



# GEMSERV SUMMARY: CLIMATE CHANGE COMMITTEE – 2023 REPORT TO PARLIAMENT

28 JUNE 2023

PUBLIC

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# OVERVIEW

In the past year, the UK Government has shown renewed commitment to its net zero ambitions. The recent Powering Up Britain announcements outlined ambitions to secure energy independence and security, and diversify and decarbonise UK energy production. Despite this, the Climate Change Committee (CCC) has echoed calls from across the low carbon sector that highlight the oversaturation of strategies, promises and commitments, and a lack of action to deliver these. “Genuine leadership” has been seen as leaders seek to embrace a Net Zero future, but “Ministers seem less willing to put that programme at the centre of their stated aims”.

The CCC’s Annual Progress Report has outlined the need for greater focus on delivery of climate ambitions to reinstate the UK as a “credible, impactful climate leader on the international stage”, delivering real-world action and advancing progress on initiatives. Progress has been noted to be too slow in multiple areas of policy, including hydrogen storage, greenhouse gas removal and carbon capture and storage (CCS). The rollout of low carbon heating systems has also been a key theme in the report, with the rollout of heat pumps at just one-ninth of the 600,000 yearly installations needed by 2028. The report has highlighted the CCC’s weakening confidence in the UK hitting its medium-term Carbon Budget Delivery Plan targets. The Government must take this seriously and raise the pace for the delivery of overall Net Zero initiatives.

However, whilst it is evident that the UK has a long way to go, there have been numerous indicators of progress across the industry. Electric car sales have continued to grow ahead of the CCC’s pathway, and there has been a positive increase in the UK’s renewable energy capacity. Despite this, action is still significantly off track in a range of areas, and progression cannot wait until the next election.

## Comment from Ilias Vazaios (Low Carbon Director)

*“The path to net zero requires more than just good intentions and ambitions, as emphasised by the Climate Change Committee’s progress report to Parliament. It is tangible action through policies and their successful delivery that truly demonstrates our commitment, and it is crucial to accelerate our efforts. This is particularly pivotal in decarbonising buildings, where the CCC’s message should serve as a wake-up call, urging us to expedite our efforts and deliver the necessary mix of low carbon heat technology and efficiency measures to make up for lost time. I anticipate that our industry partners will share the same sentiment and engage in discussions to support the Government in accelerating our collective efforts.”*

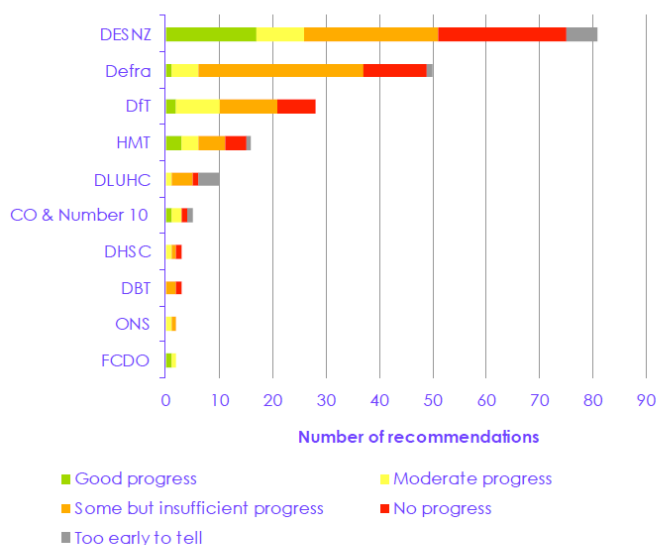


# PROGRESS AND AMBITION

Back in March this year, commitments were made by the Government to accelerate the deployment of renewables, reduce the UK's reliance on fossil fuels to heat buildings, decarbonise transport, and reduce household bills by increasing the energy efficiency of the UK's extensive building stock. The Great British Insulation Scheme (formerly ECO+) was designed to upgrade the country's least energy efficient homes and help a wider range of households, including aiding the able-to-pay sector. The Government also unveiled its ambition to phase out all new and replacement natural gas boilers by 2035, although a concrete date for the phase out of 100% of fossil fuel boilers has still not been set. Commitments were also made to deliver a hydrogen economy, provide more funding for heat network deployment, and invest more into electric vehicle charging infrastructure. Greater focus was further placed on delivering the skills needed to transform the UK into a Net Zero powerhouse.

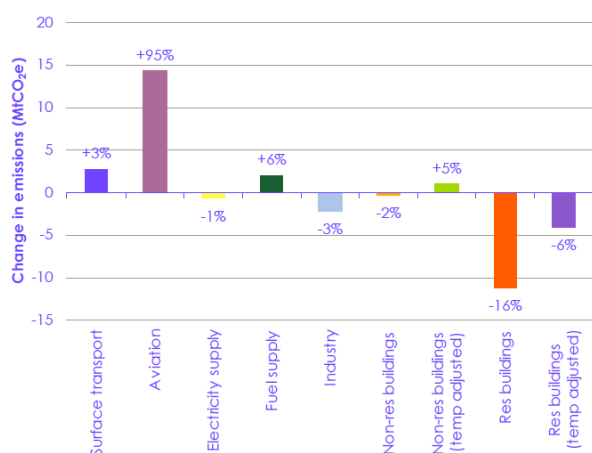
The CCC's report is clear that not enough progress has been made to implement these commitments. The UK's greenhouse gas emissions are now 46% below 1990 levels, currently 9% below pre-pandemic levels. In addition to this, surface transport emissions are 8% below pre-pandemic levels, and since 2022, there has been a 16% decrease in emissions from homes. This headline decrease was largely due to a relatively mild winter in 2022, and readjusting for this factor reduces the decrease in home emissions to just 6%.

b) All recommendations



Source: CCC analysis.  
Notes: Some recommendations are not scored. See the supplementary material for our assessment of each individual recommendation.

Figure 1 Change in UK emissions for key sectors (2021 to 2022)



Source: DESNZ (2023) Provisional UK greenhouse gas emissions national statistics 2022; BEIS (2023) Final UK greenhouse gas emissions national statistics: 1990 to 2021; CCC analysis.  
Notes: Global warming potentials from IPCC AR5 without feedback are used. Provisional 2022 estimates are not made for non-CO<sub>2</sub> greenhouse gases, so the change in 2022 agriculture emissions is not shown.



It is clear that there has been some progress shown against the CCC's recommendations last year, but this has largely been insufficient. In particular, no progress was made in introducing clear, implementation focused policy to ensure owner-occupied homes reach a minimum energy performance of EPC C by 2035, on publishing a long-term strategy for electricity decarbonisation, or on funding mechanisms to support the costs of electrification in manufacturing.

There are a diverse range of additional policy recommendations that the CCC has put forward this year, and the Committee has been keen to stress that the UK cannot afford to put forward further proposals without a focus on how these will be actioned and delivered.



# ENERGY EFFICIENCY

Comment from Ben Madden (Senior Consultant)

*“The CCC’s evaluation of progress in this sector echoes Gemserv’s continued messaging to government. As industry and Gemserv have repeatedly noted, consistent policy direction and clear ambition is critical to achieving the long-term step-change in scale required to achieve net zero in this sector, but both remain elusive. While the contributions of targeted government schemes are recognised, the CCC notes concern about the rate of low-carbon heating technology installations, policy gaps for non-residential buildings, and the recurring issue of affordability of measures. Gemserv continue to drive the message of urgency through our industry Trade Associations, and provide assistance for accelerating retrofit, building decarbonisation, develop affordability offerings and promote proper accreditation through our work across the sector.”*

## SUMMARY OF PROGRESS

The CCC supports the upcoming changes to regulation including the implementation of the Future Homes Standard and the Government’s commitment to banning off-gas grid boilers. However, there is also a sense that the current pace of decision making is not fast enough to deliver Net Zero commitments. The slow decision making is reducing confidence in the industry and creating uncertainty on how homes and businesses are best to retrofit along with uncertainty in investment decisions in skills and building supply chains.

The CCC also point to the need to give greater attention to policy gaps relating to non-residential buildings and the lack of an effective plan for decarbonising commercial buildings.

Despite the Government detailing its ambition to decarbonise our buildings in 2021’s Heat and Building Strategy, the CCC’s Progress Report notes that all major progress indicators are falling behind, with the possible exception of overall emissions reductions. However, the CCC also note that this is likely to be a consequence of high energy prices and milder than usual weather. Temperature adjusted emissions show a decrease of 6% in residential buildings, but an increase of 5% in non-residential. It is further noted that reductions in emissions and energy use are unlikely to continue without further policy interventions.

Progress reported for specific indicators are as follows:

- Despite an increase in funding available for socially-owned homes, actual numbers of installations have not yet increased, and installations under ECO also lag behind the CCC’s pathway expectations with each iteration of ECO delivering reducing measures, and ECO4 starting slowly.
- The installation of low carbon heating measures also remains well below the balanced pathway, which expected 130,000 heat pump installations, but reported 69,000. The target for 2023 increases to 145,000, more than double the reported installations in 2022.
- Additionally, the uptake of energy efficiency measures remains slow, especially in the owner-occupied and private-rented sectors, despite the energy crisis providing increasingly clear incentive to retrofit properties.



- Public sector and commercial buildings also require an increase in the uptake of fabric energy efficiency improvements.
- Finally, it is evident by the number of heat-pump installers trained in 2022 that development of suitable workforce for the net-zero transition is not progressing at a rate suitable to meet the CCC’s pathways.

The CCC also reports that 77% of building related emissions in the 6<sup>th</sup> Carbon Budget are judged to be “at significant risk, or with insufficient plans”, highlighting the policy gaps in this sector. It is also judged that the greatest policy gap is in dealing with energy efficiency in non fuel-poor homes. For each sector, a number of specific recommendations have been set out to address the evident policy gaps, which we have summarised below.

## RECOMMENDATIONS

The CCC report classes energy efficiency improvements to existing buildings as a “no-regret” option for the decarbonisation of buildings. The CCC identifies the role of behaviour change and access to energy efficiency in homes as well as the need to speed up uptake in non-residential buildings.

As a priority the CCC urge the Government to respond to the 2020 consultation on requiring that homes in the Private Rented Sector (PRS) meet an EPC C by 2028 as a step towards implementing these plans.

A comprehensive home energy retrofit scheme is also required to provide long term funding for consumers and supply chains and support the installation of energy efficiency measures. It is also necessary to consider a whole building approach that will be effective across multiple building archetypes, including those that are traditionally difficult to retrofit, such as large blocks of flats.

POLICY AREA	ACTION	DATE
New homes	Launch the consultation on Future Homes Standard to ensure that new buildings are resistant to the impacts of climate change.	2023
	Consider committing to ending new connections to the gas grid for new homes.	2022
Energy Efficiency in non fuel-poor homes	Respond to the consultation on Minimum Energy Efficiency Standards in the Private Rented Sector (promised by the end of 2021).	2023
	Focus on investment to reduce energy waste to increase resilience to energy price spikes, rather than simply support consumers and transferring risk to the Treasury.	N/A
	Publish a response to mortgage lenders EPC disclosure consultation.	2023 - <b>overdue</b>
Energy Efficiency in fuel-poor homes	Identify and address issues within ECO4 to ensure that it delivers the target number of measures, and set an end date for gas boiler installations under the scheme.	2023
	Set a long-term, regulatory standard for homes to reach EPC C by 2028.	2023



	Confirm the proposed regulatory mechanism for phasing out fossil fuel boilers (overdue – priority recommendation in 2022).	2023
Public Buildings	Create a policy commitment that continues beyond 2024/25 to allow a significant ramp-up in investment, and meet the government’s 2037 ambition of 75% reduction in emissions (2017 baseline).	2023
	Respond to consultation on the implementation and trajectory of the EPC B target in the non-domestic private rented sector (consultation closed 2021).	2023
	Finalise and implement plans to prohibit fossil fuel heating in off-gas-grid buildings from 2026.	2023 - <b>overdue</b>
Commercial Buildings	Develop and consult on policies for delivering energy efficiency and low-carbon heat in owner-occupied commercial buildings, including proposals to require a minimum EPC rating.	2023
	Implement the performance-based rating scheme for offices and publish timelines for other building types, outlining how timelines correspond to the expected emissions reduction trajectory of commercial buildings in the 2020s.	2023



# HEAT NETWORKS

## Comment from Rosie Knight (Senior Consultant)

*“We know that heat networks are essential to meeting the UK’s net zero targets and we agree with the CCC that more needs to be done to encourage investment into the sector. We’re hugely excited to be involved in the Government’s Heat Network Transformation Programme which was praised by the CCC today. The extension of funding enables the pace of installation the CCC has encouraged. The GHNF incentivises the market to transition to low carbon heat sources for heat network projects, while the HNES ensures that there is funding available for optimising existing, poorly performing heat networks; crucially reducing customer detriment. It is positive to see this section ranked as green until 2028, undoubtedly due to the additional funding announced earlier this year.*

*Importantly, we noticed an omission in the report which will be critical for the sector the Heat Network Technical Assurance Scheme (HNTAS). Although not referenced in the CCC progress report, this piece of works aims to ensure a minimum level of performance and reliability for heat networks. This is essential to improve affordability and customer experience, whilst increasing investor confidence, which will be key to enable the rapid rollout that we so crucially need.”*

## SUMMARY OF PROGRESS

The heat network industry has received much needed certainty from the Government through funding and legislation that must be replicated in other sectors. The technology is “mature, safe and reliable”, providing a strategic solution to decarbonise heating across the country at scale. A confirmed extension to the Green Heat Network Fund, and the additional funding to improve existing heat networks through the Heat Network Efficiency Scheme has been welcomed by the CCC’s Progress Report. This decisive action and confirmed funding have provided clarity for heat networks, and encouraged public, private and third sector applicants to implement the technology to decarbonise homes.

Stronger regulatory frameworks need to be in place, and the highly anticipated Energy Bill will empower Ofgem to regulate heat network zoning by 2025. The Government must now act to pass legislation that will enable them to “make regulations to implement heat network zoning in England”, providing the ability to identify areas where heat networks will provide the lowest cost, low carbon solution for decarbonising home heating.

Additional funding through the Government’s Heat Training Grant will support trainees to undertake short training courses relevant to installing heat networks, and with the technology still in its infancy in the UK, this will be warmly welcomed across the industry. The CCC is clear within their report that policymakers must back heat networks as a proven technology, foregrounding them in areas where communal heating is the best option to help contribute to Net Zero targets. Whilst reference is made to these heat networks providing a limited potential for the role of hydrogen in the longer term, it is stated that the technology could largely be powered electrically. Waste heat also has a role to play in the development of heat networks, but this is highly location dependent.





The report also referenced the crucial element of energy bills for those on heat networks, and how consumers on these are not currently protected by the energy price cap. Whilst it is expected that the Energy Security Bill will address this, greater support must be placed on heat network storage and flexibility which can support lower cost energy systems.

The ongoing issue of high capital costs for large infrastructure projects was referenced, alongside implementation difficulties in practice. In Denmark, 65% of homes are already connected to a heat network. For the UK, heat networks are progressing well, however, in a country largely dependent on gas, continued focus on ensuring new and existing networks are low carbon should be a priority.

## RECOMMENDATIONS

POLICY	ACTION	DATE
Cross-cutting: Buildings; Electricity supply	Developing a clear process and legislation to implement heat network zoning across local, regional and national levels.	Q1 2024
Buildings: Low-carbon heat	Foreground heat networks by setting out clear routes for properties and areas where heat networks present the lowest cost, low carbon option for decarbonisation.	2023
Heat Network implementation	Heat networks must begin to be installed at pace, with the Government encouraging the industry to invest and roll them out quicker.	N/A
Heat Network Policy	Clear policies must be developed to prohibit the creation of high-carbon networks which do not draw on public funds. Progress on low carbon heat networks has been made by requiring new GHNf projects to use low carbon sources.	N/A



# HEAT PUMPS

## Comment from Samantha Shea (Head of Policy Insights and Engagement)

*“It is clear to anyone involved in the heat pump sector that deployment rates are lagging behind what is needed. The report sets out clear recommendations for the Government to take forward. There has been some progress over the past year and if these actions are implemented, we could see a significant ramping up of the industry with investment in manufacturing and upskilling across the supply chain.*

*Awareness of heat pumps and consumer experience has increased but more needs to be done to promote this established technology if we are to catch up with some of our European neighbours.*

*Big decisions need to be made by the Government and policies must be put in place over the next year if we are to meet the 2028 target. We’re excited to be working across the heat pump sector to enable this transition.”*

## SUMMARY OF PROGRESS

The CCC’s report is clear that “the UK is not currently on track to hit” the 600,000 yearly installation target by 2028. It has been noted that “supply chains for electrified heat are weak and growing slowly” and heat pump installations across the UK must rise “nine-fold in six years” to catch up with targets and the rest of the world. Ongoing uncertainty in the heat pump sector is concerning and stalling progress, and heat pumps must be backed and invested in to roll them out at pace.

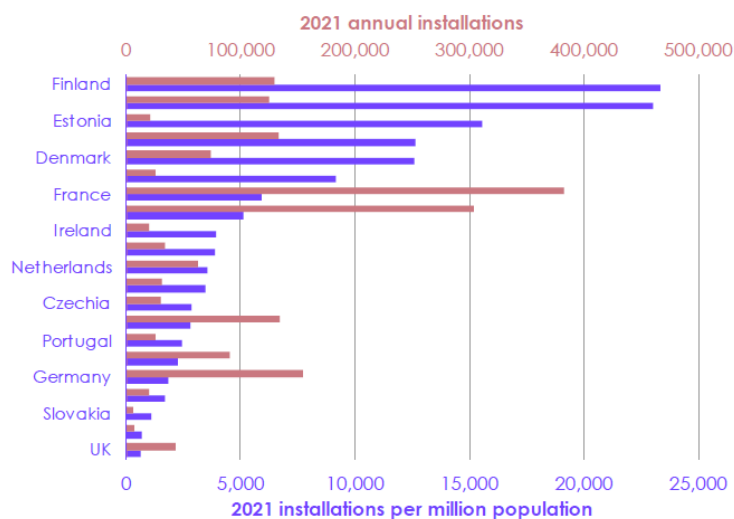
Slow rollout can be put down to the lack of trained engineers for the future heat pump workforce, the high upfront installation costs that are in fact growing rather than falling, limited and insufficient finance options for consumers to cover these costs, and the small growth of key component imports. Limited progress has been made under these metrics, whereby the Government “has not sent clear signals about its intentions for low carbon heat... nor has it done much to engage the public about the issue.” The House of Lords Environment and Climate Change Committee’s inquiry on the Boiler Upgrade Scheme earlier this year provided scathing analysis that the consumer funding scheme for heat pumps was failing to deliver, with slow uptake attributed to insufficient funding availability for individual installations, and a lack of consumer awareness of both the scheme and heat pump technology itself.

Demand for heat pumps is high, and the systems are proven to be a well-established, effective heating technology. The CCC was keen to point out recent and ongoing research by organisations such as Nesta that prove consumers are largely satisfied with their heat pump systems, with running costs noticeably reducing. However, running costs continue to be a major issue for the rollout of heat pumps across the UK, and the Government must address this.



The report highlighted that “manufacturers, installers, importers and others” are holding back UK heat pump investment and making decisions surrounding this due to a lack of clarity from the Government and evidence that they can help markets scale up. The current small cohort of trained heat pump installers is oversubscribed, and delays are casting doubt over the UK’s ability to deliver heat pumps at scale. Central to calls from the CCC is the urgent need to reform energy markets to make heat pumps a more attractive and viable option for consumers, ensuring they will be cheaper to run than gas boilers in all cases, and doing this through the rebalancing of energy levies.

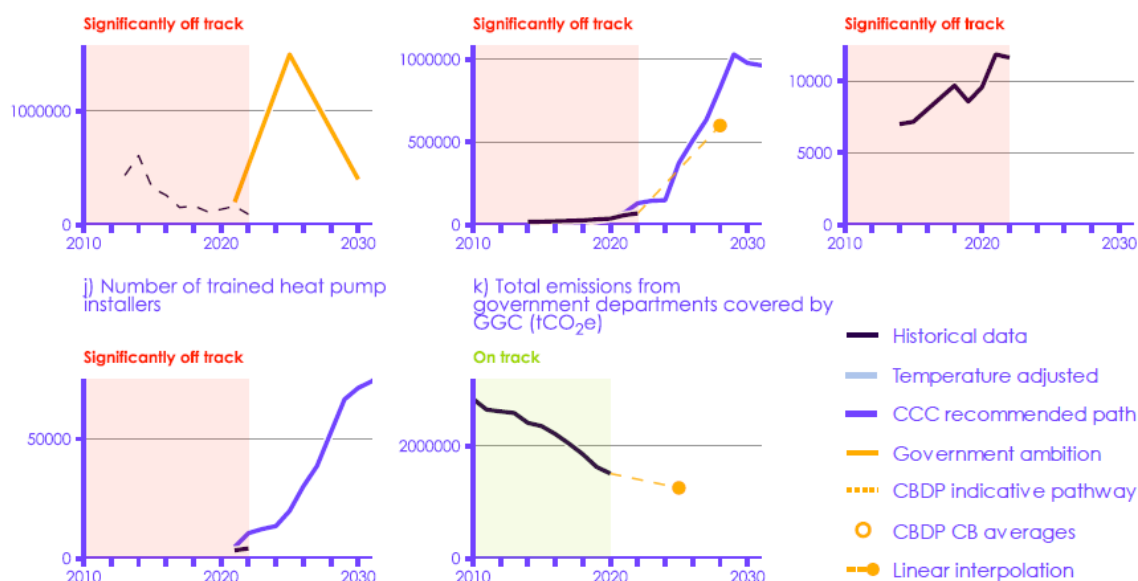
Figure 5.4 Heat pump markets in Europe (2021)



Source: EHPA (2023) *European Heat Pump Market and Statistics: Report 2022*; UN (2023) *2022 Revision of World Population Prospects*.  
 Notes: Installation numbers are for 2021, population estimates are from 2022.

It was recommended that the Government also publish targets for the rollout of heat pumps from now until 2037 that “do not use F-gases as a refrigerant and set out how the Government plans to meet these targets”. More importantly, the 2025 Future Homes Standard consultation must be launched, and a committed date must be placed to end connections to the gas grid for new homes. The Clean Heat Market Mechanism “may help some smaller commercial buildings” too, although the majority of non-residential buildings will not be covered under the scheme in its current form. The Heat Training Grant will help to support trainees undertaking courses relevant to install heat pumps, and this is welcome.

Heat pump installations rose in 2022, although compared with the CCC’s pathway, this is still significantly below required levels. 72,000 new systems were installed in 2022, and yet the CCC’s “balanced pathway projected 130,000 installations [the same year], rising to 145,000 in 2023.” Figures also found that “the average cost of installing a heat pump in a home fell by 1.9% in 2022” and although the cost of the heat pump itself fell by 6.7% last year, this was overshadowed by the rising costs for components and labour. The UK has ranked last place for per-capita installations of heat pumps last year in comparison to neighbouring countries. Recommendations must be acted on immediately and in full to catch up with our European and global counterparts.



Source: Refer to the Monitoring Framework, available on our website, for full documentation on the CCC's indicators, including historical data sources and data gaps.

Reference has also been made to the Electrification of Heat Demonstration Project solidifying heat pumps as a suitable option for most property types, with an expectation that up to 74% of homes will receive the systems by 2050. Despite earlier reference to the role hydrogen-ready boilers can play in the decarbonisation process, other options are becoming available for home heating, including compact hybrid heat pumps. The Government must clarify their position on hybrid heat pumps and “the role they will play within the clean heat market”.

## RECOMMENDATIONS

POLICY	ACTION	DATE
Buildings – Low-carbon heat	“Monitor the impact of the Clean Heat Market Mechanism and evaluate its effects on deployment of heat pumps and development of supply chains. Develop contingency plans for other interventions should progress prove insufficient, and develop further options for incentivising uptake of heat pumps beyond the lifetime of the Market Mechanism”.	Early 2025
Buildings – Low-carbon heat	Heat pumps must be cheaper than gas boilers, and this can be done through removing market distortions in the form of energy price levies and wider improvements to “pricing mechanisms in the electricity market”.	2022 - <b>Overdue</b>
Buildings – Low-carbon heat	Funding support must be improved for hybrid heating systems to help consumers access them, especially in scenarios where a direct switch to a heat pump may not be feasible. The view must be that all households must be aided to help transition to technologies which provide 100% low carbon heat.	2024



Buildings – Progress monitoring and data	A framework must be published to help track the delivery of the Heat and Buildings Strategy, helping to track the supply of heat pumps in key areas.	2023
F-gases: F-gas technology replacement	The Government must publish targets for the roll-out “from now until 2037 of heat pumps that do not use F-gases as a refrigerant and set out how the Government plans to meet these targets.”	Q1 2023 - <b>Overdue</b>



# HYDROGEN

## Comment from Clare Jackson (Head of Hydrogen)

*“The CCC’s recommendations on hydrogen will be largely welcomed by an industry that is waiting for government to finalise funding mechanisms and allocate funding to unlock the first projects. The recognition that government is not moving fast enough on business models for transportation and storage will also be welcomed as it remains a key concern for industry that infrastructure won’t be ready in time. The CCC’s circumspect views on the use of hydrogen in the decarbonisation of buildings will likely be a cause for concern for those parts of the sector that are developing solutions in this area.”*

## SUMMARY OF PROGRESS

Overall, the CCC do not believe that enough progress has been made against hydrogen and more clarity is needed to ensure that enough hydrogen is produced, it is used in the most appropriate sectors and action in other sectors is not delayed. Since the last progress report, the following developments have been made:

### Transport

- £140 million Zero-Emission Road Freight demonstration competition, which ran from August-October 2022.
- A Hydrogen Transport Hub competition was launched in October 2022, with £20 million in funding for projects using hydrogen in transport in the Tees Valley.

### Heat

- Legislation which will enable neighbourhood and village-scale trials of hydrogen for heat in 2024 and 2025 is progressing. The neighbourhood-scale trial in Fife is running two years behind schedule and is now on track to start in 2024.
- A consultation on boiler standards and efficiency has been launched which includes a section to develop policies for hydrogen-ready boilers.

### Industry

- In October 2022, the first window of the Phase 2 funding rounds for the Industrial Energy Transformation Fund (IETF) was launched, and the winners have been announced. The IETF has been extended, with a further £185 million available in Phase 3, starting in 2024.
- The Net Zero Innovation Portfolio has progressed innovation in industrial hydrogen use across four competitions.
- A hydrogen-ready industrial boiler equipment external research study has been published as well as a summary of responses to the consultation.
- The £26 million Industrial Hydrogen Accelerator (IHA) has funded nine feasibility projects.
- Phase 2 of the Industrial Fuel Switching (IFS) competition (£55 million) has progressed 21 Phase 1 feasibility projects.
- £19 million has been awarded across five projects of the Low Carbon Hydrogen Supply 2 competition – Stream 1, Phase 2. These include dispersed industrial sites and off-road mobile machinery projects.



## Power

- Government have announced intention to consult on the need and potential design options for market intervention to support hydrogen to power in 2023.

## Hydrogen Supply

- An update to Hydrogen Net Zero Investment Roadmap was published in April 2023. The roadmap presented the pipeline for hydrogen projects, with the potential capacity totalling around 20 GW in 2030.
- The Energy Bill, which is currently being debated in Parliament, contains provisions to underpin delivery of low-carbon hydrogen production.
- The Government has published the Heads of Terms for the Hydrogen Production Business Model (HPBM) contract and a consultation on proposed regulations in relation to the HPBM.
- £19 million of funding has been awarded across five successful projects of the Low Carbon Hydrogen Supply 2 competition.
- The first winning projects from the Net Zero Hydrogen Fund strands 1 and 2 have been confirmed. Nearly £38 million will be allocated to support development and deployment of low-carbon hydrogen production across 15 projects.
- The Government has committed to develop a hydrogen production roadmap during 2023 on scaling up production and supply chains.
- In July 2022, the first electrolytic hydrogen production allocation round was launched, and a shortlist of projects was announced in March 2023, expecting to award contracts totalling up to 250 MW of capacity. A second allocation round is expected by the end of 2023 with the intention to move to price competitive allocation in 2025.
- A consultation on business models for hydrogen transport and storage infrastructure was published in August 2022, with final models to be developed by 2025.
- The Government has announced plans to develop a certification scheme for low-carbon hydrogen, to be introduced by 2025.
- Jane Toogood was appointed as the UK’s Hydrogen Champion in July 2022. This position has been extended for six months until July 2023 and will build on recommendations set out in the Hydrogen Champion’s Report.

## RECOMMENDATIONS

POLICY	ACTION	DATE
	Narrow the scope of the strategic decision on hydrogen heating prior to 2026 by:	
Hydrogen’s role in heat	<ul style="list-style-type: none"> <li>- Publicly affirming that electrical heat is the default option in all new buildings and existing properties off the gas grid.</li> <li>- Prohibiting connections to the gas grid for new buildings from 2025.</li> <li>- Setting out clear routes for other properties or areas where electrification or heat networks represent low-regret options.</li> </ul>	2023



- Clarifying the Government’s position on the economy-wide priority of use-cases for hydrogen – in particular, its potential to help manage peak demands for both heat and electricity, and its role in hybrid heating systems.

Electricity supply strategy	Publish a comprehensive long-term strategy for the delivery of a decarbonised, resilient, power system by 2035. This should comprise a variety of low-carbon flexibility options, including hydrogen. It should set out how the low-carbon flexibility required to replace unabated gas will be delivered (12-20 GW of low-carbon dispatchable capacity by 2035). This must set out plans and contingencies for addressing key risks on a co-ordinated basis.	2023
Role of FSO, Ofgem and Ministers	Clarify urgently and formalise the institutional responsibilities of the FSO, Ofgem and Ministers, for strategic planning and delivery of a decarbonised, resilient energy system.	2023
Infrastructure investment	Identify a set of low-regret electricity and hydrogen infrastructure investments that can proceed now. Either prior to, or as part of publication of the cross-sectoral infrastructure strategy, identify on a whole system and economy-wide basis which areas are unlikely to be suitable for hydrogen alongside potential candidate areas for hydrogen. This should be used to inform a set of low-regret investments that can proceed immediately.	2023
Hydrogen village trials	Provide publicly visible Government support to the hydrogen village trials. Assist local authorities in their role, help to address public concerns and deliver community backing for the trials, including through direct involvement in public engagement if requested.	2023
Hydrogen transport and storage plan outside of clusters	Publish a plan for distribution and storage of hydrogen outside clusters.	Q1 2023
Decarbonisation readiness of electricity generation	Ensure new gas plant are genuinely CCS and / or hydrogen-ready as soon as possible and by 2025 at the latest.	2025
Energy and CO <sub>2</sub> distribution strategy	Develop a long-term cross-sectoral infrastructure strategy to adapt and build, respectively, the distribution of liquid and gaseous fuels, electricity, CO <sub>2</sub> and heat networks over the next decade. It must have a view to facilitating Net Zero while ensuring climate and weather resilience. A key aim should be to inform and narrow the decision space for future decisions on hydrogen use.	2025
Hydrogen production target	Government should clarify its 2030 10 GW hydrogen production commitment in TWh/year and review whether this target is sufficient to meet future demands. Pending the outcome of this, strategic decisions may	2023





be needed around the scale of hydrogen use across sectors, or to adjust the level of the target.

Hydrogen funding	Finalise funding mechanisms and allocate funding to support the development of 10 GW of low-carbon hydrogen production by 2030, ensuring these are designed to limit residual and upstream emissions, but also reflect hydrogen costs in a way that does not bias towards hydrogen where electrification is competitive.	2023
Hydrogen transport and storage business models	Accelerate the development of new business models for hydrogen transportation and storage infrastructure, with a view to keeping options open for larger scale hydrogen use by 2030.	2023
Heavy duty transport infrastructure study	Produce an infrastructure strategy that sets out how the transition of heavy-duty vehicles to ZEVs will be enabled. The strategy should consider options for depot charging, en-route ultra-rapid charging and hydrogen refuelling infrastructure.	2024
Aviation innovation funding	Continue innovation and funding for aircraft efficiency measures, hybrid, full electric and hydrogen aircraft development and airspace modernisation.	Ongoing
Wales industrial decarbonisation	Continue to work with the UK Government on industrial decarbonisation in Wales, formally requesting some specific support measures, including for the adoption of CCUS and hydrogen in the South Wales Industrial Cluster.	Ongoing



# TRANSPORT

## Comment from Jon Regnart (Senior Consultant)

*“The continued growth of electric vehicle (EV) car sales despite economic difficulties for consumers reinforces that EVs play a central role for transport decarbonisation. The policy recommendations and progress report published by the Committee on Climate Change today reflects the maturity of the market. The key theme underpinning all the recommendations was ensuring EVs are cost effective for later adopters. Whether that’s through incentivising smaller, more cost effective BEVs, promoting the creation of a second-hand EV market and ensuring public charge points are affordable and accessible for a broad range of consumers.*

*With good progress made on cars, the CCC rightly turns their attention on heavier vehicles such as vans and heavy goods vehicles. EV adoption has been slower in these sectors, owing to different usage and purchasing habits vs car owners. Creating a heavy goods vehicle focused infrastructure strategy, that outlines the potential role of both BEV and FCEVs, will be crucial in providing further confidence to the market.”*

## SUMMARY OF PROGRESS

The CCC’s confidence in the Net Zero transition in the transport sector has increased in the short-term, largely because of growth in the sales of electric vehicles. However, slow policy progress risks holding back decarbonisation, as credible policies are only in place to meet 38% of the required emissions reduction by the Sixth Carbon Budget period. Delays to key policies also increase delivery risks.

The level of progress has varied across the following key indicators that are crucial to the overall decarbonisation of the sector:

**Emissions.** Surface transport emissions increased by 3% in 2022 as travel demand continued to bounce back after the COVID-19 pandemic. However, emissions remain 8% below pre-pandemic (2019) levels, primarily driven by changes in car-kilometres during and following the pandemic, with only a marginal impact from the uptake of electric vehicles. Aviation emissions almost doubled in 2022 as the sector rebounded following the pandemic but remained 25% lower than in 2019.

**Zero-emission vehicle (ZEV) markets.** Over the last year, the market share of electric cars continued to increase ahead of the CCC Balanced Pathway assumptions. 17% of new car sales were BEVs in 2022, four percentage points ahead of the CCC’s pathway. Availability is also increasing in the used car market – the supply of used EVs available for purchase has risen by 270%, while average prices have fallen by 15% in the past year. Given that there are typically 3-4 times as many used car transactions as new car sales each year, it is vital that this trend continues.

**EV charging networks.** While the fast uptake of EVs is promising, there are slower signs of progress for crucial enablers, in particular, EV charging infrastructure. The UK’s EV charging network has expanded by almost one-third over the past year, but provision remains geographically inconsistent and there are concerns around the reliability and cost of chargepoints. The rate of chargepoint deployment will need to more than double in the coming year and beyond to ensure charging provision keeps pace with EV uptake.



**Zero-emission vehicle policy.** Successfully delivering on the 2030 phase-out of new conventional car and van sales is vital to meeting the transition pathway for the transport sector. The final consultation on the zero-emission vehicle (ZEV) mandate was published in March. The CCC regards this as a ‘credible policy’ will require manufacturers to sell a rising proportion of ZEVs up to 2030. The Government must now work at pace to ensure that it is implemented from 2024 as planned.

**Road transport demand.** The number of kilometres driven by road vehicles was 21% higher in 2022 than in 2020 as travel restrictions were lifted following the pandemic, but is still around 5% below pre-pandemic levels. The Government has made no progress on the CCC’s recommendations on clarifying the role that car demand reduction has to play in reducing transport emissions. Compared to the CCC’s pathway, car demand is on track for now, but there is a significant risk that this will fall off track, without sustained policy action to reduce the need to travel by car or grow the availability and attractiveness of alternative lower-carbon modes.

**Modal shift.** Switching to lower-carbon modes of travel, including active travel, public transport and shared mobility, is an important way of reducing car demand. There has been little progress on this to date, and this is exacerbated by concerns around public transport service provision, reliability and cost.

The Government’s Carbon Budget Delivery Plan (CBDP) requires a reduction in surface transport emissions of 58% (61 MtCO<sub>2e</sub>) by 2035, compared to 2022 emissions. There are several key barriers that must be overcome in order to achieve this level emissions reduction in the transport sector. These include:

- Delayed policy progress
- Public charge point deployment for EVs
- Concerns around reliability and cost of the EV charging network
- Affordability
- Lower than expected carbon savings from plug-in hybrids
- High electricity prices.

## RECOMMENDATIONS

The CCC has made a number of recommendations on how to achieve a successful Net Zero transition in the sector:

RECOMMENDATION	ACTION	DATE
Confirm proposals for a zero-emission vehicle (ZEV) mandate	The Government needs to respond to the final consultation and then set out details of the ZEV mandate in regulation. They need to do this imminently to ensure that the mandate is implemented from 2024 as planned. This should impose targets on manufacturers that are at least as ambitious as those in the Transport Decarbonisation Plan and should drive consistent growth in sales of EV cars and vans through the 2020s to meet the 2030 phase-out date.	Q1 2023 – <b>Overdue</b>
Establish mechanisms to monitor delivery against the ZEV mandate	This will enable early identification of areas where further policy support may be needed to address shortfall risks or harness opportunities to boost delivery.	Q1 2024



Accelerate rapid chargepoint rollout	Review and strengthen rapid chargepoint rollout plans on the major road network to 2035, so there are sufficient rapid chargepoints as EV uptake grows.	Ongoing
Bring in legislation requiring better standards for public chargepoints	Enact legislation requiring better reliability, accessibility, interoperability and ease-of-use at public chargepoints. This was committed to in the Government response to the consultation on the consumer experience at public chargepoints.	Q1 2023 – <b>Overdue</b>
Set out an ambitious definition for ‘zero emission capability’	This definition would determine which cars and vans will be permitted to be sold between 2030-2035. Ideally this should only allow fully electric vehicles, considering recent research showing the lower-than-expected carbon savings of hybrid vehicles.	2023
Increase standards for proposed CO <sub>2</sub> -intensity regulations for ZEVs	Make proposed CO <sub>2</sub> -intensity regulations for new non-zero-emission cars and vans more ambitious, thus ensuring that manufacturers are incentivised to reduce vehicle sizes and are not subject to perverse incentives that could restrict the availability of small EVs.	2023
Produce an infrastructure strategy for the transition of HGVs	Produce an infrastructure strategy that sets out how the transition of heavy-duty vehicles to ZEVs will be enabled. The strategy should consider options for depot charging, en-route ultra-rapid charging and hydrogen refuelling infrastructure	2024
Take action to reduce the cost of public charging	This should include reducing VAT on residential public charging. This is vital for drivers who do not have access to private off-street parking to make it more comparable to charging at home.	Q1 2023 – <b>Overdue</b>
Increase standards for proposed CO <sub>2</sub> -intensity regulations for ZEVs	Increase the ambition of the proposed CO <sub>2</sub> -intensity regulations for new non-zero-emission cars and vans, by ensuring that manufacturers are incentivised to reduce vehicle sizes and are not subject to perverse incentives that could restrict the availability of small EVs.	2023
Monitoring reliability of public chargepoints	Monitor the reliability of all public chargepoints, not just the rapid network. Consider options on how to intervene if reliability does not improve.	2024



# CIRCULAR ECONOMY

## Comment from Waco Yokoyama (Consultant)

*“Circularity is critical for the sustainable use and efficient management of resources. As we transition to a low carbon economy, we have the opportunity to proactively ensure that the new supply chain is circular, where materials are sourced sustainably, recovered, long lasting, and reusable. This means preparing the last stage of the supply chain in the first stage of design and production, turning a linear model into a cradle-to-cradle system. Unfortunately, progress is lagging behind with not enough awareness, infrastructure, collaboration and integration with wider decarbonisation schemes. We welcome the Climate Change Committee’s report which maps out the necessary infrastructure and policies required to improve the management of resources in the supply chains today and set out a sustainable ecosystem for the future. As we move towards a low carbon economy, we would like to see more engagement in the sustainable management of critical minerals and metals.”*

## SUMMARY OF PROGRESS

Policy progress in the waste sector has been insufficient and largely unchanged since the CCC’s last assessment in 2022. The 2023 Progress Report to Parliament introduces five emission hotspots within the waste sector - Energy from Waste (EfW), Recycling, Landfill, Wastewater and Carbon Capture and Storage (CCS) – and concludes that developments in any of these areas have been sufficient. Total emissions from the waste sector remained stable between 2020 and 2021 at 25 MtCO<sub>2e</sub> as falling emissions from landfills have been offset by a 5% growth in annual emissions from EfW plants. The continued growth in the use of EfW undermines efforts to reduce waste and focus on the circularity of materials. Evidence suggests that no notable progress is being made to cut emissions from EfW plants and that additional policies will be needed to cut emissions from this sector. However, progress in the CCS sector, where plans have been developed to install CCS technology in EfW plants, could reduce the amount of carbon emissions released into the atmosphere. Emissions from wastewater have also been increasing from 2020 to 2021. Although Ofwat has made some progress in defining how water companies will be assessed, the CCC has identified a significant risk that water companies might not prioritise decarbonisation matters. Furthermore, a firmer commitment on reducing waste going into landfills with a strong focus on stopping biodegradable waste from entering landfills is needed. While recycling rates in Wales and Northern Ireland have improved slightly, progress across England and Scotland has been stagnant over the past year with both countries being significantly off track to meet their respective recycling targets of 65% by 2035 (England) and 70% by 2025 (Scotland).

Some of the key developments over the past year have been outlined below:

1. Governments in the UK continue to work on developing disruptive reforms in the waste sector to support a circular economy approach. Collection and Packaging Reforms include policies such as the Extended Producer Responsibility for Packaging, a Deposit Return Scheme and binary recycling labelling to simplify the recycling process for end-users.



2. Residual waste in England has been set to reduce by 50% by 2042 compared to 2019 levels.
3. To prevent biodegradable waste from entering landfills from 2028 onwards, Defra has introduced a call for evidence to support the development of an action plan.
4. Defra will allocate £295 million of funding to Local Authorities in order to support the implementation of food waste collections and reduce the amounts of biodegradable waste diverted to landfills.
5. Defra and the Environmental Agency investigate the potential for improved methane capture methods at landfills and are working together to improve measurement systems.
6. The English Government has started developing plans to improve food waste reporting by large companies in 2022.
7. In December 2022, a detailed business model to support industrial CCS projects was published with two EfW plants being eligible and moving into negotiations. Together with waste collection and reduction reforms which should reduce the amount of plastic ending in EfW plants, this presents good progress in terms of reducing carbon emissions from the EfW sector.

## RECOMMENDATIONS

In general, a more holistic and strategic approach is needed to drive decarbonisation across the waste sector. As of now, efforts are largely concentrated on increasing recycling rates meaning that initiatives considering circularity and waste reduction are lagging behind significantly. An increased focus on resource efficiency, repair and reuse alongside recycling efforts is therefore needed urgently. To provide a comprehensive overview of areas that need to be addressed, the CCC has developed a waste monitoring map that sets out policies, enablers and outcomes required to achieve a 30% reduction of waste sector emissions by 2035. Resource efficiency policies such as product and material standards, producer obligations on reuse and recycling, mandatory reporting of food waste and an improved waste infrastructure form the basis of a successful transition. Landfill and plastic taxes, improved labelling and support for CCS in EfW plants represent some of the specific initiatives recommended by the CCC to drive change in the sector.

Finally, the recommended actions are expected to result in the following key outcomes that should enable the Government to meet targets set out for the waste sector:

1. Reduce waste arisings.
2. Phase out fuel exports.
3. Capture landfill gas to reduce methane emissions from landfills by 41% by 2035.
4. Stop sending biodegradable waste to landfills.
5. Reduce fossil fuel waste (incl. plastic) to landfill.
6. Capture EfW emissions to reduce total EfW emissions by 8% by 2035.
7. Improve wastewater to reduce wastewater emissions by 19% by 2023.



An overview of policies required to achieve these outcomes and their respective timelines are outlined in the table below:

POLICY/ TARGET	ACTION	DATE
Waste prevention	Implement Extended Producer Responsibility, Deposit Return Scheme and consistent collections of waste. Consider that the industry and Local Authorities will need time to prepare for upcoming changes.	Q1 2024
Landfill and waste prevention	Provide clarity on how the £295 million capital funding will be allocated to Local Authorities in order to prevent food waste. Furthermore, describe additional policies needed to prevent biodegradable waste from going into landfills.	Overdue
Landfill and waste prevention	Introduce mandatory food waste reporting for large businesses and include recommendations to improve methane capture at landfill sites in forthcoming addendums.	2023
Cross-Cutting	Develop a plan to reduce emissions from the waste sector that sets out details on how policies are expected to reduce emissions in line with emission pathways, the Sixth Carbon Budget and Net Zero strategies. Strengthen efforts on <b>waste reduction and circularity</b> alongside policies aimed at improving recycling rates.	2023
Infrastructure	The National Planning Policy Statement has not been updated since 2014. The CCC recommend reviewing this document to ensure the infrastructure is capable of meeting recycling aims and decarbonisation targets.	2023
Infrastructure	Residual waste treatment capacity requirements need to be assessed up until 2050. Estimated capacities should be consistent with existing recycling and waste reduction targets and consider projected improvements in resource efficiency.	Overdue
Market Conditions	Describe how incentives to reduce waste and increase recycling rates are effective in reducing carbon emissions across the waste sector. This should be addressed in addendums published later this year and include the pricing of materials as well as waste management solutions.	2023
Waste prevention	Assess the behavioural changes needed to reduce (food) waste and increase recycling rates from an end user perspective. Relevant behavioural changes should be included in waste strategy papers published later this year.	2023



# GREEN SKILLS

## Comment from Will Taylor (Senior Consultant)

*“It is encouraging to see that delivering Net Zero continues to be a source of jobs growth in the UK. We know that the Net Zero transition will drive skilled jobs and economic growth across a range of sectors. However, it’s concerning to see that progress on skills continues to fall behind what’s required to meet Net Zero.*

*We welcome the recommendations in the report requiring a detailed action plan and evidence on green skills. The Committee rightly suggests they should sector and skills gap specific to support the training and development for specific job roles and address key barriers to entry.*

*To have the impact required, these recommendations must be supported by local input from employers and training providers who will be critical to delivering and implementing them as well as by increased funding for education and training to support their rollout. Remaining competitive in terms of the skills and workforce for net zero is critical to implementing the technologies and systems to decarbonise the economy and deliver economic growth. “*

## SUMMARY OF PROGRESS

Green skills is a sector that needs urgent action in order to meet the UK’s Net Zero ambitions. The sector has cross-cutting implications on all other sectors of the transition, so slow progress in this area poses a risk to the attainment of Net Zero targets across the board.

Currently, progress in the green skills space is **off track** for achieving Net Zero. In particular, the CCC has warned that there are insufficient plans in place in terms of the ambition and timelines required in the green skills sector to facilitate Net Zero. Progress is being made in specific areas, but a lack of clear strategy means that overall change is slow and fragmented. Clearer plans are needed from government to harness the potential of the transition and manage its risks. Without a clear strategy, there is also a risk that the UK will miss out on the opportunity for economic growth and employment in key sectors to competition from overseas. For instance, the US and EU have both produced comprehensive strategies in this area already, set out in the US Inflation Reduction Act and EU Green Industrial Plan.

Moving forward, there is potential for the Net Zero transition to create more jobs than will be lost. Between 135,000 and 725,000 net new jobs could be created by 2030 in low-carbon sectors, such as buildings retrofit, renewable energy generation and the manufacture of electric vehicles. However, as previously noted, this is contingent on having a clear green skills strategy in place.





Broadly speaking, there is expected to be increased employment in growth sectors and a decrease in phase-down sectors. Low Carbon and Renewable Energy Economy (LCREE) employment across the UK grew 16% from 207,800 in 2020 to 247,400 in 2021, representing the largest year-on-year increase recorded. Over the same period, total UK employment only grew by 6%.

There are a number of key barriers in this sector that need to be overcome to reach Net Zero:

- Lack of clear strategy from government
- Inadequate supply of skilled workers
- Lack of long-term certainty around investment incentives and sector demand
- Competition from overseas
- No consistent UK-wide evidence is available for monitoring progress on green skills
- Low levels of diversity in the Net Zero workforce
- Potentially disruptive impacts for some communities (i.e. job losses).

## RECOMMENDATIONS

POLICY	ACTION	DATE
Action Plan for Net Zero Skills	Government must publish an evidence-based Action Plan for Net Zero Skills that includes a comprehensive assessment of when, where, and in which sectors there will be skills gaps specific to Net Zero. Scotland and Wales have already published their own versions.	2022 – <b>Overdue</b>
Detailed roadmap for skills standards, frameworks, and qualifications	Government should publish a detailed Net Zero skills roadmap, outlining the relevant skills standards, frameworks, and qualifications that need to be developed or updated, including a delivery timeline	Q1 2024
Produce a Net Zero and Nature Workforce Action Plan	This is due to be published in early 2024. It is important that Government considers the recommendations made by the CCC in their <a href="#">‘A Net Zero Workforce’</a> report when coming up with this plan.	Q1 2024
Prioritise key growth sectors	Government should focus attention within its action plan on sectors which will need to grow rapidly to support the transition, such as buildings and EV, and on sectors that have growth potential, but are exposed to international competition.	2022 – <b>Overdue</b>
Support for workers and communities in ‘phase down’ sectors	Government should assess the impacts for workers and communities affected by industries that are expected to experience job losses as a result of the Net Zero transition. It should then publish a strategy on how to help these workers and communities, including by	Q1 2024



providing reskilling packages and tailored support to transition to alternative low-carbon sectors.

<p>Improve diversity in net zero sectors</p>	<p>As part of the action plan for Net Zero skills, the Government should address barriers to employment and training opportunities, especially for under-represented demographics. A lack of diversity in these sectors limits the effective delivery of Net Zero and means people with these characteristics are not included in the opportunities Net Zero brings. For example, women only make up 12% of the workforce in the construction sector, despite representing 47% of the total workforce.</p>	<p>Q1 2024</p>
<p>Coordinated action between key stakeholders to grow demand for net zero skills</p>	<p>Develop a public-private partnership to help to coordinate action across government, businesses, local authorities, education providers and workers, aiming to grow demand for workers in sectors that are key to the Net Zero transition.</p>	<p>Q1 2024</p>
<p>Embed Net Zero within the education system</p>	<p>Government to play a supporting role in schools, higher education and further education institutions to enhance Net Zero education. Government should also review FE funding for Net Zero skills.</p>	<p>2023</p>
<p>Ensure that skills and workforce plans support Net Zero ambitions</p>	<p>Demonstrate how plans to grow and upskill the workforce will support the Government's Net Zero pathways, particularly in terms of low-carbon heat and energy efficiency and fill the skills gap identified in the Heat and Buildings Strategy.</p>	<p>2022 – <b>Overdue</b></p>



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