CBI

GOING FOR GREEN:

The UK's net zero growth opportunity

The CBI serves as the catalyst between industry and government to drive positive change, speaking for businesses of all sizes and sectors across the whole economy, in every UK region and nation, ensuring sustainable growth for the benefit of society.

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Foreword

The science is irrefutable, time is not on our side in the race to net zero. Urgent action is needed to limit the rise in global temperatures, and its catastrophic impacts on our planet and people's lives.

As recent months have reinforced, those countries who move fast and early to adapt their economy and mitigate these risks can secure a huge competitive advantage. The US Inflation Reduction Act, EU Net Zero Industry Act and others are setting the pace for what it will take to secure market share, create jobs, improve quality of life, and succeed in the net zero economy.

This is a global race the UK has the strategic potential to lead. As the first major economy to sign net zero into law, the UK has reduced emissions faster than our competitors. We've set internationally leading targets. Most importantly, we have a business community keen to secure the sustainable growth the UK's transition can bring.

And although the UK may not have the fiscal scope to outspend our competitors, we can leverage our regulatory expertise and policy environment to stand out and get ahead.

But we need to focus on delivery, and fast, government and business together. This report recommends a programme of policy solutions – covering the three essentials of a stable business environment, finance and delivery – to inform an ambitious UK industrial strategy of our own, that prioritises green industries.

These are long-term measures that will bolster the UK's energy security, drive sustainable growth, and help generate vital investment in infrastructure and communities across the UK.

CBI analysis confirms that the green growth prizes within the UK's reach are worth it, offering a potential £37 – 57bn boost to GDP in 2030. Huge gains that – when translated into projects on the ground, innovations in the way we work and live, new markets and export opportunities, and jobs and training – can power the UK's economy, protect our planet, and transform peoples' lives for the better, for decades to come.

This is why the CBI is supporting businesses of all sizes, sectors and corners of the UK to decarbonise and pushing for all parties to put our solutions, advancing the green economy, at the heart of their General Election manifestos. Together, we can strengthen UK competitiveness and deliver fairer, more sustainable growth for the benefit of all.

Rain Newton-Smith
Director General, CBI

Executive summary

The UK is a leader in the transition to net zero, with an array of strategic advantages that should enable it to go further and faster than many other nations. It was the first major economy to sign net zero into law and has a strong track record on emissions reductions, reducing them faster than any other developed economy. Critically, we also have a business environment that is supportive of the transition, with more UK-headquartered firms signed up to the UN's Race to Zero campaign than any other country.[1] This mass support is not just altruistic or borne from the necessity of decarbonisation – businesses see real commercial opportunity in the transition.

However, other nations have recognised the prizes on offer and are rapidly ramping up their own plans and spending to attract the green industries of the future. Businesses believe that the US' Inflation Reduction Act, the EU's Net Zero Industry Act, and other nations' ambitious incentive packages developed in their wake, have changed the game. These actions amount to new industrial plans, tying their nations' future prosperity and economy to the net zero transition.

But they aren't a silver bullet, and the race isn't over. The UK has the basis for green growth in its internationally leading targets: we have the direction and goals, and now need to move to delivery to secure investment, supply chains and green jobs. We need our own strategy for 2030, prioritising green industries where we can have genuine strategic advantage. Otherwise we risk throwing away what *Mission Zero – the UK's Independent Review of Net Zero* refers to as, "the economic opportunity of the 21st century".[2]

Green growth can be the engine powering the UK's economy. The scale of investment needed to reach net zero will not only create new markets within the UK but also enable us as early movers to develop new export markets as the rest of the globe decarbonises. Looking across the opportunities in new markets over the next five years, and considering UK strategic advantages, **the CBI estimates that by 2030, a non-exhaustive list of 27 green growth 'prizes' could increase in value to contribute £37-57 billion of annual UK GDP alone.**

These opportunities include technology rollout, underlying infrastructure build out, and new export markets. Representing up to 20% of total GDP growth between now and 2030, the prizes can be grouped into seven key themes: electric vehicles (EVs), low-carbon power, heating and insulation, green services, hydrogen, carbon capture utilisation and storage (CCUS), and biofuels. In each, the UK has competitive strengths it can leverage for success. But that doesn't mean it can be complacent. A programme of action is required in the crucial years ahead to ensure its policy environment enables green growth to take off, and with specific interventions to remove stumbling blocks.

To help policy makers, CBI has a series of recommendations across three key areas – policy stability, finance incentives, and delivery – drawing on business steering groups, independent economic analysis, and technology specific focus groups convened over the last nine months. If we act fast, the UK has the chance to become distinct for the agility and responsiveness of our policy structures, and present the most welcoming environment for green industry to invest in the UK over other jurisdictions. A targeted use of regulation to unlock a speed of deployment that others can't match can be the UK's competitive advantage.

In other words, if we aren't going to outspend the competition, we need to outsmart it.

Creating a world-leading environment for green industry

A clear and stable policy environment to build business confidence

1. **All political parties should place green growth at the heart of their economic strategy in their manifestos ahead of the next General Election.** This should include commitments to retaining the significant timelines already set out under the Climate Change Act and corresponding sector-specific targets.
2. **Accelerate major policy decisions to stimulate green markets on the supply and demand side, in consultation with business.** For example, firm up a phaseout date of gas boilers and advancing Track 2 and Track 1 expansion of the CCUS cluster deployment.
3. **Task the Energy Security and Net Zero Committee to identify where cross-party parliamentary consensus is a priority and secure ministerial backing to develop bipartisan agreements.** For example, outline minimum commitments to funding or structural reforms to electricity markets.
4. **Appoint net zero champions for strategically important industries where they do not currently exist and coordinate their functions through the newly-established Net Zero Council.**
5. **Ensure major central government policy-making and fiscal decisions are properly considering impacts on the net zero transition.**
    a. Introduce a Net Zero Test, requiring all government departments to assess proposed new policies against the UK's climate and environment commitments.
    b. In coordination with the Office for Budget Responsibility, HM Treasury should regularly make transparent the climate impact assessments of major government budgets, spending decisions and spending reviews.

A comprehensive and competitive set of incentives to enable investment in the green economy

1. **Review the tax system within the first year of a new government to ensure it supports the net zero transition, with changes starting as soon as possible and no later than April 2027.**
    a. As part of this review, consider the introduction of a targeted tax mechanism for green industries specifically. This measure can be targeted at a limited range of activities and training. It could be supported by the UK's development of a green taxonomy.
2. **Publish a plan by early 2025 for sustaining government revenues as tax receipts from the fossil fuel economy decline, for consultation with the public and businesses. Start to implement this plan before 2027.**
3. **Establish a Net Zero Investment Plan, identifying green investment gaps and policy with the intention of crowding in private finance. Ensure this is regularly updated against carbon budget timelines.**
4. **Plan the evolution of price support mechanisms, such as the Contract for Difference to:**
    a. Make nascent technologies – such as hydrogen, CCUS and Sustainable Aviation Fuels (SAF) – investable and scale to a competitive market.
    b. Incorporate non-price factors into the tender selection process to ensure the full value of the technologies, including supply chain and jobs, are realised here in the UK.
5. **Election manifestos should set out an approach on carbon pricing and future innovation funding designed to drive industrial demand for crucial green technologies.**
    a. This should include measures to avoid carbon leakage, such as carefully designed carbon border adjustments, alongside the evolution of the UK Emissions Trading Scheme (ETS).
    b. Increase targeted support to decarbonise industries either through existing funds like the Industrial Energy Transformation Fund (IETF) or a new fund to address other innovation challenges, supported by higher ETS revenues.

Efficiency and coordination across delivery mechanisms

1. **Election manifestos should set out how government architecture will be structured to deliver net zero in a coordinated, whole-systems manner, including across devolved administrations.** This could include the establishment of a new Office for Net Zero Delivery or strengthened central government machinery that ensures consistent delivery across Whitehall departments.
2. **Incorporate green skills into existing training opportunities – such as more flexible apprenticeships, bootcamps and T-Levels – and create a statutory requirement for all schools and Further Education institutions to make young people aware of green career pathways available.**
3. **Establish coordinated, centralised government guidance for local authorities and regions on how to implement devolved aspects of net zero, with clear guidance on timelines and funding pots available.** This can work to empower regions to deliver a place-based transition, but without resulting in a disjointed transition that can hinder business planning or lower the attractiveness of certain regions.
4. **Reform the planning systems for both local and major projects to enable faster delivery of green infrastructure.**
    a. Develop mechanisms that enable financial benefits for communities that accommodate critical net zero infrastructure rapidly.
    b. Legislate for regular reviews of the National Policy Statements for Energy.
    c. Work with industry to modernise and standardise the environmental impact assessment process in the new Environmental Outcomes Report regulations.
    d. Ensure all decision makers in the planning system have a remit or duty to support the transition to net zero.
5. **Speed up the process for obtaining connections to the grid.**
    a. Publish a new National Policy Statement for Energy Networks.
    b. Establish a more strategic approach toward planning policy building on reforms to the National Planning Policy Framework.
    c. Replace first-come, first-served model in grid connection queues with a system that considers achievement of project milestones.

The imperative to act

Capitalising on existing strengths can ensure green growth opportunities are secured

There are good reasons to be confident about the UK's ability to capture the economic opportunities associated with the transition to net zero. For a start, it has a proven track record in recent decades of cutting emissions at the same time as growing the economy, decarbonising faster than any other G7 country while growing the economy by 65%. Furthermore, the UK has a leadership position on the international stage when it comes to establishing targets.[3] It also enjoys consensus on the net zero agenda, with all major political parties committed alongside active and engaged businesses and civil society groups. In addition, the UK boasts a globally revered institutional framework, with the independent Climate Change Committee (CCC) recognised as a neutral guide for setting carbon budgets that inform and influence government policy.

More broadly, businesses consulted for this study have consistently stressed certain key factors acting in the UK's favour as it seeks to grow its green economy.

1. **Early-mover advantage** – By being among the first to act, the UK has a realistic prospect of generating the intellectual property and ways of working that open up export opportunities when other countries follow suit. We have already demonstrated the strength of our market-based models in leading to one of the world's most rapid rollouts of offshore wind. As well as developing and producing green technologies, the UK can be the first to solve systems-level challenges that emerge in the transition. For instance, how to modernise the grid to enable the electrification of home heating and transport while accommodating the intermittency of renewable generation. The UK's strengths in digital and services sectors position it well for this task and by being the first to tackle these issues, we can set the standards and export the expertise that will drive the global transition.
2. **World-leading universities and innovation** – The UK has a long-standing reputation for world-class universities and research institutions. This strength helps to attract global business investment that can help pull through early-stage research to application in the real economy. In addition, the UK has adopted a market-led approach to its net zero strategy, creating incentives for business innovation and cost competitiveness.

3. **Global financial centre** – The UK's status as a global financial centre provides an excellent base from which to build, boasting a strong history, the right market infrastructure and world-class talent.[4] Access to this competitive financial system will provide more opportunities for promising companies in the green economy to scale up. The UK might also lay claim to new financial market opportunities, such as through the development of carbon markets.

4. **Geological and meteorological conditions** – Plans for rapid deployment of offshore wind turbines in the years ahead are evidence of the UK already making good use of its natural assets as a windy island nation. Access to the right geology in the North Sea for storing captured carbon is another hugely significant asset that is not easily replicated by other countries.

For these reasons, businesses are confident that the green growth prizes identified in this report are realistically within grasp. But that is not to say their achievement is automatic. With almost 90% of global emissions covered by countries that now have a declared net zero target, many other nations are setting their sights on capturing their own share of fast-growing markets for green products and services.[5] Competition for investment is now as fierce as it has ever been.

The UK's place in a global race

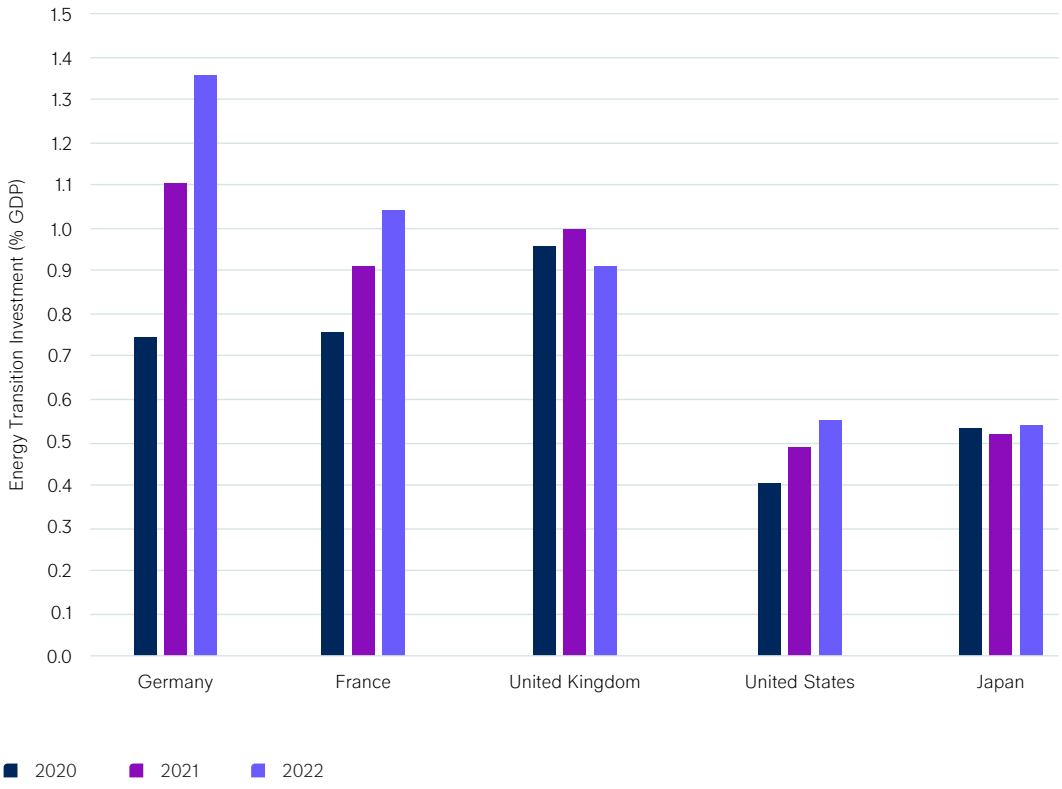
The global competition for green growth is intensifying.

As other nations have set their own ambitious climate targets, many have combined decarbonisation strategies with industrial policy. From the United States Inflation Reduction Act (IRA), to the EU's Net Zero Industry Act (NZIA), to Japan's Green Transformation programme, major economies are acting to secure their green supply chains and scale domestic manufacturing for the net zero transition. This is not just for the delivery of their own climate transition, but also with geostrategic and growth agendas in mind.

As these countries increase their spend to secure green manufacturing, green jobs, and energy security, the UK has reduced its spending on the energy transition compared to other G7 economies in recent years, while dealing with the broader economic challenges of low growth and productivity.[6, 7]

As a result, despite continuing to lead on emissions reduction, the UK risks failing to capture the whole economy benefits available from the transition – benefits that are potentially unrecoverable without decisive action.

Figure 1 UK investment in the green transition is stalling while others' grows



Source: BloombergNEF

The competition: The US' Inflation Reduction Act has changed the game

The scale and design of the clean technology subsidies in the Inflation Reduction Act have seen investors globally repositioning towards the US.

In numbers:

$369 bn over 10 years

+1.5 million US jobs

+1% in US GDP by 2030

- The IRA provides both Production and Investment Tax Credits for a range of clean technologies, imposing labour and domestic content requirements to get full subsidy benefits, and in some cases, regionally targeted subsidies.
- CBI members report that it isn't just the size of credits and subsidies on offer but their immediacy and ease of access that now makes the US market particularly attractive, alongside the nature of the US tax system providing unshakeable certainty that the measures will persist for at least 10 years.
- The incentives on offer mean that some clean technologies still struggling to be economically viable could even now be profitable at large scale. For example, the $3/kg hydrogen production tax credit can reduce the costs of green hydrogen by almost half, making it the cheapest hydrogen in the world. This, therefore, has benefits not just for the US hydrogen pipeline, but for lowering the costs for industrial decarbonisation globally if exported.
- It, therefore, isn't just "green" industry or sectors that stand to benefit. The design of IRA incentives will support the net zero transition across all manufacturing supply chains, and support heavy industry to reduce their emissions footprint, as clean energy and green technologies are made more widely available and cheaper.

- While still too early to quantify the impact of the IRA in full, we can already see the beginnings of its ambition:
  - Over 100,000 new jobs in clean energy have been announced in the US since the IRA passed.[8]
  - Approx. $150 billion in US utility-scale clean energy investments since August 2022.[9]
  - Around 47 new manufacturing facilities since August 2022.[10]

"The US have just bankrolled their cleantech businesses enormously – the IRA has been a massive injection into their system. The UK currently isn't quite doing enough... When it comes to exporting, we need to have a global presence, and so will of course have to consider potentially setting up in the US."
CBI Member

The EU has responded quickly through its Green Deal Industrial Plan and Net Zero Industry Act

The EU has delivered its own package of clean energy legislation backed up by significant funding – made up most significantly of the European Green Deal, Fit for 55, and RePowerEU.

These are already embedded long-term policy trajectories and requirements for all EU member states to meet, supported by ringfenced funds for the climate and energy transition from the EU's long-term budget. However, the EU recognised the size of the competitive challenge posed by IRA, and rapidly developed a new targeted package to directly answer the challenge.

The Green Industrial Plan and Net Zero Industry Act

- While still being negotiated, the EU's Net Zero Industry Act (NZIA) transforms net zero policy for the EU. Previously focused on emissions and environmental damage reduction, and financing to capacity build, the NZIA is actively targeted on increasing manufacturing share in key, "strategic" green technologies – such as solar panels and batteries.[11]
- To do so, the proposal commits to match equivalent subsidies available elsewhere to avoid offshoring of industry – relaxing the EU's typically strict state aid rules.
- The Plan also significantly includes a simplified regulatory framework to accelerate production of select green products, defined specific technology targets to send demand signals, and new industry partnerships for reskilling. By doing so, it sets a standard for others to follow, not just in spending but in ensuring regulatory frameworks keep pace to prevent delays.

The UK's green growth opportunity

For businesses, the transition to a net zero economy is not just a moral imperative but a vital economic opportunity. Companies are aligned with the conclusion of Chris Skidmore's *Mission Zero* report, which describes net zero as, "the opportunity of the 21st century" and states that, "without the green economy, there is no economy".[12]

Despite fierce competition, businesses remain confident that the economic opportunities of net zero remain within grasp.

The CBI has identified specific growth opportunities linked to the development and adoption of a series of green technologies where the UK has a realistic prospect of gaining global market share.* **We found that, when added up, these economic prizes could increase UK GDP by 1.6-2.4% in 2030, representing 14-20% of total GDP growth between now and 2030.**

The prizes explained

In total, we selected 27 large green growth opportunities based on:

- **Their ability to deliver net savings** – where the technology is predicted to save money at the same time as reducing emissions. The savings from deploying these technologies or services can be recycled for growth-enhancing investment or consumption.
- **The size of the domestic market** – sectors where domestic investment in 2030 is predicted to be above £1bn per year by 2030.
- **Their export potential** – we identified the 11 largest green export markets globally, with a particular focus on the EU market.
- **UK distinctiveness** – we assessed the extent to which the UK could claim to have a strategic advantage, for example, because of its natural assets or evidence of first/early-mover status.

* For more information on how these "prizes" were identified, please see methodology section on page 64

We identified economic prizes across the UK economy that drive green growth:

£25 - 36bn

£25-36bn in **cost savings** by 2030 through developing and deploying these green technologies, products, and services.

£50 - 71bn

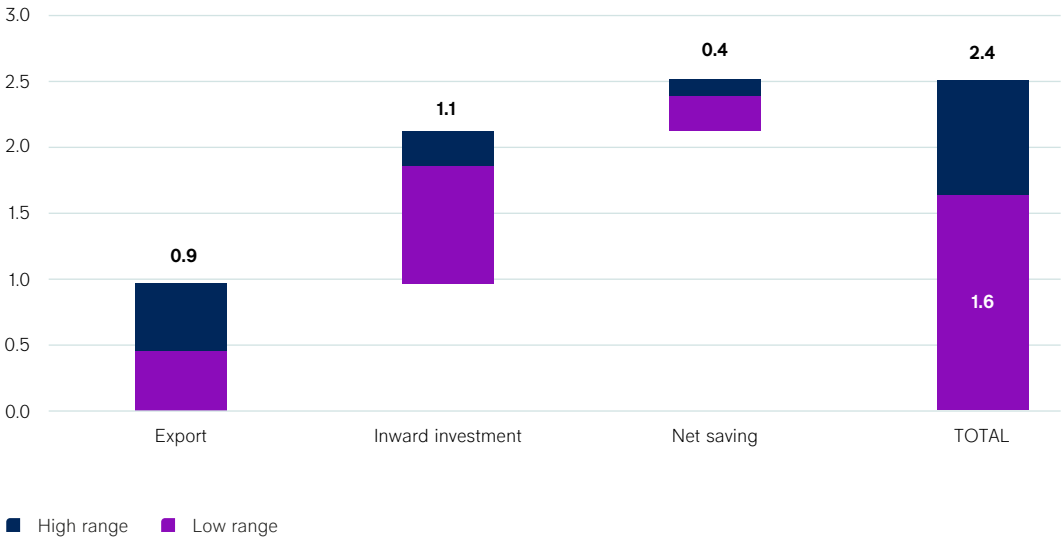
Exploiting **export opportunities** where the UK has a natural 'right to win' could yield £50-71bn in extra revenues by 2030.

£79 - 104bn

£79-104bn of **inward investment** by 2030 that boost the capacity of the economy.

These green growth prizes translate to a potential increase in UK GDP in 2030 of between 1.6% and 2.4%:

Figure 2 Annual GDP impact in 2030, in %



That is an additional £37bn-57bn of annual GDP in 2030, derived from a mix of directly created growth in green industries, indirect growth from their supply chains, and induced growth from increased levels of household spending:

Figure 3 Breakdown of GDP impact

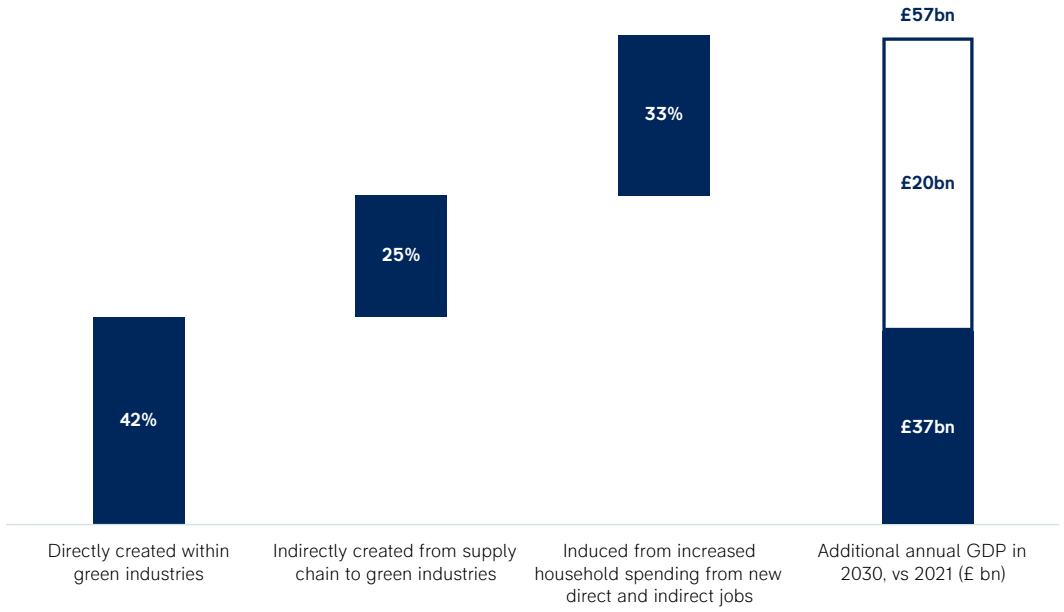


Figure 4 The 27 green growth prizes

Theme	Opportunity	2030 prize
Electric vehicles	Export of high-performance IP	£16.5bn
	Export of manufactured battery cells	£2.2bn - £6.8bn
	Net savings gained from the roll out of EVs	£11.5bn
	Investment for the deployment of charging infrastructure	£2.3bn - £9.3bn
Low-carbon power	Additional investment through growth in offshore wind	£32bn
	Additional investment through growth in onshore wind	£10bn
	Net savings through deployment of offshore wind	£6.9bn
	Net savings through deployment of onshore wind	£0.4bn
	Exports of offshore wind cabling to the EU market	£1.8bn - £3.7bn
	Export of nuclear Small Modular Reactors	£4.7bn - £5.2bn
	Export of Long Duration Energy and Storage technologies	£4.8bn
	Net savings from reduced curtailment costs	£2.3bn - 5.6bn
Heating and insulation	Onshoring heat pump manufacturing	£0.2bn - £0.4bn
	Net savings from the deployment of district heating	£0.3bn - £0.8bn
	Inward investment into district heating networks	£5.2bn - £12bn
	Savings created through energy efficiency improvements and modernised heating systems	£1.9bn - £6.3bn
Green services	Green finance exports	£8.6bn
	Exporting digital services for global grid upgrades	£6.5bn - £18bn
	Capturing a share of carbon offset trading markets	£16m - £300m
Biofuels	Inward investment to secure SAF refining capacity	£2.5bn - £4.2bn
	Investment to scale the biomethane industry	£16.7bn - £22.5bn
	Net savings from the deployment of biomethane	£2bn - £4.3bn
CCUS	Exports of knowledge based IP	£1.4bn - £3.3bn
	Investment in carbon dioxide transport and storage for first two CCUS clusters	£5bn - £7.5bn
	Export of storage to Europe	£0.5bn - £1.1bn
Hydrogen	Export of IP for high-tech parts of the value chain	£2.7bn
	Inward investment in domestic hydrogen-use cases	£5.3 - £6bn

Chasing down the UK's green growth opportunities

Theme 1: Capitalising on the electric vehicle revolution

The UK's proud automotive history positions it well to capture the opportunities presented by the transition to zero emission mobility. The government has set ambitious and world-leading targets, coupled with a long pedigree of automotive exports and growing supply chain capabilities, the UK has the potential to capture a significant portion of this expanding market.

However, relying on our heritage alone and failing to address challenges that underpin the transition will leave the UK vulnerable to competitors and risk lost investment in advanced UK manufacturing. Despite recent positive developments, battery cell manufacturers have declined to invest in the UK at sufficient scale, owing to among other reasons, high energy prices, with electricity costs on average double those in the EU. Meanwhile, gaps in infrastructure provision have hindered consumer confidence in electric vehicles.[13]

The opportunity presented is a lucrative one. Around 40,000 new jobs are forecast to be created in the sector by 2030. At present, more than 80% of cars manufactured in the UK are exported, with the sector generating trade worth more than £77bn. SMMT, the industry body for automanufacturers, estimates that if effectively managed, the transition could present aggregate opportunities worth £106 billion between now and 2030.[14, 15] This is a competitive space as the global transition gathers pace, but the UK has distinct strengths that position us to capture distinct economic prizes.

£16.5bn
£2.2bn - 6.8bn

Export of high-performance IP and manufactured battery cells

The UK is distinctive in high-performance-IP, design and manufacturing and should continue to capitalise on this export opportunity. It can act as a regulatory leader and innovator in the age of zero emission vehicles and maintain its world class innovation ecosystem from R&D start-up to scale-up pathways that bring together academia with business.

£11.5bn

Net savings gained from the roll out of EVs across the UK

As the EV transition gathers pace, fuelled by a thriving UK market, cost savings will increase through the greater deployment of electric passenger cars and commercial fleets.

£2.3bn - 9.3bn

Investment for the deployment of charging infrastructure

Substantial inward investment in the manufacture, maintenance and planning of charging infrastructure is available, and is a key underpinning enabler of the EV transition. Investors should expect greater returns on EV charging infrastructure over time.

Theme 2: Building on strengths in low-carbon power

The UK has a good track record of reducing the carbon intensity of its energy sector over the last two decades, with the phase-out of coal and the exponential growth of renewable energy generation.

The UK's 50GW offshore wind capacity target for 2030 is the largest in Europe and its pipeline is behind only China globally.[16] The UK is well positioned to reach its target as the Contract for Difference (CfD) mechanism, powered by the Crown Estate's licencing of the seabed, makes this an attractive location for developers. On top of this, the UK also has a large 30GW pipeline of onshore wind projects that are waiting to be realised.

Utility scale solar power is now 88% cheaper than thought a decade ago and rooftop solar costs have declined by 60% since 2010.[17] This represents a huge opportunity for cost savings, both for businesses and households, if barriers to deployment can be rapidly dismantled. However, the CCC's recent 2023 progress report to Parliament concluded that the UK was "significantly off track" to meet the UK Government's target of 70 GW by 2035.[18] Furthermore, opportunities to advance the market through regulation in the non-domestic market – for example, making solar panels a requirement for newly-built manufacturing facilities – remain untapped.

On nuclear, the UK was the first country to build civil nuclear power. But with an aging operational fleet and the increasing need for secure low-carbon power, the industry now must work collaboratively with Great British Nuclear (GBN) to develop a clear plan to expediate the development of the next generation of nuclear power, from large scale plants to Small Modular Reactors (SMRs).

Being a fast mover in low-carbon power, positions the UK well to capture export opportunities from complementary technologies, such as cabling and Long Duration Energy Storage (LDES). However, the UK cannot take for granted its record to date on low-carbon investment. Decarbonising at pace and capturing the economic opportunities of the clean power transition will require significant volumes of investment into low-carbon infrastructure, alongside an increase in the deployment of demand-side measures. Achieving this will mean evolving our historically world-leading CfD design that addressed yesterday's problem, to reduce costs, to be able to tackle the new challenges of the future. It will mean reducing delays and blockers across technologies that hold up deployment as well as securing supply chains and transitioning workers' skills. Overcoming these barriers are vital to boost the UK's energy resilience, meet the UK Government's own deployment targets, and unlock the significant economic growth opportunities identified. The North Sea Transition Deal is a good example, and first of its kind, of an industry and government collaboration on planning for the transition, stimulating investment and supporting jobs.[19]

£42bn

Inward investment through growth in wind power

Reaching the 2030 targets offers a significant inward investment opportunity as companies bring forward projects through the Contracts for Difference auction process.

£7.3bn

Net savings through the deployment of clean power

The lower operating costs of renewables deliver economic savings that can be recycled back into the economy.

£1.8bn - 3.7bn

Exports of offshore wind cabling to power European demand

The UK has strong existing capabilities and stands to benefit from growing demand in Europe if it maintains, or doubles, its current 12% share in the European market.

£4.7bn - 5.2bn

Export of nuclear Small Modular Reactors

The UK is a leader in Small Modular Reactor R&D, backed by a government capital commitment, so is well positioned to capture the opportunity of the global market of 65GW by 2030.

£4.8bn

Export of LDES technologies and IP

Due to its first mover advantage, LDES offers the UK export opportunities across the value chain including, R&D, manufacturing, and system integration.

£2.3 - 5.6bn

Net savings from reduced curtailment

LDES could reduce wind curtailment costs significantly and limit grid congestion at key energy boundaries.

Theme 3: Reaping the economic benefits from decarbonising homes and buildings

The built environment presents one of the most complex infrastructure challenges on the UK's journey to net zero. While countries like Germany and Holland make fast progress towards decarbonising their buildings,[20] the UK's stock remains one of the oldest and least energy efficient in Europe.[21] As a result, a substantial portion of household and business income is spent on energy, rather than other important goods and services necessary to grow the economy.[22] Low-carbon heating and insulation, therefore, represents an important infrastructure challenge to be addressed.

The UK still has a sizeable opportunity to reap the economic and environmental benefits of a fair and affordable transition to net zero buildings. Input from the Energy Savings Trust, into the Mission Zero Independent Review of Net Zero, highlighted that retrofitting poorly performing homes to EPC-C standard will lower energy bills by £8.1 billion annually and reduce gas imports by 15%, bolstering energy security to benefit the wider economy and supporting 190,000 jobs, across all regions, and across a range of trades to 2030.[23]

In addition, accelerating roll-out rates for heating and insulation technologies will also encourage a wider set of UK manufacturing opportunities, such as the growth of local supply chains and investment from UK firms. However, to continue to grow UK manufacturing capability and to rebalance the current trade deficit on heating and insulation technologies, firms need long-term, predictable policy frameworks that drive consistent demand from the commercial and residential markets. Without these clear domestic demand signals, it will continue to be challenging for firms to make a case for the UK as an investable location when considering international competition.

£5bn - 12bn

Inward investment into district heating networks

Beyond savings on heating bills, rolling out district heating to areas of potential offers investment opportunities with sizeable impact on GDP growth.

£1.9bn - 6.3bn

Savings created through energy efficiency improvements and modernising heating systems

If the UK could reach similar insulation roll-out rates to Germany and France by 2024, this would help approx. 2m to 4m UK households by 2030, saving between £1.9bn to £6.5bn by 2030.

£0.2bn - 0.4bn

Onshoring heat pump manufacturing

The UK currently imports over two-thirds of all heat pumps for installation. There is an opportunity to rebalance some of this deficit, securing investments from major international manufacturers while also supporting local firms.

£0.3bn - 0.8bn

Unlocking savings from district heating

The UK's planned Heat Network Zoning is building momentum in the district heating sector. Installing district heating to serve the estimated 800,000 – 1.2m eligible homes could create substantial savings on heating costs.

Theme 4: Forging ahead to develop and export green services

The UK is well-placed to continue as a leading global centre for services thanks to its strong history, leading market infrastructure and access to world-class talent from top global universities. It now not only has the opportunity to develop and export products and technologies, but also the wrap-around services that enable a fully decarbonised economy to work in synchronicity.

In energy, an enormous amount of physical infrastructure is required to increase clean-power capacity and upgrade networks. But software and digital services will also play a hugely significant role as the grid modernises. These areas are already a growing proportion of investment in smart grid infrastructure today compared with five years ago.[24]

UK financial services account for 8-9% of total economic output, with the sector also leading in global commitment and adaptation towards a net zero economy. The amount of green capital needed to decarbonise the global economy is vast with approximately $4000bn each year required to reach net zero by 2050.[25] In the UK alone, £50bn investment will be required annually to reach the national decarbonisation targets.[26]

The UK has the potential to become the world's top destination of choice for green finance as the industry grows. Both, as a place where green services are delivered for global clients and as an attractive destination for domestic sustainable investments.

£8.6bn

Green finance exports

The UK can continue as a hub for financial services, helping to lead global efforts to modernise financial regulation to support the net zero transition. Ultimately, this can drive exports, particularly to the EU where an estimated €470bn of green finance will be required each year by 2050.

£6.5bn - 18bn

Exporting digital services for global grid modernisation

Global investment in electricity grids is ramping up rapidly, with the International Energy Agency predicting more than a doubling in annual investment by 2030. If the UK can capture a 'more-than-fair' share (3.5-4%) of spend on digital and software elements, the economic rewards would be substantial.

£16m - 300m

Capturing a share of growing carbon offset trading markets

If the UK could win 20% share of issuances on carbon offset trading markets, this could be worth up to £16m per year in issuance fees rising to £300m in 2030.

Theme 5: Powering emissions reduction through biofuels

Transport represents the single largest emitter of carbon in the UK, but also a significant opportunity for green growth. For some of the most pressing decarbonisation challenges in transport – particularly HGVs and aviation – it is not expected that zero carbon solutions will be available in the next few years, and lower carbon solutions like biomethane and SAF represent a significant opportunity to reduce carbon emissions in the medium term.

Biomethane is expected to play a substantial role in the decarbonisation of the gas grid as well as in heavy transport vehicles that currently do not have a market-ready zero-carbon solution. However, production of these fuels in the UK is low, and without significant intervention, will remain low. The logistics sector urgently awaits the publication of a low-carbon fuels strategy to provide a strategic direction for the enhanced use of biomethane, amongst other low-carbon alternatives, in transport.[27]

The development of SAF epitomises both the opportunities and challenges that come from biofuels. As the largest aviation network in Europe, and third largest in the world, the UK aviation sector represents a critical part of the UK economy, with an estimated value of around £28bn.[28] Recognising this opportunity alongside the need to decarbonise the UK's fastest growing source of emissions, the UK government published a Jet Zero Strategy, established a Jet Zero Council, and committed to introduce a 10% SAF mandate in 2025. However, as indicated by the Phillip New Independent Report into SAF, significant investment challenges remain, including competition for green finance, the lack of competitive transport fuel mechanisms to support investment like CfDs and limited public investment capacity.[29]

£2.5bn - 4.2bn

Inward investment to build and secure SAF refining capacity

Building on the strength of the UK's aviation sector, developing SAF capacity in the UK represents an opportunity to attract inward investment. SAF facilities already earmarked in locations, including the Humber, North West, Solent, South Wales and Teesside, could be expected to create over 20,000 jobs and generate £3bn GVA by 2035, also contributing to levelling up in those regions.

£2.0bn - 4.3bn

Net saving from biomethane gas blending

Biomethane is particularly profitable when produced in medium or low-cost regions when supplying gas for commercial or residential usage. By 2030, 45TWh of annual production could equate to £4bn in savings.

£16.7bn - 22.5bn

Investment to scale the UK biomethane industry

Government can consider regulatory unlocks to scale the UK biomethane industry, including improved environmental permitting for digestate and blending compliance targets.

Theme 6: Capitalising on UK advantages to lead the world in carbon capture, utilisation and storage

In recent years, the UK has made good progress in establishing a CCUS industry – with the development of private law contracts and the launch of the UK Government's flagship Cluster Sequencing process. Meanwhile globally, both the need and plans for CO2 capture facilities are expanding, with technological advances capturing further emission reduction opportunities. However, the IEA notes that even current levels of deployment fall short of the substantial requirement for the net zero scenario this decade.[30] To bolster confidence in the future of CCUS in the UK, bold ambition and delivery must be maintained to secure inward investment and capitalised on the significant export potential.

The Government has committed an unprecedented amount of funding to CCUS in early 2023, with £20 billion allocated to the initial eight Track 1 projects.[31] This funding will enable key decarbonisation projects to become a reality and pave the way for industrial decarbonisation in the UK, while unlocking private sector investment in jobs, supply chain and construction. These projects will capture and store millions of tonnes of CO2 a year.

However, the commitments made to date only scratch the surface on the UK's industrial decarbonisation challenge and CO2 storage potential, with projects in the UK's largest industrial region – the Humber – missing out on support. By 2035, over 70 million tonnes of carbon emissions in the UK could be abated by CCS, with a large proportion of these emissions located in industrial clusters, which could support over 140,000 new and existing jobs.[32] With projects ready in the pipeline and business ready and able to invest significant private capital, the UK must now set out its long-term CCUS deployment plan.

£1.4bn - 3.3bn

Exports of knowledge-based IP

The UK is home to several world-leading companies who are well placed to capitalise on project delivery experience and capture value in future markets.

£5.0bn - 7.5bn

Investment in the first CO2 transport and storage networks at HyNet and on the East Coast

The capital investment to deliver carbon transport and storage networks at the HyNet and East Coast Clusters alone could deliver £5-7.5bn investment by 2030. But this is likely to be the tip of the iceberg. Carbon Capture and Storage Association modelling for the whole value chain of four clusters storing 30 MT of CO2 by 2030 has suggested a total prize almost four times this size.

£0.5bn - 1.1bn

Export of storage to Europe

Compared to global peers, the UK has structural geological advantages that, if utilised, could unlock significant a storage export potential. Based on industry figures from the Carbon Capture and Storage Association the export prize to Europe could be even larger, rising to £2bn by 2030.[33]

Theme 7: Finding the UK's niche in the hydrogen economy

Hydrogen is recognised as a critical component for achieving a low-carbon energy system and decarbonised industry. The adoption of low-carbon hydrogen offers a significant growth opportunity for the UK by attracting inward investment to transform the North Sea energy industry, offering a route to decarbonising industrial clusters and the development of exportable world-leading expertise and technology.

To help achieve this opportunity, the UK Government has raised its own ambition to now produce 10GW by 2030, with at least 5GW of electrolytic-enabled hydrogen. The development of a hydrogen business model stands to make this ambition a reality by providing businesses with revenue certainty. Policies have also been brought in to support production, such as the £240m Net Zero Hydrogen Fund, and end-use, including the Industrial Energy Transformation Fund.[34, 35] Meanwhile internationally, the UK is co-lead of the Hydrogen Breakthrough Agenda, with the task of being at the forefront of promoting international collaboration on hydrogen development.

While these steps demonstrate ambition, efforts must be redoubled to keep pace with a global movement towards low-carbon hydrogen and demonstrate a clear ability to deliver a policy and regulatory framework to support high-capital investments into this nascent market. In addition to the US IRA, Canada has committed to introduce a new tax credit up to 40% for hydrogen production[36] and Germany alone has committed over £9bn to establish a domestic low-carbon hydrogen sector – compared to less than £1bn committed in the UK.[37]

£2.7bn

Exports of knowledge-based IP for high-tech parts of the value chain

The UK is home to several world-leading companies who are well placed to capitalise on project delivery experience and capture significant value in future markets.

£5.3bn - 6bn

Inward investment in domestic hydrogen use cases

Key locations, such as the Humber, Teesside, South Wales, Solent and Scotland, have the potential to drive job growth and attract inward investment, primarily outside of London.

"Much of the investment needed for the net zero transition can come, and is already flowing, from the private sector. The task of government is to deploy smart policies backed by public finance to strategically crowd in private investment."

How government can optimise for green growth

While heads have been turned towards enhanced packages of investment support in other parts of the world, the UK need not copy such measures like-for-like. Instead, it can choose to double down and improve on the market-led approach that has brought success in the last decade. Effectively communicating a refreshed UK proposition to international investors can build confidence, momentum and energy to establish a bold programme for change. Acting as an independent nation should bring the benefits of speed and agility in policy making and delivery, with all agencies of government united behind the shared mission for green growth.

For this to be realised, there are **three fundamentals** that must be in place:

1. Clarity and stability on the long-term policy environment to build business confidence.
2. A comprehensive and competitive set of incentives to enable private investment in the green economy.
3. Efficiency and coordination in delivery mechanisms so projects can be brought to operation at pace.

1. Clarity and stability

One of the UK's greatest strengths in the net zero transition has been in the institutional frameworks guiding our pathway and instances of clear policy signals to stimulate the markets. This includes, for example, the phase out of internal combustion engine vehicles, which businesses identify as a gold standard policy measure to drive the transition.

A sense that the net zero agenda is embraced and gripped at the heart of government – namely Number 10 and the Treasury – is crucial and can drive action through central departments. It enables businesses to forward plan their investments, which typically extend well beyond parliamentary timelines. The appeal of straightforward and long-term changes in other jurisdictions means the UK risks losing market share in green industries at a critical juncture. If we are going to out-compete based on our policy environment, it needs to be predictable and coherent over the long-term.

Recommendations:

1. **All political parties place green growth at the heart of their economic strategy in their manifestos ahead of the next General Election.** This should include commitments to retaining the significant timelines already set out under the Climate Change Act and the sector-specific targets.
2. **Accelerate major policy decisions to stimulate green markets on the supply and demand side, in consultation with business.** For example, firm up a phase-out date of gas boilers, and progressing Track 2 and Track 1 expansion of the CCUS cluster deployment.
3. **Task the newly established Energy Security and Net Zero Committee to identify long-term aspects of the UK's net zero delivery where cross-party parliamentary consensus is necessary and would be conducive to attracting investment, and secure ministerial backing to develop bipartisan agreements.** For example, outline minimum commitments to funding or structural reforms to electricity markets.
4. **Appoint net zero industry champions for key industries where they do not currently exist and coordinate their functions through the newly established Net Zero Council.**
5. **Ensure major central government policy-making and fiscal decisions are properly considering impacts on the net zero transition.**
    a. Introduce a Net Zero Test, requiring all government departments to assess proposed new policies against the UK's climate and environment commitments.
    b. In coordination with the Office for Budget Responsibility, HM Treasury should regularly make transparent the climate impact assessments of major government budgets, spending decisions and spending reviews, as recommended by the CCC.

2. Comprehensive and competitive incentives for private investment

Much of the investment needed for the net zero transition can come, and is already flowing, from the private sector. The task of government is to deploy smart policies backed by public finance to strategically crowd in private investment. The Climate Change Committee estimates that overall public and private investment in emissions reduction will have to scale from the £10 billion per year in 2020 to around £50 billion per year from 2030.[38]

The UK has a strong track record and expertise in developing a range of investment models, from Contracts for Difference to Regulated Asset Base (RAB) models. Going forward, the priority only needs to be ensuring that these models are able to adapt to support new clean technologies, and evolving to the changes in relative "riskiness" of these investments to ensure any public support is targeted where it needs to be. A more strategic use of the blended finance mechanisms available to governments to de-risk investments, such as the role of the UK Investment Bank, could also act to crowd in more private investment for emerging or nascent industries.

The UK can also make better use of our tax system to incentivise the development and adoption of green technologies. The cost of tax incentives is generally lower than direct investment, as it represents a proportion of the investment made up of foregone revenue for government rather than the total cost of that investment – and they can be offset over time by increased tax revenue from the new and growing industries that develop as a result of the incentive.

At the moment, the UK tax system has no clear links with our net zero strategy and is not tailored to support the growth of green industry. Broad measures, such as the R&D tax credit – while an effective tool for stimulating private business investment in innovation – do nothing specific to support green innovation. In some cases, the tax system even works against green investment as in the case of the recent windfall tax measures against electricity generators, which did not provide relief for reinvestment.[39]

We also know tax revenues from existing sources will reduce in a decarbonised economy. Carbon taxes – like fuel duty, VAT on fuel and corporation taxes from the ring-fenced oil and gas regime – are already declining as a share of GDP.[40] To ensure sustainable revenues in future, it is important to start conversations now about taxation in a net zero world. Used correctly, tax can be a powerful and flexible tool in stimulating green growth, but it needs to be purposefully aligned with these goals for this to happen.

Recommendations:

1. **Review the tax system within the first year of a new government to ensure the UK has the right tax framework to support the transition to net zero, with a timeline for implementation of any changes to the existing system starting as soon as possible, and before end of 2027.**

    a. As part of this review, consider the introduction of a targeted tax mechanism for green industries specifically. This measure can be targeted at a limited range of activities. It could be supported by the UK's development of a green taxonomy.

2. **Publish a plan by early 2025 for sustaining government revenues as tax receipts from the fossil fuel economy decline, for consultation with the public and businesses. Start to implement this plan before 2027.**

3. **Establish a Net Zero Investment Plan, identifying green investment gaps and policy with the intention of crowding in private finance, and ensure this is regularly updated against carbon budget timelines.**

4. **Plan evolution of price support mechanisms, such as the CfD to:**

    a. Make nascent technologies investable and scale to a competitive market (i.e. hydrogen, SAF, CCUS).

    b. Incorporate non-price factors into tender selection process so as to ensure the full value of the technologies, including supply chain and jobs, is realised here in the UK.

5. **Election manifestos should set out an approach on carbon pricing and future innovation funding designed to drive domestic demand for crucial green technologies.**

    a. This should include measures to avoid carbon leakage, such as carefully designed carbon border adjustments alongside the evolution of the UK ETS.

    b. Increase targeted support to decarbonise industries either through existing funds like the Industrial Energy Transformation Fund (IETF) or a new fund to address other innovation challenges, supported by higher ETS revenues.

3. Efficiency and co-ordination of delivery mechanisms

One of the most critical determining factors in the success of the next phase of green growth will be the delivery of a vast range of projects and programmes at pace. Even with stable policy mechanisms, lengthy and unreliable timelines in getting projects delivered make investors doubt the reliability of the UK. The same issues cause delays that then lengthen the time taken for projects to make returns – again, disincentivising private investment in the UK when other countries are seen to be moving faster and with more urgency to seize the green growth prizes.

A lack of joined-up thinking across government and government bodies needs to be addressed to get momentum back into the system to get bankable projects realised and "delivery underway".

Recommendations:

1. **Election manifestos should set out how government architecture will be structured to deliver net zero in a coordinated, whole-systems manner, including across UK nations.** This could include the establishment of a new Office for Net Zero Delivery (as recommended by *Mission Zero*) or strengthened central government machinery that ensures consistent delivery across Whitehall departments.
2. **Incorporate green skills into existing training opportunities – such as more flexible apprenticeships, bootcamps and T-Levels – and create a statutory requirement for all schools and Further Education institutions to make young people aware of green career pathways available.**
3. **Establish coordinated, centralised government guidance for local authorities and regions on how to implement devolved aspects of net zero, with clear guidance on timelines and funding pots available.** This can work to empower regions to deliver a place-based transition, but without resulting in a disjointed transition that can hinder business planning or lower the attractiveness of certain regions.

4. **Reform the planning systems for both local and major projects to enable faster delivery of green infrastructure.**

   a. Advance mechanisms that enable financial benefits for communities that accommodate critical net zero infrastructure rapidly.

   b. Legislate for regular reviews of the National Policy Statements for Energy.

   c. Work with industry to modernise and standardise Environmental Impact Assessments.

   d. Ensure all decision makers in the planning system have a remit or duty to support the transition to net zero.

5. **Speed up the process for obtaining connections to the grid.**

   a. Publish new National Policy Statement for Energy Networks and adopt National Grid's Holistic Network Design into policy.

   b. Replace first-come, first-served model in grid connection queues with a system that considers achievement of project milestones.

Removing stumbling blocks in the race for green growth

Where there is failure to deliver on green growth, there are often multiple stumbling blocks in the supply side, either in the value chain or in the policy interventions needed to create markets. Frequently, the demand is not being driven for new green services or products, as in the case for energy efficiency and clean heat, hindering the attractiveness of the UK as a place to invest in manufacturing facilities or the desire for skilled professionals to retrain. In other cases, it is barriers and delays in associated processes holding up project pipelines, as in the case of low-carbon power where the lengthy purgatory of the 'queues' for new grid connections are stifling the interest and excitement around new renewables projects.

This is why the need for holistic, cross-cutting enhancements to the UK's entire approach for building the green economy are necessary. However, there are more specific challenges that must be addressed at a technology and sector level if the UK is to capture all of the green growth prizes on offer.

Key

- ✓ **Favourable conditions for green growth**
- ! **Average conditions for green growth**
- ✗ **Deficient conditions for green growth**

	Supply	Demand	Enabling Environment
Electric vehicles	✗	✓	✗
	Lack of domestic cell manufacturing capacity is expected to restrict UK manufacturers' ability to take advantage of the Zero Emission Vehicle mandate. The Faraday Institute expects that around 100 GWh of supply will be needed to satisfy demand for private cars, commercial vehicles, heavy goods vehicles, buses, micro mobility, and grid storage.[41]	Demand for EVs is growing and has the potential to remain strong between now and 2030 due to policy measures, including the Zero Emissions Vehicle (ZEV) mandate, ICE phase-out date for 2030, proliferation of low emissions and clear air zones within city centres, and increasing orientation of car manufacturers in favour of Battery Electric Vehicles (BEVs) and hybrid models. In fact, demand has outstripped supply considerably, in part due to supply chain shortages over the last few years. The main threat to long-term demand for BEVs is, however, low provision of EV charging infrastructure. If left to the market, there is a risk that chargepoints will service commercial needs more than consumer needs. The focus now needs to be on a reliable infrastructure network alongside a taxation and regulatory framework that promotes equity and choice wherever drivers live or work.[42]	High energy costs are cited as a significant factor preventing both investment in gigafactories as well as suppressing demand for vehicles – if the cost differential between charging an EV and filling an ICE vehicle can be shown to be significant, more consumers will make the investment. Significant upgrades to the grid will be necessary to ensure that the transition to EVs is able to proceed. There is also greater need to develop a clear plan for the future of motoring taxation, as the transition to zero emission mobility will change the obligations on drivers. This is particularly critical as in recent years incentives have been reduced and removed, making the UK one of the only markets to have no direct consumer incentives in place.[43]

Low-carbon power

The UK benefits from a highly competitive supplier market for low-carbon technologies cultivated through a market-led approach. Competition in the market has been a driving force behind rapid reductions in strike price achieved through CfD auctions.

However, as we move towards a more flexible energy system, the design of CfDs must also evolve. This requires moving from a sole focus on reducing costs to rolling out vast volumes of low-carbon power at the lowest available cost.

Demand for low-carbon power is predicted to grow rapidly in the next decades as more parts of the economy become electrified. The CCC estimates that total capacity of the Grid will be roughly double what it is today in 2050.[44]

Central to bolstering investor and developer confidence across the range of low-carbon power technologies is a clear pipeline of projects. Clarity of future pipelines supports investment in supply chain capacity and skills as well as boosting confidence in emerging technologies. Government-backed technology targets have been used across technologies to send these signals to the market but there remain gaps in targets for onshore wind, SMR uptake and LDES.

Current planning processes are a major impediment to rolling out low-carbon infrastructure at sufficient pace. Around 40% of all major infrastructure projects have been delayed at the planning stage since 2017, with several major offshore wind projects awaiting approval from the Secretary of State for over two years.[45]

In addition, current planning rules in England have effectively banned the development of onshore wind since 2015, with projects able to be blocked from just a single objection.

Five times as much grid infrastructure will need to be deployed in the next seven years than has been in the last 30 years. This is crucial to connect over 70GW of new renewable capacity and meet the needs of rising electricity demand from heating and transport. The CCC estimates that electricity network boundaries will have to double capabilities on average. However, new low-carbon energy projects seeking grid connection dates are facing wait times of over a decade, with one project being quoted 2036 at the earliest for grid connection.

Heat and buildings

The Clean Heat Market Mechanism (CHMM) is hoped to encourage scale up of heat pump manufacturing facilities in the UK. However, in its current form the CHMM may reduce the ability of manufacturers to invest in the heat pump supply chain and UK manufacturing in favour of diverting funds to pay fines for missed targets or a quota, while also not recognising the role that potential hybrid technologies could have to scale the market.[46]

While industry is broadly supportive of using a market mechanism to encourage heat pump manufacturing, other factors in the supply chain need to also be addressed – particularly the skills gap. Research indicates that upwards of 100,000 trained engineers will be needed to sell 600,000 heat pumps a year, far greater than the current capability of manufacturers.[47]

UK demand for heat pumps and broader retrofitting is one of the lowest in Europe. This is in part due to high switching costs associated with electrifying your heating, with heat pumps costing upwards of £10,000 per household, and poor awareness across households.[48] Until demand is increased, it won't be cost-effective to manufacture in the UK.

This low demand is largely fuelled by a poor track record on the generosity and longevity of subsidy regimes. Business have made clear that given the scale and depth of retrofitting needed, longer term commitments to retrofit funding programmes, over ten years or more rather than one or two, would give the certainty needed for workforces to be trained and supply chains established. The current design of the Energy Performance Certificate (EPC) system does not correctly represent the data requirements needed to accurately measure the operational energy consumption and efficiency of the UK's building stock. This in turn leads to misleading baseline calculations, which could underestimate the potential cost savings made from critical retrofitting.[49]

For example, the Boiler Upgrade Scheme, which offers households £5k to support the capital requirements of heat pumps, has to date been slow on uptake and is still too little to pique the level of consumer demand required to reach the Government's targets. By comparison, the KFW Reconstruction Credit Institute in Germany offers up to €10k, nearly double the UK's offer. The scheme also touts longevity as key to the programme's success over 10 years.[50]

The CCC projections that 200,000+ additional skilled workers will be required by late 2020s across the retrofit supply chain looks challenging.[51]

Meeting these needs will require both attracting new talent and upskilling/retraining the existing workforce – currently inhibited by the perceived lack of demand for these skills.

Delivery of installations must also come hand in hand with a suitable cost regime that ensures a fair and affordable approach to low-carbon heating. High energy costs inhibiting cost savings from electrifying heat lower the attractiveness of making the switch further.

Green services

While the UK has many strengths and high potential in green finance, by some metrics it lags behind its international counterparts. For example, while it has a 37% of European Assets Under Management in conventional funds, the figure for sustainable funds is 10%.[52]

The scale of investment needed to decarbonise the economy is driving demand for green finance products, such as sustainability-linked loans, green bonds, green mortgages, and funds with sustainability-related labels.

The rapid pace at which the UK is deploying renewables and transforming the balance of technologies contributing to the grid is a natural driver of modernisation and demand for digital services.

In carbon markets, issuances of voluntary carbon credits have grown fivefold since 2009 and accelerated since 2017, particularly driven by the growing number of companies committing to net zero targets. However, persisting doubts in the integrity of these markets is hindering their growth, and a lack of political endorsement in the UK is holding us back from being seen as a global leader in trading carbon credits.[53]

The UK is one of the regions in the world with the most ambitious green finance regulation, including mandatory Taskforce on Climate-Related Financial Disclosures reporting, an upcoming mandatory template for transition plans, and proposed Sustainability Disclosures Requirements (SDR) intended to align with standards of the International Sustainability Standards Board (ISSB). If designed appropriately, this broad set of regulation has a chance to provide investors with much needed clarity to identify the right sustainable investments and enhance corporate accountability.

However, we are lagging European counterparts in setting out key pieces of legislation, particularly the UK Green Taxonomy.[54] In order to be seen as a leader we must continue to be seen to be setting standards, not just following or existing outside of them.

Biofuels

Despite ambitions to have five SAF facilities under construction by 2025, current supply remains low. Without support in the form of a revenue support mechanism, the sector will be unable to source adequate private sector investment.

The SAF mandate, requiring airlines to use 10% SAF by 2030, has significantly bolstered demand and sent a clear signal to the aviation sector. However, without a domestic supply base of SAF, this mandate simply encourages airlines to import the SAF needed, robbing the UK of SAF jobs, GVA and exports.[55]

The UK Government target of 20TWh/year of production of biomethane lacks sufficient ambition. The creation of more stretching and ambitious targets would send a clear signal to the biofuels industry, in addition to a clear decision on how much biomethane will be required to decarbonise the gas grid.

This lack of this clarity means that demand for biomethane for transport is likely to remain suppressed, as the transport sector is unwilling to gamble on investing in biomethane only to be told that biomethane supplies are being prioritised for heating.

To date the Renewable Transport Fuel Obligation (RTFO) has been effective at increasing the proportion of renewable fuels required in road fuels. However, today the impetus to develop low-carbon fuels is greater than ever before and the RTFO must be developed to work alongside wider policy mechanisms to develop a range of new advanced low-carbon fuels. The development of a low-carbon fuels strategy will be pivotal to providing a whole-systems vision for deployment and investment.[56, 57]

The Aerospace Technology Institute (ATI) has been central to fostering collaboration, promoting research and development, and catalysing growth within the aerospace and aviation sectors. However, lack of long term and stable funding stands to hamper investment opportunities.[58]

Current planning regulations and high energy costs make the construction of a biofuels refining facility very expensive and represent a significant investment risk.

Hydrogen	The Energy Bill introduces vital legislation to finalise hydrogen business models that will be crucial to supporting investor confidence in early hydrogen projects. Without revenue certainty, the UK will be unable to compete with the significant fiscal incentives emerging globally.[59]	Currently there are limited government mechanisms directly supporting or incentivising decarbonisation of industry, resulting in progress being severely off track.[60] While the recent extension to the Industrial Energy Transformation Fund (IETF) has been welcomed, the long-promised Clean Steel Fund is yet to materialise. As a result key funding gaps exist for industrial, manufacturing and energy intensive businesses, which is hampering progress with the development and adoption of decarbonisation technologies such as hydrogen.	Hydrogen will be crucial to decarbonising a range of sectors across all regions of the UK. Transporting and storing hydrogen will be crucial to unlocking these end-use applications. Providing long-term confidence and revenue certainty in the development of transport and storage infrastructure will be critical to unlocking crucial private sector investment.[61, 62]
CCUS	Currently there are no commercial applications of CCUS in the UK but the Government has a stated aim to deliver 4 CCUS low-carbon industrial clusters, capturing 20-30 MtCO2 per year across the economy by 2030.[63]	There is significant appetite for CCUS from hard-to-decarbonise sectors – however, adopting some kind of CCUS targets beyond 2030 as the EU has done, in consultation with industry, would give industry a clearer pipeline to plan against. As well as the decarbonisation of industrial clusters, many of which will be located close to offshore CO2 pipelines and sites, around half of industrial activity is located at dispersed locations and present substantial CCUS potential. However, Government support to date has focused on early deployment at large industrial clusters.[64]	Providing long-term clarity and certainty in the support mechanisms and regulatory frameworks is crucial to supporting the commercial viability and attracting finance into significant infrastructure like CCUS. This long-term clarity is also vital to support investment and growth in UK-based supply chain activities that will drive inward investment into the UK.

Technical policy enablers to promote areas of UK strength

This strategy for green growth has identified clear areas of competitive advantage, split into seven technology themes. The previous section, outlines some of the challenges still standing in our way of capturing green growth. Our recommendations on creating a supportive policy environment for all opportunities to flourish are critical to redress these and get us back in the global race, and we already know specific areas where these principles must be applied immediately. In addition, across these technology themes there are a range of specific policy interventions needed to ensure the UK doesn't lose market share but retains its natural advantages or head start.

Electric Vehicles	**Clarity and stability**
	• Ensure a fair system of motoring taxation and duties that encourage the switch to zero emission and provides long-term certainty and affordability to consumers. • Commit to an industrial strategy that creates attractive investment conditions and positions the UK as one of the best places in the world for advanced automotive manufacturing. • Maintain phase out dates for the new sales of pure internal combustion engine cars and light vans by 2030 as well as the ZEV mandate from 2024 to 2030.
	Financing
	• Maintain and review appropriate incentives and grants, in particular for commercial and freight vehicles to provide consumer confidence and to support mass market uptake and fleet renewal. • Reduce VAT on public EV charging to bring parity with private charging. • Lay out plans for the future of the Automotive Transformation Fund and R&D tax credits to enable the scale up and commercialisation of innovation products and processes.
	Delivery
	• Provide clearer guidance and best practice for local authorities on installing charging infrastructure, with mandatory requirements for minimum provision within a local authority.
Low-carbon power	**Clarity and stability**

	• Set new ambitions for critical low-carbon power technologies, including:
	  • A UK onshore wind deployment target of 30GW by 2030.
	  • A long-duration energy storage target of 25GW by 2035.
	  • A UK SMR uptake by 2030 target.
	• Working with Great British Nuclear and industry, to set out a roadmap to deliver the 2050 nuclear ambition, with interim deployment targets, and a siting strategy.

	Financing
	• Carefully manage the evolution of the CfD mechanism to address future investment challenges. • De-risk investments in Long Duration Energy Storage with a cap and floor revenue support mechanism, similar to the interconnector model.
	Delivery

	• Undertake planning reforms for both local and nationally significant projects including:
	  • Legislating for regular reviews of the National Policy Statement (NPS) for Energy.
	  • Work with industry to modernise and standardise Environmental Impact Assessments.
	  • Ensure all decision makers in the planning system have a remit or duty to support the transition to net zero.
	• Speed up processes for obtaining connections to the grid:
	  • Publish new NPS for Energy Networks.
	  • Adopt National Grid's Holistic Network Design into policy.
	  • Replace the first-come, first-served model in grid connection queues with a system that considers achievement of project milestones.
	• Establish the Future System Operator (FSO) as soon as legislation allows with a duty to apply a strategic approach to planning and development, and to support Government and Ofgem in key decision making.

Heating and insulation	**Clarity and stability**	

		• Enshrine the 2035 phase-out date of gas boilers in law.
		• Make a clear decision on hydrogen for heating on a timeline in lockstep with other critical policy decisions, particularly the Future Homes Standard and Future Buildings Standard.
		• For EPCs:
		  • Set out how metrics to measure energy performance will change during the reform process and in future.
		  • How Energy Performance Certificates will work alongside and be aligned with Minimum Energy Efficiency Standards (MEES).

	Financing	
		• Work with industry to ensure the Clean Heat Market Mechanism is best designed to incentivise investment in domestic heat pump manufacturing, with all actors in the supply chain targeted, consideration given to the potential roles of hybrid technologies, and any fines within the mechanism offset with broader investment into clean heat manufacturing and training. • Accelerate plans to rebalance the gas and electricity policy costs to improve the cost efficiency of heat pumps. • Explore ways for the tax system to incentivise energy efficiency upgrades – e.g. business rates relief and exploring reforms to the 0% VAT relief of energy savings materials to ensure it can still be obtained when part of wider refurbishment programmes.
	Delivery	
		• Address skills gaps by raising installer awareness of accreditation and increased salary potential and consolidating and standardising fragmented accreditation schemes. • Empower and fund Councils and regional authorities to carry out Local Area Energy Planning: • Enable zoning of localities, assessing heating requirements and suitability of housing stock with motivation to roll out district heating wherever appropriate.
Green services	**Clarity and stability**	
		• Provide detail on future plans for UK taxonomy in consultation with industry. • Set out clear timelines by end of 2023 for the implementation of other key pieces of regulation, such as Sustainability Disclosure Requirements and transition plans. • Take a lead in digital innovation and systemic planning for domestic grid, encouraging use of novel smart grid applications, advanced data and system management in the Review of Electricity Market Arrangements process. • Continue to support key international voluntary carbon market (VCM) initiatives including UK Voluntary Carbon Markets Forum and Voluntary Carbon Markets Integrity Initiative.
	Financing	
		• Establish a Net Zero Investment Plan to identify gaps in finance and policy solutions to enable crowding in of private finance. • Use government procurement to drive consensus on offset legitimacy and send clear demand signals to the VCMs.
	Delivery	
		• Position the UK as a leader on transition finance and new areas, such as nature markets by delivering actions announced in the Green Finance Strategy.
Biofuels	**Clarity and stability**	
		• Provide early policy clarity, such as on blending and the role of hydrogen in heating. Ahead of final decisions being made ensure collaborative working with industry to ensure changes are undertaken in a clear and ordered way. • Prioritise the publication of a low-carbon fuels strategy.
	Financing	
		• Establish a revenue support mechanism for the UK production of Sustainable Aviation Fuels.

CCUS	**Clarity and stability**
	• By 2024, set out CCUS deployment plan to 2035 to support timely cluster delivery across whole of the UK.
	• By 2024, set a strategy for dispersed industrial sites, with a focus on connection of dispersed sites to the CCS network, including details on non-pipeline transport and storage.
	Financing
	• Finance and legislate for CCUS business models and regulatory frameworks this year. Commit to regular contract allocation rounds.
	Delivery
	• By Autumn 2023, set out clear timelines and eligibility for Track 1, Track 2 and beyond.
Hydrogen	**Clarity and stability**
	• By 2024, set out a post 2030 plan for scaling up hydrogen production.
	• Set out demand-side targets for hydrogen use in key sectors, including energy intensive industries, heating, energy storage, and heavy transport.
	Financing
	• Finalise hydrogen business models and publish transport and storage models.

Annex 1: Green growth case studies

Case study 1. Power Roll seeks to scale-up production of innovative solar technology

The UK and many parts of the world are facing an energy crisis with high electricity prices and major energy security issues. North East business, Power Roll, has developed and is scaling a unique and cost disruptive solar photovoltaic (PV) technology, enabling businesses and families to generate green electricity at an affordable cost. Power Roll's solar film is low-cost, lightweight, and flexible. At an ultra-low cost to scale, this provides an opportunity for a first of a kind giga-watt solar factory to be set up in the North East to help address these challenges.

Power Roll's vision is to enable the generation of renewable energy anywhere, on any surface by removing many of the barriers with existing technologies, alleviating fuel poverty by producing affordable clean energy, and driving towards global carbon reduction, net zero and increased energy independence and security.

Power Roll's unique solar film is based on a patented micro-groove architecture, utilising established roll-to-roll manufacturing processes. Invented in the UK, they have successfully proven the science, protected the technology, through a global patent portfolio, and are now demonstrating and optimising manufacturability in a pilot factory in County Durham.

UK energy targets call for a fivefold increase in UK solar deployment to 70GW by 2035, providing a huge opportunity to establish UK solar manufacturing capacity. With a capital requirement significantly lower than required for traditional silicon PV and physical properties that open new markets, Power Roll's solar film can make this a reality. A Northeast factory, once scaled, can produce 6 million square meters of solar film annually and over 20 years save 95 million tonnes of CO2.

As well as producing solar film for deployment on warehouse and factory roofs, and off-grid solutions, the UK plant is an important inflection point for international deployment of the solar film through a global licencing model. Power Roll already have two early-stage licence partners on board in India and Japan.

A Northeast business with a product that will be deployed globally, producing low-cost clean energy from the sun.

Case study 2. SSE's Coire Glas Pumped Storage Hydro Project: A critical low-carbon source of system flexibility to backup offshore wind and help deliver net zero.

SSE Renewables, part of SSE plc, is a leading developer, owner and operator of 4GW of onshore wind, offshore wind and hydropower projects across the UK and Ireland, with a growing presence internationally.

The delivery of the Coire Glas project is at the heart of SSE's Net Zero Acceleration Programme (NZAP), which commits to investing around £10m a day on the critical low-carbon infrastructure needed for the net zero transition. Coire Glas is a pumped storage hydro project that can deliver critical system flexibility by storing low-carbon power in times of surplus to be deployed when the wind doesn't blow, and sun doesn't shine. Requiring a capital investment of over £1.5 billion, it would be the UK's largest-ever electricity storage project, more than doubling the country's current storage capacity, with a potential to power 3 million UK homes for 24 hours non-stop.

Given their high upfront capital costs, long lead times and the lack of revenue certainty, pumped storage projects require a 'revenue stabilisation mechanism' to de-risk investment. This was highlighted in the recent Review of Net Zero by Chris Skidmore MP, which argued that the absence of an appropriate market framework is impacting investment in long-duration storage technologies, such as pumped storage.

For several years, SSE has been advocating for the introduction of an adapted Cap and Floor scheme to support investment in pumped storage projects and the UK Government has now committed to developing appropriate policy to enable investment in such projects by 2024.

> "Coire Glas will be one of the most ambitious energy infrastructure projects the UK has ever seen and is a key component of SSE's commitment to helping lead Scotland and the UKs' energy transition."
>
> **Gregor Alexander, Finance Director, SSE**

Case study 3. Yorkshire Housing builds retrofit programme amid inflationary pressures and skills shortages

Yorkshire Housing own approximately 16,500 rented homes across the whole of Yorkshire. Of these homes, approximately 5,000 of them are performing below EPC band C and will require energy efficiency upgrades by 2030.

The organisation has made an £8m additional provision in the business plan over this period to fund this work and aligned some of its more significant retrofit work to the ambitions of the Social Housing Decarbonisation Fund (SHDF), while targeting some of its worst performing properties first with fabric first measures. Wave 1 of the scheme has recently been completed and sees the install of external wall insultation, replacement cavity wall ties, air source heat pump installs and solar PV to create warmer, more affordable homes for customers.

This award-winning retrofit scheme, in Staxton near Scarborough, sees investment of circa £1.3m but regrettably only in 15 properties. And there's the challenge: high inflation has seen costs of external wall insultation rocket, and delays to the completion of the scheme – caused by the incoming electrical supply requiring upgrade – have also made timely completion a challenge. Scaling the cost of this scheme up across the 5,000 homes that require upgrade would total in excess of £430m – not the £8m currently dedicated.

As a result, Yorkshire Housing's Wave 2 bid into the SHDF includes no external wall insulation. The percentage of subsidy is higher, and the business is targeting double the number of properties with a more affordable scheme.

Skill shortages and qualified contractors to deliver such schemes are in short supply, particularly contractors with the confidence and knowledge to assist with standards compliance. Rectifying this is crucial to be able to scale up fabric-first measures across the portfolio alongside other housing providers.

Case study 4. Public and private finance combine to develop the Rolls-Royce Small Modular Reactor

HSBC acted as the sole financial adviser to Rolls-Royce on equity fundraising for its SMR. The Government – through UK Research and Innovation funding (UKRI) – provided £210m in grant funding, matching private capital from a range of investors, including QIA, the sovereign wealth fund of the State of Qatar. HSBC were acting in an advisory capacity to attract inward investment.

The government grant – alongside a range of other conditions - helped to de-risk the project sufficiently and crowd-in private sector investment at a much earlier stage into the development of this emerging technology than normal. Most notably, the Government signaling demand through the inclusion of SMRs in the Prime Minister's *10 Point Plan for a Green Industrial Revolution*, helped to provide investors with a sufficient degree of policy clarity and certainty.

The UK's nuclear regulators also played an important role accepting the Rolls-Royce SMR into the UK's rigorous regulatory review process. The UK's internationally recognised regulator can play an important role in enabling export through regulatory harmonisation and international cooperation. Investors recognised that these conditions would facilitate the future export of SMRs, meaning the project was considered economically viable and globally scalable.

Case study 5. First-ever green loan through UK Export Finance unlocks new subsea cable manufacturing facility

In April 2022, JDR Cable Systems (JDR) – a global subsea cable and umbilical supplier and servicer – received the first-ever green loan through the UK Export Finance (UKEF) Export Development Guarantee (EDG) for its new subsea cable manufacturing facility on a brownfield site in Cambois, near Blyth, Northumberland.

The loan, which was jointly funded by HSBC and two other banks, meant JDR could begin construction on their new facility in summer 2022, with a planned opening in 2024. It is set to create 171 local jobs on completion, while securing a further 270 existing roles.

Once complete, the facility will produce the next generation of medium and high-voltage cables to link energy infrastructure in the offshore wind energy and interconnector markets. The project is the first stage of JDR's plans to expand its product portfolio to support the growing global renewable energy market, adding high-voltage export and long length array cables to its existing capacity and product capabilities.

As well as supporting regional jobs and growth, the project will also contribute to the transition to a low-carbon economy. This is just one example of the correlation between the transition to net zero, accelerating innovation to help scale up climate change solutions, and building global partnerships to ensure FDI is directed to all parts of the country.

There is a strong relationship between those areas that needed to decarbonise and boost regional economic development. This example illustrates the productivity enhancing benefits of FDI flows and how the net zero transition can boost FDI investment in manufacturing. It also illustrates that the right type of FDI project can create jobs and grow both the local and nationwide economies.

To catalyse the required flow of private investment into JDR, UKEF facilitated greater risk sharing between the public and private sectors when risk/return ratios may have been insufficient to attract private investment alone.

Case study 6. Esso rolls out 25% Renewable Diesel across the South East

In 2022, Esso, an affiliate of ExxonMobil, began a six-month trial selling Esso Supreme 25% Renewable Diesel at 20 Esso-branded service stations in the south east of England. The fuel provides motorists with a new choice, enabling them to reduce the lifecycle emissions associated with fueling their vehicles, and is a replacement fuel that is fully compatible with standard diesel. This is the first fuel of its kind to be sold at multiple retail sites in the UK.

Esso Supreme 25% Renewable Diesel is made with a minimum of 25% premium hydrotreated vegetable oil (HVO) which is produced from independently verified, Renewable Transport Fuel Obligation (RTFO) compliant, used cooking oil. It offers 15% lower life cycle GHG emissions than Esso's regular diesel. These 15% lower lifecycle GHG emissions means that the average UK diesel car driver, using Esso Supreme 25% Renewable Diesel instead of regular diesel, can prevent approximately 1,410 miles worth of lifecycle emissions associated with fuelling that vehicle per year. That is equivalent to over two round trips from London to Edinburgh.

Esso is currently considering a wider rollout of its 25% Renewable Diesel.

ExxonMobil is focused on growing lower-emission fuels by leveraging current technology and infrastructure, plus continuing research in advanced biofuels that could provide improved longer-term solutions through upgrading lower-value bio-based feedstock. Its ambition is to supply approximately 40,000 barrels per day of lower-emission fuel by 2025 and a further 200,000 barrels per day by 2030. Achieving this goal will help society reduce more than 25 million metric tons of CO2 equivalent emissions per year from the transport sector.

Case study 7. Aldbrough Hydrogen Pathfinder: Providing the green hydrogen to power value case

Aldbrough Hydrogen Pathfinder would unite hydrogen production, storage and power generation in one location by the middle of this decade. The concept would see green power sourced from grid through Renewable Power Purchase Agreements, in compliance with the Low Carbon Hydrogen Standard. Hydrogen would then be produced via a 35MW electrolyser before being stored in a converted salt cavern and then used in a 100% hydrogen-fired turbine, exporting flexible green power back to grid at times of system need.

To keep the UK on track to a net zero power system by 2035, 7-9GW of carbon capture power stations and up to 8GW of hydrogen fired peaking power stations will be needed by 2030, alongside significant renewables growth. This means the investment SSE Thermal is making in these technologies now is crucial, to ensure the low-carbon power stations we will need can be operational this decade.

Located at SSE Thermal and Equinor's existing Aldbrough Gas Storage site, it will support the evidence base for wider deployment of flexible hydrogen power in the UK's net zero journey and will demonstrate the interactions between hydrogen electrolysis, hydrogen cavern storage and 100% hydrogen dispatchable power.

Hydrogen to power has the potential to support the flexibility and security of the UK's energy system. Hydrogen transport and storage infrastructure will be key to achieving this. Storage will be needed to ensure certainty of supply for hydrogen to power generation, and transport infrastructure will be needed to connect hydrogen production, hydrogen storage and power generators. Business models to create routes to market for elements of the hydrogen value chain are being developed by the UK Government, recognising the development lead times, high capital costs and uncertain financial investment returns in a nascent market.

By taking an ecosystem approach, the project has been devised as a "proof-of-concept" for the green hydrogen production to power value case, delivering valuable system-integration learnings that will underpin the development of hydrogen to power at scale as well as cost benefits that can be applied more widely, in advance of business model deployment and larger scale investment.

The UK Government has recognised the potential of the Aldbrough Hydrogen Pathfinder by progressing it to the due diligence phase of its Net Zero Hydrogen Fund, which aims to support the commercial deployment of new low-carbon hydrogen production projects during the 2020s.

Annex 2: How this report was compiled

Across the CBI's membership, there is a huge amount of interest in, and desire to drive forward, green growth – from all sectors, types of business, and UK regions and nations. So, over the last nine months, acting upon calls for the need to see more targeted, ambitious action in response to the US Inflation Reduction Act, the CBI has convened roundtables, held one-to-one sessions with members and stakeholders, and presented regular updates to our standing committees. This process brought together a cross-sectoral mandate for how the UK can unlock green growth opportunities.

The search for how to more strategically pursue the goal of green growth emerged in October of 2022, when the CBI's input into Chris Skidmore MP's review into government delivery of net zero coincided with the increasing recognition of how the passing of the Inflation Reduction Act, in August 2022, would impact investments in the global green economy. We heard from business that the UK could no longer just focus on business-as-usual, addressing issues "around the edges" of the green economy. To be truly in the race, we need to get more strategic, more ambitious, and act with more agility. This all revealed the need for a longer-term, more extensive piece of work looking at:

- A review of the UK's strengths and how well positioned it is to capture green growth opportunities, as a result of features such as its structural advantages.
- An appraisal of the UK's green growth progress to date, taking stock of successes and challenges across the UK's major green industries and drawing comparisons to other countries where relevant.
- Defining the mechanisms of green growth drawn from economic theory, to understand how different types of decarbonisation actions and opportunities can move the needle on both the UK's pathway to net zero and economic growth ambition.


OCTOBER 2022
Member consultation for CBI response to Skidmore review into net zero.
NOVEMBER 2022
End of 2022: Independent analysis and project on green growth prizes.
DECEMBER 2022
Q4 Decarbonisation Council and Working Group were presented with, and commented on, preliminary data findings.
JANUARY 2023
CBI launch of our 2023 growth campaign.
JANUARY - MARCH 2023
Targeted outreach with members on impact of IRA and desired UK response.
MARCH 2023
Q1 Regional Councils – consultation with a broad set of business leaders across the CBI's regions and nations.
13 MARCH 2023
Internal consultation with policy teams across the CBI.
20 MARCH 2023
Green Growth Sounding Board, involving senior business leaders and independent external experts.
APRIL 2023
Technology specific focus groups convened across the seven technology themes.
MAY - JUNE 2023
CBI pause in member activity. Consolidation of policy discussions, recommendations and writing of report.
JUNE 2023
Final consultation with members on content of report.

Methodology behind the "green growth prizes"

How did the CBI identify these 27 "prizes"?

- We began with a long list of investments required as described in the UK Climate Change Committee's Sixth Carbon Budget.
- We then refined this list by applying four analytical filters for growth opportunities:

1. **High net savings:** Only those, which have a 2030 marginal abatement costs (MAC) of less than £0 per tonne of CO2.
    - This is where the concept of 'in the money' comes in – by looking at the marginal abatement cost (the cost of investments necessary to reach 2030 CO2 emissions reductions targets) out to 2030 across all industries and sectors, we identified the low cost 'no regret' opportunities that both reduce emissions and are not only cheap, but will save the UK money.
    - The best examples in this case are offshore wind or passenger EVs that have a MAC of roughly -200 USD/CO2.
    - Examples of technologies identified as not (yet) being in the money is hydrogen as a source of heat.
    - This is based on no assumed policy change so in theory changes to carbon pricing could result in more technologies being brought 'into the money'.
    - An example of how external environment changes can affect the MAC analysis is that five key technologies moved lower down the cost curve due to changes as a result of the Ukraine war: biomethane, LDES, hydrogen, heat pumps, and accelerated uptake of wind and solar.
2. **Large domestic markets:** Only those opportunities that are estimated to have a domestic capex spend in 2030 above £1bn.
    - This looked at the level of capex spend required in 2030 to hit decarbonisation pathways as described in the UK's CCC sixth carbon budget (i.e. not opportunities beyond this).
    - It found there are at least 16 green markets with 2030 UK addressable market sizes over £1bn.
    - The most significant of these was again passenger cars.

3. **Large export markets:** The largest 11 green export markets globally (with a particular focus on the local EU market).
    - This identified an opportunity to increase UK trade exports based on the large 2030 global sustainability markets. This found that there was a potential economic prize of $90-125bn in 2030 if you assume that the UK can capture 1% of the top 11 global investable sustainable markets.
    - The key markets looked at were: transport, buildings, power, water, agriculture and land/forest management, consumer, oil/gas decarbonisation and sustainable fuels, hydrogen, waste, industrials, and carbon management.
    - Within these, it was broken into smaller categories, for example, buildings into green buildings' materials, sustainable design, engineering and construction advisory, high efficiency building equipment, green building technology and operations.
    - This was not further broken down by market but is representative of the global total.
    - The research further looked into how the UK can support the creation of future export markets through development funding and climate diplomacy to encourage the net zero transition (e.g. Just Energy Transition Partnerships)
4. **Distinctive UK strengths:** Taking the opportunities together and assessing where the UK actually has potential to win across three different export timelines (pre-2025, 2025-2030, and post-2035)
    - The five sources of strategic advantage prioritised were: strategic location, existing UK players, UK supply chain, skills and know how (scored well across all areas), and tradeability.
    - The key themes tended to map across not just one but multiple of these areas for example CCUS benefiting from both strategic location geologically, and extensive existing cluster system (supply chain, skills, existing players).

- The 27 opportunities then emerged out of these filters as the best of the best – they were then grouped roughly into seven themes (EVs, low-carbon power, Heating and insulation, Green services, CCUS, Hydrogen).

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