E3G

REPORT JANUARY 2025

THE UK'S CLEAN POWER MISSION: DELIVERING THE PRIZE

AN ANALYSIS OF THE OPPORTUNITIES AND CHOICES

SUSIE ELKS, ELLIE MAE O'HAGAN, SIMON SKILLINGS & ED MATTHEW

E3G

About E3G

E3G is an independent climate change think tank with a global outlook. We work on the frontier of the climate landscape, tackling the barriers and advancing the solutions to a safe climate. Our goal is to translate climate politics, economics and policies into action.

E3G builds broad-based coalitions to deliver a safe climate, working closely with like-minded partners in government, politics, civil society, science, the media, public interest foundations and elsewhere to leverage change.

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Our partner

E3G would like to acknowledge the considerable contribution from Baringa Partners to the work set out in this report.

About Baringa Partners

We set out to build the world's most trusted consulting firm – creating lasting impact for clients and pioneering a positive, people-first way of working. We work with everyone from FTSE 100 names to bright new start-ups, in every sector.

You'll find us collaborating shoulder-to-shoulder with our clients, from the big picture right down to the detail: helping them define their strategy, deliver complex change, spot the right commercial opportunities, manage risk or bring their purpose and sustainability goals to life. Our clients love how we get to know what makes their organisations tick – slotting seamlessly into their teams and being proudly geeky about solving their challenges.

As a Certified B Corporation®, we've proven that we've built social and environmental good into every bit of what we do.

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EXECUTIVE SUMMARY

Modelling for E3G has shown the UK government's 2030 clean power target is achievable and will protect the UK from electricity price volatility. A concerted build-out of renewable energy, led by offshore wind, will enable long-term electricity bill stability under existing policies. The full potential for electricity bill reductions can be realised with policy changes. We propose a package of reforms – an Electricity Bills Charter – which could save billpayers over £200 per year.

The Clean Power 2030 mission can be achieved

E3G commissioned modelling by Baringa Partners which sets out pathways to achieving the 2030 clean power target and estimates the associated impact on electricity bills, based on the existing policy framework. Three scenarios were investigated and delivered the following results:

> **Baseline:** The pre-election trajectory for the power system. This achieves 86% clean power[1] by 2030.

> **Constrained Acceleration:** Maximum use of existing delivery mechanisms to increase deployment within current delivery constraints. This achieves 94% clean power by 2030.

> **Unconstrained Acceleration:** Action is taken to reduce delivery constraints by 2 years and achieve higher deployment of offshore wind. This achieves 96% clean power by 2030.

This modelling shows that a huge increase in renewable generation is possible by 2030 and confirms the assessments by the National Energy System Operator and by the government that the clean power target is ambitious but achievable.[2]

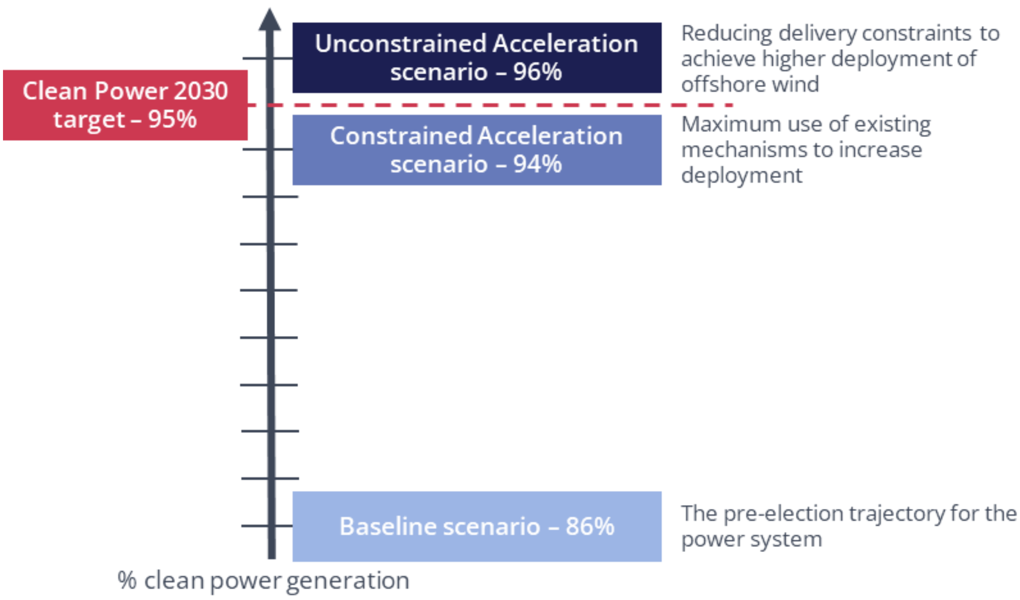
[1] Using the definition for clean power adopted by government in the **Clean Power 2030 action plan**, December 2024

[2] Department for Energy Security and Net Zero, December 2024, **Clean Power 2030 action plan**; NESO, November 2024, **Clean Power 2030**

In our Unconstrained Acceleration scenario, offshore wind more than trebles, and both solar and onshore wind capacity more than double. Offshore wind becomes the foundation for the clean power system and by 2030 provides nearly half of power generation, with another third provided by onshore wind and solar.

This increase in renewable generation eliminates the requirement for much of the gas fired power upon which the UK currently depends. The gas fired power stations which provided nearly a third of power generation in 2023 will shift to providing backup support on the occasions when renewable generation is scarce.

Accelerating renewables build-out makes 95% clean power by 2030 achievable



Clean power and the impact on electricity bills

Our modelling shows that under existing pricing policies, and with central gas price projections, the UK government can complete its clean power mission by 2030 with electricity bills at the same level as they are today. Moreover, accelerating renewables rollout will result in less impact on bills if gas prices rise. However, the energy market and electricity bills are not set up to allow consumers to reap the potential benefits of an electricity system powered mostly by renewables. Policy reform is essential to achieve this and guarantee a reduction in electricity bills for households.

Less volatility in electricity bills in the future

Electricity bills are projected to be the same or lower by 2030 under all scenarios using central gas price assumptions and existing power policies. However, electricity bills under all scenarios would be higher in 2030 with existing power policies if gas prices are high. This shows that gas prices would still impact bills, but the more renewables we have the lower this impact will be.

We also modelled a gas price shock. In our Unconstrained Acceleration scenario, a gas price shock in 2030 equivalent to the one experienced in 2022 would raise the typical annual household electricity bill by £71 – less than 9% – compared to central gas price assumptions. This compares to a threefold increase in the price cap following the Russian invasion of Ukraine in 2022,[3] which led to electricity bills for an average household increasing from £770 in 2021 to £1,105 in 2022 – a rise of £335 – with the government having to make up the difference.[4] In total, the government had to spend £44 billion bailing out UK households on their energy bills.[5] Delivering the clean power mission, even under existing power policies, would provide significant protection for households from very high gas prices.

Reforming Contracts for Difference to reflect a fairer price for renewable energy

The main support mechanism for large scale renewables is Contracts for Difference (CfDs). These are contracts allocated in an auction to renewables developers that guarantee a stable payment for electricity generation for a set number of years. Ensuring CfD costs are as low as possible is critical to enable consumers to benefit from cheap renewables.

Our modelling of CfD auctions under central gas price assumptions and with existing pricing policies suggests typical electricity bills would be slightly higher in our Unconstrained Acceleration scenario than the Baseline, by £30–£40. Policies must be reformed to ensure additional renewables are brought online in a way that results in lower costs for the consumer.

[3] Ofgem, **Energy price cap (default tariff) levels**

[4] Department for Energy Security and Net Zero, updated 27 June 2024, **Annual domestic energy bills statistics**. These figures incorporate the Energy Price Guarantee from October 2022 but do not reflect payments made through the Energy Bills Support Scheme, which provided UK customers with £200 of support in 2022.

[5] National Audit Office, November 2024, **Energy bills support: an update**

CfD costs can be significantly reduced. For example, our modelling of CfD auctions shows that merely increasing contract duration by 10 years will reduce annual bills by £30.

Other changes could realise other significant savings, including:

- Switching to CfD bilateral cost-based negotiation to prevent developers of renewable projects making excessive profits through the auction process. At present the CfD auction works well but, when the government needs to contract all the renewable capacity being offered, changes are needed to keep the price low.
- Reducing financing costs, since this represents a significant proportion of the cost that renewable developers will seek to recover through the CfD auction. This can be done through introducing green interest rates and providing public sector investment, via GB Energy or the National Wealth Fund

Clean power can deliver lower bills

A full programme of policy reform could lower electricity bills by over £200 while the clean power mission is delivered.[6] We have identified a package of policy recommendations, including those relating to CfD costs, which would ensure the benefits of clean power are realised – our Electricity Bills Charter.

Move levies off electricity bills

- Moving legacy renewable policy costs, including the Renewables Obligation and Feed-in Tariffs, to general taxation, could cut bills by about £80 in 2030 and more than that in the intervening years.

Reduce wholesale costs

- Ensuring more customers can benefit from smart tariffs, allowing them to use cheaper, off-peak electricity to power electric vehicles and renewable heating.
- Regulating gas power plants to stop profiteering as gas moves to a backup role.

[6] Removing legacy policy costs will save £80. Extending CfD contract duration will save £30. The impact of other proposed changes has not been calculated, but those which reduce wholesale costs (demand side response, gas plant regulation) could save several £10s and those reducing contract strike prices (bilateral negotiation, financing costs) could save significantly more.

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Unleash an efficiency revolution

> Improving energy efficiency in homes and businesses.

> Reforming the electricity market (for example via zonal pricing) to offer cheaper power to communities that live near wind farms and solar farms.

> Using digital technologies such as AI to reduce the costs of running the power system.

E3G's Electricity Bills Charter

Reduce the cost of renewables

- **Extend Contracts for Difference by 10 years** to reduce typical household bills by £30 in 2030.
- **Move from auctions to bilateral cost-based negotiations** to keep prices low when all offers of renewable capacity need to be accepted.
- **Reduce financing costs** through public sector investment – via GB Energy or the National Wealth Fund – or green interest rates.

Move levies off bills

- **Shift legacy costs to general taxation** to reduce typical household bills by £80 in 2030.

Reduce wholesale costs

- **Ensure consumers can benefit from off-peak electricity and smarter tariffs.** Using electricity more smartly will reduce costly curtailment of wind energy.
- **Strengthen gas plant regulation** so that plants cannot generate unjustified profits when backup power is needed.

Unleash an efficiency revolution

- **Upgrade buildings and electrify heating** to reduce energy demand.
- **Reform pricing systems** so that the cheapest resources are always used to meet demand. Allow communities to benefit from cheap power produced locally.
- **Use digital technologies** to improve efficiency in both production and consumption of electricity.

Together, these measures could lower typical household electricity bills by over £200

Prioritise hydrogen for the best backup power

Renewable "green" hydrogen is the most cost-effective option for backup power.[7] Government should urgently take steps now to prioritise hydrogen investment towards the infrastructure needed to bring forwards both the power stations and the large-scale hydrogen storage needed to supply them.

[7] The Royal Society, September 2023, **Large-scale energy storage**

This means that up until 2030 the government will have to keep the same amount of gas capacity available as it has today, but by then it will only be providing backup power.

We recommend the government minimises the use of gas power stations with carbon capture and storage (CCS) as backup power. This is relatively expensive given how infrequently it will be required, has residual carbon emissions, and does not help to break the linkage between electricity and gas prices. However, we calculate that 2–3 GW of CCS may be required to achieve the Clean Power 2030 mission. Additional investment in CCS cannot be economically or environmentally justified given the potential for cheaper hydrogen options shortly thereafter. The government should, therefore, focus its energies on deploying offshore wind, and use CCS mainly for industries such as waste incineration, cement, and chemicals – where decarbonisation options are limited.[8]

Electrification of the economy can be boosted

Our modelling shows that increased offshore wind allows for faster heating and transport electrification without raising bills or compromising 2030 clean power targets. This is because more of the electricity produced can be used rather than being exported to Europe or curtailed due to lack of demand.

Working with the EU

Efficient trading of electricity resources with Europe will help the UK to strengthen its energy security, lower electricity bills and create opportunities to exploit the offshore wind resources that will be required after 2030. Our modelling has shown that, while some domestic gas generation is exported to Europe, we can achieve efficient trading alongside delivering clean power goals.

[8] E3G and Bellona, July 2023, **Carbon capture and storage ladder**

Drax is not needed to achieve the Clean Power 2030 mission

The former coal power station at Drax has been converted to operate on imported biomass and receives a large legacy subsidy to support its operation. The electricity it produces is currently classified as clean power which could provide backup support. However, there is strong evidence that the emissions associated with using biomass in power stations are significant.[9] Our analysis has shown that the clean power mission can be met without using biomass from Drax.

[9] JRC, 2020, **The use of woody biomass for energy production in the EU**

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INTRODUCTION

Clean power by 2030 is a key element of the government's mission to make the UK a clean energy superpower. The international community is watching closely. With the world heading towards a catastrophic 3 °C of heating before the end of this century without a rapid acceleration of global action to reduce emissions to net zero, this mission has the potential to drive economic growth and ignite lift-off for global electrification, sealing the UK's reputation as a climate leader.

The UK has made good progress on decarbonising power, but continued dependence on gas undermines the UK's energy security and macroeconomic stability and has led to higher energy bills. In the context of increasing fossil fuel price volatility, we cannot discount the possibility of further surges in gas prices such as followed the Russian invasion of Ukraine in 2022, which resulted in the electricity price cap rising by over £1,300 in a year, peaking at £2,000.[10] The UK government ended up having to spend £44 billion to bail out household and business energy bills.[11]

To wean the UK off gas, the government will have to decarbonise the electricity system while also electrifying heating, transport and most of industry. The questions we address in this report are how the 2030 clean power mission can be technically achieved and what policies are needed to bring down electricity bills at the same time.

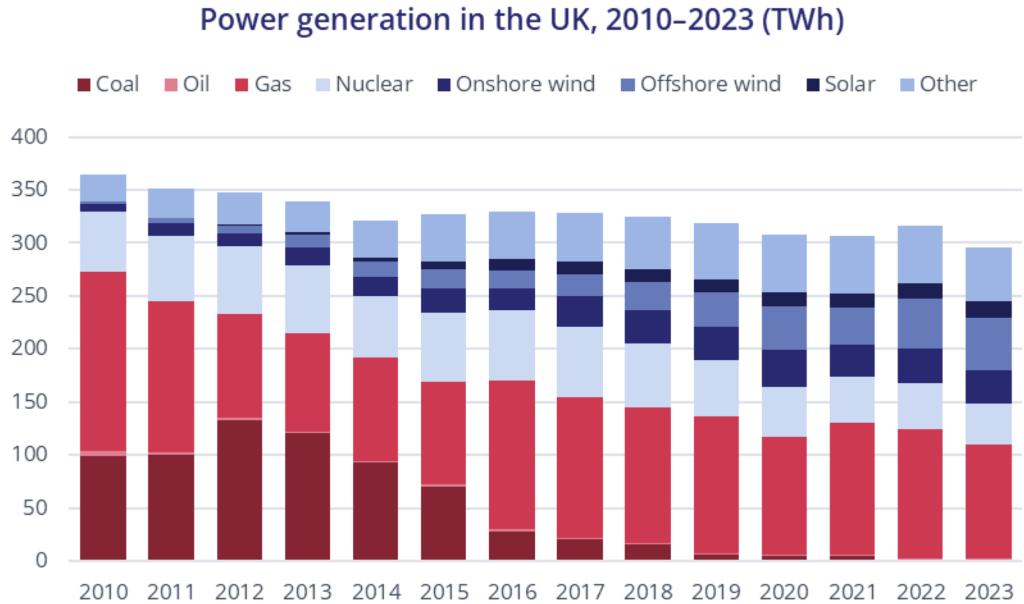
UK power decarbonisation so far

The UK has been a leader in power decarbonisation. While gas played an important role in reducing coal generation in the 1990s, renewables have been doing the heavy lifting more recently. Coal generation dropped from 133 TWh to zero between 2012 and 2024 (Figure 1).[12] Three-quarters of coal power was replaced by gas, wind, solar and biomass. Imports and energy efficiency improvements displaced the other quarter. The elimination of coal fired power from the generation mix has burnished the UK's climate leadership credentials.

[10] Ofgem, **Energy price cap (default tariff) levels**

[11] National Audit Office, November 2024, **Energy bills support: an update**

[12] Baringa, **Power market projections and energy systems analysis**



Note: "Other" = Biomass & waste, Hydro, and Pumped storage

Source: Baringa, Power market projections and energy systems analysis

Figure 1: Clean power sources, imports and efficiency have displaced over half of fossil fuel-based power generation (predominantly coal) since 2010.

The challenge turns to gas

Despite the impressive reduction in emissions from the power sector so far, the job is far from done. Gas fired power made up nearly a third of power generation in 2023. By 2030 the UK will need to retain a similar level of gas generation capacity as it has today, but it will be confined to a backup role for the times when renewable generation is low. To meet the clean power definition, it will need to provide 5% or less of total generation over a typical year.[13]

Although a new nuclear power station, Hinkley Point C, is being built in Somerset, this will not be finished by 2030. Some older nuclear plants are having their operational lives extended and others are expected to close. This means that delivery of the government's 2030 clean power target will depend largely on expanding renewable power capacity and the grid will need to be prepared accordingly.

[13] NESO, January 2024, **Britain's electricity explained: 2023 review**

According to the National Energy System Operator (NESO), reaching the 2030 clean power target will require an average of £40 billion a year of investment (mostly private) between now and 2030.[14] This will be needed to greatly increase build-out of renewables, strengthen the power grid at a record pace, and invest in supporting technologies. E3G is calling on the government to create sectoral net zero investment plans to outline where the investment will come from. We will publish in 2025 an indicative plan for the power sector.

Meanwhile, plans must recognise that 2030, while the mission target, is not an end point. Choices made now to achieve the target must make sense given the expected evolution of the energy system after 2030 and the impact on other sectors. It is important that the government does not lock the UK into technology choices such as carbon capture and storage (CCS) at a scale that are not cost-effective in the future.

Policy choices can mitigate the cost of investment

The upfront investment is significant, but speeding up investment in decarbonising the power system will not lead to higher energy bills if done in the right way. Wind and solar power are cheaper than gas to produce on a levelised basis and our modelling shows the price of wholesale electricity will decline as more renewables come onto the system. This will decrease pressure on electricity prices, helping to offset the investment cost.

However, to guarantee that electricity bills reduce requires the adoption of a suite of policies to ensure the cheaper cost of renewables reaches households and that the investment is undertaken in the most cost-effective way. By implementing the right policy reforms, the government can ensure that the benefits of clean power are not only felt by future generations, but by people living in Britain today. The first step is to make the most cost-effective technology choices.

[14] NESO, November 2024, **Clean Power 2030**

CHAPTER 1

THE CLEAN POWER MISSION AND TECHNOLOGY CHOICES

The Clean Power 2030 mission can be achieved

Clean power by 2030 is a core part of the government's mission to make the UK a clean energy superpower. Clean power has been defined by NESO as an electricity system where clean sources produce at least as much power as Great Britain consumes in total and unabated gas should provide less than 5% of Great Britain's generation in a typical weather year.[15] This definition has been accepted by government.[16]

Our modelling shows that the 2030 clean power target can be met through a major build-out of renewable energy, with the bedrock being provided by offshore wind. Unabated gas fired generation (that is, with no emissions captured) can be reduced to as little as 4% of generation over a year, although significant gas capacity will still be needed to provide this generation, before the introduction of other forms of backup capacity.

The government will need to develop zero emissions alternatives to unabated gas capacity. Although 2–3 GW of gas combined with carbon capture and storage (CCS) may be needed by 2030 to deliver the clean power mission, the priority should be given to preparing the ground for more cost-effective and zero carbon solutions – namely a big uplift in green hydrogen production and storage alongside building as much offshore wind as possible. The biomass Drax plant is not needed to reach the clean power target by 2030.

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15 NESO, November 2024, **Clean Power 2030**

16 Government energy statistics do not currently measure clean power. Our modelling has included biomass, energy from waste, and industrial combined heat and power (CHP) as clean power sources in line with the government's definition. However, we have needed to make certain assumptions, including the proportion of gas CHP which would qualify.

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Power system scenarios modelled

E3G commissioned Baringa to model three pathways to clean power 2030 and calculate the percentage reduction in gas generation and impact on bills. These are the headline results on clean power generation:

> **Baseline:** This scenario reflects the pre-election trajectory for the power system. Our modelling found that this would achieve 86% clean power by 2030.

> **Constrained Acceleration:** This scenario assumed that existing delivery mechanisms are used to maximum extent within current delivery constraints. The model shows that this would achieve 94% clean power by 2030.

> **Unconstrained Acceleration:** This scenario assumed that action is taken to significantly reduce delivery constraints and achieve higher deployment of offshore wind. This achieves 96% clean power by 2030.

Prioritising renewables for speed and cost

The Baringa model projected that around 80 TWh of gas generation will be produced in Great Britain in 2025; this will need to be replaced by clean power. Our modelling suggests that 190 TWh of new wind and solar generation can be added to the system by 2030. However, Baringa has estimated that electricity demand will rise by ~20% by 2030 due to the continued electrification of heat, transport and industry. Also, some sources of clean power will close. We assume biomass from Drax is discontinued after 2027 when its current contract expires, and nuclear power output will decrease in the short term as some stations are retired (although we assume two stations are given life extensions through to 2030). Also, our modelling suggests that power exports will increase significantly.

Our assumptions for the renewable capacity in 2030 are set out in Table 1. In the Unconstrained Acceleration scenario, offshore wind more than trebles, and both solar and onshore wind capacity more than double. Offshore wind will be the foundation for the clean power system and by 2030 will provide nearly half of power generation, with another third provided by onshore wind and solar.

Table 1: Assumptions for renewable capacity in 2030 in the three scenarios modelled for this report (in GW).

	2024	2030		
		Baseline	Constrained Acceleration	Unconstrained Acceleration
Onshore wind	13.4	21.0	30.0	34.7
Solar PV	17.0	24.6	30.2	38.7
Offshore wind	15.8	34.7	41.8	50.9

These renewable deployment targets are very stretching, and this build-out of generation will have to be accompanied by significant grid development, which requires rapid reforms to the planning system and connection queue. Network expansion will have to proceed at four times the speed that has been achieved in the last decade.[17] The costs of this grid build-out have been included in Baringa's model.

Building more wind and solar is very effective at rapidly displacing fossil fuel generation and Baringa estimates that the amount of gas generation on the system which is not classified as clean can be reduced to around 4% by 2030.

Prioritising green hydrogen for backup dispatchable generation

It is important to provide cost-effective backup for periods when wind and solar power generation is scarce. This requires some form of generation whose output can be controlled (firm dispatchable generation). Some unabated gas generation will still be needed in 2030 in all scenarios (see Figure 2), because it will take time to be replaced with zero or low-carbon forms of backup.

The current main technological options for doing so are either producing hydrogen (ideally via electrolysis of water – green hydrogen) and storing it for use in gas turbines or engines, or capturing and storing the carbon emissions (carbon capture and storage, CCS) from combined cycle gas turbine power plants (CCGTs).

[17] NESO, November 2024, **Clean Power 2030**

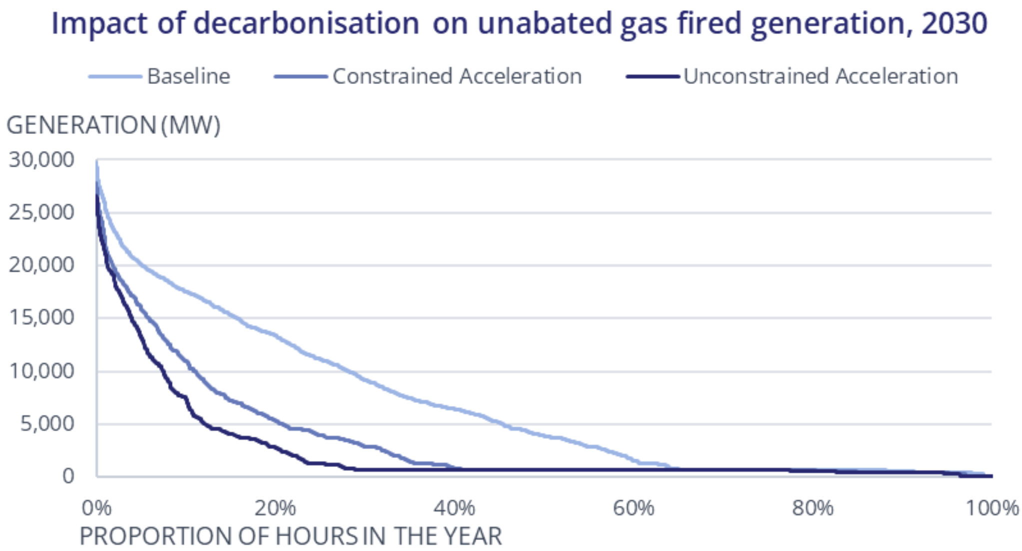


Figure 2: Residual unabated gas fired generation will still be needed in all modelled scenarios

Other analysis has shown that hydrogen would be preferred for low utilisation backup operation given the lower fixed costs.[18] Moreover, gas CCGTs with CCS would not be zero emissions due to leakage of methane and carbon dioxide, and taking that path foregoes the benefit of decoupling prices from global fossil fuel price volatility. The leading option for storage of large quantities of hydrogen is new salt caverns, but these can take many years to bring into service and are unlikely to be available at scale by 2030.[19] The modelling indicates that a minimal level of gas CCS will be needed to achieve the clean power mission until green hydrogen is available at scale.

The Constrained Acceleration scenario includes 2.6 GW of gas power plants with CCS, which would provide 7.8 TWh of generation. Increasing deployment to 4 GW of gas CCS in the Unconstrained Acceleration scenario delivered minimal additional generation (0.3 TWh) and carbon savings because the requirement was so small. This additional investment in CCS beyond 2–3 GW cannot be economically or environmentally justified given the potential for cheaper hydrogen options shortly thereafter.

[18] The Royal Society, September 2023, **Large-scale energy storage**

[19] Ibid.

The Government Clean Power plan suggested a range of 2–7 GW of low-carbon firm dispatchable power.[20] We believe the correct technology mix should be driven by the long-term vision for the UK electricity supply. This will inevitably require significantly more offshore wind to meet growing demand, and the North Sea has the potential to provide enough surplus renewable electricity to produce huge volumes of green hydrogen.[21] We conclude that only 2–3 GW of gas with CCS – in combination with levels of renewables modelled in the Unconstrained Acceleration scenario – will be required to achieve the clean power mission before significant hydrogen storage becomes available.

Deploying offshore wind as fast as possible should, therefore, remain the strategic priority and the government should minimise the amount of gas CCS that it has to build for electricity generation. CCS should be prioritised instead for combined heat and power plant serving the industrial heat processes where no credible alternative decarbonisation options exist.

Interconnection is vital

The UK has around 10 GW of electrical interconnectors to neighbouring countries. Our analysis assumes this will increase to around 13 GW by 2030. These interconnectors enable electricity to be transferred from regions that have a surplus of cheap electricity to ones which have a shortage. This reduces prices in importing countries and increases incentives to locate renewable power generation in exporting countries where it is cheapest – thereby reducing prices here as well in the long term. Efficient electricity trading between the UK and EU improves security of supply, reduces costs and reduces overall emissions. Interconnection does not, however, replace requirements for backup power since there will be instances where power shortages exist in all connected markets.

Our modelling has assumed efficient trading across interconnectors. It is apparent that cold, dark winter evenings are periods of stress for the UK and its interconnected markets (Norway, Denmark, Germany, Netherlands, Belgium, France, and Ireland) and interconnector flows are relatively balanced during these periods between imports and exports. Table 2 shows that in our acceleration scenarios around half of domestic gas generation could be exported to provide balancing support to other countries in 2030.

[20] Clean Power Plan, December 2015

[21] Heinrich Böll Stiftung, November 2024, **Marking the most of North Sea renewables**

Table 2: Exports of gas generation in 2030

	Baseline	Constrained Acceleration	Unconstrained Acceleration
Gas generation not including CHP (TWh)	50.2	22.7	14.6
Total exported generation (TWh)	36.9	46.2	59.7
Exported gas generation (TWh)	16.7	9.2	7.8
Proportion of gas generation exported	33%	41%	53%

The UK Emissions Trading Scheme (ETS) imposes carbon prices on gas power generation, which subsequently influences wholesale electricity prices. This system currently includes an administered uplift known as the carbon price support. The UK scheme's separation from the EU ETS can complicate electricity and goods trading. In our modelling we assumed a progressive merger of UK and EU schemes before 2030 which included the removal of the carbon price support. Detailed carbon price assumptions used in our modelling are provided in the Annex.

The NESO analysis has maintained a carbon price premium over the EU price to suppress exports of gas power generation by making it appear more expensive than gas generation in the EU.[22] This does not appear to create a mutually beneficial trading relationship with EU countries that will allow the UK to take full advantage of the renewable resources in the North Sea over the coming decade.

[22] NESO, November 2024, **Clean Power 2030**

Drax biomass is not needed to reach clean power

The former coal power station at Drax has been converted to operate on imported biomass and is in receipt of a large legacy subsidy to support its operation. The electricity it produces is currently classified as clean power which is also firm and dispatchable. It might appear tempting to continue to support Drax biomass operations once the current subsidy expires in 2027. However, there is strong evidence that using biomass in power stations is creating high carbon emissions.[23] Our analysis has shown that the clean power mission can be delivered without extending the lifetime of Drax. The government should recognise the high environmental and financial costs associated with Drax's biomass operations and seek zero emission sources of firm dispatchable power.

[23] JRC, 2020, **The use of woody biomass for energy production in the EU**

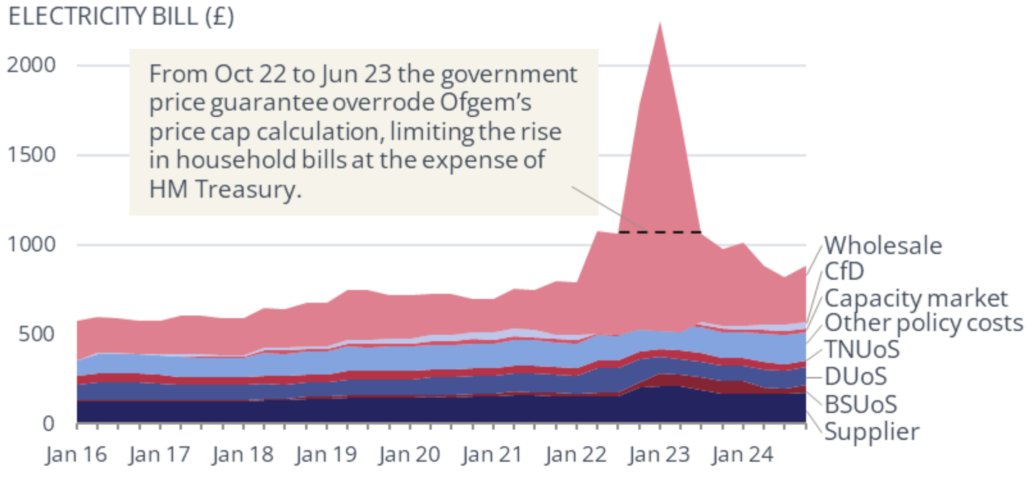
CHAPTER 2

THE CLEAN POWER MISSION AND ITS IMPACT ON BILLS

Gas dependency risks high energy bills

Continued dependency on gas carries major financial risks for UK households and the entire UK economy. Figure 3 shows the composition of a typical household electricity bill over the last 9 years.[24] This shows the huge impact of the gas price spike following the Russian invasion of Ukraine which led to a threefold increase in the price cap,[25] meaning average annual household electricity bills increased from £770 in 2021 to £1,105 in 2022.[26]

Composition of typical household electricity bill over time



Notes: CfD = Contracts for Difference; TNUoS = Transmission Network Use of System charges; DUoS = Distribution Use of System charges; BSUoS = Balancing Services Use of System charges

Source: Based on Ofgem, Energy price cap (default tariff) levels, London single residential supply, direct debit, 3,100 kWh, excluding VAT

Figure 3: Historic evolution of household electricity bills

[24] Modelled bill values, referred to as typical household bills, presented in this report are based on London area, residential supply (3,100 kWh), and excluding VAT. All prices are also at Jan 2024 levels.

[25] Ofgem, **Energy price cap (default tariff) levels**

[26] Department for Energy Security and Net Zero, updated 27 June 2024, **Annual domestic energy bills statistics**. These figures incorporate the Energy Price Guarantee from October 2022 but do not reflect payments made through the Energy Bills Support Scheme, which provided UK customers with £200 of support in 2022.

The impact on gas bills was much more pronounced for households because 78% of them still use gas boilers for heating. Overall, during the gas price crisis the average heating bill rose from £478 to £986[27] and the government had to spend £44 billion bailing out UK households and businesses to keep it at these levels.[28]

Clean power and the impact on electricity bills

We have modelled the impact on bills under a central gas price projection and a high gas price projection (see Annex for details of gas price assumptions). We also considered the impact of a gas price shock in 2030 at similar levels to that seen in 2022. This modelling assumed current policies are in place and does not consider the potential to reduce bills through pricing policy reform. That potential is examined in Chapter 3.

According to the modelling, we expect bills in 2030 in real terms to be the same as, or lower than, they are today unless gas prices are high. The Ofgem price cap for July to September 2024 expressed on a consistent basis with the way we calculate bills elsewhere in this paper gives a typical annual household electricity bill of £815.[29] This is the same or higher than the level we predict for 2030 under all scenarios using central gas price assumptions but lower than for our high gas price assumptions.

Our modelling confirms that increasing renewables, under existing pricing policies, reduces the impact of gas price rises on the level of household bills – with more renewable capacity, electricity consumers are less exposed to the impact of higher gas prices. Figure 4 plots the modelled electricity bills for central and high gas price projections over time for each of the three scenarios.

[27] Department for Energy Security and Net Zero, latest update June 2024, **Average annual domestic gas bills by home and non-home supplier (QEP 2.3.1)**

[28] National Audit Office, November 2024, **Energy bills support: an update**

[29] The actual figure for July to September 2024 was £831. However, this includes the "Adjustment Allowance" which covers certain COVID-related costs. This allowance has been excluded to provide a like-for-like comparison with our forward-looking projections. See: Ofgem, **Final levelised cap rates model (Annex 9)** (Excel)

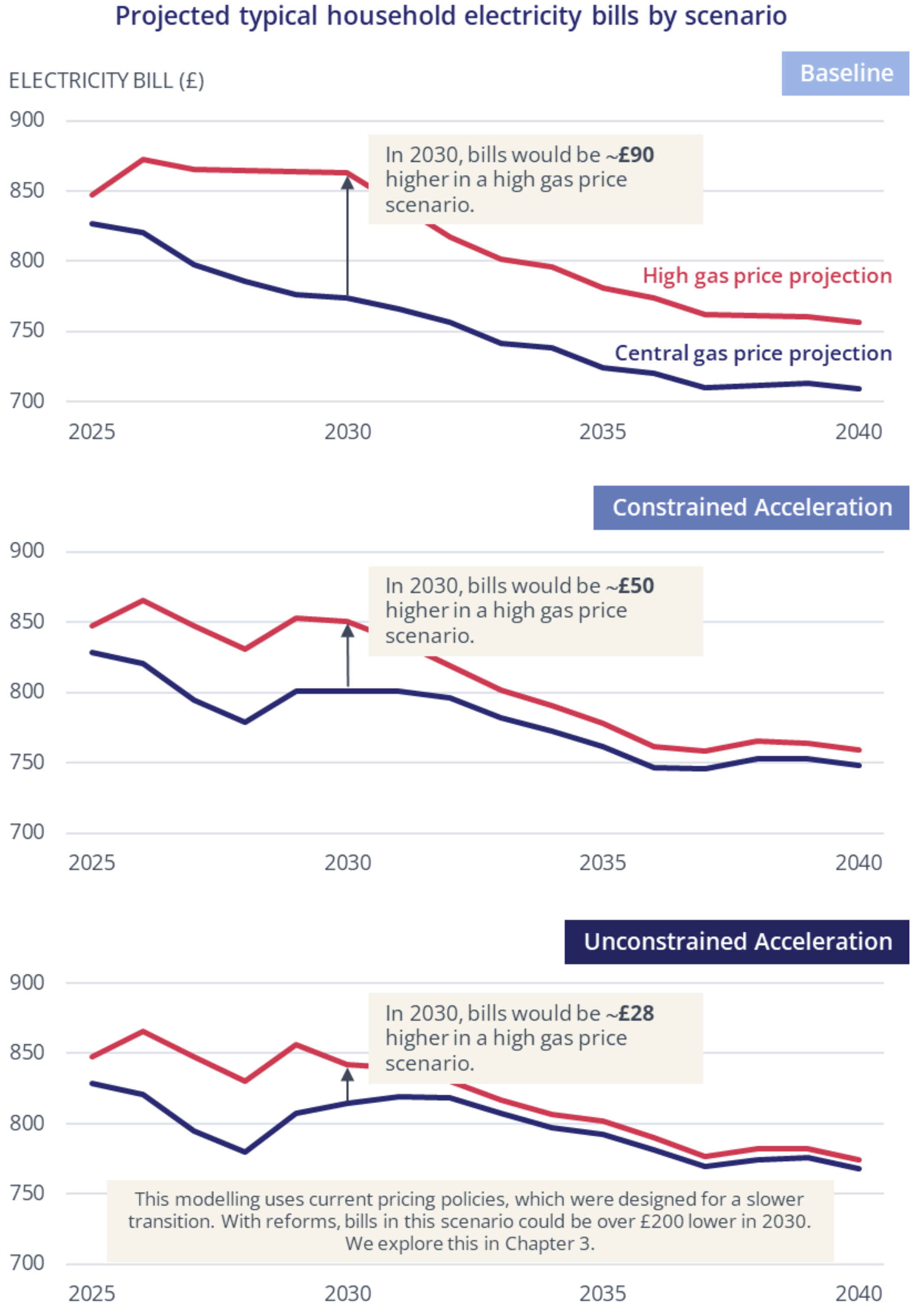


Figure 4: Accelerated renewables build-out protects consumers from high gas prices.

We additionally modelled the impact of a gas price shock such as that seen in 2022 on electricity prices in 2030. In that situation, the typical bill in our Unconstrained Acceleration scenario (which achieves 96% clean power), would rise by only £71 compared to our central gas prices – an increase of less than 9%. In our Baseline scenario (which achieves 86% clean power), a similar gas price shock would result in an increase in electricity bills of £161, or over 20%.

These increases compare to a threefold increase in the price cap following the Russian invasion of Ukraine in 2022,[30] which led to electricity bills for an average household increasing from £770 in 2021 to £1,105 in 2022 – a rise of £335, with the government having to make up the difference.[31] In total, the government had to spend £44 billion bailing out UK households and businesses on their energy bills.[32]

The relatively limited impact of gas prices on electricity bills that we are projecting reflects the extent of generation that will be covered by Contracts for Difference (CfDs), even in the Baseline scenario. CfDs are government-allocated contracts designed to stabilise earnings for renewable energy projects, thereby reducing financing costs and driving investment in the sector. They provide consumers with a hedge that dilutes the impact of wholesale prices on electricity bills.

The extent to which overall bills are lower, and the benefits of cheap renewables passed through to consumers, depends on the CfD strike prices achieved. Ensuring these prices are as low as possible, consistent with encouraging the investment required, is a key policy imperative. Our modelling of CfD auctions under central gas price assumptions and existing pricing policies suggests typical electricity bills in 2030 would be slightly higher in our Unconstrained Acceleration scenario than the Baseline, by £30–£40. Improving the efficiency of the contract allocation process can eliminate this increase and ensure the benefits of cheap renewables are felt by consumers – this is one of the recommendations in our Electricity Bills Charter set out in Chapter 3.

[30] Ofgem, **Energy price cap (default tariff) levels**

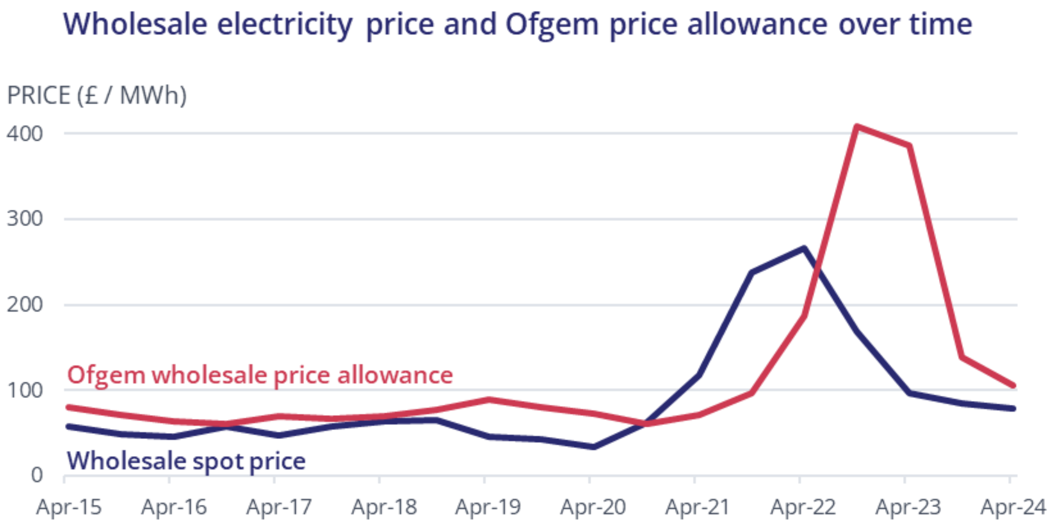
[31] Department for Energy Security and Net Zero, updated 27 June 2024, **Annual domestic energy bills statistics**. These figures incorporate the Energy Price Guarantee from October 2022 but do not reflect payments made through the Energy Bills Support Scheme, which provided UK customers with £200 of support in 2022.

[32] National Audit Office, November 2024, **Energy bills support: an update**

Accelerated clean power reduces hedging costs

There is an important additional potential benefit to household electricity bills from more rapid decarbonisation of the power system that is not captured by the modelling. Electricity bills include a premium of about 20% to cover the costs of hedging against future wholesale price volatility. Before the 2022 gas price spike many smaller energy suppliers did not hedge sufficiently, leading to their collapse. As a result, suppliers are now encouraged to fully hedge their exposure to wholesale prices, and the Ofgem price cap formula includes a cost allowance.

Figure 5 shows the historic wholesale spot price compared to the wholesale cost allowance included in the Ofgem price cap. The increased wholesale price stability of a clean power system could lead to a reduction in the cost of hedging, potentially reducing bills further with greater reductions in higher renewable scenarios.



Sources: Nord Pool, N2EX Day-ahead prices; Ofgem, Energy price cap (default tariff) levels – Wholesale costs allowance methodology (Annex 2)

Figure 5: Impact of forward wholesale price volatility on Ofgem price cap wholesale allowance

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CHAPTER 3
AN ELECTRICITY BILLS CHARTER TO REDUCE BILLS

Our modelling shows that under existing pricing policies the UK government can complete its clean power mission by 2030 with electricity bills at the same level as today and better insulated against high gas prices. However, this assumes current policies are retained. The energy market and electricity bills are not set up to allow consumers to reap the full potential benefits of an electricity system powered mostly by renewables. Policy reform is essential to achieve this and guarantee a reduction in electricity bills for households.

There are several policy reforms the government can undertake to help ensure that electricity prices are brought down whatever happens to the price of gas. We have designed an **Electricity Bills Charter** that has the power to lower electricity bills for all households. This is based on considering the significant components of the bill and how they may be reduced. We recommend that the introduction of such a charter should represent a core element of the clean power mission. We estimate that these new policies could bring down electricity bills by over £200.

Reducing the cost of renewables

CfDs are government-allocated contracts designed to stabilise earnings for renewable energy projects, thereby reducing financing costs and driving investment in the sector. Reforming how these contracts work is the single most important step the government can take to reduce electricity bills. They are not only critical to ensure sufficient investment in renewables, but the strike prices pass directly through to consumer bills since they determine the price paid for renewable generation. Any reduction in these prices can deliver a significant benefit and reform is essential to ensure consumers reap the benefit of low-cost renewables.

Increase contract duration

We have illustrated the potential impact by modelling one change to CfDs. Contracts currently last for 15 years, which is about 10 years less than a typical project lifetime. Developers must factor these last 10 years of earnings into their contract auction offers. Extending contract duration from 15 to 25 years would align with the typical lifetime of renewable projects and allow developers to offer lower prices. Figure 6 shows that this relatively small policy change could reduce annual electricity bills by approximately £30 in 2030. The government has indicated in the Clean Power action plan that it will consult on this potential reform.

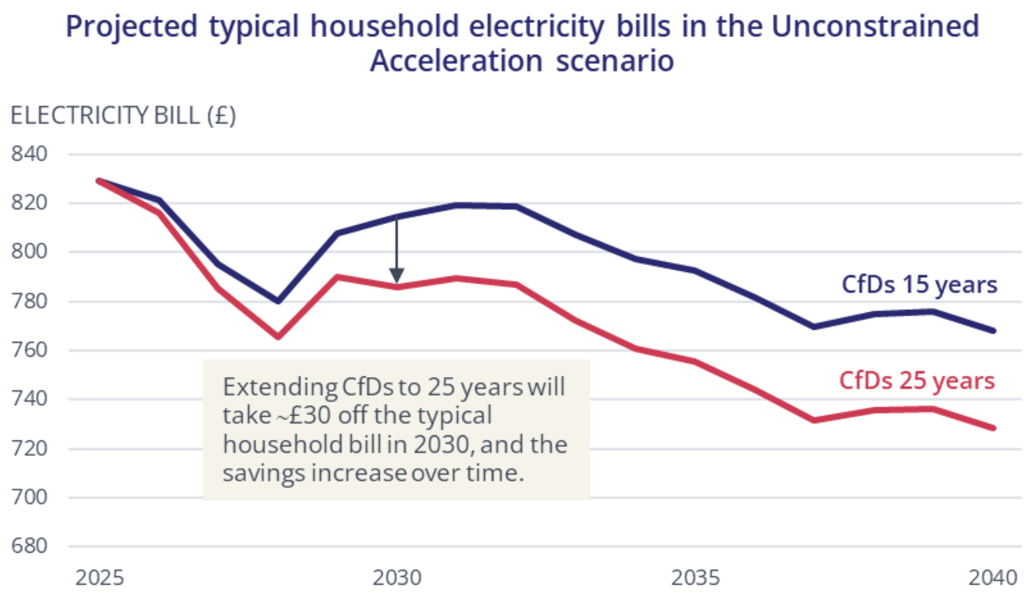

Figure 6: Extending the duration of CfDs to match the lifetime of renewable projects allows investors to offer lower prices in the CfD auction, which feeds through into electricity bills

Reform contract allocation

There is, however, a fundamental change to the contract allocation process which could deliver a much greater dividend. Allocation is currently conducted through competitive auctions, with all successful projects receiving the price offered by the highest-priced successful project (marginal pricing). This competitive approach has been instrumental in driving down costs for consumers.

As the clean power mission progresses, two significant risks will emerge:

> **Excess profits:** The marginal pricing approach may lead to substantial excess profits for lower-cost projects due to the significant range in project costs.

> **Reduced competition:** Nearly all projects in the pipeline will be required to meet mission goals. The absence of competitive pressure may allow projects to offer prices above viable levels.

The government should transition from the current competitive allocation to a bilateral negotiation of cost-based offers to address these challenges and ensure the successful delivery of the clean power mission. For example, those projects that are unsuccessful in the upcoming contract allocation round could be transferred into a subsequent process of bilateral negotiation. This would retain some of the benefits of competition while ensuring all renewable projects required would be contracted at a lower overall cost. This change could significantly reduce annual bills compared to the situation where the current allocation process is retained.

Reduce financing costs

Significant investment in renewable energy and other clean technologies is essential to achieve the clean power mission. The cost of financing these investments will constitute a substantial portion of the overall expense which will feed directly into CfD costs and through to bills. For example, in 2024, the cost of finance was 45% of the cost of an offshore wind project.[33] The government should explore ways to reduce these financing costs, for example:

> **Co-investment by GB Energy and the National Wealth Fund:** The government is legislating to set up GB Energy, a new public company to invest in the net zero energy transition with a mission to accelerate investment and bring down bills for households. The National Wealth Fund has also been set up as an evolution of the UK Infrastructure Bank.[34] By co-investing in the more challenging power infrastructure projects, these institutions could shield private finance from difficult-to-manage risks. This could reduce financing costs and lower bills for consumers.

> **Bank of England intervention:** The Bank of England could establish preferential interest rates for commercial banks providing loans to net zero infrastructure projects – "green interest rates". This would reduce the cost of

[33] Resolution Foundation, April 2024, **Electric Dreams**

[34] GB Energy and the National Wealth Fund can also invest in community energy projects which can provide direct financial benefits to households.

financing these projects which could be passed on as savings to consumers by lowering CfD costs. This would lower bills by £24 per household by 2030 if it reduced interest rates for renewables and grid upgrades by 2.5%.[35]

We anticipate that these changes would be as significant as changes to CfD allocation. Also, this approach could be applied to investment in other parts of the value chain such as networks or smart consumption.

Move levies off electricity bills

A significant portion of current levies on electricity bills stem from mechanisms that supported early renewable energy projects. These projects had higher costs compared to current initiatives; renewable projects have decreased in costs as the technologies have matured. As illustrated in Figure 7, these levies will gradually decrease as older projects reach the end of their operational life, but this will not be felt by consumers until well after 2030. These policy costs will continue to have an impact on consumer bills for the foreseeable future unless action is taken. The current approach to levying these costs on energy bills is also highly regressive, with poorer households taking on a much higher share of costs than wealthier households.[36]

We propose two ways to address the costs associated with Feed-in Tariffs and the Renewables Obligation:

> **Renegotiation of support mechanisms:** The government could engage with project operators to restructure existing agreements. For instance, offering extended support periods in exchange for lower overall costs.

> **Shift to general taxation:** Our preferred approach involves transferring the funding of these legacy projects from electricity bills to general taxation. This strategy reduces consumer bills by 10% in 2030 (~£80 on the typical household bill), and provides even greater reductions in the intervening years.

[35] New Economics Foundation, December 2024, **Green interest rate could reduce electricity costs by £1.9bn a year**

[36] Nesta, 2024, **Cheaper electricity, fairer bills**

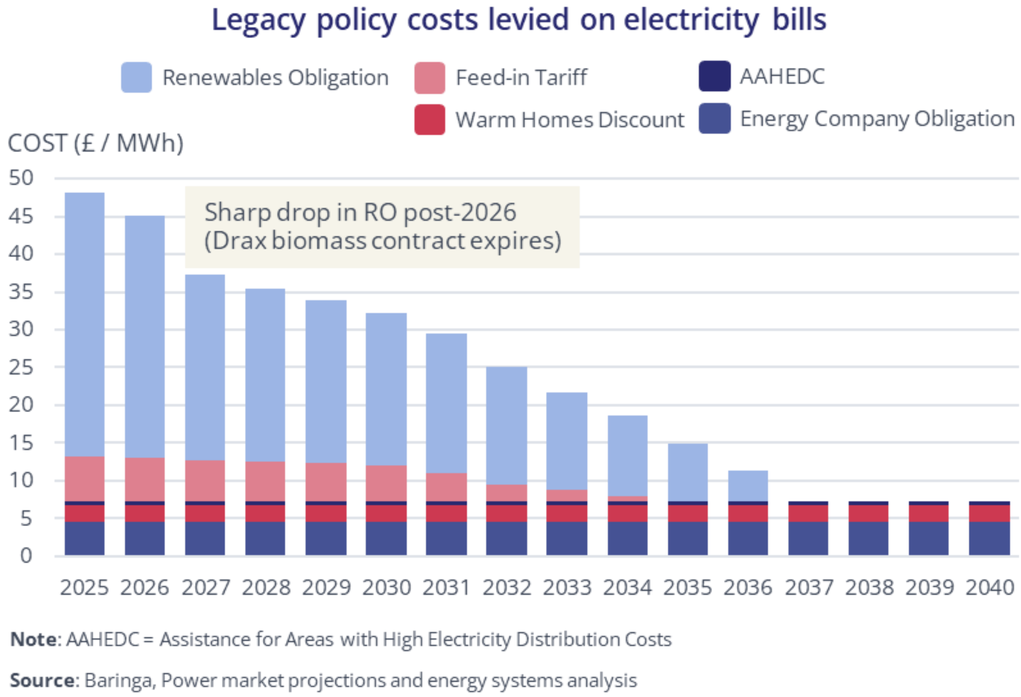

Figure 7: While legacy policy costs will reduce over time, they continue to add to bills over the next decade unless they are paid for by the Exchequer.

Reduce wholesale electricity costs

Wholesale prices will reduce as more renewables come onto the system as we use less gas. These prices can be reduced further by ensuring cheaper resources set the price. This is either by encouraging new resources into the market, such as demand side flexibility, or reducing the prices offered by existing gas plant. The following policy changes should be developed that would reduce wholesale prices.

Ensure consumers can benefit from off-peak electricity and smarter tariffs

Demand will rise as electricity increasingly replaces other fuels for heating and transport. However, our modelling shows that the clean power mission can still be achieved alongside intensified electrification efforts without reducing the proportion of clean power or increasing bills (see Table 3). This is due to the reduction in wind energy curtailment, where wind farms are sometimes ordered to switch off because the supply of power exceeds the demand, and a reduction in power exports to the EU.

Table 3: Impact of higher demand on decarbonisation and bills

Unconstrained Acceleration scenario 2030	Base demand sensitivity	High demand sensitivity
Demand	362 TWh	384 TWh
Proportion of clean power	96%	96%
Typical household annual electricity bill	£815	£803

Note: Base demand sensitivity is based on current policies; high demand sensitivity is based on accelerated electrification to achieve carbon budgets. See the Annex for a breakdown of demand assumptions in these sensitivities.

Increased electrification offers the opportunity for surplus power at times of high generation to be used to heat homes and charge electric vehicles. Managing demand in this way can reduce peaks in demand by incentivising households and businesses to use electricity when it is plentiful and cheaper. These reductions in peak demand will not only provide direct savings for participating consumers but help to bring down electricity prices for all users.

Consumers with electric vehicles can charge their car when electricity prices are low and there is plentiful cheap renewable electricity. Buildings can also be heated in a way which makes better use of cheaper off-peak electricity – either using heat storage or the thermal inertia of the building. Homes with a heat pump can deliver some of the largest reductions, with trials suggesting the potential to reduce usage by up to 32% during peak times.[37]

Encouraging consumers to shift usage away from peak times not only reduces pressures on the electricity grid but also creates opportunities to save households money. Electric vehicles with "vehicle to grid" capability can even be paid to export electricity back to the grid at times of peak demand.

Our modelling assumes a substantial amounts of flexible demand by 2030, with significant increases thereafter (Figure 8).

[37] Nesta and Centre for Net Zero, 2024, **HeatFlex: the untapped potential of automated heat pump flexibility**

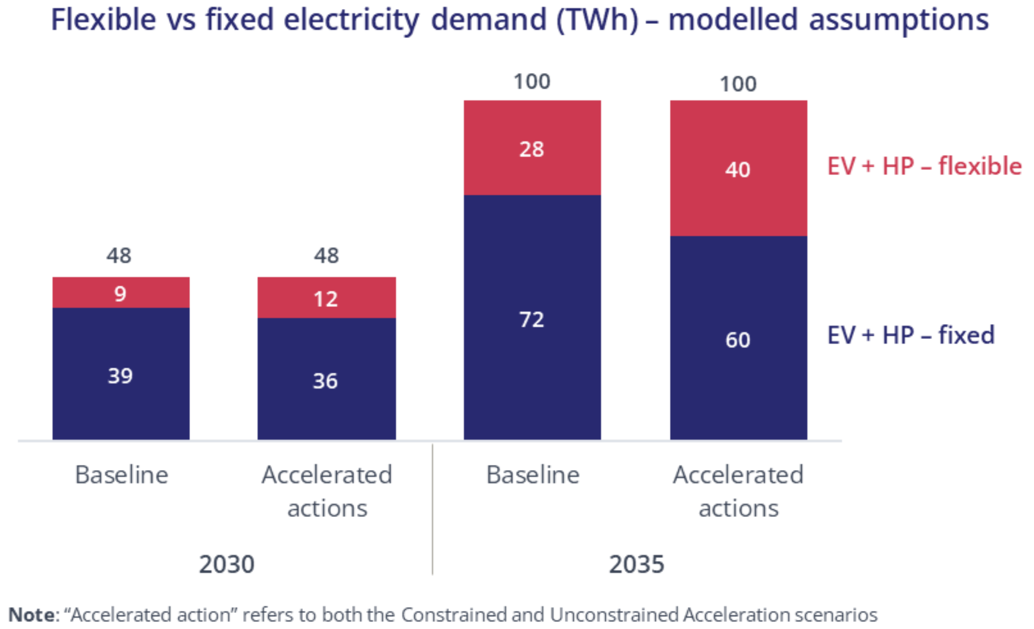

Figure 8: Electrification offers opportunity for more flexible electricity demand.

Steps should be taken to boost standardisation and interoperability of vehicle charge points and electric heating technologies, so all consumers are able to access a full range of smart tariffs. Government must also address poor consumer experiences of smart meters and hold Ofgem accountable for any further delays to the introduction of Market-Wide Half Hourly Settlement. Market reforms should aim to ensure time-of-use signals more closely reflect wholesale prices. The removal of inflexible legacy policy costs will help in this regard.

Strengthen gas plant regulation

The clean power mission aims to ultimately phase out unabated gas fired power generation from the electricity system. This process involves gradually reducing the amount that is needed to meet electricity demand and transitioning gas plants to provide backup security support. Ultimately gas plants will be replaced with zero-emissions long-duration energy storage solutions, such as green hydrogen.

As we progressively remove gas plants from the market, there is a risk of reduced competitive pressure on their pricing. During periods when gas plants are needed to meet demand, they could potentially charge prices exceeding cost recovery requirements. To address these challenges and reduce costs for households, we recommend that Ofgem ensures a strict application of competition law to gas plants so that they do not sell into the wholesale market at levels that generate unjustified profits.

Ofgem should also consider how and when it would be appropriate to remove gas plants from the market, transitioning them to operate as backup reserve with providers remunerated through regulated arrangements. This approach would eliminate gas plants from directly setting the wholesale price of electricity.

Our modelling does not account for the impact of removing gas plants from price-setting in the market. However, we assume that gas plant offers to the wholesale market are not elevated above cost, implicitly assuming that measures are taken to prevent profiteering.

Unleash an efficiency revolution

There are several other changes which would reduce bills further by delivering substantial improvements in the efficiency of our energy system. This includes more efficient end-usage in homes and businesses, as well as using the cheapest resources to meet demand, driven by market reforms. Better use of digitalisation and AI could also revolutionise the operation of the entire electricity system.

Use energy more efficiently in our homes and businesses
Enhancing energy efficiency in homes and industries continues to be crucial for reducing overall energy demand. Research conducted by UKERC (UK Energy Research Centre) concluded that achieving an Energy Performance Certificate (EPC) of Band C for all British homes could reduce energy consumed in homes by a quarter, equivalent to the output of six nuclear power stations the size of Hinkley Point C.[38] E3G has previously found that Labour's plans to insulate all homes in the private rented sector to EPC C will on average reduce heating bills by £300 per year.[39] In manufacturing and construction, energy efficiency improvements could achieve emissions reductions of 4 Mt CO_2e per year by 2050 and significantly lower operating costs.[40]

The electrification of home heating must be done in concert with a much more rapid and effective programme to bring all UK homes up to at least EPC B and C as rapidly as possible. The delivery of previous schemes has comprehensively

[38] UKERC, September 2017, **Unlocking Britain's first fuel: The potential for energy savings**
[39] E3G, July 2024, **A warmer, fairer private rented sector**
[40] CCC, 2020, **Sixth Carbon Budget**

failed. E3G has made detailed recommendations on reforming the UK's central[41] and local[42] energy efficiency programmes.

Our calculation of bills has assumed annual electricity demand of 3,100 kWh for a representative domestic consumer which remains constant over time. However, improvements in energy efficiency will enable this to be reduced. A reduction of, say, 10% would feed directly through to a bill reduction of 10%.

Electricity market reforms

The government has been reviewing electricity market arrangements.[43] This has revealed that the wholesale pricing system lacks the necessary granularity to allow market processes to ensure the cheapest resources are always used to meet demand and the system operator is not able to correct for these deficiencies. It also means that households and businesses near wind and solar farms are not fully benefiting from the cheaper power produced in their vicinity. Indeed, wind farms may be paid to switch off when they could be kept running, providing these households with cheaper power.

The government should introduce more granular wholesale prices, such as the zonal pricing approach it is currently considering, to address these challenges. The approach taken should be selected on the basis that it offers lower electricity costs to consumers located close to renewable energy sources, reduces system balancing costs, and improves incentives for demand-side flexibility, encouraging consumers to adjust their energy use based on the true system value.

It is important that changes to market arrangements are made alongside measures to support investment. For example, the introduction of zonal pricing would need to be accompanied by changes to CfDs to ensure investors are not exposed to new risks.

Digitalisation and AI

The integration of digital technologies and artificial intelligence (AI) offers a promising avenue for improving operational efficiency in both electricity production and consumption:

[41] E3G, March 2024, **The future of the Energy Company Obligation**

[42] E3G, March 2024, **A new deal for locally led home upgrades**

[43] UK government, updated March 2023, **Review of electricity market arrangements**

> **Enhanced production efficiency:** AI can optimise power generation, transmission and distribution processes, reducing waste and increasing output.

> **Smarter energy consumption:** Digital tools can help consumers and businesses use electricity more efficiently, potentially lowering bills and reducing strain on the grid.

It is important that NESO (responsible for balancing electricity supply and demand across the national grid) and distribution system operators (managing the regional electricity networks that connect to homes and businesses) should be incentivised by Ofgem to accelerate the deployment of digital technologies. This will create a more efficient, responsive, and sustainable electricity system that could lead to reduced costs, improved reliability, and better integration of renewable energy sources.

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CONCLUSION

The clean power mission offers the chance to revolutionise the UK economy, accelerating the transition to net zero while reforming power policies so the benefits of decarbonisation are felt in people's pockets.

Reaching clean power by 2030 can be achieved with electricity bills at a similar level to today and reduced exposure to gas prices under existing pricing policies. However, our Electricity Bills Charter aligns the path for decarbonising the power grid with significant reductions in bills, which could offer savings of over £200 a year by 2030.

Clean power will be realised by a major expansion of renewable energy, particularly offshore wind, and a strengthened grid to deliver power to homes and businesses. Meanwhile, gas power can be reduced to less than 5% of the generation mix by 2030. Eventually, backup power should be provided by stored green hydrogen. A small amount of gas CCS generation may be needed to achieve the 2030 clean power mission, but this should be minimised, with a focus on reducing emissions from combined heat and power plants for industries that are not suitable for electrification and energy from waste plant. Biomass power from Drax is not needed to achieve the mission.

The clean power mission offers the opportunity for a clean power system which can lay the foundations for a largely electrified, high-tech, high-growth economy. It can be achieved while bringing down electricity bills, and will cement the UK as a world leader in addressing the greatest challenge of our time.

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ANNEX
CLEAN POWER MISSION MODELLING

Objectives

E3G commissioned Baringa Partners to undertake modelling of the energy system in Great Britain. The objective was to identify the key choices facing government as it pursues the clean power mission and, importantly, how these would affect consumer bills.

Scenarios

Three scenarios were defined:

> **Baseline:** The "business-as-usual" direction for the power sector based on market expectations of how government would act using the policies in place.

> **Constrained Acceleration:** Assumes accelerated actions by the new government to procure additional renewable and other resources using existing policy instruments and the constraints of today's approach to delivery.

> **Unconstrained Acceleration:** Assumes additional policy reform to unlock faster delivery, bringing forward by 24 months the deployment of renewable and other resources.

Key assumptions

Demand

Demand assumptions are summarised in Figure A1. Demand increases largely through the electrification of heat and transport. Demand flexibility is assumed to increase due to a program of market and regulatory reforms.

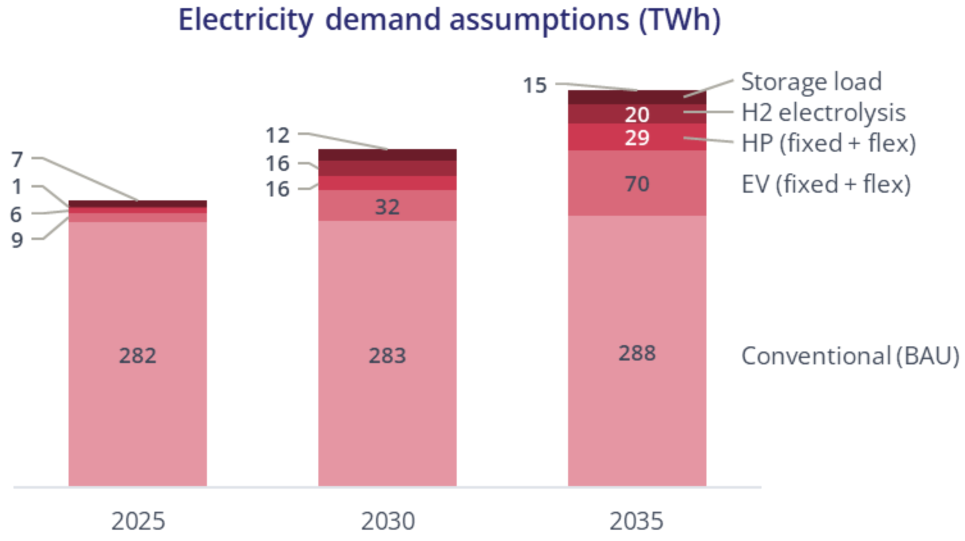


Figure A1: Demand assumptions

Gas prices

Two gas price scenarios were considered as shown in Figure A2. We also modelled the impact of a gas price shock in 2030 with prices increased to 280p/therm.

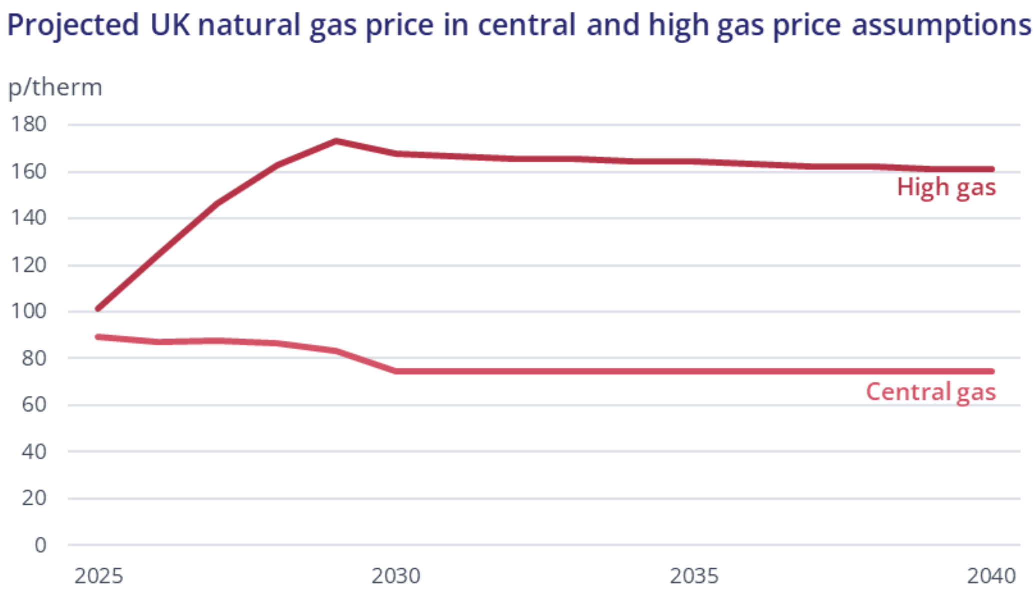


Figure A2: Gas price assumptions

Carbon prices

We assumed the UK emissions price is gradually aligned with the EU scheme giving rise to the carbon prices shown in Figure A3.

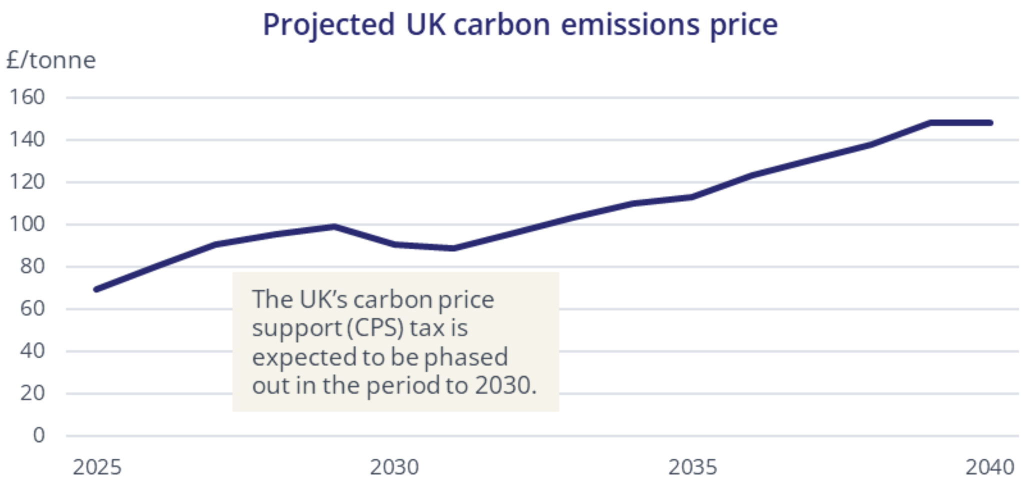


Figure A3: Carbon price assumptions

Offshore wind

The offshore wind assumptions are shown in Figure A4. The average time for projects to deliver is currently 5 years. The Unconstrained Acceleration scenario assumes delivery can be accelerated, allowing a further auction round to procure additional capacity that would be generating by 2030. The lack of transmission capacity meant that accelerated actions limit offshore wind in Scottish waters to no more than 25% of the total.

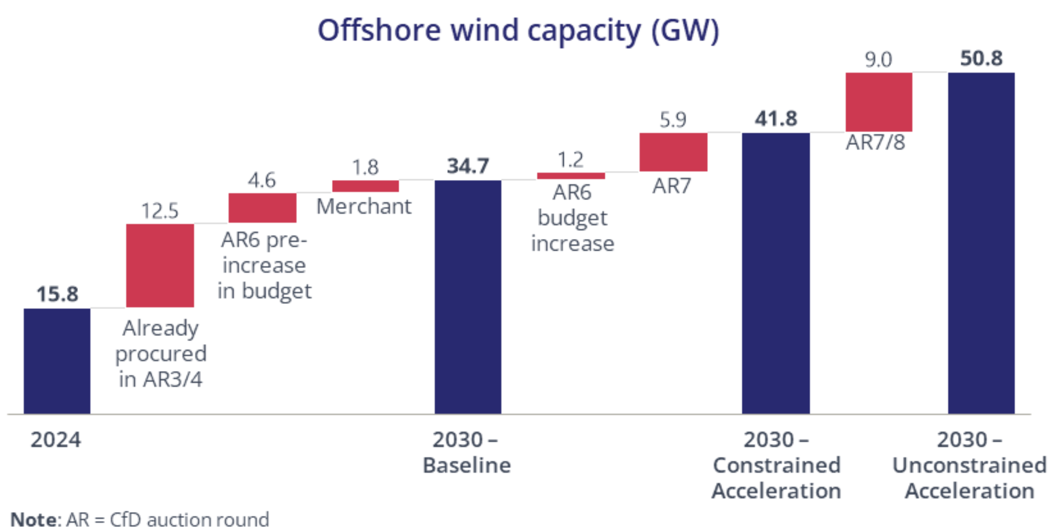


Figure A4: Offshore wind assumptions

Onshore wind

The government has already taken accelerated action post-election to lift the ban on onshore wind in England. Additional onshore wind in England in the Constrained Acceleration scenario is assumed to be 9 GW (+40%) by 2030, on top of 21 GW nationally in the Baseline. With delivery constraints addressed, capacity can reach 35 GW by 2030 in the Unconstrained Acceleration scenario.

Solar PV

Additional solar in the Constrained Acceleration scenario is projected at 5.5 GW (+23%) by 2030, on top of 25 GW nationally in the Baseline. With delivery constraints addressed, capacity can reach 39 GW in the Unconstrained Scenario. More capacity may be possible.

Nuclear

Existing nuclear capacity provided by the AGR fleet will retire soon. Heysham 1 and Hartlepool will close in 2027 and the closure of Heysham 2 and Torness has recently been delayed until March 2030. Our modelling assumptions are in line with these recent announcements.

No accelerated actions are relevant for this period. Life extension for AGRs is an engineering challenge for EDF and government support does not appear to be needed. The new PWR project at Hinkley Point cannot be accelerated into this decade and any subsequent project at Sizewell will not deliver before 2035.

Bioenergy

Drax operates unabated biomass at four units with legacy revenue support until 2027, providing 17 TWh generation. While this is currently treated as zero emissions, we consider it to be a high emitter and have assumed all units will close when current support expires.

Carbon capture and storage

Carbon capture projects have a poor track record in the UK with a series of stalled or failed initiatives. The latest initiative involves a series of clusters of capture projects around centralised transport and storage infrastructure. Negotiations for “Track-1” of the Cluster Sequencing for Carbon Capture Usage and Storage Deployment process are underway and could bring forward a CCGT-CCS power station at Teesside under the proposed Dispatchable Power Agreement. This is included in the Baseline.

Accelerated action can be achieved through bringing forward the Track-2 negotiations to a schedule consistent with 2030 delivery or adding power stations such as Connah's Quay to Track-1. Track 2 clusters have significant power generation capture projects. We have assumed 2,550 MW are built in the Constrained Acceleration scenario and 3,960 MW in the Unconstrained Acceleration scenario. In all scenarios, CCGT-CCS is modelled as new build capacity, operating in the power market only.

Hydrogen storage and power generation

Hydrogen storage is needed to enable hydrogen to be used as a fuel for peaking generators which would run for only a few hours each year. Generators' demand for hydrogen needs to be met from storage because it is not economic to have sufficient production capacity idle to meet this demand continuously. New salt caverns are the leading option for geological storage of hydrogen and take several years to create and bring into service. While some projects are being considered, we have assumed that these are not deliverable before 2030.

Networks

We have assumed the transmission network that will be in place for 2030 is defined by the current National Grid "Holistic Network Design" plan.

Key results

Proportion of clean power

The modelling demonstrates that the clean power target can be achieved through accelerated deployment of offshore wind, demand flexibility and 2–3 GW of CCS capacity. It will not be necessary to extend the lifetime of Drax beyond 2027. Figure A5 shows the proportion of clean power achieved in the period out to 2040 for each scenario and with central and high gas price sensitivities.

Proportion of clean power by scenario

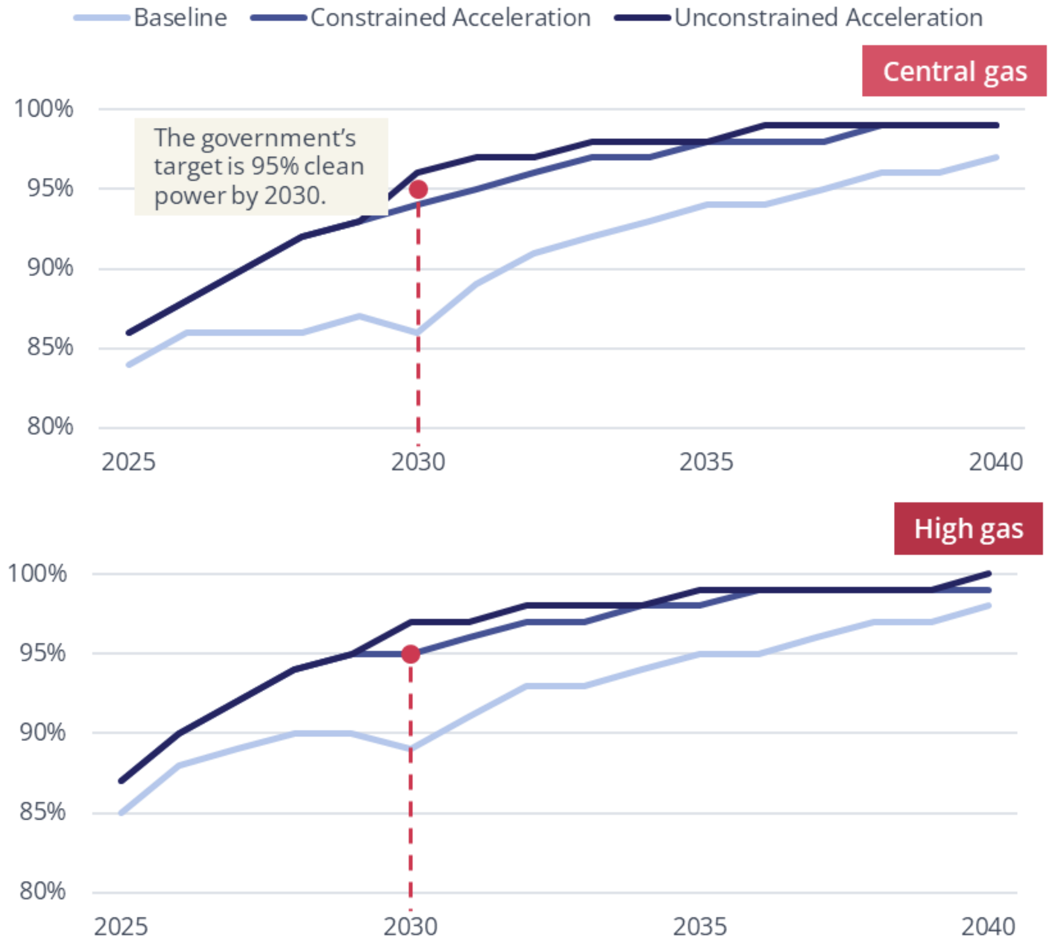
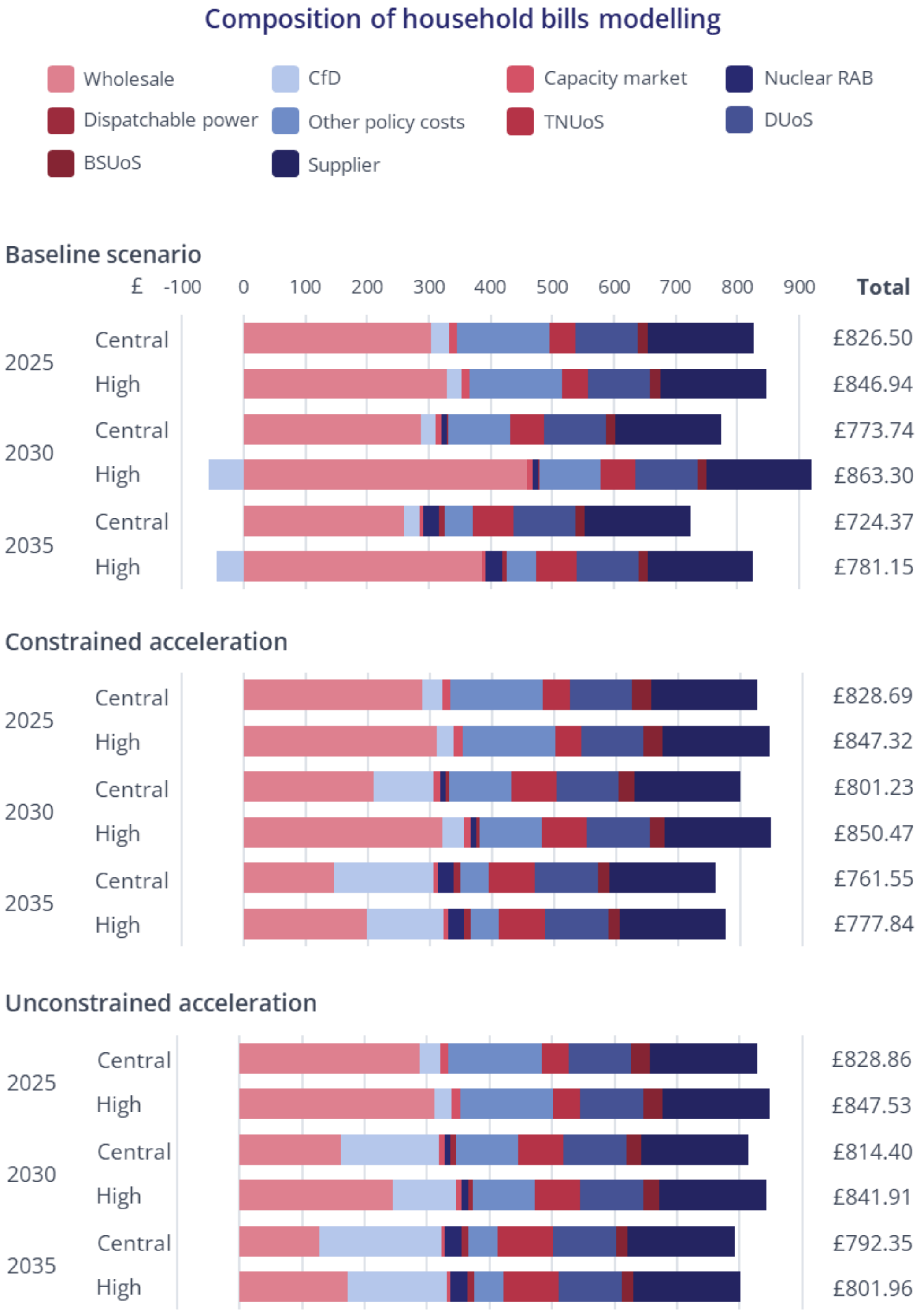


Figure A5: The government's 2030 clean power target can be achieved in the Unconstrained Acceleration scenario, and potentially in the Constrained Acceleration scenario if gas prices rise.

Household bills

Our modelling has shown that domestic electricity bills do not change significantly under existing pricing policies with different levels of decarbonisation and technology mix, although more renewables reduce the impact of gas prices on bills. [44] Figure A6 shows the composition of household bills in 2025, 2030 and 2035 for the three scenarios with central and high gas price projections. This shows how reducing the extent to which wholesale prices contribute to bills in the accelerated scenarios in turn makes bills less responsive to rises in gas prices.

[44] London area, residential supply (3,100 kWh), real terms Jan 2024, exclude VAT



Notes: CfD = Contracts for Difference; RAB = Regulated Asset Base; TNUoS = Transmission Network Use of System charges; DUoS = Distribution Use of System charges; BSUoS = Balancing Services Use of System charges

Prices based on Ofgem price cap formula, London area, single residential supply, direct debit, 3,100 kWh, exclude VAT

Figure A6: Household energy bill projections

The benefits become most apparent in the case of a gas price shock where the typical annual electricity bill in 2030 rises to £936 in the Baseline scenario and £886 in the Unconstrained Acceleration scenario (not shown on Figure A6 – this extreme gas price shock was only modelled for 2030).

Our modelling of CfD auctions means that increased levels of renewables lead to slightly higher electricity bills under central gas price assumptions, as well as under high gas price assumptions in the longer term. However, policy actions can significantly reduce CfD costs, ensuring the benefits of cheap renewables are felt by consumers through lower bills. E3G estimates that the full suite of policy reforms we set out in our Electricity Bills Charter could reduce bills by over £200.