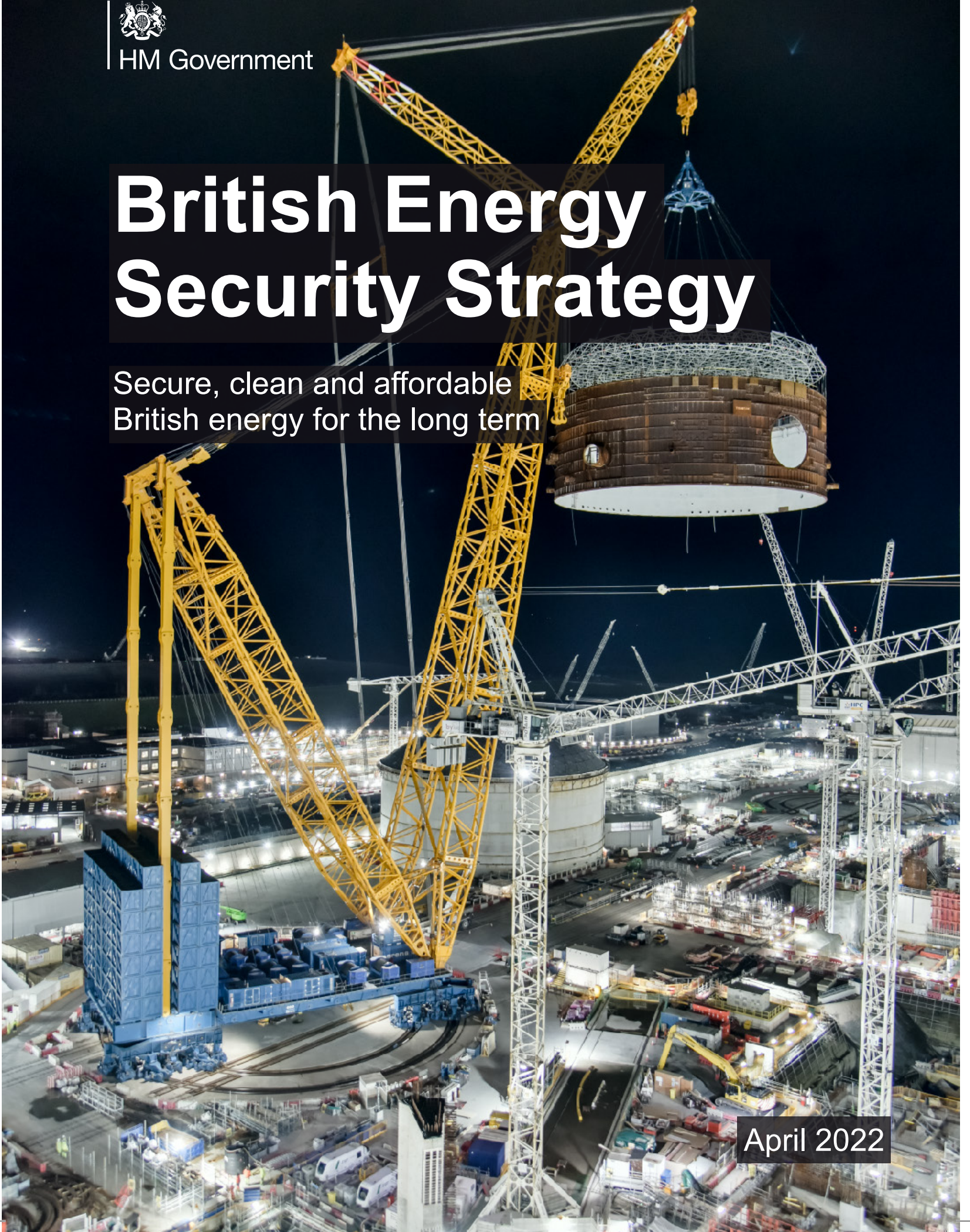


HM Government

British Energy Security Strategy

Secure, clean and affordable
British energy for the long term

April 2022



Hinkley Point C, Somerset







HM Government

British Energy Security Strategy

Secure, clean and affordable British energy for the long term

April 2022



© Crown copyright 2022

This publication is licensed under the terms of the Open Government Licence v3.0 except where otherwise stated. To view this licence, visit nationalarchives.gov.uk/doc/open-government-licence/version/3

This publication is also available on our website at www.gov.uk/government/publications

Any enquiries regarding this publication should be sent to us at enquiries@beis.gov.uk

Contents

Foreword from the Prime Minister	3
Introduction	5
Immediate support on energy bills	9
Energy efficiency	11
Oil and gas	14
Renewables	16
Offshore wind	16
Onshore wind	18
Solar and other technologies	19
Nuclear	20
Hydrogen	22
Networks, storage and flexibility	24
International delivery	27
Energy plan objectives and key measures	29

Foreword from the Prime Minister



For most of the industrial age, the UK was what we now call “energy independent”.

The great coal fields of the North, the Midlands and South Wales heated our homes, fed the voracious boilers of Megawatt Valley and created vast volumes of town gas for municipalities across the country.

In time they were joined by a steady flow of oil and natural gas extracted from deep below the waters of the North Sea.

Yet as the years passed we drifted into dependence on foreign sources.

Sometimes this was through deliberate planning; more often it was the by-product of policy fudges, decision-dodging and short-term thinking.

But whatever the cause, the result today is all too obvious to anyone who receives an energy bill.

Global energy costs have been rising for some time as demand soars and factories roar back into life after Covid; Putin’s invasion of Ukraine pushed them still higher and, ultimately, it is the consumer who ends up paying the price.

This government is already stepping in to help, with over £9 billion of help for families struggling with their bills.

But if we’re going to get prices down and keep them there for the long term, we need a flow of energy that is affordable, clean and above all, secure. We need a power supply that’s made in Britain, for Britain – and that’s what this plan is all about.

We’re not going to try and turn back the clock to the days when we choked our streets and our atmosphere with filthy fumes and ever-rising levels of climate-imperilling carbon dioxide.

Instead, we’re going to take advantage of Britain’s inexhaustible resources of wind and – yes – sunshine.

We’re going to produce vastly more hydrogen, which is easy to store, ready to go whenever we need it, and is a low carbon superfuel of the future.

We're embracing the safe, clean, affordable new generation of nuclear reactors, taking the UK back to pre-eminence in a field where we once led the world.

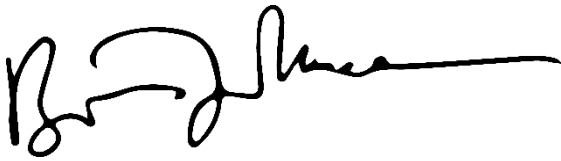
We're making homes and businesses more efficient, so you need to use less energy in the first place.

We're going to work with industry to slash our way through needless and repetitive red tape so that all this can happen much more quickly. Energy companies tell me they can get an offshore wind turbine upright and generating in less than 24 hours, but that it can take as much as 10 years to secure the licences and permissions required to do so.

And as even the most evangelistic environmentalist would concede that we can't simply pull the plug on all fossil fuels overnight without the lights going out all over Europe, we're going to make better use of the oil and gas in our own backyard by giving the energy fields of the North Sea a new lease of life.

For years, governments have dodged the big decisions on energy, but not this one.

We've got the ambition, we've got the vision – and, with this plan, we're going to bring clean, affordable, secure power to the people for generations to come.

A handwritten signature in black ink, appearing to be 'Boris Johnson', with a long horizontal line extending to the right.

The Rt Hon Boris Johnson MP

Prime Minister

Introduction

Energy is the lifeblood of the global economy. From heating our homes to powering our factories, everything we do depends on a reliable flow of affordable energy.

So as the global economy reopened in the aftermath of the pandemic, the sudden surge in demand for everything from new cars to foreign holidays drove a massive spike in demand for oil and gas, dramatically increasing the price of these essential fuels.

This has been compounded by Russia's abhorrent and illegal invasion of Ukraine. As we are part of a global market, the price we pay for gas is set internationally. And President Putin has used this against us by restricting the supply of Russian gas to the European market, further pushing up prices. The vital sanctions imposed by the UK and its allies to support the Ukrainian people will also inevitably have an adverse effect on all economies.

As a result of all these factors, European gas prices soared by more than 200 per cent last year and coal prices increased by more than 100 per cent. This record rise in global energy prices has led to an unavoidable increase in the cost of living in the UK, as we use gas both to generate electricity, and to heat the majority of our 28 million homes.

The Government's immediate priority has been to provide financial assistance to families and businesses struggling with higher energy bills. But when the UK is spending the equivalent of over £1,200 per person this year, just to service the national debt, we cannot afford merely to rely on taxpayer funding to assist with paying ever higher bills; we need to bring down the bills themselves.

The first step is to improve energy efficiency, reducing the amount of energy that households and businesses need. We have already saved households on the lowest incomes around £300 a year on bills through energy efficiency measures – and we are investing over £6 billion on decarbonising the nation's homes and buildings.

But the long-term solution is to address our underlying vulnerability to international oil and gas prices by reducing our dependence on imported oil and gas.

Even as we reduce imports, we will continue to need gas to heat our homes and oil to fill up our tanks for many years to come – so the cleanest and most secure way to do this is to source more of it domestically with a second lease of life for our North Sea. Net zero is a smooth transition, not an immediate extinction, for oil and gas.

Accelerating the transition away from oil and gas then depends critically on how quickly we can roll out new renewables. The Government's Ten Point Plan for a Green Industrial Revolution, together with the Net Zero Strategy and this Energy Strategy, is driving an unprecedented £100 billion of private sector investment by 2030 into new British industries

including Offshore Wind, and supporting around 480,000 clean jobs by the end of the decade.







The growing proportion of our electricity coming from renewables reduces our exposure to volatile fossil fuel markets. Indeed, without the renewables we are putting on the grid today, and the green levies that support them, energy bills would be higher than they are now. But now we need to be bolder in removing the red tape that holds back new clean energy developments and exploit the potential of all renewable technologies.


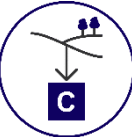


Most critically, when we have seen how quickly dependence on foreign energy can hurt British families and businesses, we need to build a British energy system that is much more self-sufficient. This requires power that can be relied on, even when the sun is not shining, or the wind is not blowing. So, this government will reverse decades of myopia, and make the big call to lead again in a technology the UK was the first to pioneer, by investing massively in nuclear power.

Investing in the North Sea, expanding our renewable capacity, and leading in nuclear power will also enable the UK to produce more hydrogen. We will seize this opportunity so that we are not wholly dependent on other countries for this vital superfuel which has vast potential applications – from industrial production to net zero aviation.

All of these steps will accelerate our progress towards Net Zero, which is fundamental to energy security. By 2030, 95 per cent of British electricity could be low-carbon; and by 2035, we will have decarbonised our electricity system, subject to security of supply. This is a transition which reduces our dependence on imported oil and gas and delivers a radical long-term shift in our energy with cleaner, cheaper power, lower energy bills and thousands of high wage, high skilled new jobs.

We are delivering on the 10 Point Plan, having already generated 68,000 green jobs and £22 billion in private investment, so now we are raising our ambition.

10 Point Plan	Delivery highlights so far
 <p data-bbox="347 584 560 651">Advancing offshore wind</p>	<ul data-bbox="576 510 1477 734" style="list-style-type: none"> • Over £1.6 billion invested, securing 3,600 jobs • 11GW already generated, and another 12GW in the pipeline • Up to £320 million in government support for fixed bottom and floating wind ports and infrastructure • Additional government support for other low-cost renewables technologies
 <p data-bbox="347 853 520 987">Driving the growth of low carbon hydrogen</p>	<ul data-bbox="576 757 1477 1093" style="list-style-type: none"> • £7.5 million awarded to ITM's Gigastack Project, an early mover in the market, with potential to support up to 2,000 jobs over time • Preparing to allocate up to £100 million of revenue support to initial electrolytic projects • Launching £240 million Net Zero Hydrogen Fund later in April • Developed indicative Heads of Terms for hydrogen business model contract
 <p data-bbox="347 1167 504 1346">Delivering new and advanced nuclear power</p>	<ul data-bbox="576 1115 1477 1406" style="list-style-type: none"> • Committed to provide up to £1.7 billion of direct government funding to enable one nuclear project to FID this Parliament • Investing £100 million into Sizewell C to help develop this project • Investing £210 million to develop Small Modular Reactors with Rolls Royce • Announced a £120 million Future Nuclear Enabling Fund to progress new nuclear
 <p data-bbox="347 1451 544 1630">Accelerating the shift to Zero Emission Vehicles</p>	<ul data-bbox="576 1429 1477 1653" style="list-style-type: none"> • £4 billion of investment has flowed into the UK zero emission vehicle sector • Building two new gigafactories, in Sunderland and Blyth • 30,425 public charge-points in the UK with 100 new rapid chargers were added to the UK network every month during 2021
 <p data-bbox="347 1675 544 1809">Green public transport, cycling and walking</p>	<ul data-bbox="576 1697 1477 1787" style="list-style-type: none"> • 1,678 zero emission buses funded • Launched Active Travel England, increased cycling by 75%
 <p data-bbox="347 1883 536 1966">Jet zero and green ships</p>	<ul data-bbox="576 1832 1477 2011" style="list-style-type: none"> • Consulted on introduction of a UK Sustainable Aviation Fuel (SAF) mandate, requiring jet fuel suppliers to blend an increasing proportion of SAF into aviation fuel from 2025 • Allocated £23 million as part of the Clean Maritime Demonstration Competition

10 Point Plan	Delivery highlights so far
 <p>Greener buildings</p>	<ul style="list-style-type: none"> • Cut VAT for insulation and heat pumps • 46% of English homes at EPC C or above, up from 9% in 2008, and 2,300 social housing homes in the process of being improved • Over 60,000 heat pumps installations estimated by industry, now offering households grants of £5,000 towards an air source heat pump so they are cost competitive compared to a gas boiler
 <p>Investing in CCUS</p>	<ul style="list-style-type: none"> • Committed £1 billion in public investment to decarbonise our industrial clusters • Announced the first 2 clusters in Teesside, the Humber and Merseyside • Launched phase 2 of the Industrial Energy Transformation Fund, allocating £60 million to decarbonisation technologies, with a further £100 million delivered in May and October this year
 <p>Protecting our natural environment</p>	<ul style="list-style-type: none"> • Additional £124 million provided at Spending Review 2021 to the Nature for Climate Fund to support tree planting and peat restoration, going beyond 2019 Manifesto Commitment of £640 million • 13,290 hectares of trees planted across the UK in 2020/21 • Launched three new Community Forests, in Cumbria, Devon and the North-East • £5.2 billion invested in six year programme of flood defences
 <p>Green finance and innovation</p>	<ul style="list-style-type: none"> • £615 million allocated from Net Zero Innovation Portfolio allocated • Set the JET world record, with 59 megajoules of heat energy in a single fusion 'shot' that lasted 5 seconds

Immediate support on energy bills



The government has acted quickly to provide immediate relief to British families and businesses facing steep increases in their energy bills.

Help for families

A **£9.1 billion package of support** including a £150 non-repayable Council Tax rebate for the majority of households in England from April, with comparable provision in the devolved administrations, and a £200 reduction in energy bills from October for all households in Great Britain through the **Energy Bills Support Scheme**, to be recovered through energy bills and will spread the cost of the energy price shock over 5 years from 2023.

The **Warm Home Discount** will increase to £150 in October and extend its coverage to assist three million people.

The Government is investing a further £500 million in a **Household Support Fund** for local authorities to use in supporting the most vulnerable with food and utility bills.

Totalling £22 billion worth of support for cost of living, further measures include:

- the first cut in **fuel duty** for over a decade;
- an increase in the **National Living Wage** equivalent to a £1,000 a year increase in gross earnings for full time workers;
- and a cut to the **Universal Credit taper and increase to Universal Credit work allowances** worth around £1,000 for 1.7 million families on average.

Help for industry

The Government recognises that UK industrial electricity prices are higher than those of other countries and will act to address this. We will extend the Energy Intensive Industries (EII) Compensation Scheme for a further three years and intend to increase the aid intensity to up to 100 per cent (1.5 per cent of GVA).

We have increased the overall budget limit for the scheme accordingly, but as is the case under the current scheme, if there is a risk of budget over-spend, we may choose to reduce the aid intensity.

We will also consider other measures to support business including increasing the renewable obligation exemption to 100 per cent.

Energy efficiency



Over 90 per cent of our homes are heated by fossil fuels, accounting for a third of UK total gas use. The price spikes in the gas market mean households are particularly exposed to these changes and facing energy bills upwards of £2,000. The majority of our homes are energy inefficient. Improving the efficiency of our homes could reduce our heating bills by around 20 per cent and reduce our dependency on foreign gas. By 2025, around 700,000 homes will be upgraded, and by 2050 all our buildings will be energy efficient with low carbon heating.

At the end of the First World War, Britain was a nation in which almost 80 per cent of people rented their homes. Fast-forward to now, and around 70 per cent of people own their own home, with most built prior to the 1973 oil shock which precipitated an improvement in insulation standards.

Our homes are our castles – people want choices regarding how they improve them. But internationally, some countries are faring better than the UK as their homes are less dependent on gas and better insulated.

We want to continue making UK homes more comfortable and cheaper to run. Every therm of gas saved grows our energy security and brings jobs to the UK.

On cost, there are many measures for reducing energy bills including cavity wall insulation, which typically costs between £1000-£3000. Measures that improve the efficiency of our homes, on average, reduce bills by £300. On aesthetics, upgrades can retain and enhance building's character with measures being easy to install and beautiful in design.

On choice, this is not being imposed on people and is a gradual transition following the grain of behaviour. The British people are no-nonsense pragmatists who can make decisions based on the information.

We have gone further than any government in setting out an **ambitious strategy** by:

- Publishing the landmark Heat and Buildings Strategy with an accompanying £3.9 billion of support.
- This includes nearly £1.8 billion targeted at low-income households through the Home Upgrade Grant and the Social Housing Decarbonisation Fund. This builds on more than £1.2 billion we have already invested this Parliament to support low-income households to install energy efficiency measures.
- Combined, this funding will improve up to 500,000 homes, saving households hundreds of pounds per year on their energy bills and reduce our reliance on gas. It also included more than £1.4 billion to upgrade public sector buildings. This brings capital spending on buildings decarbonisation over the lifetime of Parliament to £6.6 billion.
- Expanding the Energy Company Obligation to £1 billion per year from 2022-2026, helping 113,000 low-income households annually to improve their energy efficiency.
- Setting a 2035 date by which we intend to phase out the sale of new and replacement gas boilers.
- Introducing a package of measures to increase deployment of heat pumps to 600,000 installations per year by 2028, and expanding heat networks through the Green Heat Networks Fund and designating heat network zones.

We will **cut the cost for consumers** who want to make improvements by:

- **Zero-rating VAT for the next five years** on the installation of energy saving materials, including insulation and low carbon heating, saving between £1000-£2000 on the cost of an air source heat pump.
- **Launching the £450 million Boiler Upgrade Scheme** this month. Thanks to government support, heat pumps are now priced much more competitively compared to gas boilers. We want as many people as possible who want one this year to be able to have one installed, **so will continue to keep uptake of the scheme under review.**
- **'Rebalancing' the costs placed on energy bills** away from electricity to incentivise electrification across the economy and accelerate consumers and industry's shift away from volatile global commodity markets over the decade. This will also ensure heat pumps are comparatively cheap to run over time. We will publish our proposals on how to do so in 2022, considering overall system impacts and limiting the impact on bills, particularly for low-income consumers.

We will help to send **clear signals**:

Through the market

- We are **looking to facilitate low-cost finance from retail lenders** to drive investment in energy efficiency measures. There are currently around 40 green mortgage products available to consumers wanting to make green home improvements. We will double innovation funding for the development and piloting of new green finance products for consumers from £10 million to £20 million and introduce a scheme under which lenders will work to improve the energy performance of the properties against which they lend. We will also work with the UK Infrastructure Bank as it considers investment opportunities, including those that would improve the energy efficiency of our buildings.
- **Better labelling and product standards** so consumers can purchase more efficient products including for heating, lighting, washing and cooking. For example, LED lightbulbs are now the norm and Energy Saving Trust estimate that consumers save £2-3 per lightbulb each year, with little effort. We are bringing in new minimum standards and labelling requirements for a range of energy-using products and will formally consult on draft regulations in early 2023.
- **Expanding heat pump manufacturing**: We will run a Heat Pump Investment Accelerator Competition in 2022 worth up to £30 million to make British heat pumps, which reduce demand for gas.

Through government channels

- Research suggests the government is the trusted source of advice so we will work with trusted voices to scale up our information offer to help households understand energy saving measures. By summer we will launch a comprehensive Energy Advice Service on GOV.UK, which will help consumers navigate what can be unknown territory to improve the energy performance of their homes. We will launch additional support for homeowners through telephone support and specific local area advice for energy consumers.
- Establishing a dedicated energy advice offering for smaller businesses to provide trusted advice on improving industrial energy efficiency and decarbonisation.

Through frameworks

- Setting clear energy performance standards varying by building type, phased in over the long-term. More details will be announced in May.
- Reviewing the practical planning barriers that households can face when installing energy efficiency measures such as improved glazing, including in conservation areas and listed buildings. This will be completed by the end of 2022 and ensure protection of local amenity and heritage, whilst making it easier to improve energy efficiency.

Oil and gas



Currently around half of our demand for gas is met through domestic supplies. In meeting net zero by 2050 we may still use a quarter of the gas that we use now. So to reduce our reliance on imported fossil fuels, we must fully utilise our great North Sea reserve, use the empty caverns for CO₂ Storage, bring through hydrogen to use as an alternative to natural gas and use our offshore expertise to support our offshore wind sector. As a result of our plans, the North Sea will still be a foundation of our energy security but we will have reduced our gas consumption by over 40 per cent by 2030.

The North Sea emerged as an important oil-producing area in the 1970s and 1980s, with the UK Continental Shelf currently home to around 290 offshore installations, over 10,000 km of pipelines, 15 onshore terminals and over 2,500 wells.

Gas is currently the glue that holds our electricity system together and it will be an important transition fuel. We are taking a balanced approach to this unique subterranean asset. There is no contradiction between our commitment to net zero and our commitment to a strong and evolving North Sea industry. Indeed, one depends on the other.

On decarbonisation, the flexibility of gas has underpinned our world-leading rollout of offshore wind and UK gas has a lower carbon footprint well under half that of most imported gas.

On longevity, estimates suggest 7.9 billion barrels of oil reserves and resources remain under our seas, and 560 billion cubic metres of gas.

On profits, the industry is set to invest billions in the development of nascent clean technologies, such as hydrogen and carbon capture.

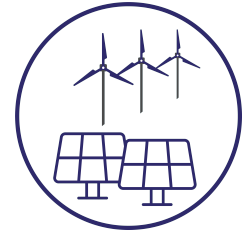
We will send clear signals on the **role of gas** in the transition by:

- The North Sea Transition Authority plans to launch **another licensing round in the autumn**, taking into account the **forthcoming climate compatibility checkpoint** and **the need for energy security**. This will mean more domestic gas on the grid sooner.
- Establishing **Gas and Oil New Project Regulatory Accelerators** to provide dedicated, named project support to facilitate the rapid development of projects – which could take years off the development of the most complex new opportunities.
- Reducing the emissions of our offshore oil and gas further, by driving rapid industry investment in **electrifying offshore production**, to ensure our gas remains the low-carbon choice.
- Remaining open-minded about our onshore reserves. We have commissioned an **impartial report on the geological science of shale gas and the modelling of seismic activity by the British Geological Survey**, reviewing any scientific updates that the government ought to consider. The pause continues to remain in place unless new evidence emerges. Any exploration or development of shale gas would need to meet rigorous safety and environmental protection, both above ground and sub-surface.

We will ensure a new lease of life for the North Sea in **low-carbon technologies** by:

- Delivering on our **£1 billion commitment to four Carbon Capture Usage and Storage (CCUS) clusters by 2030**, with the first two sites selected in the North East and North West currently proceeding through Track 1, with the Scottish Cluster in reserve.
- The industrial clusters will be the starting point for a new carbon capture industry with a sizeable export potential, helping to create industrial ‘SuperPlaces’ in the UK.
- Publishing **delivery roadmaps for CCUS and hydrogen** to provide clear signals to industry to invest this month.

Renewables



Accelerating the transition from fossil fuels depends critically on how quickly we can roll out new renewables. Our *Ten Point Plan for a Green Industrial Revolution* has already put the UK at the forefront of many renewable technologies, delivering £40 billion of private investment in under two years. By the end of 2023 we are set to increase our capacity by a further 15 per cent. But now we must go further and faster, building on our global leadership in offshore wind.

Offshore wind

Our island's resources, with its shallow seabeds and high winds offers us unique advantages that have made us global leaders in offshore wind and pioneers of floating wind. With smarter planning we can maintain high environmental standards while increasing the pace of deployment by 25 per cent. Our ambition is to deliver up to 50GW by 2030, including up to 5GW of innovative floating wind.

Our history of North Sea oil and gas expertise enables us rapidly to deploy our rich expertise in sub-sea technology and maximise our natural assets. Already, just off the coast of Aberdeenshire, we have built the world's first floating offshore wind farms. There will be huge benefits in the Irish and Celtic Sea. And by 2030 we will have more than enough wind capacity to power every home in Britain.

We will be the Saudi Arabia of wind power, with the ambition that by 2030 over half our renewable generation capacity will be wind, with the added benefit of high skilled jobs abounding these shores. But the development and deployment of offshore wind farms still takes up to 13 years.

On planning, these projects tend to have public support, and ultimately benefit the environment because they help reduce the damage to habitats that is caused by climate change.

On cost, the unit cost of offshore wind power has fallen by around two thirds. The Contracts for Difference (CfD) scheme has shared the risks of investing in new technologies to boost UK renewables and bring in billions of pounds of private investment.

On jobs, our technological leadership is delivering high skilled, high wage British jobs. Our increased ambition means we expect the sector will grow to support around 90,000 jobs by 2030.

We will cut the process time by over half by:

- Reducing consent time from up to **four years down to one year**.
- Strengthening the Renewable **National Policy Statements to reflect the importance of energy security** and net zero.
- **Making environmental considerations at a more strategic level**, allowing us to speed up the process while improving the marine environment.
- Introducing **strategic compensation environmental measures**, including for projects already in the system, to offset environmental effects and reduce delays to projects
- **Reviewing the way in which the Habitats Regulations Assessments are carried out** for all projects making applications from late 2023 to maintain valued protection for wildlife, whilst reducing reams of paperwork.
- Implementing a **new Offshore Wind Environmental Improvement Package** including an industry-funded **Marine Recovery Fund and nature-based design standards** to accelerate deployment whilst enhancing the marine environment.
- Working with the **Offshore Wind Acceleration Task Force**; a group of industry experts brought together to work with Government, Ofgem and National Grid on further cutting the timeline.
- **Establishing a fast-track consenting route for priority cases where quality standards are met**, by amending Planning Act 2008 so that the relevant Secretary of State can set shorter examination timescales.

We will ensure the UK remains a **world leader** by:

- Offering clear investable signals through **annual auctions**, with the next round a year earlier in March 2023, helping to keep costs down through competition.
- Consulting on changes to the 2024 CfD auction, Allocation Round 6, that incentivise renewables to locate and operate in a way that minimises overall system costs.
- Aiming to bring forward up to **5GW of floating offshore wind by 2030**, which opens up some of the windiest spots. This is backed by investing up to £160 million in ports and supply chains and £31 million in Research & Development (R&D) funding.

Onshore wind

Onshore wind is one of the cheapest forms of renewable power. The UK already has over 14GW of onshore wind, with a strong pipeline of future projects in Scotland. We will improve national network infrastructure and, in England, support a number of new projects with strong local backing.

The Government is serious about delivering cheaper, cleaner, more secure power, so we need to consider all options. That is why we included onshore wind in the latest Contracts for Difference auction round and will include it in future rounds.

In Scotland, which has its own planning system, we will work with the Scottish Government to ensure communities and landscape issues are considered for future projects.

In Wales, we will support the work underway by the Welsh Government, Ofgem, and networks to improve grid connections.

In the more densely populated England, the Government recognises the range of views on onshore wind. Our plans will prioritise putting local communities in control. We will not introduce wholesale changes to current planning regulations for onshore wind but will consult this year on developing local partnerships for a limited number of supportive communities who wish to host new onshore wind infrastructure in return for benefits, including lower energy bills. The consultation will consider how clear support can be demonstrated by local communities, local authorities and MPs.

We will also look at arrangements to support the repowering of existing onshore wind sites when they require updating or replacement. With advances in technology this process can enhance capacity and provide new opportunities for communities to benefit.

Solar and other technologies

With the sun providing enough daily energy to power the world 10,000 times over, solar power is a globally abundant resource. There is currently 14GW of solar capacity in the UK split between large scale projects to smaller scale rooftop solar. The cost of solar has fallen by around 85 per cent over the past decade, and can be installed in just one day on a domestic roof. We expect a five-fold increase in deployment by 2035.

For ground-mounted solar, we will **consult on amending planning rules** to strengthen policy in favour of development on non-protected land, while ensuring communities continue to have a say and environmental protections remain in place.

We will continue supporting the effective use of land by encouraging large scale projects to locate on previously developed, or lower value land, where possible, and ensure projects are designed to avoid, mitigate, and where necessary, compensate for the impacts of using greenfield sites.

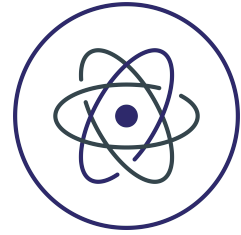
We will also support solar that is co-located with other functions (e.g. agriculture, onshore wind generation, or storage) to maximise the efficiency of land use. We have also included solar in the latest Contracts for Difference auction round and will include it in future rounds.

For rooftop solar, we will bring down bills and increase jobs by radically simplifying planning processes with a consultation on relevant permitted development rights and will consider the best way to make use of public sector rooftops.

We have already **removed VAT on solar panels** installed in residential accommodation in Great Britain. We are looking at **facilitating low-cost finance** from retail lenders to drive rooftop deployment and energy efficiency measures. And we will design performance standards to make installation of renewables, including solar PV, the presumption in new homes and buildings.

As an island nation surrounded by water, we will also aggressively explore **renewable opportunities** afforded by our geography and geology, including tidal and geothermal. And we are actively exploring the potential for **international projects** to provide clean, affordable and secure power, for example by expanding the Contracts for Difference scheme.

Nuclear



Low-carbon nuclear supplies 15 per cent of our electric lifeblood as a steady source of generation to complement intermittent renewables. Nuclear is the only form of reliable, low carbon electricity generation which has been proven at scale and returns more than a hundred times as much power as a solar site of the same size. We can only secure a big enough baseload of reliable power for our island by drawing on nuclear. Our aim is to lead the world once again in a technology we pioneered so that by 2050, up to a quarter of our power consumed in Great Britain is from nuclear.

When Her Majesty The Queen opened the world's first nuclear power station at Calder Hall in Cumbria in 1956, she described being present at the making of history. The UK had indeed led the world as the first country to split the atom, and the first to pioneer this new form of power.

But since then, we have fallen behind other countries. Five of our six existing plants will be offline within the decade, and we currently have only one new project in construction. By comparison, France currently has nine times more nuclear capacity than the UK. For decades successive governments have failed to make the necessary investments in British nuclear.

Today the UK is making the big call to reverse decades of under-investment. We will kickstart a nuclear reaction to recover our global leadership in civil nuclear power and drive down costs by building at scale over the next thirty years.

On safety grounds, the UK applies the highest global nuclear safety standards, including for the safe long-term disposal of all nuclear waste.

On cost, the UK is making the responsible decision to invest in this country's future and ultimately lower costs through setting up a long-term nuclear programme.

On jobs, each large-scale nuclear power plant could support up to around 10,000 jobs at peak construction.

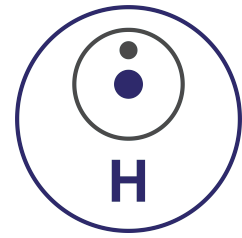
We will ensure the UK is one of the best places in the world to **invest** in nuclear by:

- Increasing our plans for deployment of civil nuclear to up to **24GW by 2050 – three times more than now** and representing **up to 25% of our projected electricity demand**.
- Within this overall ambition, we intend to take **one project to FID this Parliament and two projects to FID in the next Parliament, including Small Modular Reactors**, subject to value for money and relevant approvals. This is not a cap on ambition, but a challenge to the industry to come forward and compete for projects and aim to come online this decade.
- Depending on the pipeline of projects, **these ambitions could see our nuclear sector progressing up to 8 more reactors across the next series of projects**, so we improve our track record to **deliver the equivalent of one reactor a year, rather than one a decade**.
- This will all sit alongside our existing investment of **over £2 billion this Parliament in new nuclear**, including £100 million to support the development of Sizewell C, and £210 million to bring through small modular reactors.

We will radically change how we **deliver** new nuclear projects by:

- **Launching the £120 million Future Nuclear Enabling Fund in April**, first announced in the Comprehensive Spending Review.
- **Setting up the Great British Nuclear Vehicle this year**, tasked with helping projects through every stage of the development process and developing a resilient pipeline of new builds. **We will work with industry to scope the functions of this entity starting straightaway** – building on UK industrial strengths and expertise.
- Backing Great British Nuclear **with funding to support projects to get investment ready** and through the construction phase. We expect to **initiate the selection process in 2023 for further UK projects**, with the intention that government will enter negotiations with the most credible projects to **enable a potential government award of support as soon as possible, including (but not limited to) the Wylfa site**. As part of this, HMG will consider the role UK government financing can play in supporting new projects. Final contracts and construction would commence when any outstanding conditions are satisfied and projects are sufficiently mature. Any projects would be subject to a value for money assessment, all relevant approvals and future spending reviews.
- The UK has eight designated nuclear sites: Hinkley, Sizewell, Heysham, Hartlepool, Bradwell, Wylfa, Oldbury and Moorside. **To facilitate our ambitious deployment plans we will also develop an overall siting strategy for the long term**.
- Without impacting the robust safety, security and environmental protections offered by UK regulatory regime, Government will work with the regulators to understand the potential for any **streamlining or removing of duplication from the consenting and licensing of new nuclear power stations**, including possibly new harmonisation on international regulation.
- **We will also collaborate with other countries** to accelerate work on advanced nuclear technologies, including both Small Modular Reactors and Advanced Modular Reactors (AMRs).

Hydrogen



We have virtually no low-carbon hydrogen in our system today – but technology is making this a near-term reality with vast potential applications. By investing in the North Sea, renewables and nuclear through this Plan, the UK is well-placed to exploit all forms of low carbon hydrogen production. Our drive on renewables makes green hydrogen especially valuable for flexibility and as a storage solution. Excess renewable electricity used to produce hydrogen can be stored over time and used to power the grid when needed. We will double our UK ambition for hydrogen production to up to 10GW by 2030, with at least half of this from electrolytic hydrogen.

Hydrogen has many uses, for example, the first car to use a hydrogen fuel cell was invented by General Motors in 1966. It was a key component in town gas that powered UK homes before the discovery of North Sea gas. When produced cleanly, hydrogen is one of the greenest forms of energy we have – which is why we plan to blend up to 20 per cent hydrogen into the natural gas grid and will take a final decision by the end of next year.

Hydrogen is the most abundant chemical element in the universe, but needs releasing from water, hydrocarbons, or other organic matter before we can use it. The UK will look to be a leader in developing a domestic source of this superfuel, in this ever-increasing internationally competitive space. And we fully support hydrogen as a relatively frictionless way to decarbonise our lives in the near-term.

Hydrogen can be produced in many different ways. Sometimes colours are used to describe this process.

“**Blue**” hydrogen splits natural gas into hydrogen and carbon dioxide, with the carbon captured and stored.

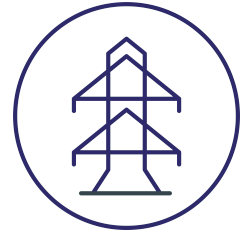
“**Green**” hydrogen uses electrolysis, passing electricity through water to separate out the hydrogen and oxygen.

“**Pink**” hydrogen also uses electrolysis, but with energy from a nuclear power plant.

We will offer clear **long-term signals** alongside **immediate support** by:

- Doubling our ambition to **up to 10GW of low carbon hydrogen production capacity by 2030**, subject to affordability and value for money, with **at least half of this coming from electrolytic hydrogen**. By efficiently using our surplus renewable power to make hydrogen, we will reduce electricity system costs.
- **Aiming to run annual allocation rounds for electrolytic hydrogen**, moving to price competitive allocation by 2025 as soon as legislation and market conditions allow, so that **up to 1GW of electrolytic hydrogen is in construction or operational by 2025**.
- **Designing, by 2025, new business models for hydrogen transport and storage infrastructure**, which will be essential to grow the hydrogen economy.
- Levelling the playing field by setting up a **hydrogen certification scheme by 2025**, to demonstrate high-grade British hydrogen for export and ensure any imported hydrogen meets the same high standards that UK companies expect.

Networks, storage and flexibility



Accelerating our domestic supply of clean and affordable electricity also requires accelerating the connecting network infrastructure to support it. Within this decade, our modern system will prioritise two key features: anticipating need because planning ahead minimises cost and public disruption; and hyper-flexibility in matching supply and demand so that minimal energy is wasted. This more efficient, locally-responsive system could bring down costs by up to £10 billion a year by 2050.

Flexibility has always been the valuable heart of our system, ensuring power can flow quickly from where it's produced to where it's needed. In 2021, the onshore electricity network had approximately 18,000 km of high voltage transmission cables, and approximately 800,000 km of lower voltage distribution lines, enough to stretch around the world 20 times. Networks are a complex system that have been slow in their transformation. We aim to halve the time it takes to get this infrastructure built so we can double the pace.

On costs, building ahead of need, where good value for money, may mean paying more in the short term for an asset that isn't efficiently utilised immediately but is the cheapest option over the long term and reduces the need for repeated disruptive works to continually upgrade the system.

On uncertainty, whilst there are many future decisions yet to be taken, and a need for an agile approach to network infrastructure, we do know that electricity demand is highly likely to double by 2050.

On competition, price signals can harness the power of responsive demand to minimise wasted energy and deliver far more efficient distribution of power than a state-planned system ever could.

We will ensure **lower total costs** by offering clear signals on future need by:

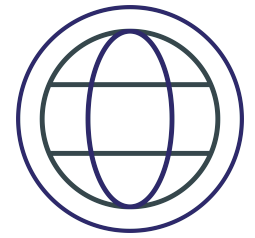
- **Establishing the Future System Operator** as soon as practicable to drive our overall transition and oversee the UK energy system.
- Publishing a **strategic framework** this year with Ofgem for how networks will deliver net zero.
- **Appointing an Electricity Networks Commissioner** to advise Government on policies and regulatory changes to accelerate progress on network infrastructure.
- **Setting out a blueprint for the whole system by the end of 2022 in the Holistic Network Design (HND) and Centralised Strategic Network Plan (CSNP)**. The HND will identify strategic infrastructure needed to deliver offshore wind by 2030. Certain infrastructure identified in the HND and CSNP will be exempt from the introduction of onshore network competition.
- **Updating the National Policy Statements to recognise these blueprints** in the planning system, increasing certainty for the planning inspectorate, developers and other stakeholders, and speeding up delivery.
- **Ensuring Ofgem expedites its approvals process** to build networks in anticipation of major new sources of generation and demand. Government will set out the importance of strategic network investment in its forthcoming Strategy and Policy Statement for Ofgem.
- Working with developers and the supply chain, we will increase **pipeline visibility and certainty** to help accelerate procurement timelines. And we will work with Ofgem to speed up connections to the local distribution networks.
- **Dramatically reduce timelines for delivering strategic onshore transmission network infrastructure by around three years**. We will work with Ofgem, network operators and the supply chain to find further savings, for example in the procurement, manufacture and construction stages. **Overall, we aspire to halve the end-to-end process by the mid-2020s**.
- **Ensuring that local communities can benefit** from development of onshore infrastructure in their area, we will consult on community benefit options. We will launch an Offshore Coordination Support Scheme which will de-risk delivery of well-advanced offshore wind projects.

We will ensure a more **flexible**, efficient system for both generators and users by:

- Encouraging all forms of flexibility with sufficient large-scale, long-duration electricity storage to balance the overall system by developing appropriate policy to enable investment.
- Ensuring consideration is given to the **siting of hydrogen electrolysers** to best use surplus low carbon electricity and reduce network constraints.
- Undertaking a comprehensive **Review of Electricity Market Arrangements (REMA)** in Great Britain, with high-level options for reform set out this summer.
- Ensuring we have a retail market fit for purpose. We will **join REMA up with our ongoing retail review** to ensure that consumers fully benefit from the next phase of our energy revolution, setting out plans before the next price cap period.

- Smartening up the system with more **flexible pricing**, through Time of Use tariffs and battery storage through Electric Vehicles.
- Ensure all new homes are designed so that **smart meters can be fitted from the outset**, in advance of the Future Homes and Buildings Standards by 2024.

International delivery



It is crucial we work with international partners to maintain stable energy markets and prices. This will help protect UK consumers and reduce the use of fossil fuels globally. Similar to our domestic strategy, we have a dual approach to reduce global reliance on Russian fossil fuels whilst pivoting towards clean, affordable energy.


To reduce global reliance on Russian fossil fuels, the UK is:

- Committing to **phase out the use of Russian oil and coal by the end of 2022, and end imports of Russian liquified natural gas as soon as possible thereafter**. The US has made similar commitments.
- **Building international support to reduce Russian energy revenues**. Internationally coordinated action, e.g., through the G7 and International Energy Agency is key to support stable markets and to help secure the critical minerals we all need to successfully move to clean energy.
- Building on our important **partnerships with non-Russian OPEC countries, and the US**, to promote market stability through the availability of alternative supplies of oil and gas.
- **Hosting the first UK-Qatar Strategic Energy Dialogue** in May to further deepen our existing energy collaboration.
- **Working closely with the US on gas**, particularly on how we can leverage UK LNG infrastructure to support European supply.
- Driving our work with European partners for more **efficient trading across our electricity interconnectors**, lowering costs for UK and EU consumers.
- **Providing a key EU entry point for non-Russian supplies of gas**. We are examining our infrastructure to ensure gas flows efficiently between the UK, Europe and the global market through our interconnectors and LNG terminals and promote gas infrastructure to be hydrogen-ready.

To support other countries to make the same transition to clean, affordable, secure energy, the UK is:


- Leading the **Clean Green Initiative**, launched by the Prime Minister at COP26.
- Committing to **double our International Climate Finance to** £11.6 billion over five years.
- Collaborating with partners to reduce reliance on fossil fuels, from the Powering Past Coal Alliance, the Green Grids Initiative, to nuclear. The UK has decades of experience in uranium enrichment and fuel fabrication to support alternatives to Russian fuel. We are working with like-minded partners at the IAEA and other fora to form an alliance that shapes international regulations to drive SMR deployment. Our North Seas collaboration will accelerate the development of offshore windfarms with links to continental power grids, unleashing hundreds of gigawatts of clean energy into North Seas countries' electricity systems.

Energy plan objectives and key measures

 Oil & Gas Low carbon UK gas, and zero Russian imports						
Key measures	End 2022 ambition	2023 ambition	2024 ambition	2025 ambition	2030 ambition	2050 ambition
<ul style="list-style-type: none"> Regulatory Accelerators for new oil & gas Planned new oil & gas licensing, mindful of delivered Climate Checkpoint & energy security Review of the science on shale gas Clean electricity for offshore platforms CCUS clusters to futureproof North Sea Phase out Russian oil and coal by end 2022 and Russian LNG gas imports as soon as possible thereafter 	<ul style="list-style-type: none"> Climate Checkpoint launched Planned new licensing round for oil & gas Oil & Gas New Project Regulatory Accelerators 0% Russian oil and coal 	<ul style="list-style-type: none"> Potential new projects merge from licensing round 			<ul style="list-style-type: none"> Domestic gas production remains a core part of UK energy security Large scale electrification to provide clean power to offshore platforms 20-30MT CCUS target Over 40% reduction in gas consumption 	<ul style="list-style-type: none"> Net zero compatible oil and gas sector, supplying the UK economy


Nuclear


Deliver Great British nuclear with high ambition, expertise and backed to support projects


	<h3>Deliver Great British nuclear with high ambition, expertise and backed to support projects</h3>					
Key measures <ul style="list-style-type: none"> Up to 8 reactors progressed across the next series of projects Reaching up to 24GW by 2050 (up to 25% of demand) Starting scoping out the Great British Nuclear Development Vehicle next month 	End 2022 ambition <ul style="list-style-type: none"> Great British Nuclear (GBN) Vehicle being set up Future Nuclear Enabling Fund funding awarded 	2023 ambition <ul style="list-style-type: none"> Initiate the selection process for further nuclear projects 	2024 ambition <ul style="list-style-type: none"> By 2024, FID on one nuclear project (i.e. this parliament) 	2025 ambition	2030 ambition <ul style="list-style-type: none"> Up to 8 new reactors progressed across the next series of projects 	2050 ambition <ul style="list-style-type: none"> Up to 24GW nuclear installed (up to 25% of total GB demand)


Solar

Ramp up deployment, on both roofs and ground

	<h3>Ramp up deployment, on both roofs and ground</h3>					
Key measures <ul style="list-style-type: none"> Consult on amending planning rules to strengthen policy in favour of solar development Consult on reviewing permitted development rights to support solar deployment Explore low-cost finance options with retail lenders to help households install rooftop solar Design performance standards to further encourage renewables, including solar PV, in new homes and buildings 	End 2022 ambition <ul style="list-style-type: none"> Publish updated planning documents to support solar deployment Bring the Part L Homes Standards interim uplift into force, enabling solar deployment as a route to compliance 	2023 ambition <ul style="list-style-type: none"> Contracts for Difference auction 	2024 ambition <ul style="list-style-type: none"> Enable improvements in network infrastructure and connectivity; streamline network charging rules Contracts for Difference auction 	2025 ambition <ul style="list-style-type: none"> Future Home Standard and Future Buildings Standard in force, further uplifting energy performance in new homes and buildings Contracts for Difference auction 	2030 ambition <ul style="list-style-type: none"> This could be up to 70GW of solar by 2035 	2050 ambition <ul style="list-style-type: none"> A low-cost, net zero consistent electricity system, most likely to be composed predominantly of wind and solar generation

 Wind Cheaper power for local areas by cutting planning and delivering better connections						
<p>Key measures</p> <ul style="list-style-type: none"> • Halving planning and regulation time for new offshore wind projects • Consult on developing partnerships for a number of onshore wind projects for supportive communities, with associated benefits for local population • Improving community benefits for areas with strategic network infrastructure • By next year, have blueprint for strategic network infrastructure • Networks Commissioner and Future System Operator to help plan ahead • Launch an Offshore Coordination Support Scheme 	<p>End 2022 ambition</p> <ul style="list-style-type: none"> • Publish Electricity Networks Strategic Framework • Publish Holistic Network Design, identifying critical reinforcements required to support wind ambition and helping to speed up delivery timelines including planning and regulatory approvals • Improving Community Benefits consultations for strategic network infrastructure and onshore projects for supportive communities • Launch an Offshore Coordination Support Scheme • Updated English planning policy to support repowering 	<p>2023 ambition</p> <ul style="list-style-type: none"> • Contracts for Difference auction • Amend National Policy Statements • Introduce environment strategic compensation measures • Amend Habitat Regulations Assessment • Introduce Offshore Wind Environmental Improvement Package • Establish a fast track consenting route for priority cases where quality standards are met 	<p>2024 ambition</p> <ul style="list-style-type: none"> • Contracts for Difference auction • Develop appropriate policy to enable investment in long-duration energy storage • Future System Operator established 	<p>2025 ambition</p> <ul style="list-style-type: none"> • Contracts for Difference auction 	<p>2030 ambition</p> <ul style="list-style-type: none"> • Up to 50GW offshore • Including up to 5GW floating offshore wind capacity 	<p>2050 ambition</p> <ul style="list-style-type: none"> • A low-cost, net zero consistent electricity system, most likely to be composed predominantly of wind and solar generation

 Hydrogen Boost our commitment to green H ₂ , accelerating our H ₂ economy						
<p>Key measures</p> <ul style="list-style-type: none"> • Double our ambition to up to 10GW hydrogen production capacity, at least 50% from electrolytic projects • Aim to run annual allocation rounds for the hydrogen business model, moving to price-competitive allocation by 2025 as soon as legislation and market conditions allow • Aim that up to 1GW of electrolytic hydrogen is in operation or construction by 2025, alongside our existing commitment up to 1GW of CCUS-enabled hydrogen • Design Transport & Storage business models by 2025 	<p>End 2022 ambition</p> <ul style="list-style-type: none"> • Complete final hydrogen business model • Net Zero Hydrogen Fund open and funding allocated • Launch UK Low Carbon Hydrogen Standard 	<p>2023 ambition</p> <ul style="list-style-type: none"> • Decision on blending up to 20% hydrogen into natural gas grid • Award first business model contracts to electrolytic and CCUS-enabled hydrogen projects • Hydrogen heating neighbourhood trial begins 	<p>2024 ambition</p> <ul style="list-style-type: none"> • Allocate second round of business model contracts to electrolytic hydrogen projects 	<p>2025 ambition</p> <ul style="list-style-type: none"> • Up to 1GW electrolytic hydrogen and up to 1GW of CCUS-enabled 'blue' operational or in construction by 2025 • Hydrogen Transport & Storage business models designed • Hydrogen heating village trial begins and plan for town pilot • Hydrogen certification scheme set up 	<p>2030 ambition</p> <ul style="list-style-type: none"> • Up to 10GW low carbon hydrogen production capacity, double previous 5GW ambition • Hydrogen Transport & Storage business models in place 	<p>2050 ambition</p> <ul style="list-style-type: none"> • There could be 240-500TWh low carbon hydrogen supply by 2050

 Demand Accelerate energy efficiency deployment and phase out fossil fuel use						
<p>Key measures</p> <ul style="list-style-type: none"> • VAT cut for insulation & heat pumps • Facilitating low-cost finance from retail lenders to catalyse green finance market • Heat Pump Investment Accelerator of up to £30m • Better labelling and product standards so consumers can purchase more efficient products including for heating, lighting, and cooking • Setting clear energy performance standards varying by building type • Launching our new national digital support tool on GOV.UK Energy Advice Service to help consumers improve the energy performance of their homes • Establishing a dedicated energy advice offering for smaller businesses • Extend the EII Compensation Scheme for a further three years, and intend to increase the aid intensity to up to 100% (1.5% of GVA) • Consider other measures to support business including increasing the renewable obligation exemption to 100% 	<p>End 2022 ambition</p> <ul style="list-style-type: none"> • Continue to deliver energy efficiency upgrades through existing public sector, social housing and supplier-led schemes • Launch the Boiler Upgrade Scheme and the Green Heat Network Fund • Upgrade around 2,000 social homes in 2022 through the Social Housing Decarbonisation Fund demonstrator • Begin ECO4 which will upgrade 450,000 homes over four years • Publish proposals to rebalance energy costs 	<p>2023 ambition</p>	<p>2024 ambition</p> <ul style="list-style-type: none"> • Consulted on phasing out fossil fuel heating off the gas grid from this date • Ensure all new homes are designed so that smart meters can be fitted from the outset, in advance of the Future Homes and Buildings Standards • Launch Clean Heat Market Mechanism 	<p>2025 ambition</p> <ul style="list-style-type: none"> • Ensuring all new buildings in England are ready for Net Zero from 2025 • Begin designating heat network zones 	<p>2030 ambition</p> <ul style="list-style-type: none"> • 600,000 heat pump installations per year by 2028 • As many fuel poor homes as reasonably practicable to Band C by 2030 • As many homes to reach EPC B and C as possible by 2035 	<p>2050 ambition</p> <ul style="list-style-type: none"> • All heating systems used in 2050 are compatible with Net Zero with an ambition to end the installation of gas boilers by 2035 at the latest

