

June 2023

Progress report: Reducing emissions in Wales



Progress Report: Reducing emissions in Wales

Climate Change Committee
June 2023

Presented to Welsh Ministers pursuant to Section 45(2) of the Environment (Wales) Act 2016. This report was published on 6 June 2023 and is available online at: www.theccc.org.uk/publications

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Acknowledgements

The Committee would like to thank:

The team that prepared this report and its analysis: This was led by Chris Stark, David Joffe, Emily Nurse, James Tarlton and Simona Battipaglia, and included Sasha Abraham, Rose Armitage, Ruby Barrett, Owen Bellamy, Bhargabi Bharadwaj, Sandra Bogelein, Marili Boufounou, Victoria de la Cruz, Ramesh Deonarine, Joshua Deru, Eoin Devane, Tom Dooks, Caitlin Douglas, Kieron Driscoll, Brendan Freeman, Lisa Friberg, Kirsty Girvan, Ruth Gregg, Rachel Hay, Robbie Herring, Gemma Holmes, Sarah Holmes, Daisy Jameson, Luke Jones, Stephen Jones, Miriam Kennedy, Cara Labuschagne, James Lees, Bianca de Farias Letti, Michael Lord, Luke Maxfield, Richard Millar, Bea Natzler, Chloe Nemo, Chris Parker, Simon Rayner, Niki Rust, Vivian Scott, Penny Seera, Olivia Shears, Marcus Shepheard, Suzannah Sherman, Felicity Taylor, Seán Taylor, Indra Thillainathan, Emma Vause, Sophie Vipond, Louis Worthington, Ken Wright and Susie Wright.

A number of organisations and stakeholders for their support, including the Welsh Government.

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Executive summary

<u>1. Assessment of the First Carbon Budget</u>	13
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With an ambitious target to reach Net Zero greenhouse gas emissions by 2050, action on decarbonisation in Wales must now accelerate. Wales's journey to Net Zero is mapped out by a series of legislated five-yearly carbon budgets and decadal interim targets. While the First Carbon Budget (2016-2020) has been achieved, Wales is not yet on track to meet its targets for the second half of this decade and beyond.

Some positive steps have been taken in Wales, with a welcome focus from ministers on skills, jobs and public engagement for the Net Zero transition. However, there are too many areas where the Welsh Government has policy responsibility, but progress is slow. In this report we discuss how Wales achieved its First Carbon Budget, assess progress towards the future targets and outline priority next steps. We have shifted our focus to include monitoring real-world indicators of decarbonisation progress.

Our key messages are:

- **The First Carbon Budget (2016-2020) was achieved.** Welsh greenhouse gas emissions decreased to an average of 28% below 1990 levels during the First Carbon Budget period. Wales has therefore achieved its First Carbon Budget, which required a 23% reduction. Wales's interim 2020 target for a 27% reduction was also achieved with 2020 emissions being 34 MtCO₂e, 39% below 1990 levels, with emissions falling sharply as a result of the COVID-19 pandemic.
 - Over the course of the First Carbon Budget period (2016 to 2020) significant reductions were seen in the power (a 68% reduction) and industry (a 10% reduction) sectors, both of which have policy powers mostly reserved to the UK Government. Transport saw a sharp reduction in 2020 as a result of the response to the COVID-19 pandemic. There was little progress in emissions reduction in other sectors of the economy, which overall fell by only 3%.
 - Prior to this, the largest absolute fall in emissions since 1990, was in the industry sector. There was also a significant reduction in emissions from waste, whereas emissions from power increased over this time.
- **Decarbonisation indicators.** Tangible progress has been insufficient in many areas that are dependent on Welsh Government policy powers. Most notably, tree-planting rates and peatland restoration rates are far too low, and development of the charging infrastructure needed to support the transition to electric vehicles is not happening quickly enough. More progress has been seen in the waste sector and recycling rates remain higher than in the rest of the UK, but improvements have stalled in recent years.
- **Policy progress.** Wales has taken some positive steps, for example the recent decision to cancel all major road projects on environmental grounds and the welcome focus ministers have placed on skills, jobs and public engagement for the Net Zero transition via several public engagement campaigns and a Skills Action Plan. But the Welsh Government is not using its policy powers to full effect. In those sectors where policy is mostly controlled in Wales, the effort is insufficient to achieve the emissions reduction required. In particular, agriculture and land use are missing an overarching decarbonisation strategy and the Welsh Government's plan for the Second Carbon Budget (2021-2025) projects a slight increase in emissions from agriculture.

Low ambition in this sector puts the later targets at risk and increases Wales's reliance on emissions reduction in sectors with reserved policy powers, such as industry.

- **Third Carbon Budget (2026-2030).** The middle of the Third Carbon Budget is only five years away, and by then Wales should have reduced emissions by 39% compared to pre-pandemic (2019) levels. Policy action in all sectors across the economy is now needed, including:
 - Addressing the funding gap in 2024 for agri-environment financial support and overcoming non-financial barriers related to woodland creation, through capacity building and skills development.
 - Delivering a widespread, reliable, and high-quality electric vehicle charging network and developing a full delivery plan for achieving Wales's target of a 10% reduction in car-km per person compared to 2019 levels by 2030.
 - Improving recycling policies to increase the currently stalled rates in Wales to ensure future recycling targets are met.
 - Developing a detailed plan for delivering energy efficiency measures and low-carbon heat – drawing on Local Area Energy Plans – including clear deployment targets and investment costs, and enabling delivery of long-term plans to decarbonise public buildings, social housing and fuel-poor homes.

The rest of this executive summary is set out in two sections:

1. Assessment of the First Carbon Budget
2. Progress towards future emissions reductions

1. Assessment of the First Carbon Budget

Welsh emissions fell to an average of 28% below 1990 levels during the First Carbon Budget period (2016-2020) and Wales has therefore met its First Carbon Budget.

Welsh greenhouse gas emissions have been falling slowly since 1990 and fell to an average of 28% below 1990 levels during the First Carbon Budget period (2016-2020). Wales has therefore met its First Carbon Budget, which requires a 23% reduction (Figure 1). Emissions in 2020 were 34 MtCO_{2e}, which is 39% lower than 1990 levels and so Wales has also achieved its 2020 interim target of a 27% reduction.

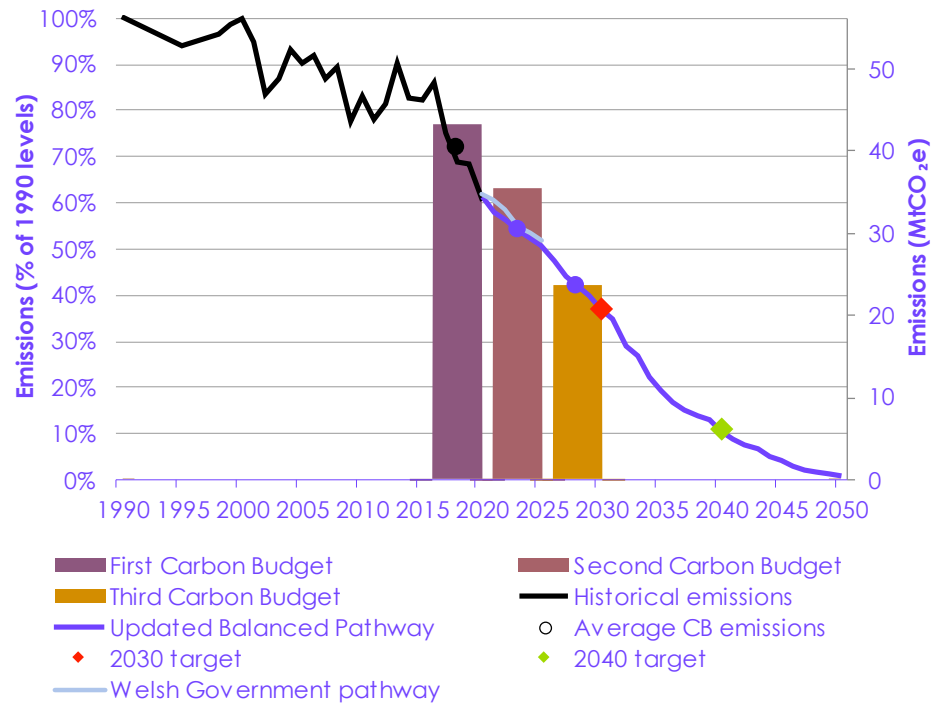
The power and industry sectors led Wales's decarbonisation over the First Carbon Budget period.

- **2020 emissions.** There was a large drop in emissions in 2020 as a result of the response to the pandemic, but even prior to this, emissions were already falling faster than required to meet the First Carbon Budget.
- **Emissions reductions 2016 to 2020.** Over the First Carbon Budget period, both power and industry emissions fell significantly, with a transient contribution from transport in 2020 due to the pandemic (Figures 2 and 3). The reduction in power was driven by the Aberthaw coal power station ceasing operations in 2019.
 - Emissions reduced in both the power and industry sectors at a much faster rate than projected in the CCC's pathways for the First Carbon Budget period, which were based on existing trends at the time of our advice in 2017 (Figure 4).
 - Emissions reduction in the agriculture and land use, land use change and forestry (LULUCF) sectors, which depend on Welsh Government policy, and the F-gas sector, which is mostly reserved to the UK Government, was slower than expected (Figure 4).
 - Progress in the waste sector stalled during this period, but this pathway was following a significant reduction in the years prior to the First Carbon Budget (Figures 2, 3 and 4).
- **Emissions from 1990 to 2016.** The most significant contribution to the absolute fall in Welsh emissions between 1990 and 2016 (the start of the First Carbon Budget) was in the industry sector (Figures 2 and 3).
 - Industrial emissions decreased 34%, driven by changes in the energy-intensity of production, the industrial fuel mix and a structural shift in output towards a less carbon-intensive mix of products, including a fall in Welsh production of crude steel. There was also a significant (63%) reduction in emissions from waste, driven by the landfill tax and increased recycling rates.
 - Emissions from power generation increased by 44%, driven by an increase in exports to England and an increase in fossil fuel generation, partly to compensate for the closure of Wylfa nuclear power station. Wales has a disproportionate share of gas power stations, compared to the rest of the UK. Both power and industry are policy areas largely reserved to the UK Government whereas action in waste is dependent on Welsh Government policies.

The most significant contribution to the fall in Welsh emissions between 1990 and 2016 was in the industry sector.

Wales has achieved its First Carbon Budget and now must significantly outperform its Second Carbon Budget to be on track to meet future targets.

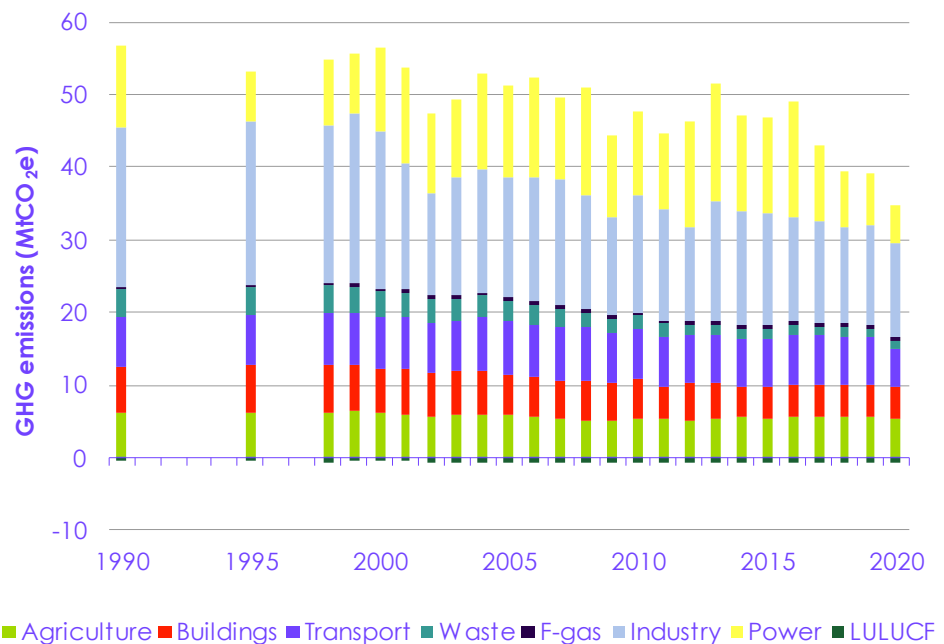
Figure 1 Historical emissions and future targets in Wales



Source: National Atmospheric Emissions Inventory (2022) *Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland: 1990-2020*; CCC (2020) *The Sixth Carbon Budget*; CCC analysis; Welsh Government.
 Notes: The updated Balanced Pathway includes the following changes: rescaling residential buildings emissions to match 2019 emissions and correcting for greenhouse gas inventory methodology updates up to the 1990-2020 inventory. The global warming potentials are those without carbon feedback from the IPCC's Fifth Assessment Report.

Emissions in Wales fell slowly between 1990 and 2016, but sped up between 2016 and 2020.

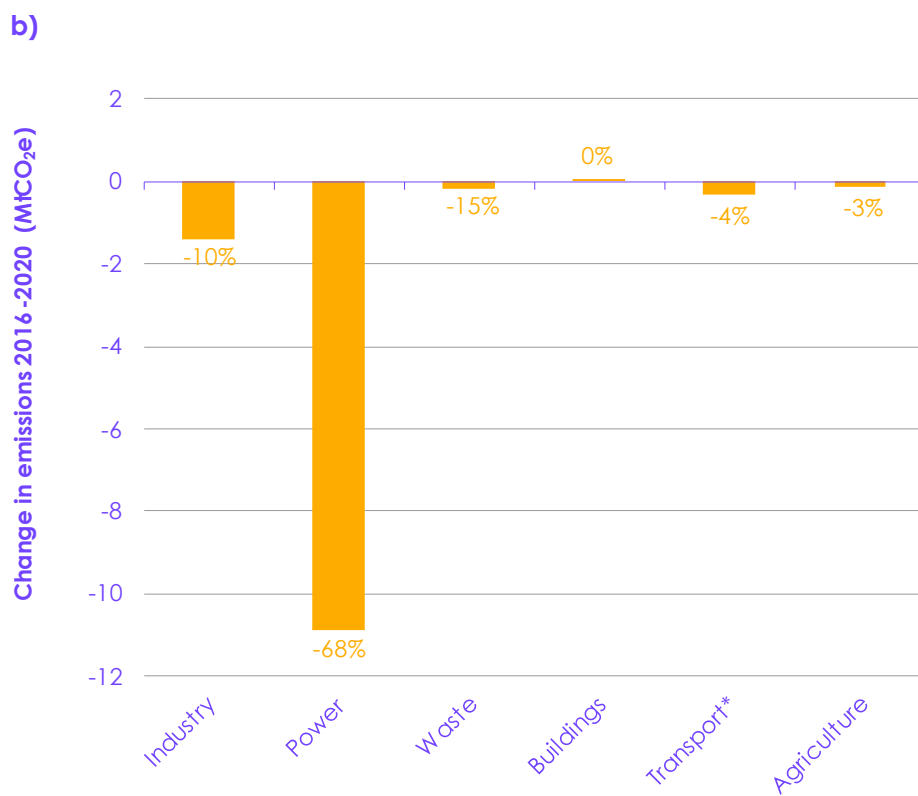
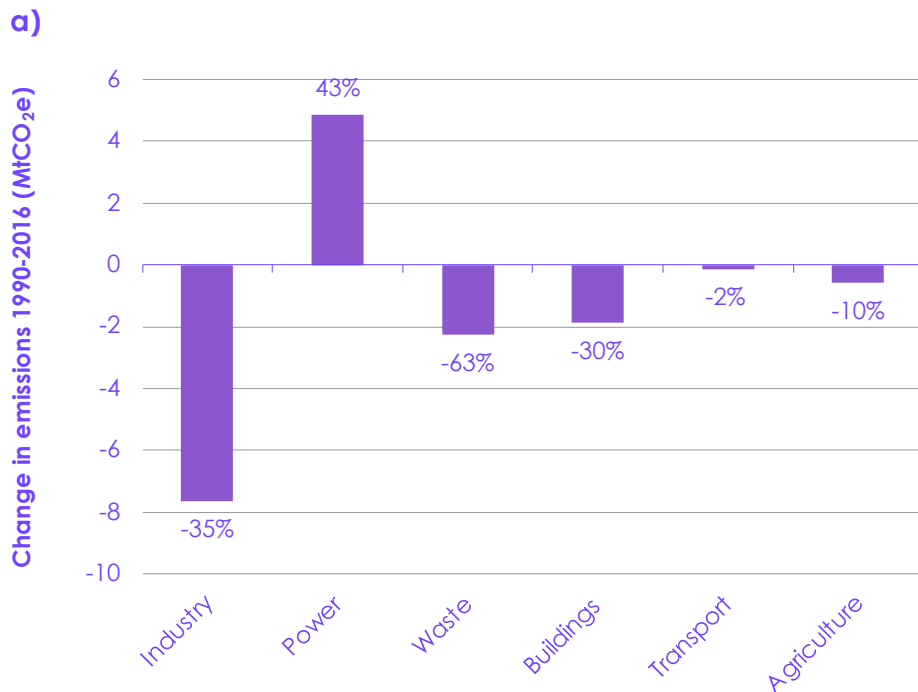
Figure 2 Historical emissions by sector in Wales



Source: National Atmospheric Emissions Inventory (2022) *Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland: 1990-2020*.
 Note: The global warming potentials are those without carbon feedback from the IPCC's Fifth Assessment Report.

Welsh emissions reductions were driven by industry between 1990 and 2016 and by power over the First Carbon Budget period (2016-2020).

Figure 3 Change in Welsh emissions 1990 to 2016 and 2016 to 2020

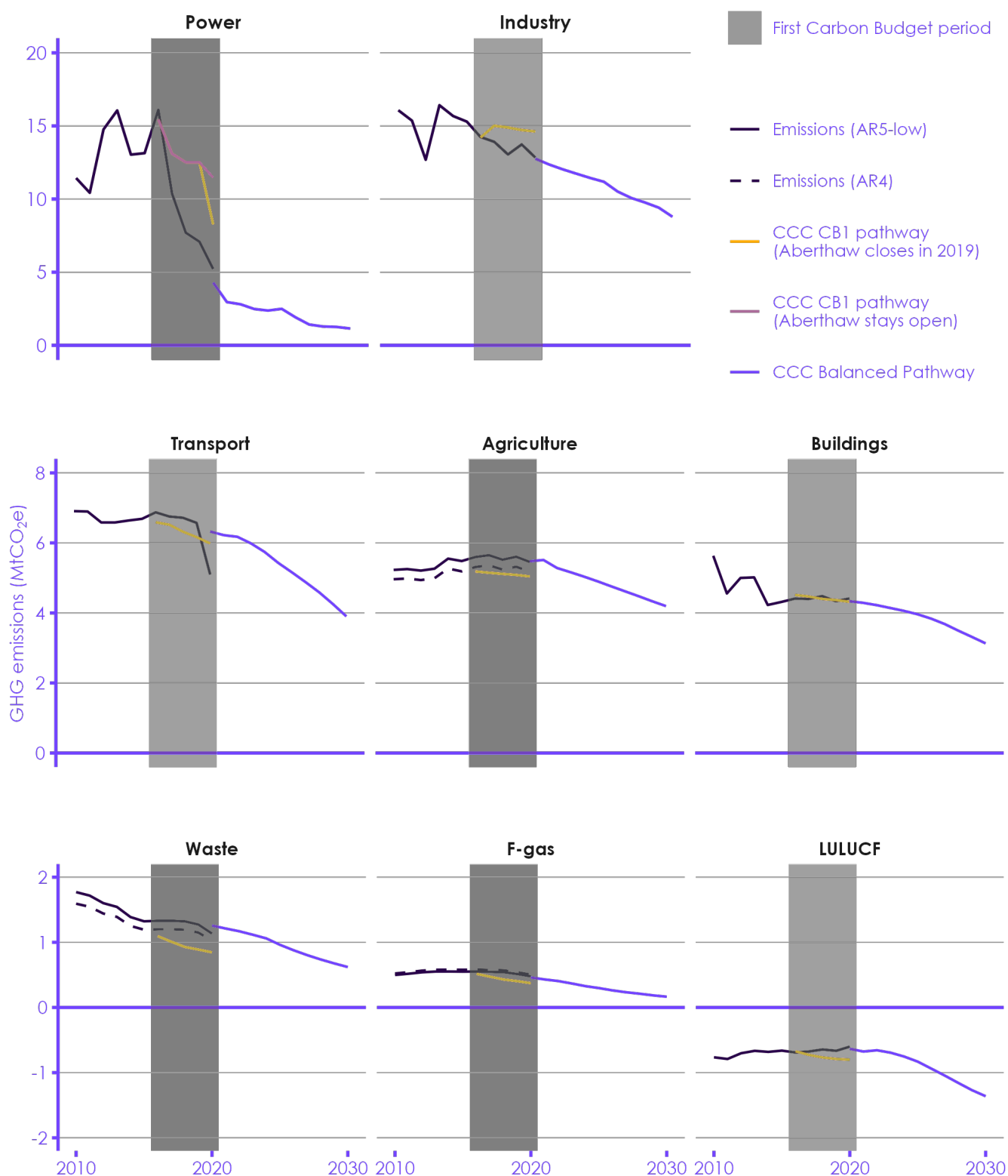


Source: National Atmospheric Emissions Inventory (2022) *Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland: 1990-2020*.

Notes: The global warming potentials are those without carbon feedback from the IPCC's Fifth Assessment Report.

*For the second graph, transport emissions are compared from 2016 to 2019 to take out the impact of the COVID-19 pandemic.

Figure 4 Comparison between CCC pathways and historical emissions (2010-2030)



Source: Welsh Government, CCC analysis.

Notes: Global warming potentials from the IPCC's Fifth Assessment Report without carbon feedback, except for the CB1 pathway and the dashed lines, for historical emissions (to allow for comparison) which use the IPCC's Fourth Assessment Report. The updated Balanced Pathway includes the following changes: rescaling residential buildings emissions to match 2019 emissions and correcting for greenhouse gas inventory methodology updates up to the 1990-2020 inventory. The discontinuity in power emissions in 2020 reflects uncertainty in the CCC pathway due to data lags and differences in modelling assumptions compared to actual outturns (e.g. for load factor of fossil fuel plant). The y-axis range is different for each row in the chart.

2. Progress towards future emissions reduction

The Welsh Government has made insufficient progress on emissions reduction with the policy powers available.

The Welsh Government has made insufficient progress on emissions reduction with the policy powers available. Action should now be focused on those sectors where Welsh Ministers have the greatest capacity to effect change. This is the best possible basis for deeper co-ordination and influence with the UK Government on those sectors where reserved policy plays a greater role in reducing Welsh emissions.

- **The Second Carbon Budget (2021-2025).** The level of the Second Carbon Budget was set before Wales had a Net Zero target, to an average reduction in emissions of 37% compared to 1990 levels. This is too loose to be on track for Wales's later targets.
 - In October 2021 the Welsh Government published its plan for emissions reduction over this period. The plan projects to outperform the target with a reduction of 44%* (Figure 1).
 - A series of targets and milestones for deployment rates in each area of the economy are given in the plan, but the Welsh Government have not published a transparent quantification of how these add up to achieve the plan's sectoral emissions pathways.
 - The plan projects no change in emissions from agriculture over the Second Carbon Budget period. Reducing agricultural emissions is important for Wales to achieve its longer-term targets and failing to reduce them will place greater reliance on sectors with reserved policy powers, such as industry.
 - In our updated Balanced Pathway, 57% of the required emissions reduction between 2020 and 2025 comes from power and industry sectors, whose progress is substantially determined by policies set by the UK Government. The majority of the remaining abatement before 2025 is in the transport and agriculture sectors. Beyond 2025, Welsh emissions targets become increasingly reliant on sectors including agriculture, LULUCF, transport and buildings where significant policy powers lie with Welsh Ministers. These sectors require early policy action now to ensure they are on track.
- **Third Carbon Budget (2026-2030).** The middle of the Third Carbon Budget is only five years away, and by then Wales needs to have reduced emissions by 39% compared to pre-pandemic (2019) levels (Figure 1). Action in all sectors across the economy is needed now.

The Welsh Government have not published a transparent quantification of how their targets and milestones add up to achieve their plan's sectoral emissions pathways for the Second Carbon Budget.

The middle of the Third Carbon Budget is only five years away, and by then Wales needs to have reduced emissions by 39% compared to pre-pandemic levels.

* The 44% reduction is based on the 1990-2019 greenhouse gas inventory and uses global warming potential values from the IPCC's Fourth Assessment Report.

(a) Progress against key indicators

Table 1 summarises the progress against key indicators where devolved policy has significant influence. The picture is mixed:

Both new woodland creation and peatland restoration remain significantly off-track, with waste indicators generally on-track.

- Agriculture and LULUCF.** Both new woodland creation and peatland restoration remain significantly off-track, with tree-planting rates being consistently low. The peatland restoration rates are judged against the CCC's target, which is more ambitious than the Welsh Government's. While decreases in livestock numbers are currently on-track, this has not been driven by policy and the Welsh Government has not made it clear how it will capitalise on this momentum. Emissions from machinery are not falling fast enough.
- Waste.** Indicators for waste are generally on-track, with Welsh recycling rates being higher than the rest of the UK, although progress has stalled in recent years. Energy from waste has been increasing in recent years.
- Transport.** Progress on transport is off-track for areas in which the Welsh Government has policy control. Expansion of charging infrastructure provision needs to accelerate and, whilst positive steps have been made in Wales to reduce traffic, it is too early to say if this is sufficient as the sector rebounds from the pandemic. Van-kilometres have increased faster and are already slightly off-track.

Table 1

Summary of progress against key indicators where Welsh Government policy has significant influence

Agriculture and land	Waste	Transport
New woodland	Total waste	Charge points
Peatland restoration	Recycling rate	Rapid charge points
Livestock numbers	Landfilled waste	Car km
Meat consumption	Biodegradable waste	Van km
Machinery emissions	Energy from waste	HGV km

Key:



On track
Slightly off track
Significantly off track



Too early to say
Data not reported
No benchmark or target

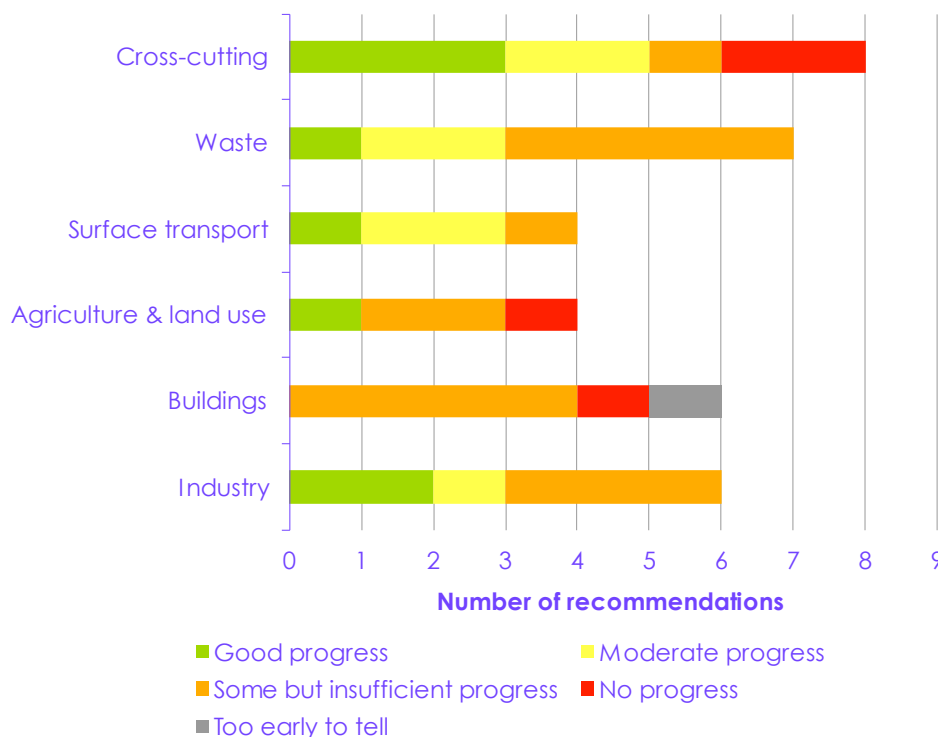
Notes: An indicator is on track if it is going in the right direction at an appropriate rate. This is determined either by comparing to a quantified pathway/benchmark or making a judgement.

(b) Policy progress and next steps

Wales has made insufficient policy progress since our last progress report in 2020. Many of our recommendations made to the Welsh Government, either in that report or in our 2022 progress report to the UK Government, have seen either insufficient or no progress, this is particularly striking in the buildings sector (Figure 5).

Many of our recommendations made to the Welsh Government, have seen either insufficient or no progress. This is particularly striking in the buildings sector.

Figure 5 Assessment of previous recommendations to Wales



Source: CCC analysis.

Note: Recommendations are from our 2022 UK Progress Report, our 2020 Wales Progress Report and our 2020 Advice Report: The path to a Net Zero Wales.

(i) Sectors in which significant policy powers are held by the Welsh Government

Table 2 summarises our assessment of policy progress in sectors with significant policy powers devolved to the Welsh Government. The criteria for this assessment are outlined in the Annex. The picture is mixed but, overall, there are significant risks to Wales meeting its Third Carbon Budget.

There are significant risks to Wales meeting its Third Carbon Budget, particularly in the agriculture, LULUCF and buildings sectors.

- **Agriculture and LULUCF.** There has been little progress in agriculture and LULUCF in recent years and an overarching strategy is missing.
 - The Agriculture (Wales) Bill was introduced in 2022, outlining the future framework of agricultural policy and support. However, there will be a funding gap in agri-environment financial support between the current scheme ending in 2023 and the replacement scheme not beginning until 2025. This needs to be addressed.

- Success depends on delivering a just transition where livestock farmers can benefit from new opportunities to diversify land use which can provide an additional income stream.
- Although the level of grant funding committed to afforestation until 2024 is generous, challenges remain on encouraging landowners and managers to take up the offer. The Welsh Government should work to overcome the non-financial barriers related to woodland creation through capacity building and skills development. This includes implementing actions recommended by the Trees and Timber Taskforce. On its recommendation, the Welsh Government issued a guide for farmers and land managers on woodland carbon credits.
- Cross-departmental work comprising health and agriculture has started to develop a long-term strategy to promote a shift to a 'healthier and suitable' diet. Work will aim to identify opportunities for new policies and/or interventions, which could lead to improved dietary patterns within Wales.

Wales has a relatively high recycling rate compared to other UK nations, although recent progress on waste emissions has plateaued.

- **Waste.** Wales has a relatively high recycling rate compared to other UK nations, achieved through initiatives such as the 'Collaborative Change Programme' and 'Be Mighty' public campaign. Although recent progress on waste emissions has plateaued.
 - Like the rest of the UK, Wales is bringing in Extended Producer Responsibility and a Deposit Return Scheme, which should help improve recycling rates – but further policies are likely to be needed to meet recycling targets.
 - Business Wales's initiative to provide businesses dedicated resource efficiency advice linked to public-backed loans is a good example for the rest of the UK – but more work is needed to improve waste prevention and resource efficiency.
- **Surface Transport.** There are promising early signs in the uptake of electric vehicles and policies to incentivise a shift away from private car use.
 - The Welsh Government should work with the UK Department for Transport to ensure that the zero-emission vehicle mandate is effective in driving the scale-up in EV sales that is required. Delivering a widespread, reliable and high-quality charging network will be key to enabling this.
 - Wales is aiming to reduce car-kilometres travelled per person by 10% by 2030 relative to 2019 levels and has made several key decisions in line with this, including cancelling all major road projects, introducing environmental requirements for future road-building, and reducing speed limits. Wales has committed almost four times as much funding per capita to active travel as the UK Government. The Welsh Government should build on this progress to develop a full delivery plan for achieving its demand-reduction target.
- **Buildings.** The Welsh Government is supporting delivery of Local Area Energy Plans across all local authorities in Wales, but currently lacks a comprehensive national plan for decarbonising buildings.

Wales is aiming to reduce car-km travelled per person by 10% by 2030 relative to 2019 levels and has made several key decisions in line with this.

– The Welsh Government has plans to decarbonise public buildings and socially rented homes. However, it is yet to make long-term plans for the funding required. Its proposals to require existing social housing to reach an EPC ‘A’ rating are unlikely to be a cost-optimal approach to decarbonising homes.

A detailed plan for delivering energy efficiency measures and low-carbon heat in buildings should be developed.

– A detailed plan for delivering energy efficiency measures and low-carbon heat should be developed – drawing on Local Area Energy Plans – including clear deployment targets and investment costs.

Table 2

Assessment of Welsh policy progress in sectors with significant policy powers devolved to Wales

Sector	Emissions reduction needed from 2020 to 2028 (MtCO ₂ e)	Assessment of Welsh policy progress	Risk due to UK Government action
Surface transport	2.0 MtCO ₂ e*	Some risks (Y)	Medium
Agriculture and LULUCF	1.5 MtCO ₂ e	Significant risks (O)	Low
Waste	0.4 MtCO ₂ e	Some risks (Y)	Medium
Buildings	0.8 MtCO ₂ e	Significant risks (O)	High

Notes: *Change in emissions is from 2019 for surface transport due to the low emissions in 2020 during the pandemic. The criteria for policy assessment are given in the Annex. The required emissions reductions are taken from our updated Balanced Pathway.

(ii) Sectors with significant reserved policy powers

The Welsh Government has influence over the decarbonisation of all sectors, for example through use of its planning powers or skills and enterprise support.

The Welsh Government has influence over the decarbonisation of all sectors, for example through use of its planning powers or skills and enterprise support. However, progress in these sectors is influenced by UK Government policies to a greater degree:

- **Industry (excluding fuel supply).** Decarbonisation of Welsh industry is at risk from insufficient action at the UK level, especially in the steel sector. The Welsh Government plans to continue working with the UK Government to advocate for more support for industrial decarbonisation in Wales. It is also using its limited powers to enable industrial decarbonisation, for example by setting up Net Zero Industry Wales to support all Welsh industrial clusters.
- **Fuel supply.** The Welsh Government has made positive progress in announcing the intent to prevent further extraction of fossil fuels, including preventing the expansion of the coal industry, and restricting new oil and gas extraction projects in Wales. Next steps are to assess the potential for large-scale hydrogen production and infrastructure in Wales, coordinate with the UK Government on how Wales can best contribute to UK-wide hydrogen plans and develop a Bioenergy Action Plan to clarify its position on bioenergy in Wales.

- **Electricity supply.** By 2030, Wales aims to generate renewable electricity equal to 70% of its electricity consumption. Welsh renewables capacity has increased over time but at a slower rate since 2016. Wales must now work with the UK Government to deliver strong policy consistent with decarbonising electricity supply by 2035 (e.g. on standards for new-build power plants), and to continue to take Welsh-specific programmes forward where these are devolved (e.g. on planning and consenting for new low-carbon developments).
- **Aviation.** Decarbonising aviation is dependent on the uptake of Sustainable Aviation Fuel and UK-wide aviation demand management, which are dependent on UK Government action. However, the Welsh Government is not using the levers it does have. It does not have a strategy for managing airport expansion and aviation demand, and does not have a plan for ensuring Cardiff Airport is prepared for sector decarbonisation.



Chapter 1

Progress in reducing emissions

1. Assessment of the First Carbon Budget	26
2. Welsh Government's plans to meet future targets	34

Introduction and key messages

Greenhouse gas emissions in Wales are regulated by the Environment (Wales) Act 2016 (hereafter 'the Act'). This legislation originally included a target to reduce emissions by at least 80% on 1990 levels* by 2050. Our 2017 advice on the First (2016-2020) and Second (2021-2025) Carbon Budget targets, which was accepted by the Welsh Government, was based on this 80% target. Following the advice of the CCC in 2019 and 2020, Wales subsequently increased the ambition of its 2050 target to be Net Zero emissions.^{1,2} This means that emissions will need to be reduced at a faster rate than envisaged when the First and Second Carbon Budget targets were set.[†] Wales's Third Carbon Budget (2026-2030) was set, following our 2020 advice, at a level compatible with the Net Zero target. In this chapter we look back on Welsh emissions over the First Carbon Budget, assessing how it was met, as required in the Act. We then discuss Wales's plans for meeting future carbon budgets and targets. Our key messages for this chapter are:

- Emissions in Wales were 34 MtCO₂e in 2020. Wales met both its 2020 interim target and its First Carbon Budget, with emissions falling to an average of 28% compared to 1990 levels over the period 2016-2020.
- The reduction in emissions during the First Carbon Budget period (2016-2020) was primarily driven by the power and industry sectors, and a reduction in 2020 transport emissions as a result of the COVID-19 pandemic. In the sectors with policy powers mostly devolved to Wales, emissions reductions were generally slower than the pathways in our 2017 advice, which were based on a continuation of trends at the time.
- The largest absolute fall in emissions since 1990 and prior to the First Carbon Budget period was in the industry sector. There were also significant reductions in the waste sector, while an increase in emissions was seen in the power sector. Both industry and power have policy largely reserved to the UK Government whereas policy in waste is mostly devolved to Wales.
- The Welsh Government has published its plan for meeting the Second Carbon Budget.
 - The plan sets out sectoral pathways from 2021 to 2025 that combine to project an average reduction in emissions of 44% compared to 1990 levels, outperforming the Second Carbon Budget target of a 37% reduction.
 - The plan projects emissions in agriculture to slightly increase by 2025 compared to 2020 levels, whereas the CCC's updated Balanced Pathway projects a reduction of 11% over this period. Reducing agricultural emissions is vital for Wales's longer term decarbonisation goals and decreasing reliance on sectors with reserved policy powers.
- The middle of the Third Carbon Budget is only five years away. By this point, Wales needs to have reduced emissions by 39% compared to pre-pandemic levels in 2019 in order to achieve the target of an average reduction of 58% compared to 1990 levels. Emissions reduction will now need to significantly speed up in all sectors across the economy.

* The comparison year for CO₂, methane and nitrous oxide is 1990. The comparison year for fluorinated gases is 1995.

† The Second Carbon Budget was adjusted to account for the earlier than expected closure of the Aberthaw coal power station, but even with this adjustment the target is insufficient to be on track for Net Zero.

1. Assessment of the First Carbon Budget

(a) Total emissions

Emission in Wales reduced by an average of 28% compared to 1990 levels over the First Carbon Budget period (2016-2020) and the target of a 23% reduction has therefore been met.

Under the Act, emissions targets are set as percentage reductions on 1990 levels rather than in absolute terms. This is in order to minimise the impacts of changes in the methodology to estimate emissions on whether the targets are met.³ The First Carbon Budget requires an average reduction in greenhouse gas emissions of 23% on 1990 levels over the period 2016 to 2020, consistent with the CCC's 2017 advice for a path to an 80% reduction in emissions by 2050.⁴ In that 2017 advice, we also recommended that if the Aberthaw coal power station ceased operation in 2019 (as turned out to be the case) rather than 2020 or later, the First Carbon Budget target should be a 24% reduction rather than a 23% reduction.

The advice on the level of the First Carbon Budget was provided well into the budget period, but without data being available on emissions during the budget period (2015 was the latest year for which emissions data were available at the time). The advice was therefore based on analysis of available data relating to emitting activities in Wales in 2016 and 2017 and projections of current trends for 2018 to 2020. It was assumed that the scope was small for new policies developed following the 2017 advice to affect emissions by 2020.

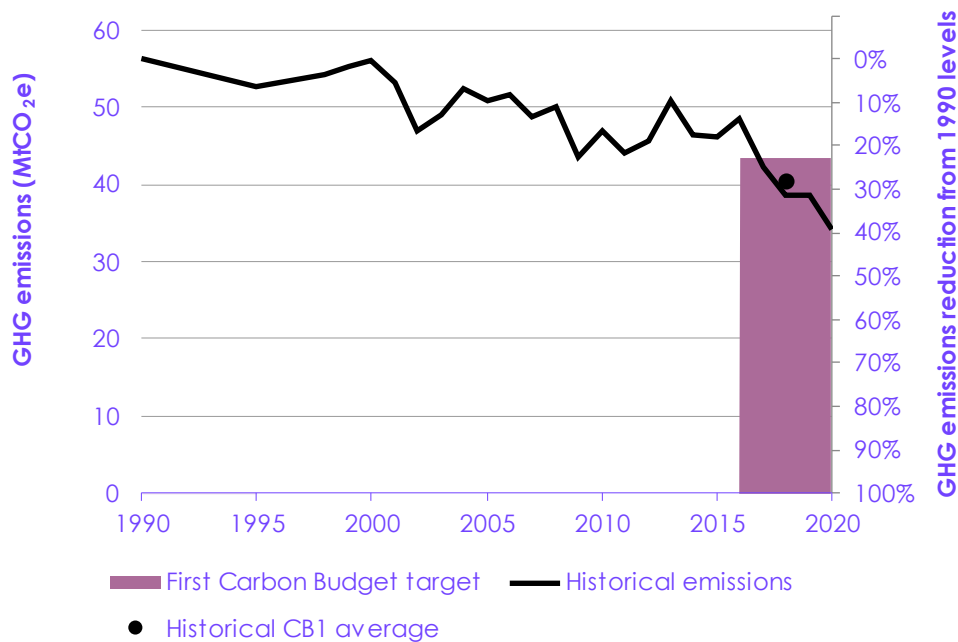
Emissions in Wales have been falling slowly since 1990 (Figure 1.1) and have so far been in line with the targets set in 2017:

- Reported average emissions over the First Carbon Budget period were 40 MtCO₂e, corresponding to a 28% reduction on 1990 levels (Figure 1.1). The First Carbon Budget has therefore been met. Emissions in 2020 were 34 MtCO₂e, a fall of 12% since 2019 and of 39% since 1990. The interim 2020 target for a 27% reduction has therefore also been achieved.
- The average annual fall in emissions between 2016 and 2019 was 7%, a significant increase from before the First Carbon Budget period, with emissions falling an average of 0.6% each year between 1990 and 2016.
- There was a large drop in emissions in 2020 as a result of the response to the pandemic. But even prior to this, in the period 2016 to 2019, emissions were falling faster than needed to meet the First Carbon Budget – the reduction in emissions in 2017 already surpassed the average reduction required by the Budget (Figure 1.1). Progress up to 2019 meant that the First Carbon Budget would have been met as long as emissions were 26% above 2019 levels, rather than the 12% fall seen that was largely associated with the pandemic. The targets would therefore have been met even if the pandemic had not occurred.

Although there was a large drop in emissions in 2020 as a result of the response to the COVID-19 pandemic, emissions were already falling faster than required prior to this.

Emissions have fallen slowly overall since 1990 and Wales has achieved its First Carbon Budget.

Figure 1.1 Welsh greenhouse gas emissions (1990-2020) and the First Carbon Budget target



Source: National Atmospheric Emissions Inventory (2022) Report: Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland: 1990-2020; Welsh Government.

Notes: GHG stands for greenhouse gas. The global warming potential values used are those without carbon feedback from the IPCC's Fifth Assessment Report.

(b) Sectoral emissions

(i) Emissions changes 1990-2016

The most significant contribution to the fall in Welsh emissions between 1990 and 2016 was in the industry sector.

The most significant contribution to the absolute fall in Welsh emissions between 1990 and 2016 (the start of the First Carbon Budget) was in the industry sector (Figures 1.2 and 1.3). Industrial emissions decreased 34%, driven by changes in energy intensity, industrial fuel mix and a structural shift towards a less carbon-intensive mix of products, including a fall in Welsh production of crude steel.

There was also a significant reduction in emissions from waste (63%), driven by the landfill tax and an increase in recycling rates resulting in less waste being sent to landfill. Power emissions increased by 44% in Wales during this period, driven by an increase in exports to England and an increase in fossil fuel generation, partly to compensate for the closure of Wylfa nuclear power station. Wales has a disproportionate share of gas-fired capacity (around 15% of UK gas-fired capacity) relative to its share of electricity consumption (around 5% of UK electricity consumption).^{5,6}

Both industry and power are sectors with policy largely reserved to the UK Government whereas policy in waste is mostly devolved to Wales. Emissions reduction in the UK as a whole was significantly faster between 1990 and 2016, driven predominantly by a large reduction in UK power emissions. Faster reductions were also seen in the UK's emissions from industry and waste (Figure 1.3).

(ii) Emissions changes 2016-2020

Over the First Carbon Budget period, both power and industry emissions fell significantly, with a transient contribution from transport in 2020 due to the pandemic (Figures 1.2 and 1.4). In the UK as a whole, emissions reductions in power were less over this period than for Wales. Waste emissions rose slightly in the UK over this period but decreased by 15% in Wales (Figure 1.4).

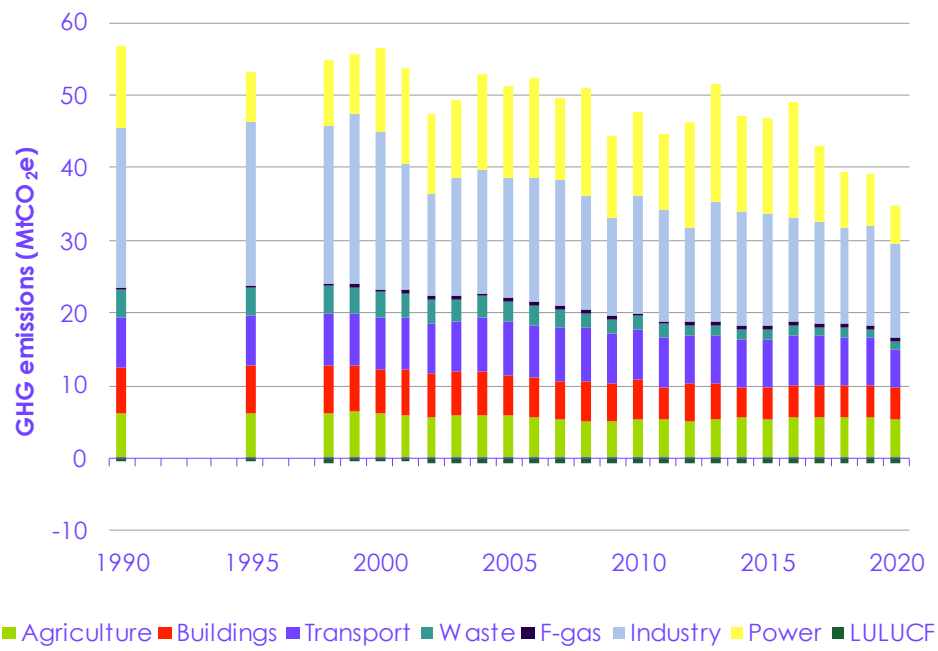
Figure 1.5 compares reported emissions with our sectoral pathways over the First (2016-2020), Second (2021-2025) and Third (2026-2030) Carbon Budget periods. The pathways for the First Carbon Budget period were based largely on existing trends at the time and were consistent with Wales's then target to reduce emissions by 80% on 1990 levels by 2050. The pathways over the Second and Third Carbon Budget periods are based on our updated Balanced Pathway (Box 1.1), originally developed as part of our 2020 Sixth Carbon Budget advice to the UK Government. The updated pathways are consistent with Wales's current target to reach Net Zero by 2050. They therefore go further than is required to reach the Second Carbon Budget target but are consistent with the Third Carbon Budget.

Over the First Carbon Budget period:

- The power sector performed better than our pathway, largely as the result of reserved policies, with emissions from both gas-fired and coal-fired generation lower than we had assumed:
 - The cessation of electricity generation by the Aberthaw coal power station in 2019 meant that the station's substantial contributions to Wales's emissions were eliminated.
 - Emissions from Welsh gas-fired power stations were lower than projected as load factors were lower than assumed in our 2017 pathway.
- The industry sector performed better than in our pathway, mainly because of a decrease in Welsh production of iron and steel. However, industry remains the dominant source of emissions in Wales.
- Progress in the agriculture and land use, land use change and forestry (LULUCF) sectors, which have significant devolved policy powers, has been insufficient. In the F-gas sector, which is mostly reserved to the UK Government, the reduction in emissions has been slower than expected.
- Progress in the waste sector, which has significant devolved policy powers, stalled during this period, although this pathway was following a significant reduction in the years prior to the First Carbon Budget.

Emissions in Wales fell slowly between 1990 and 2016 but sped up between 2016 and 2020.

Figure 1.2 Historical emissions by sector in Wales



Source: CCC analysis.

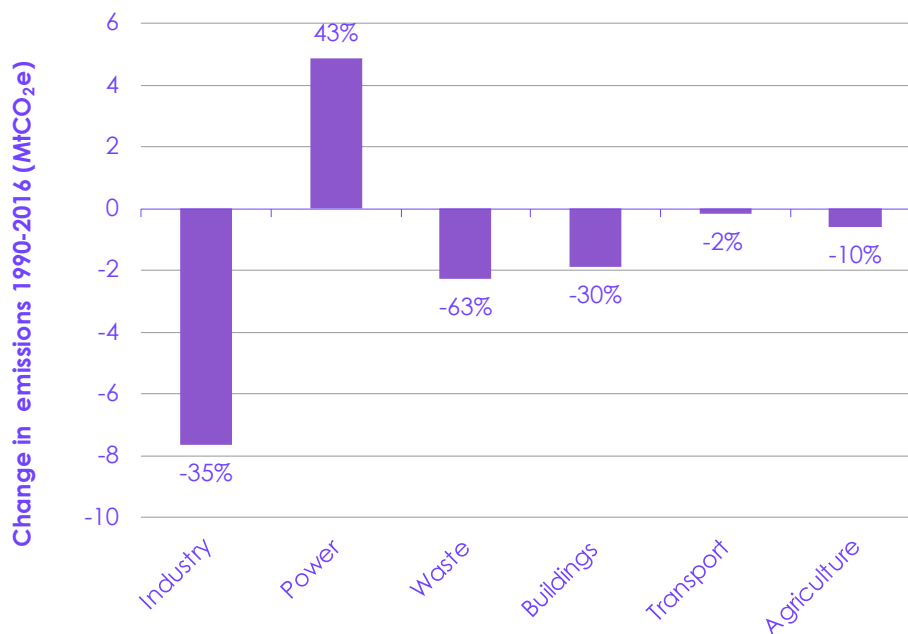
Notes: The global warming potential values used are those without carbon feedback from the IPCC's Fifth Assessment Report.

Welsh emissions reductions were driven by industry between 1990 and 2016, with a rise in emissions from power. In the UK as a whole, reductions were driven by power and industry.

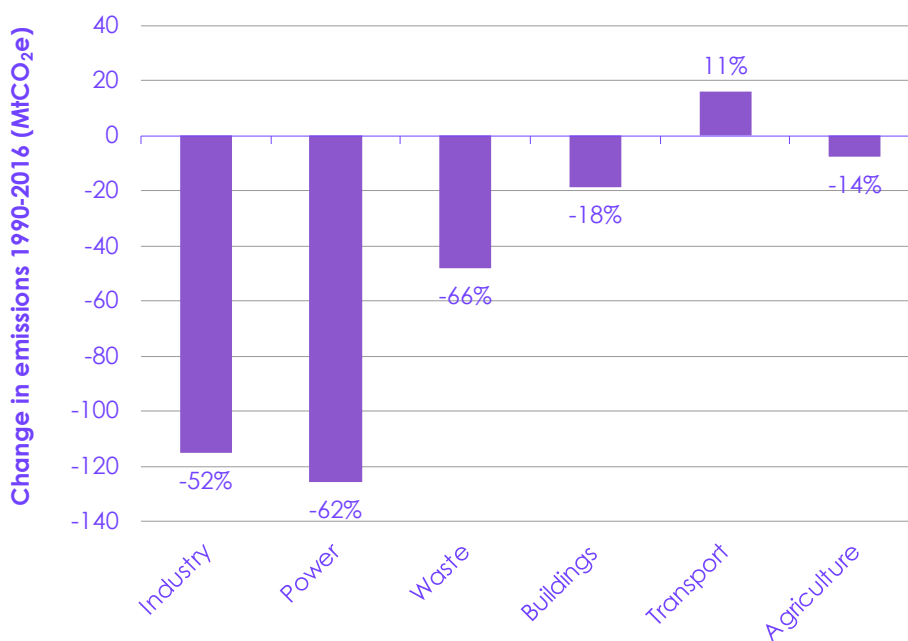
Figure 1.3 Change in Welsh and UK emissions 1990 to 2016



a) Wales



b) UK



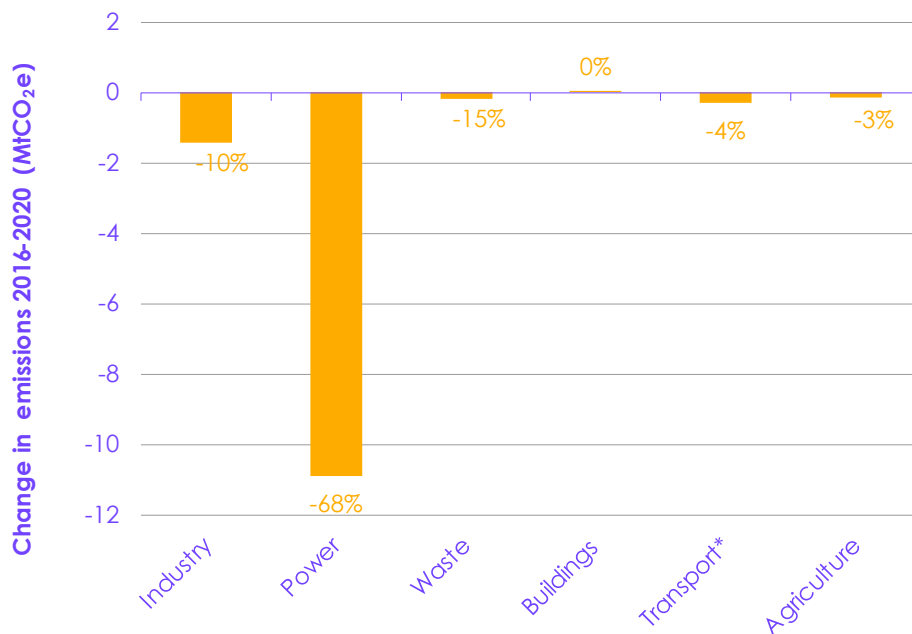
Source: CCC analysis.

Notes: The global warming potential values used are those without carbon feedback from the IPCC's Fifth Assessment Report.

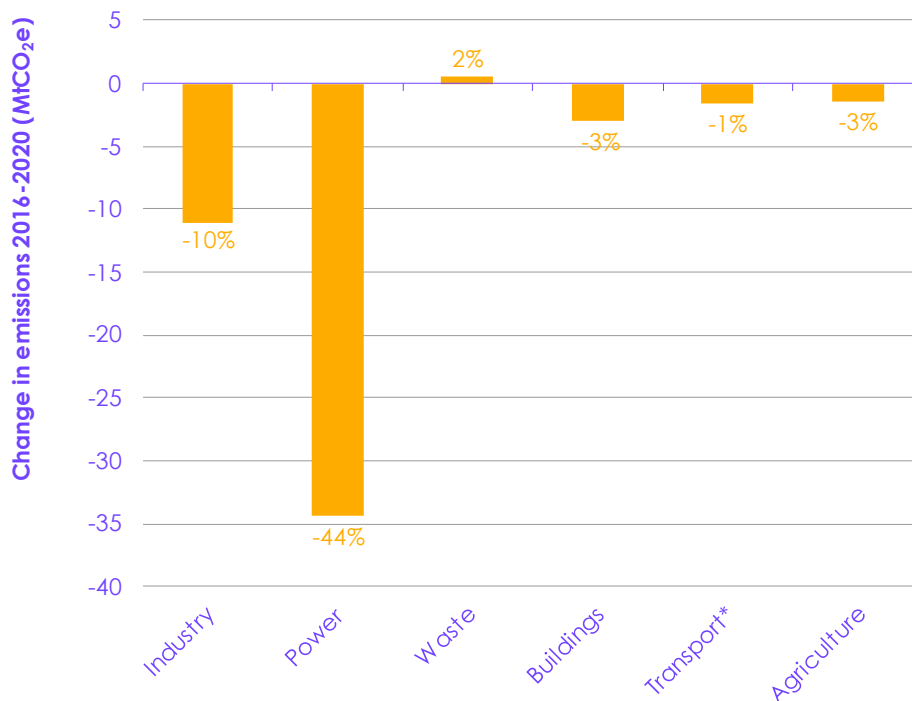
Figure 1.4 Change in Welsh and UK emissions 2016 to 2020



a) Wales



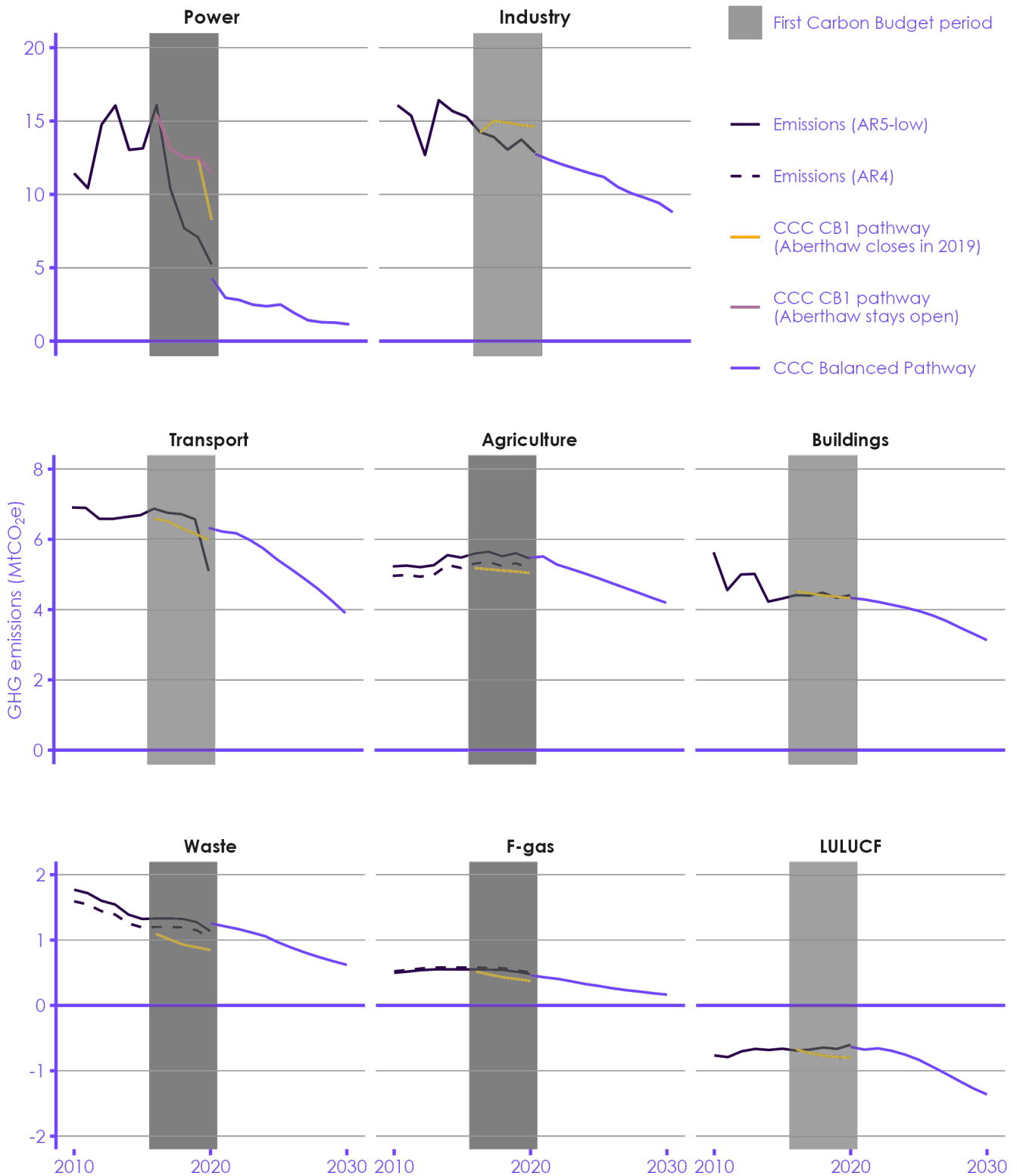
(b) UK



Source: CCC analysis.

Notes: The global warming potential values used are those without carbon feedback from the IPCC's Fifth Assessment Report. *Transport emissions are compared from 2016 to 2019 to take out the impact of the COVID-19 pandemic.

Figure 1.5 Comparison between CCC pathways and historical emissions (2010-2030)



Source: Welsh Government; CCC analysis.

Notes: GHG stands for greenhouse gas. The global warming potentials used are those from the IPCC's Fifth Assessment Report without carbon feedback, except for the CB1 pathway and the dashed lines for agriculture, waste and F-gas, which use those from the IPCC's Fourth Assessment Report. This is because the CB1 pathways were based on these global warming potentials and cannot be converted into those from the IPCC's Fifth Assessment Report, while the dashed lines are given for the sectors most affected by the change in global warming potentials. We have adjusted our pathways to account for updates to the greenhouse gas inventory methodology. We have adjusted our power CB1 pathway to account for the cessation of electricity generation by the Aberthaw coal power station in 2019. The y-axis range is different for each row in the chart.

Box 1.1

Updates to the Balanced Pathway for Wales

Here we summarise the updates and changes in presentation we have made for this report to our Balanced Pathway for Wales, originally developed as part of our 2020 Sixth Carbon Budget to the UK Government:

- To be consistent with the sector definitions used by the Welsh Government:
 - Moved Energy from Waste emissions from the waste sector to the electricity supply sector.
 - Combined the manufacturing and construction and fuel supply sectors into a single industry sector, and combined surface transport, aviation and shipping into a single transport sector.
- Converted from the IPCC's Fifth Assessment Report Global Warming Potential values with carbon feedback to those without carbon feedback to be consistent with international agreements made since 2020.
- Corrected for the inventory methodology updates since we first published our Balanced Pathway by rescaling emissions by the difference in 2018 emissions between the latest inventory and the inventory we used for our original analysis. For LULUCF, we made this correction with a constant offset in all years of the pathway, and for all other sectors we scaled the whole pathway by the proportional difference.
- Rescaled buildings emissions so that 2020 emissions match historical 2019 emissions in the 1990-2020 greenhouse gas inventory. This is to account for the impact of temperature variations on emissions, as the UK-wide buildings emissions in 2019 were similar to the temperature-adjusted emissions, so this is a good year to use to benchmark our pathway.

Source: CCC analysis.

2. Welsh Government's plans to meet future targets

Wales must now accelerate action to ensure it is on-track to meet its future carbon budgets and the Net Zero target.

Wales must now accelerate action to ensure it is on-track to meet its future carbon budgets and the Net Zero target. The Second (2021-2025) and Third (2026-2030) Carbon Budgets are set at average reductions in emissions of 37% and 58% compared to 1990 levels respectively (Figure 1.6).

- Second Carbon Budget (2021-2025). The 37% reduction target was set on the path to Wales's previous target of an 80% reduction by 2050 rather than Net Zero. In 2020, the Committee recommended the Welsh Government to outperform the Second Carbon Budget to be on track to reach Net Zero by 2050.
 - In October 2021, the Welsh Government published its plan for meeting the Second Carbon Budget.⁷ The plan presents sectoral pathways, which have been determined with its Wales 2050 calculator.* A series of targets and milestones for deployment rates in each area of the economy are given in the plan, but the Welsh Government have not published a transparent quantification of how these add up to achieve the plan's sectoral emissions pathways (**priority recommendation R2022-199**).
 - Wales plans to outperform the Second Carbon Budget and reduce emissions by an average of 44% against 1990 levels. This is lower than the 46% percentage reduction in our updated Balanced Pathway (Box 1.1), originally developed as part of our 2020 Sixth Carbon Budget report (Figure 1.6).[†] The difference comes from a steeper initial fall in emissions in the updated Balanced Pathway, predominantly caused by a decrease in power emissions in 2021, due to the assumed closure of the Connah's Quay gas plant in that year. Since the gas plant has not yet closed, power emissions are likely to be higher in 2021 and 2022 than projected in the updated Balanced Pathway.
 - Where it has been possible to compare,[‡] the split in emissions reductions between sectors is generally similar between the CCC and the Welsh Government's pathways. An exception is the agriculture sector emissions, which are projected by the Welsh Government to slightly increase over the Second Carbon Budget period (between 2020 and 2025), resulting in an average reduction of 9% compared to 1990 levels, to be compared to a 16% reduction in our updated Balanced Pathway. Emissions reductions in agriculture are important for Wales to achieve its longer-term targets and failing to reduce them in line with the updated Balanced Pathway will place greater reliance on sectors with reserved policy powers.

The Welsh Government have not published a transparent quantification of how their targets and milestones add up to achieve their plan's sectoral emissions pathways for the Second Carbon Budget.

The Welsh Government's pathway projects a slight rise in agricultural emissions over the Second Carbon Budget period (2020 to 2025) but action in this sector is needed now.

* As worded in the Second All Wales Low Carbon Delivery Plan (2021-2025): 'The Wales 2050 calculator is a scenario-based emissions projection model with a 2050 time horizon, covering all emissions sectors. ... The model allows the user to explore different pathways to decarbonisation and generates quantified emission outputs, based on the user choices made.'

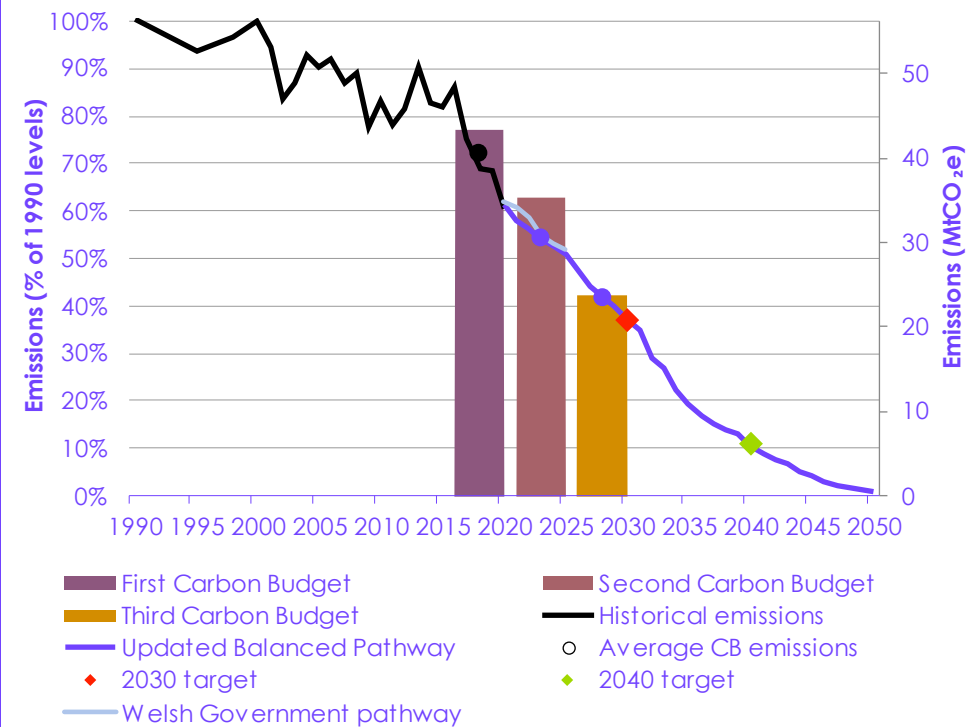
† The Welsh Government reduction is in the IPCC's Fourth Assessment Report Global Warming Potential values, whereas the CCC's reduction is in the Fifth Assessment Report values without carbon feedback. This difference makes a small contribution to the difference between these values, but most of the difference is due to a difference in the pathway.

‡ Following the Welsh Government's recent redefinition of their sectors, several of them are difficult to compare directly with their old definitions or the CCC's definitions.

- In our updated Balanced Pathway, 57% of the required emissions reduction between 2020 and 2025 comes from the power and industry sectors, where progress is substantially determined by policies set by the UK Government. The majority of the remaining abatement before 2025 is in the transport and agriculture sectors. Beyond 2025, Wales's emissions targets become increasingly reliant on sectors like agriculture, LULUCF, transport and buildings where significant policy powers lie with Welsh Ministers. These sectors require early policy action now to ensure they are on track.

Wales must significantly outperform its Second Carbon Budget to be on track to meet future targets.

Figure 1.6 Historical emissions and future targets in Wales



Source: National Atmospheric Emissions Inventory (2022) *Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland: 1990-2020*; Climate Change Committee (2020) *The Sixth Carbon Budget*; CCC analysis; Welsh Government.

Notes: We have made the following updates to our Balanced Pathway: converting from the IPCC's Fifth Assessment Report Global Warming Potential values with feedback to those without, correcting for greenhouse gas inventory methodology updates up to the 1990-2020 inventory and rescaling buildings emissions so 2020 emissions match historical 2019 emissions in the 1990-2020 greenhouse gas inventory.

(a) The Net Zero Challenge Group

The Welsh Government and Plaid Cymru commissioned an independent group to explore potential pathways to achieve Net Zero by 2035, which is well ahead of the current target date of 2050. The Net Zero Challenge Group started its work in January 2023 to examine how to increase Welsh Net Zero ambitions, while considering societal and economic impacts, mitigation of adverse effects and fair cost and benefit sharing.

Our updated Balanced Pathway (which is highly ambitious) reaches 81% emission reduction by 2035 on 1990 levels, leaving residual emissions of 11 MtCO₂e, of which 3 MtCO₂e are from industry, which is a reserved sector. While the Committee welcomes the ambitious goals of the Net Zero Challenge group, the challenges to achieving their goal to reach Net Zero by 2035 are huge.

Endnotes

- ¹ Climate Change Committee (2019) *Net Zero – The UK's contribution to stopping global warming*, <https://www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/>.
- ² Climate Change Committee (2020) *The path to Net Zero and progress on reducing emissions in Wales*, <https://www.theccc.org.uk/publication/the-path-to-net-zero-and-progress-reducing-emissions-in-wales/>.
- ³ Climate Change Committee (2017) *Advice on the design of Welsh carbon targets*, <https://www.theccc.org.uk/publication/advice-on-the-design-of-welsh-carbon-targets-2/>.
- ⁴ Climate Change Committee (2017) *Building a low-carbon economy in Wales – Setting Welsh carbon targets*, <https://www.theccc.org.uk/publication/building-low-carbon-economy-wales-setting-welsh-carbon-targets/>.
- ⁵ BEIS (2022) *Power stations in the United Kingdom*, <https://www.gov.uk/government/statistics/electricity-chapter-5-digest-of-united-kingdom-energy-statistics-dukes>.
- ⁶ BEIS (2022) *Subnational total final energy consumption, United Kingdom, 2005 – 2020*, <https://www.gov.uk/government/statistics/total-final-energy-consumption-at-regional-and-local-authority-level-2005-to-2020>.
- ⁷ Welsh Government (2021) *Net Zero Wales Carbon Budget 2 (2021-25)*, <https://www.gov.wales/sites/default/files/publications/2021-10/net-zero-wales-carbon-budget-2-2021-25.pdf>.



Chapter 2

Progress in sectors with significant Welsh Government powers

1. Agriculture and land use, land-use change and forestry	41
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3. Surface transport	50
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Introduction and key messages

Progress towards future decarbonisation in Wales has been too slow. Focus must be increased now on achieving emissions reductions in sectors with significant policy powers devolved to the Welsh Government.

In this chapter we track indicators of decarbonisation progress in these sectors and determine whether they are on track compared to the Welsh Government milestones. If Welsh Government milestones are not available, or if ambition is too low, we track against CCC milestones from our updated Balanced Pathway for Wales. We also summarise and assess policy progress and outline key next steps.

Our key messages for this chapter are:

- **Agriculture and land use.** There has been little progress in emissions reductions in recent years in agriculture and land use, land-use change and forestry (LULUCF) and Wales is still missing an overarching strategy for these sectors.
 - Rates of tree planting and peatland restoration are far too low. The Welsh Government should implement the recommendations of the Trees and Timber Deep Dive Panel on actions to overcome the non-financial barriers related to woodland creation.
 - The Agriculture (Wales) Bill, introduced in 2022, outlines the future framework of agricultural policy and support. There will be a funding gap in agri-environment financial support between the current scheme ending in 2023 and the replacement scheme beginning in 2025.
 - Success depends on delivering a just transition. As part of this, livestock farmers should be able to benefit from new opportunities to diversify land use, which can provide an additional income stream.
 - Cross-departmental work has started to develop a long-term strategy to promote a shift to a 'healthier and suitable diet'.¹ Work will aim to identify opportunities for new policies and/or interventions, which could lead to improved dietary patterns within Wales.
- **Waste.** Wales has a relatively high recycling rate compared to the rest of the UK, achieved through initiatives such as the 'Collaborative Change Programme' and 'Be Mighty' public campaign.
 - Like the rest of the UK, Wales is bringing in Extended Producer Responsibility for packaging and a Deposit Return Scheme, which should help improve recycling rates – but further policies are likely to be needed to meet recycling targets.
 - Business Wales's initiative to provide businesses with dedicated resource efficiency advice, linked to public-backed loans, is a good example for the rest of the UK – but more work is needed to improve waste prevention and resource efficiency.
- **Surface Transport.** There are promising early signs in uptake of electric vehicles and in policy to reduce vehicle-kilometres.

- Electric car sales are on track. However, charging infrastructure is off track and the number of public chargepoints per capita is lower than in England and Scotland. The development of a widespread and reliable charging network will need to accelerate now to support the transition.
- Wales has made positive progress on reduction of road transport demand and active travel and is aiming to reduce car-kilometres travelled per person by 10% by 2030 relative to 2019 levels. Several key decisions have been made in line with this, including cancelling all major road projects, introducing environmental requirements for future road-building, and reducing speed limits. The Welsh Government has also committed almost four times as much funding per capita to active travel as the UK Government. The Welsh Government should build on this progress to develop a full delivery plan for achieving its demand-reduction target.
- **Buildings.** The Welsh Government is supporting delivery of Local Area Energy Plans across all local authorities in Wales, but currently lacks a comprehensive national plan for decarbonising buildings.
 - The Welsh Government has plans to decarbonise public buildings and socially rented homes. However, it is yet to make long-term plans for the funding required. Its proposals to require existing social housing to reach an EPC 'A' rating are unlikely to be a cost-optimal approach to decarbonising homes.
 - A detailed plan for delivering energy efficiency measures and low-carbon heat should be developed, drawing on Local Area Energy Plans and including clear deployment targets and investment costs.

In the rest of this Chapter, we discuss progress in the following sectors:

1. Agriculture and land use, land-use change and forestry
2. Waste
3. Surface transport
4. Buildings

1. Agriculture and land use, land-use change and forestry

Policy towards agriculture and land use, land-use change and forestry policy area is primarily the responsibility of the Welsh Government.

(a) Indicators of progress

The agriculture and LULUCF sectors have shown little progress in reducing emissions in recent years.

Progress on key indicators for agriculture and land use, land-use change and forestry (LULUCF) in Wales are shown in Figure 2.1.

Emissions from the sector were 5 MtCO₂e in 2020, with 5.5 MtCO₂e and -0.6 MtCO₂e coming from agriculture and LULUCF respectively. Combined emissions for the two sectors have fallen by 18% since 1990. However, there has been little progress in reducing emissions in recent years and the ability of the LULUCF sector to act as a carbon sink has shown a declining trend over the last decade. Underlying indicators show that emissions may fall off track compared to the CCC's pathway at current rates of progress (Figure 2.1a).

Delivery of land-use change measures such as woodland creation and peatland restoration is off track compared to what is required.

New woodland. The rate of new woodland creation in Wales has been consistently very low and is currently less than a third of the Welsh Government's target of 2,000 hectares per year, which in turn is significantly less ambitious than the CCC's pathway (Figure 2.1b).

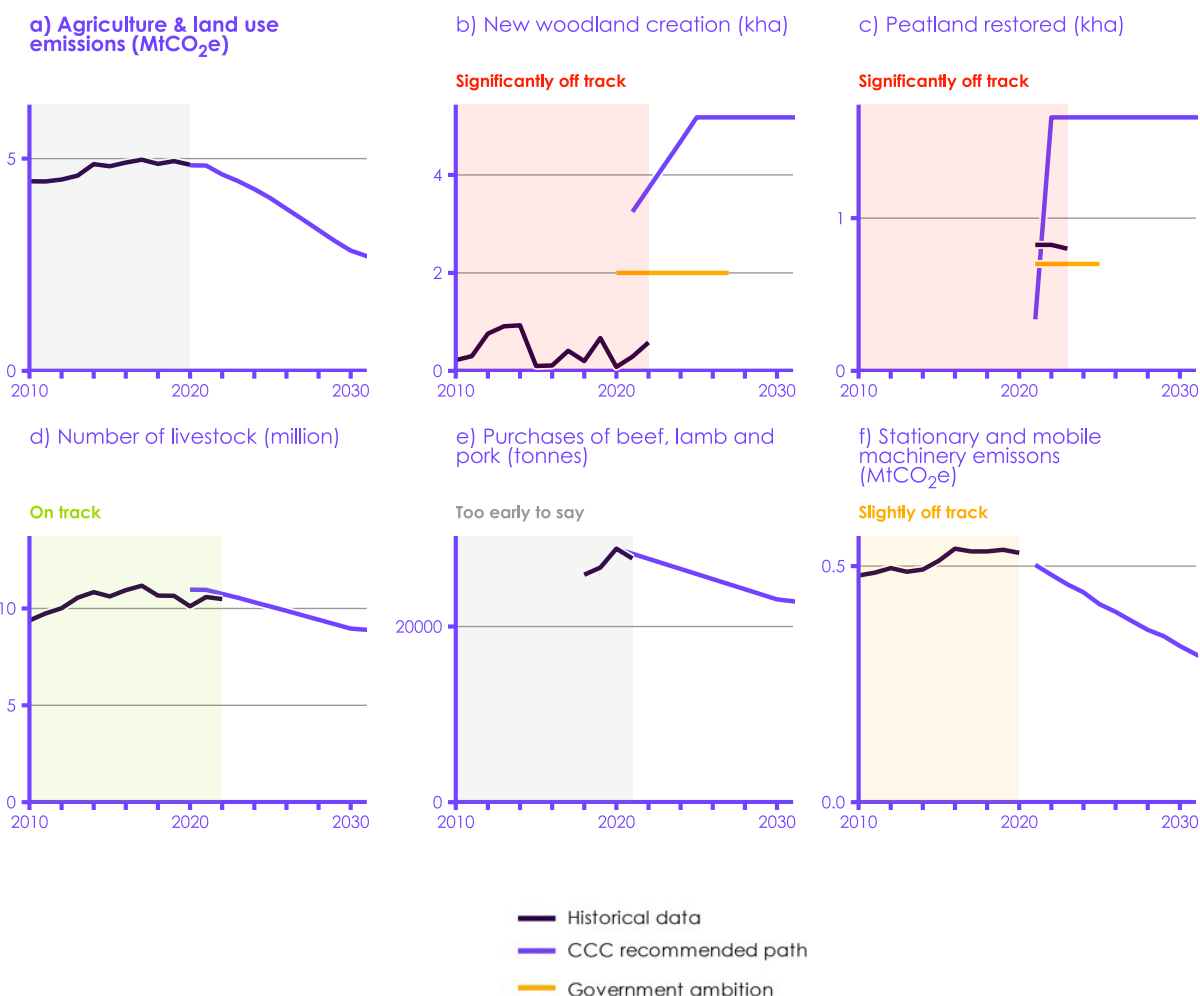
Peatland restoration. Under the National Peatland Action Programme, annual restoration of peatland soils has consistently hit around 800 hectares since 2020/21 (Figure 2.1c). This is consistent with the Welsh Government's target, but significantly off track compared to the CCC's pathway.

Livestock numbers and diet change.

- Cattle and sheep numbers fell slightly in 2022 following a larger rise of 5% the previous year. Numbers are on track compared to the CCC's pathway (Figure 2.1d).
- Purchases of beef, lamb and pork in Wales fell in 2021 after an increase in the previous three years (Figure 2.1e). It is too early to say what the longer-term trend is from the available data (only available from 2018).

Stationary and mobile machinery. GHG emissions due to the use of fossil fuels in agricultural machinery fell by 1% in 2020 compared to the previous year. The rate of decrease will need to accelerate to meet the CCC's pathway.

Figure 2.1 Key agriculture and land use, land-use change and forestry indicators



Source:

- a) National Atmospheric Emissions Inventory (2022) *Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland: 1990-2020*;
- b) Forest Research (2022) *Forestry Statistics 2022*;
- c) estimate provided by the National Peatland Action Programme, figures for 2022/23 are provisional estimates;
- d) Defra (2022) *Agriculture in the United Kingdom, sheep and cattle only*;
- e) Meat Promotion Wales (2012-2022) *Little Book of Meat Facts*;
- f) DESNZ (2023) *Final UK greenhouse gas emissions national statistics: 1990 to 2021 and CCC analysis*.

(b) Policy assessment

The policies and plans associated with each sub-sector/policy area for this sector are assessed in Table 2.1 to determine if they are credible and on track, according to the criteria outlined in Annex 1. Detailed recommendations for this sector are given in Annex 2 and in filterable and searchable tables on our website, with a reference provided to each unique recommendation ID within the table.

Table 2.1

Policy scorecard for agriculture and land use

Sub-sector / policy area	Welsh Government policy progress, assessment and next steps
<p>Low-carbon farming and productivity</p> <p>Mostly devolved</p>	<p>Significant risks (O)</p> <p>Progress:</p> <ul style="list-style-type: none"> The Agriculture (Wales) Bill, introduced to the Senedd in Autumn 2022, sets out the Welsh Government's vision for future agricultural support following the UK leaving the EU Common Agricultural Policy. The future support framework is based on sustainable land management objectives. The Sustainable Farming Scheme (SFS) will provide funding for measures that deliver sustainable and environmental benefits.² Farmers must carry out specific 'universal actions' if they are to be eligible to receive payments. Universal actions include basic nutrient accounting and soil testing, protection of soils, animal health improvement, restoration of semi-natural peatland and a baseline obligation to have 10% tree cover on-farm. The Agriculture (Wales) Bill gives farm tenants the right to challenge should landlords refuse them access to the new SFS, with the aim to remove barriers to tenant farmers participating in the scheme. This change does not apply to farm business tenancies that make up around half of the tenanted sector in Wales. The Welsh Government is offering competitive capital grants during 2023 for horticulture, with both existing businesses and those wishing to enter this industry eligible for support. The aim is to support diversification, improve efficiency and deliver sustainable local food production. Farming Connect, a knowledge-sharing platform, has received a two-year funding commitment of £23 million to support knowledge transfer to drive sustainability and improved environmental performance.³ Themes include on-farm carbon approaches and GHG abatement. <p>To be addressed:</p> <ul style="list-style-type: none"> The current agri-environment scheme, Glastir, is due to finish at the end of 2023 and the SFS is not due to begin until 2025. The Welsh Government should address this gap to facilitate farmers to make the transition and maintain incentives for land management actions (priority recommendation R2023-034). Payment levels under the new SFS are not yet set and the regulatory baseline is still in development. This detail should be released as soon as possible to provide clarity for land management planning and prevent delay in delivering land-use change (recommendation R2023-033). Schemes and capital grants available currently include emissions abatement as a delivery priority amongst many others. Clear targeting and prioritisation of actions is needed if measures under the SFS will deliver the emissions abatement that is required (priority recommendation R2022-043). The Welsh Government needs to address constraints of land managers under farm business tenancies to support their engagement with the new farming subsidy package. This continues to be a significant barrier to the tenanted sector being able to make the long-term investment decisions which are required for some low-carbon farming approaches and land-use change. <p>Risk due to UK Government action: Low.</p>
<p>Demand and consumption</p> <p>Mostly devolved</p>	<p>Significant risks (O)</p> <p>Progress:</p> <ul style="list-style-type: none"> Wales has commenced work to develop a long-term strategy to promote a dietary shift to a 'healthier and suitable diet'.¹ Work is cross-departmental, across the health and agriculture sectors, and will aim to identify opportunities for new policies and/or interventions, which could lead to improved dietary patterns within Wales.

	<ul style="list-style-type: none"> Introduction of a Food Bill into the Welsh Parliament last year by a Senedd member with the stated aim to establish a more sustainable food system in Wales, including healthier diets. The Bill is still at an early stage and a consultation on its principles closed at the end of January. <p>To be addressed:</p> <ul style="list-style-type: none"> The Welsh Government is not currently considering targeted reductions on meat and/or dairy choices. <p>Risk due to UK Government action: Low.</p>
<p>Peatlands</p> <p>Mostly devolved</p>	<p>Significant risks (O)</p> <p>Progress:</p> <ul style="list-style-type: none"> Peatland restoration ambition in Wales has significantly increased. There is a political commitment to increase the current target of 600–800 hectares of annual peatland restoration to 1,800 hectares a year by 2030/31. This exceeds the trajectory set in the CCC’s Sixth Carbon Budget advice. The Welsh Government is working with the UK to implement a ban on the retail sale of horticultural peat products. The ban will come into effect from 2024. The National Peatland Action Plan is continuing to develop how restoration is reported, aligning with the UK GHG Inventory. Collaboration with initiatives in other UK administrations indicates that steps towards consistent reporting at a UK level are making good progress. <p>To be addressed:</p> <ul style="list-style-type: none"> A significant increase in funding and capacity across actions that support peatland restoration will be needed if Wales is to meet its ambition for peat restoration. This will include addressing staffing in delivery bodies, skills and contractor availability and landowner engagement to support a steady supply of land. Funding commitments are yet to be formalised (recommendation R2023-035). The Welsh Government should increase their peatland restoration ambition to align with or exceed the trajectory set in the CCC Sixth Carbon Budget advice. <p>Risk due to UK Government action: Low.</p>
<p>Afforestation</p> <p>Mostly devolved</p>	<p>Significant risks (O)</p> <p>Progress:</p> <ul style="list-style-type: none"> The Welsh Government’s annual afforestation interim target remains at 2,000 hectares, although this would need to increase to an annual average of 4,000 hectares if it is to deliver its wider ambition to create 43,000 hectares of new woodland in the 2020s. In a bid to understand why actual planting rates remain well below this target, a Trees and Timber Deep Dive Panel outlined recommendations on actions to overcome barriers related to woodland creation and models to secure private sector investment in woodland creation.⁴ On its recommendation, the Welsh Government issued a guide for farmers and land managers on woodland carbon credits. Grant funding of £32 million to increase woodland creation has been committed for the period between 2022/23 and 2024/25 across three main schemes: <ul style="list-style-type: none"> The existing Woodland Creation Planning Scheme has boosted grants from £800 to between £1,000 and £5,000 to develop plans for new woodland creation. As part of this, Natural Resources Wales are engaging with landowners and farmers at the pre-application stage to encourage uptake. The new Woodland Creation Grant (WCG) will provide capital grants for planting and ongoing maintenance for the first 12 years after planting. Sign-posting the dates of funding windows – every three months – should address issues around uncertainty of when to apply, and payment rates are to be reviewed to determine whether they are attractive. Smaller areas of tree planting of under two hectares will also be eligible for funding under the Small Grants scheme. Land must be either agriculturally improved or of low environmental

	<p>value to be eligible. As with the WCG, farmers and land managers will still be able to claim from the Basic Payment Scheme.</p> <ul style="list-style-type: none"> Opened in April, the Coetiroedd Bach Grant is worth £2.6 million and will provide grants until March 2025 for the creation of 100 'tiny forests' of native trees, mainly in urban areas. <p>To be addressed:</p> <ul style="list-style-type: none"> Despite the target and financial support available (previously available under Glastir), planting rates remain low, with 580 hectares planted in 2021/22. Tree-planting rates need to increase if Wales is to meet its own target of 2,000 hectares per year, and the higher 4,500 hectares a year by 2030 under the CCC's pathway (priority recommendation R2023-054). While the funding pot committed to 2024 is generous, challenges remain in encouraging landowners and managers to take up the offer. The Welsh Government should continue to consider and implement the recommendations of the Deep Dive Panel, where it has not already done so. This includes publishing user-friendly guidance for farmers on tree planting, and ensuring any future advisory service has a prominent role for woodland advice to support sustainable, productive farm businesses. Welsh Government budgets have not been set beyond 2024/25. There is a risk that applications for the current round of funding may not be forthcoming, as interested parties wait to see what is being offered under the SFS. To avoid a potential hiatus in tree planting, the rates payable under the SFS should be made public and payment under the Woodland Creation Grant matched accordingly. Proposals to attract private sector investment into woodland creation need to be firmed up as soon as is practicable (recommendation R2023-122). <p>Risk due to UK Government action: Low.</p>
<p>Agroforestry and hedgerows</p> <p>Mostly devolved</p>	<p>Some risks (Y)</p> <p>Progress:</p> <ul style="list-style-type: none"> Under the Glastir scheme, a small, competitive grant funding round opened a one-month application window in early 2023 – with £3 million in funding allocated for hedgerow creation. Grants for agroforestry have been included under Woodland Creation since August 2022. These include funding for associated capital items and five years' maintenance. Funding windows are expected to open every three months and scheduled to close in September 2023. From 2025 onwards, hedgerows and agroforestry are proposed to be funded in the SFS. This will require farmers to keep their hedges higher and wider, with additional funding tiers to support expansion of farm woodland, new hedgerows and improved connectivity between sites. <p>To be addressed:</p> <ul style="list-style-type: none"> There is currently no clear funding mechanism for hedgerows in Wales during 2024 due to the Glastir scheme finishing at the end of 2023 – creating a year-long gap before the SFS begins. The Welsh Government should take steps to support delivery for hedgerows between the two schemes (recommendation R2023-036). <p>Risk due to UK Government action: Low.</p>
<p>Energy crops</p> <p>Mostly devolved</p>	<p>Insufficient plans (R)</p> <p>Progress:</p> <ul style="list-style-type: none"> There has been no progress on energy crops. <p>To be addressed:</p> <ul style="list-style-type: none"> There is currently no clear funding mechanism for hedgerows in Wales during 2024 due to the Glastir scheme finishing at the end of 2023 – creating a year-long gap before the SFS begins. The Welsh Government should take steps to support delivery for hedgerows between the two schemes (recommendation R2023-036). <p>Risk due to UK Government action: Low.</p>

2. Waste

(a) Indicators of progress

Progress on key waste indicators for Wales is shown in Figure 2.2.

Emissions in 2020 were 68% below 1990 levels meaning Wales has not met its target of an 80% reduction by 2020.

Emissions. Progress on reducing emissions from waste largely stalled over the First Carbon Budget period, prior to the pandemic (Figure 2.2a). Emissions in 2020 then fell by 11% compared with 2019, potentially due to the reduction in economic activity - and in particular the reduction in construction (which accounted for around 50% of waste generated in 2018) – due to the pandemic.^{5,6,7} Emissions in 2020 were 68% below 1990 levels, well below the Welsh Government's target of an 80% reduction by 2020. Wales is therefore off track to meet its 2030 target of a 92% reduction.⁸

Waste arisings. Total municipal waste increased by 1% in 2021, back to pre-pandemic levels, following a decrease in 2020. Waste arisings fell by 3% between 2012 and 2021 (Figure 2.2b).

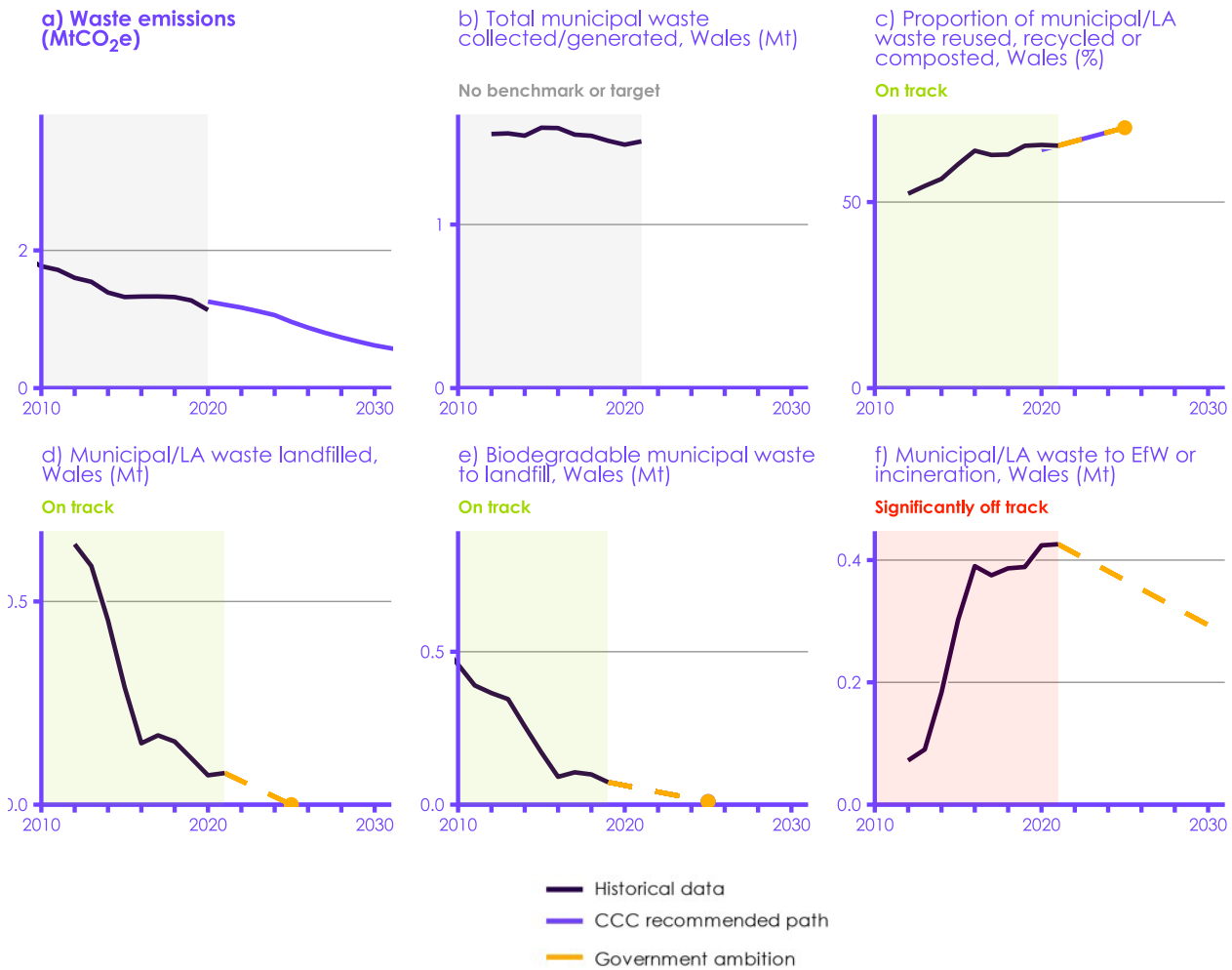
- The proportion of municipal waste being reused, recycled or composted has been increasing since 2012, although the rate of increase has slowed in recent years. It reached 65% in 2020, exceeding Wales's target of 64% (Figure 2.2c). On a like-for-like basis, Wales's rate is consistently higher than that in England. To meet Wales's target of 70% by 2025, the improvement in recycling rates over the next four years will need to be more than twice that achieved over the last four years.
- 0.08 Mt of municipal waste was landfilled in Wales in 2021, a reduction of 88% since 2012 (Figure 2.2d). The recent rate of reduction will have to continue for Wales to be on track to meet its target of zero waste going to landfill by 2025.⁹

Waste going to incineration has increase by a factor of six since 2012.

Energy from waste. Waste going to incineration* has increased by a factor of six since 2012, reaching 0.43 Mt in 2021 (Figure 2.2f). This trend must reverse if the Welsh Government is to achieve its aim to phase out the use of Energy from Waste (EfW) altogether by 2050.

* This is largely Energy from Waste, but also includes 1% of waste that is incinerated without energy recovery.

Figure 2.2 Key waste indicators



Source:

- a) National Atmospheric Emissions Inventory (2022) *Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland: 1990-2020*;
- b) Statistics Wales Local Authority Municipal Waste Data (2021-22), *Annual management of waste by management method*;
- c) Statistics Wales Local Authority Municipal Waste Data (2021-22), *Annual management of waste by management method*;
- d) Statistics Wales Local Authority Municipal Waste Data (2021-22), *Annual management of waste by management method*;
- e) Natural Resources Wales (2019-20), *Register of the Landfill Allowances Scheme (LAS) in Wales, 2004 onwards*;
- f) Statistics Wales Local Authority Municipal Waste Data (2021-22), *Annual management of waste by management method*.

(b) Policy assessment

The policies and plans associated with each sub-sector/policy area for this sector are assessed in Table 2.2 to determine if they are credible and on track, according to the criteria outlined in Annex 1. Detailed recommendations for this sector are given in Annex 2 and in filterable and searchable tables on our website, with a reference provided to each unique recommendation ID within the table.

Table 2.2
Policy scorecard for waste

Sub-sector / policy area	Welsh Government policy progress, assessment and next steps
Solid waste Mostly devolved	<p style="background-color: yellow;">Some risks (Y)</p> <p>Progress:</p> <ul style="list-style-type: none"> Wales published its Beyond Recycling⁹ strategy in March 2021. This sets targets to send zero waste to landfill and achieve a 70% recycling rate by 2025, reduce food waste by a third by 2030 and become a 'zero waste nation' by 2050. The strategy also set an ambition to establish 80 re-use and repair hubs in town centres – with around 30 established to date. Wales's relatively high recycling rate compared to other UK nations has been delivered through novel approaches such as its 'Collaborative Change Programme', which tasks the Waste and Resources Action Programme (WRAP) to support local authorities (LAs) to consider options to separate recycling collections and provides capital funds to LAs to implement service changes. Improvements to recycling rates and waste prevention have slowed in recent years. To deliver its future waste and recycling targets, the Welsh Government has been developing forthcoming Extended Producer Responsibility (EPR) and Deposit Return Scheme (DRS) reforms alongside the UK and other devolved governments. Non-residential premises will be required to separate recycling and the Welsh Government has proposed a ban on sending small electrical items and textiles to incineration or landfill, and wood to landfill – subject to consultation. Wales intends to prevent biodegradable waste from going to landfill by 2025 and introduced a moratorium on new Energy from Waste (EfW) plants over 10 MW capacity in 2021. The Welsh Government's Business Wales service is providing advice to businesses on potential resource efficiency measures alongside opportunities to access finance for these measures through the Development Bank for Wales.¹⁰ <p>To be addressed:</p> <ul style="list-style-type: none"> The Government should continue to engage closely with LAs and businesses around the incoming EPR and DRS reforms, to address concerns about the schemes. Recycling rates have shown limited improvement in recent years so stronger policies are needed to drive recycling rates up to meet the 2025 and future targets (priority recommendation R2022-327, recommendation R2022-328). More action on capturing methane emissions from landfill is needed in addition to working with Natural Resources Wales to better measure these emissions (priority recommendation R2023-004). EfW policy should be considered as part of the waste sector to effectively address the drivers of these emissions. This requires separate reporting of EfW emissions. A detailed plan setting out how policies will deliver emissions reduction in the waste sector through to 2050 is needed (priority recommendation R2023-005). <p>Risks due to UK Government action: Medium.</p> <ul style="list-style-type: none"> The joint delivery of the EPR and DRS depends on collaboration between the UK and devolved governments, and could be held up by one party, particularly the UK Government. The UK Government is developing a business model for supporting first-of-a-kind Carbon capture, utilisation and storage (CCUS) technology at industrial clusters, including the HyNet cluster in North Wales. EfW sites will be eligible for support under the scheme and a draft set of terms has been published. Rollout of the technology in Wales will depend on the Industrial carbon capture and storage (CCS) business model proving viability in the late 2020s.

Wastewater Partially devolved	Insufficient plans (R)
	To be addressed: <ul style="list-style-type: none">• Very little detail has been provided by the Welsh Government on how it intends to enable and encourage water companies and industrial users to reduce emissions from wastewater. This is a policy gap.

3. Surface transport

The surface transport, aviation and shipping sectors are treated separately in this chapter and in Chapter 3 to provide a clearer distinction of the different policies taking place and the decarbonisation rates. In Chapter 1, they were combined into an overall transport sector to align with the sector definitions used by the Welsh Government in its Low Carbon Delivery Plan, which outlines how Wales intended to meet its First Carbon Budget.

Policy powers to decarbonise surface transport are shared, with Welsh Government having particular responsibility for planning and delivering local transport systems.

Policy powers to decarbonise surface transport are shared between the Welsh and UK Governments. Planning and delivery of local transport systems, including active travel, public transport, and electric vehicle charging, are largely the responsibility of a partnership between the Welsh Government and local authorities. The key areas that are either reserved or dependent on UK-wide policy development include regulation of new vehicles sales and some parts of the rail system.

(a) Indicators of progress

Progress against key indicators for surface transport decarbonisation in Wales is shown in Figure 2.3.

Surface transport emissions fell in 2020, due to travel restrictions during the pandemic.

Emissions were 4.5 MtCO₂e in 2020, a 22% decrease compared to 2019 levels due to travel restrictions during the pandemic. There was a flat trend in emissions prior to this, with improvements in conventional vehicle efficiencies being balanced by growing road traffic and an increasing trend in the size of vehicles. It is too early to say whether surface transport emission reductions in Wales are on track compared to the CCC's pathway, as it depends on how the sector rebounds from the pandemic (Figure 2.3a).

Electric car sales in Wales are on track but remain slightly lower than the UK average.

Uptake of zero-emission vehicles is continuing to accelerate in Wales.

- Data from New Automotive* indicates that 13.8% of new car sales in Wales were battery-electric in 2022, which is on track compared to the CCC's pathway (Figure 2.3b). This is slightly below the 16.6% seen in the UK in 2022.
- Sales of battery-electric vans are significantly off track compared to the CCC's pathway (Figure 2.3c). In 2021, only 1.8% of van sales were battery-electric vehicles, which is a factor of four lower than the CCC pathway of 8%.

Public chargepoint provision is slightly off track and deployment needs to scale up urgently to support the EV transition.

Electric vehicle charging infrastructure. The number of public chargepoints increased to 1,465 in 2022, which is slightly off track compared to the CCC's pathway (Figure 2.3d). There were only 283 rapid public chargepoints in 2022, which is significantly off track compared to the CCC's pathway (Figure 2.3e). Installations will need to accelerate fast to support the transition to electric vehicles (EVs) over the next decade and beyond.

* We have used data from New Automotive on the level of electric car sales in Wales because it has been suggested that the published Department for Transport (DfT) vehicle licensing statistics (which we had used previously) may be underreporting the uptake of EVs in the devolved administrations – due to numerous leasing companies registering vehicles at their head office locations in England rather than where the vehicle is being used. New Automotive does not currently publish equivalent regional breakdowns for van sales, so we are still using the DfT data for vans.

- Wales is currently behind both England and Scotland in terms of public chargepoints per head of population, although some progress was made in closing this gap during 2022. It should be noted that there may be a slightly lower need for on-street charging in Wales, given that recent research found that the proportion of Welsh households with the potential to install a home charger is around ten percentage points higher than the UK average.¹¹
- An immediate and significant acceleration in deployment is needed if the Welsh Government is to meet its target of having one public chargepoint for every 7-11 EVs by 2025. Current provision is around one for every 15 EVs. The longer-term target for this to fall to one for every 25 EVs is more ambitious than the UK Government's minimum target of a total of 300,000 public chargepoints by 2030, which translates to around one for every 30 EVs.

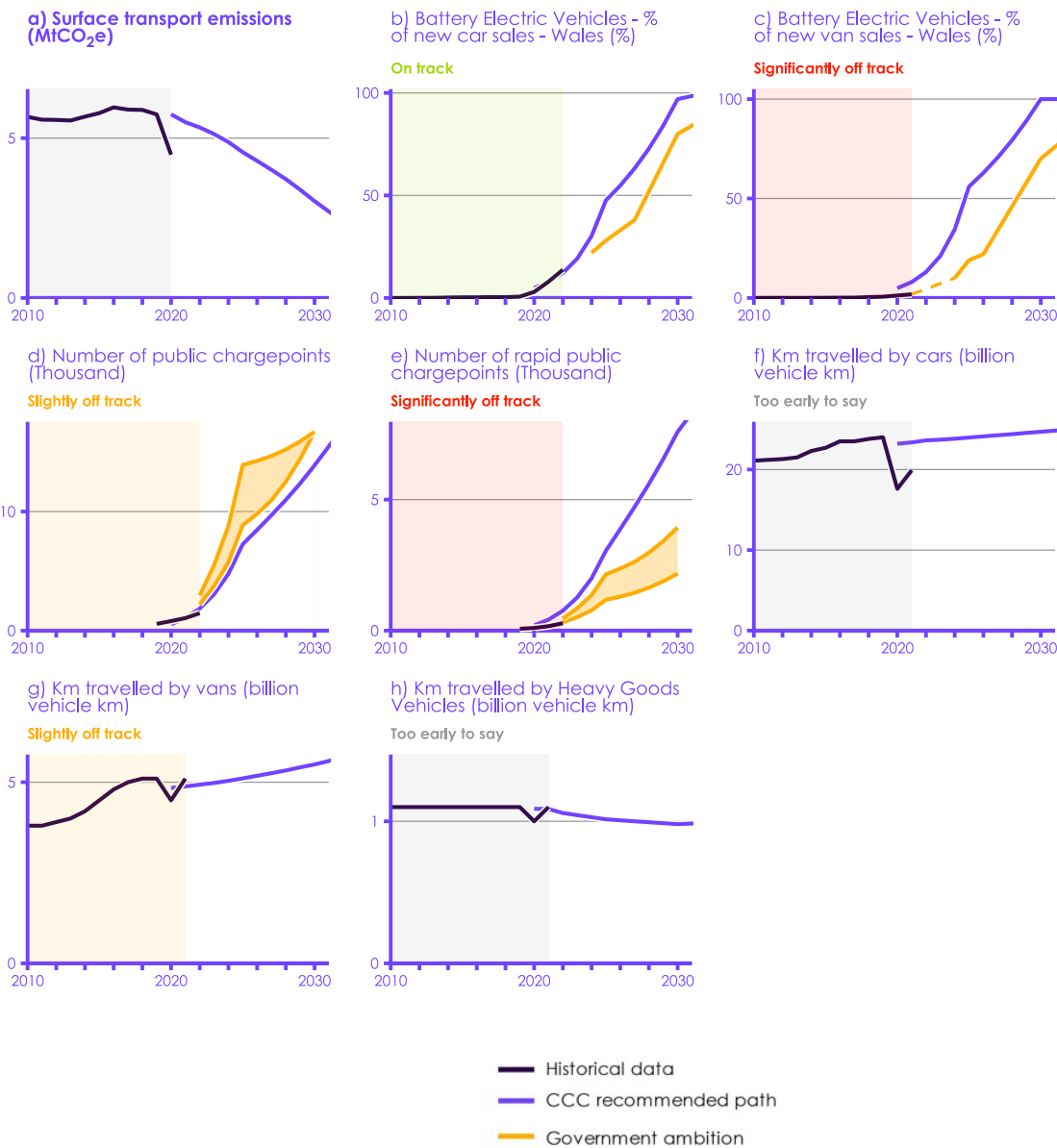
Car demand fell steeply during the pandemic. However, it began to rebound during 2021 and pre-pandemic trends were increasing.

Road transport demand. Vehicle-kilometres increased in 2021 as travel restrictions were lifted following the pandemic. Prior to the pandemic they were steadily rising.

- Car-kilometres in 2021 were still 17% below pre-pandemic levels but are expected to have increased further in 2022, and it is too early to say whether this is on track compared to the CCC's pathway (Figure 2.3f).
- Both van and Heavy Goods Vehicle (HGV) kilometres had already recovered to pre-pandemic levels by 2021, with van-kilometres being slightly off track compared to the CCC's pathway (Figures 2.3g and 2.3h). More needs to be done to address this rise in van traffic.

Van traffic has increased more than any other mode since 2000. Policy is needed to address this to reduce emissions and improve urban air quality and congestion.

Figure 2.3 Key surface transport indicators



Source:

a) National Atmospheric Emissions Inventory (2022) *Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland: 1990-2020*;

b) New Automotive (2023) *Electric car count*;

c) DfT (2022) *Vehicle licensing statistics*;

d-e) DfT (2023) *Electric vehicle charging device statistics*;

f-h) DfT (2022) *Road traffic statistics*.

Notes: We have data from New Automotive on the level of electric car sales in Wales because it has been suggested that the published DfT vehicle licensing statistics (which we had used previously) may be underreporting the uptake of EVs in the devolved administrations due to numerous leasing companies registering vehicles at their head office locations in England rather than where the vehicle is being used. New Automotive does not currently publish equivalent regional breakdowns for van sales, so we are still using the DfT data for vans.

(b) Policy assessment

The policies and plans associated with each sub-sector/policy area for this sector are assessed in Table 2.3 to determine if they are credible and on track, according to the criteria outlined in Annex 1. Detailed recommendations for this sector are given in Annex 2 and in filterable and searchable tables on our website, with a reference provided to each unique recommendation ID within the table.

Table 2.3

Policy scorecard for surface transport

Sub-sector / policy area	Welsh Government policy progress, assessment and next steps
Cars and vans – zero-emission vehicles	<p data-bbox="312 353 496 383">Mostly reserved</p> <p data-bbox="312 421 419 450">Progress:</p> <ul data-bbox="323 465 1497 1070" style="list-style-type: none"> <li data-bbox="323 465 1497 589">• The Zero-Emission Vehicle (ZEV) mandate, due to be introduced from 2024, will be the key policy mechanism to drive further uptake of electric cars and vans in the UK. It is positive that the Welsh Government has been involved in the development of the final consultation on this important policy.¹² <li data-bbox="323 607 1497 730">• The Welsh Government has published an EV charging strategy and supporting action plan, which aim to deliver a high-quality, reliable and widely available charging network across Wales.^{13,14} These documents are a good example of how to identify what needs to be done, when and by whom. <li data-bbox="323 748 1497 904">• Engagement with the private sector has been identified as a key area that needs to accelerate. The Welsh Government is working closely with local authorities to support on this, including by mapping out their vision of what charging infrastructure is expected to be needed where to guide discussions between local authorities and the private sector and by offering assistance with key enablers, such as planning. <li data-bbox="323 922 1497 1070">• Funding for local chargepoint installations in Wales is available through the UK Government's On-Street Residential Chargepoint Scheme (ORCS) – but not the Local Electric Vehicle Infrastructure (LEVI) fund. In addition to this, the Welsh Government's 2021 Infrastructure Finance Plan committed £42 million for addressing challenges and opportunities within EV adoption, including rural charging, on-street residential charging and zero-emission taxis.¹⁵ <p data-bbox="312 1088 515 1117">To be addressed:</p> <ul data-bbox="323 1133 1497 1473" style="list-style-type: none"> <li data-bbox="323 1133 1497 1227">• There is currently uncertainty over the reliability of published statistics covering EV registrations in Wales. The Welsh Government should work with the UK Department for Transport (DfT) to ensure that these statistics present an accurate picture of uptake (recommendation R2023-017). <li data-bbox="323 1245 1497 1339">• It will be important for Welsh Government to ensure proactive identification of opportunities for further policies and incentives that could drive adoption forward beyond the ZEV mandate and deliver benefits for Welsh people (priority recommendation R2023-018). <li data-bbox="323 1357 1497 1473">• The charging strategy aims to provide one public chargepoint for every 7-11 EVs on the road. Present provision is slightly below this ambition (estimated to be around one for every 8-15 EVs), so infrastructure deployment will need to grow faster than EV adoption to meet this goal (recommendation R2023-019). <p data-bbox="312 1491 839 1520">Risks due to UK Government action: Medium.</p> <ul data-bbox="323 1536 1497 1899" style="list-style-type: none"> <li data-bbox="323 1536 1497 1749">• Regulation of the new-vehicle market from 2024 onwards will be driven by the new ZEV mandate, which as currently proposed is a UK-wide scheme. Wales is therefore dependent on the efficacy of these regulations and the establishment of a robust UK-wide market for EVs. The recent acceleration in sales, coupled with the credibility of these policy proposals, gives confidence that this will occur. The four-nations approach taken for the latest ZEV mandate consultation suggests an improvement in engagement between the UK and devolved governments. <li data-bbox="323 1767 1497 1899">• However, the Welsh Government's ambition for EV uptake aligns with our Balanced Pathway, which is more ambitious than the targets proposed in the ZEV mandate. This poses a risk to delivery if further policy and market development do not drive adoption to scale up more quickly than the minimum requirements imposed by the mandate.

<p>Heavy-duty vehicles – zero-emission vehicles</p>	<p>Mostly reserved</p> <p>Progress:</p> <ul style="list-style-type: none"> Wales has signed up to a global memorandum of understanding on zero-emission medium- and heavy-duty vehicles, which commits to working together to enable 100% zero-emission new truck and bus sales by 2040.¹⁶ The Welsh Government is supporting Welsh businesses to apply for funding as part of the UK Government's Zero-Emission Road Freight Trials. The projects selected for this funding have not yet been announced. <p>To be addressed:</p> <ul style="list-style-type: none"> The Welsh Government should be involved in the UK Government's next steps on heavy-duty vehicles – including consulting on sales regulations and considering what enabling infrastructure and support might be required. <p>Risks due to UK Government action: Medium.</p> <ul style="list-style-type: none"> Decarbonisation of the fleet will depend on UK-wide markets, which are expected to expand through ongoing UK zero-emission HGV demonstration projects and as a result of UK Government phase-out dates.
<p>Conventional vehicle efficiency</p>	<p>Mostly reserved</p> <p>Risks due to UK Government action: High.</p> <ul style="list-style-type: none"> Regulation of the new vehicle market is proposed to be carried out at a UK-wide level and current proposals do not aim to reduce emissions intensities from this portion of the market, but merely to ensure they do not get worse.¹² This is unlikely to deliver the emissions savings required from the conventional vehicles that continue to be sold out to 2030. The Welsh Government should push for greater ambition, ensuring that manufacturers are incentivised to reduce the size of vehicles sold.
<p>Rail – efficiency and technology</p> <p>Joint responsibility</p>	<p>Some risks (Y)</p> <p>Progress:</p> <ul style="list-style-type: none"> Construction work is underway to electrify 170 km of track across the Core Valleys Lines. This is funded through a combination of remaining EU grants, UK Government funding and Welsh Government investment. Transport for Wales is investing £800 million in new rolling stock for the South Wales Metro and Borderlands rail services, which will be both faster and lower-carbon. This includes five diesel/battery hybrid trains. <p>To be addressed:</p> <ul style="list-style-type: none"> A comprehensive plan for decarbonising Britain's railways is needed, including establishment of a rolling programme of track electrification. The Welsh Government should be involved in the development of this. <p>Risks due to UK Government action: Medium.</p> <ul style="list-style-type: none"> There remain uncertainties around the interdependencies between Wales and the UK through Network Rail and the new Great British Railways. Welsh Government officials are represented on Network Rail's Traction Decarbonisation Strategic Implementation Board.
<p>Passenger travel – reducing car demand</p> <p>Mostly devolved</p>	<p>Some risks (Y)</p> <p>Progress:</p> <ul style="list-style-type: none"> Wales is more ambitious than the UK Government on reducing car demand, with the 2021 Net Zero Wales plan setting an aim of reducing car miles travelled per person by 10% by 2030 relative to 2019 levels.¹

	<ul style="list-style-type: none"> To help deliver demand-side emissions reductions, Wales has taken two significant and laudable decisions concerning its road network in recent years: <ul style="list-style-type: none"> – Changing the default speed limit on most residential and built-up roads from 30mph to 20mph (due to be introduced in September 2023). This aims to improve road safety and make walking and cycling in local communities more attractive. – Cancelling all major road-building projects (announced in February 2023). The Welsh Government accepted the recommendations from an independent panel to cancel construction of 44 out of 59 road projects reviewed on environmental grounds and to introduce stringent tests that will only permit new road projects if they will meaningfully contribute to modal shift, reducing emissions and adapting to the impacts of climate change.¹⁷ The Welsh Government has also published a Remote Working Strategy, setting out a vision for how to meet its goal of 30% of the workforce to work remotely on a regular basis and a framework of indicators to monitor progress.¹⁸ These include a variety of travel demand metrics. <p>To be addressed:</p> <ul style="list-style-type: none"> A full delivery plan is now needed for how to realise the ambition of reducing per-person car demand by 10% by 2030. This should include consideration of how measures that restrict car usage will interact with those that enable more sustainable modes (priority recommendation R2023-020). <p>Risks due to UK Government action: Medium.</p> <ul style="list-style-type: none"> Demand policy is largely devolved. However, measures with taxation implications, such as national road-pricing schemes, would need to be co-developed with the UK Treasury which is not currently focusing on these issues. There also remains a risk that the lower ambition and reluctance to consider demand-side measures in the wider UK could hinder public acceptance of Wales's demand-reduction plans.
<p>Passenger travel – modal shift to active travel</p> <p>Mostly devolved</p>	<p>Credible plans (G)</p> <p>Progress:</p> <ul style="list-style-type: none"> The Welsh Government's 2021 Infrastructure Finance Plan committed £220 million over 2022/23 – 2024/25 through the Active Travel Fund.^{13,19} It is positive that this includes a mixture of core funding for every local authority and grants for specific projects. On a per-capita basis, this is almost four times as much funding as that committed by the UK Government to Active Travel England.* Welsh local authorities are required to produce maps of both existing and future active travel routes, to help inform investment decisions. All local authorities except one have now produced the required maps and received approval from the Welsh Government. <p>To be addressed:</p> <ul style="list-style-type: none"> Current active travel funding runs to 2024/25. Local authorities will require certainty on funding beyond this point in order to progress plans for more ambitious schemes. Therefore, the Welsh Government should provide clarity on future funding arrangements, ideally providing certainty for a number of years, (recommendation R2023-021). <p>Risks due to UK Government action: Low.</p> <ul style="list-style-type: none"> Most active travel policy is devolved, although powers to approve the use of new types of vehicles (e.g. e-scooters) are reserved.
<p>Passenger travel – modal shift to public transport</p> <p>Joint responsibility</p>	<p>Some risks (Y)</p> <p>Progress:</p> <ul style="list-style-type: none"> £107 million of sustainable transport funding has been allocated to the Local Transport Fund with responsibility for prioritising its use devolved to regional transport planning bodies.²⁰ This is in

* This comparison refers to the funding committed to Active Travel England at Spending Review 2021, before this was subsequently cut in March 2023. Following this cut, the per-capita comparison increases to eight times as much.

	<p>addition to £770 million of funding for the public transport system, for which delivering emissions reductions and modal shift has been made a priority.</p> <ul style="list-style-type: none"> Transport for Wales is leading development of the South Wales Metro, an integrated network of rail, bus and active travel that will make sustainable travel more appealing and less complex. <p>To be addressed:</p> <ul style="list-style-type: none"> Wales should build on the success of the £2 bus fare cap in England to introduce measures to make public transport fares more affordable, joined-up and straightforward (recommendation R2023-022). <p>Risks due to UK Government action: Medium.</p> <ul style="list-style-type: none"> While bus policy is mostly devolved, planning and funding of rail infrastructure remain mostly reserved. Future interactions through the new Great British Railways are uncertain.
<p>Freight – demand reduction and modal shift</p> <p>Joint responsibility</p>	<p>Significant risks (O)</p> <p>Progress:</p> <ul style="list-style-type: none"> Sustrans is running two e-cargo bike trial schemes in Swansea and Aberystwyth, which offer businesses free loans of e-cargo bikes to test how well they could work for them. <p>To be addressed:</p> <ul style="list-style-type: none"> The Welsh Government is currently developing a National Freight and Logistics Plan. This should cover opportunities to reduce road freight travel demand, including consolidation and modal shift, and should be published by 2024 (recommendation R2023-023). <p>Risks due to UK Government action: Medium.</p> <ul style="list-style-type: none"> Cross-border freight and UK-wide haulage companies will be influenced by policies imposed by both the Welsh and UK Governments.

4. Buildings

The Welsh Government makes policy for social housing, public buildings, education and skills, and building regulations. It does not have control over energy efficiency standards for existing buildings (such as EPC requirements and regulation of private landlords), products policies, or regulating the financial sector. However, the Welsh Government is able to provide loans and grants for improvements to buildings (such as investing in energy efficiency measures and low-carbon heating).

(a) Indicators of progress

Emissions have changed little over much of the last decade and were 4.4 MtCO₂e in 2020 (Figure 2.4a). Emissions come predominantly from residential buildings (3.6 MtCO₂e) with smaller contributions from commercial (0.5 MtCO₂e) and public (0.3 MtCO₂e) buildings (Figure 2.5).

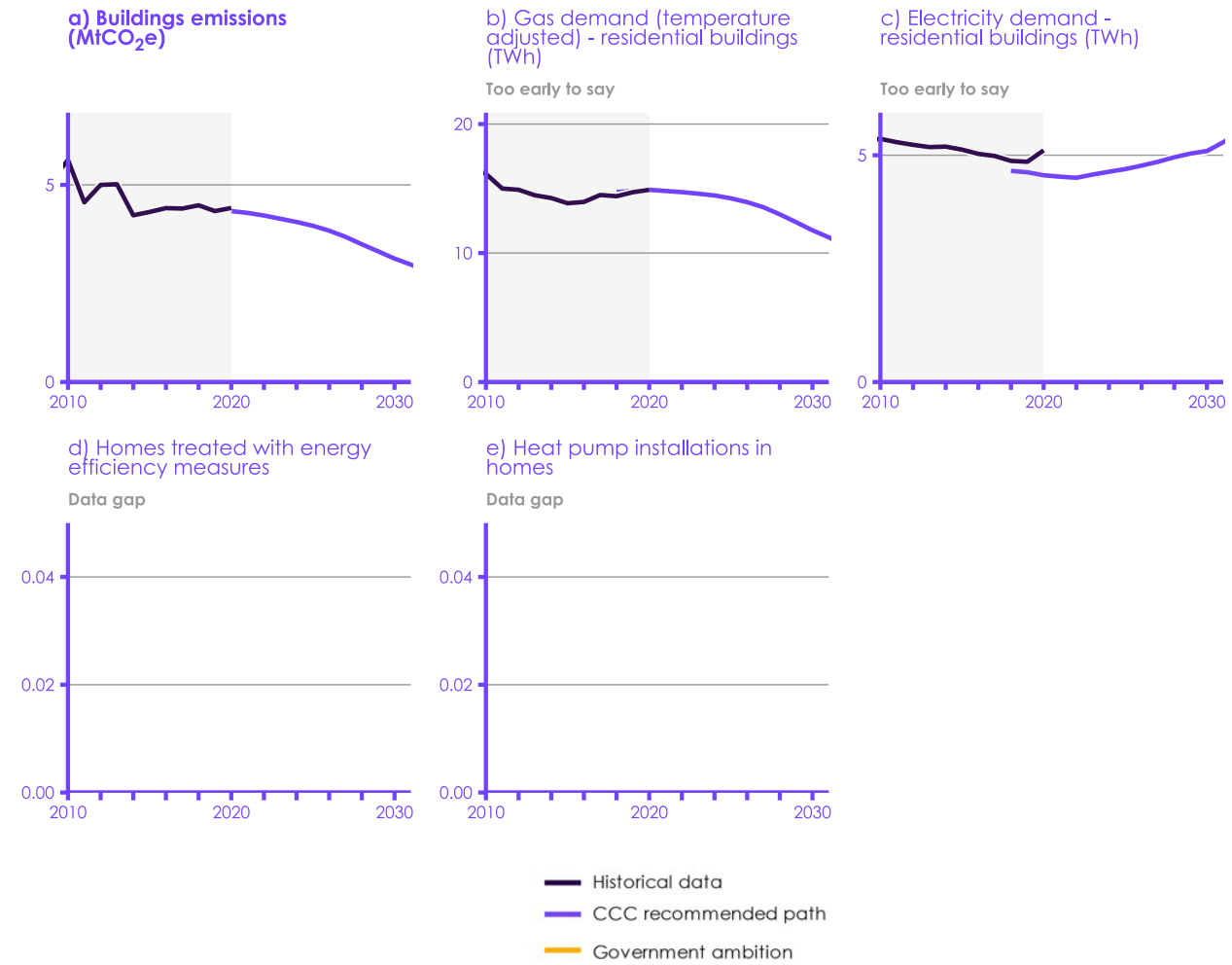
- Emissions increased by 2% in 2020 compared to 2019 levels, driven by increased emissions from residential buildings, probably caused by an increase in working from home during the pandemic. Emissions are therefore slightly off track compared to the CCC's pathway.

Energy demand.

- Gas demand in residential buildings has remained broadly similar over the last decade. In 2020, temperature-adjusted gas demand in residential buildings in Wales was 14.9 TWh, almost the same as in 2011 (Figure 2.4b).
- Electricity demand in residential buildings fell by around 9% over the decade from 2009 to 2019. However, in 2020 consumption rose 5%, to 5.1 TWh, driven by increased occupation of homes in the COVID-19 pandemic.

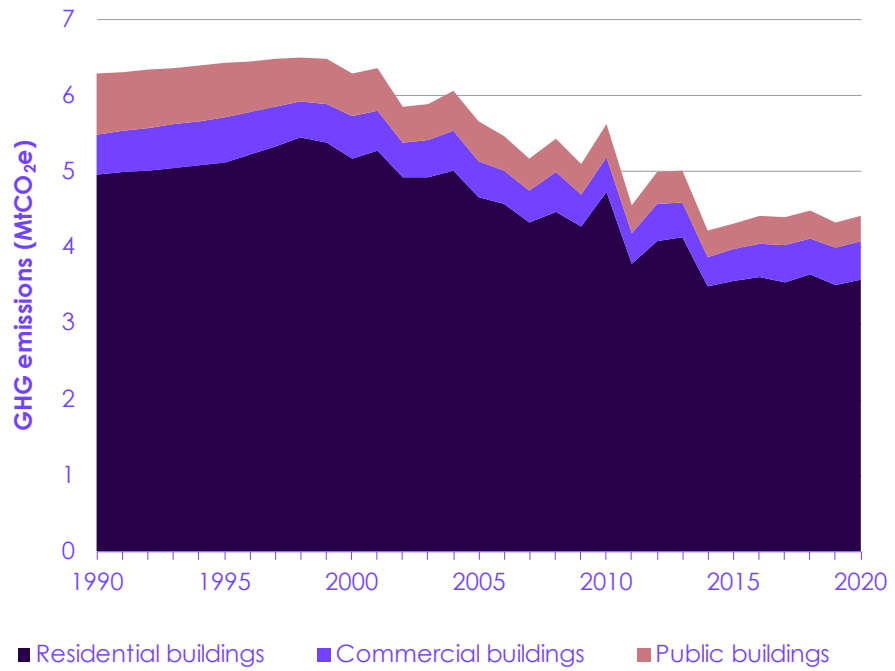
Data gaps. There is currently no data to track energy efficiency treatments or heat pump installations. Data collection should be improved in these areas.

Figure 2.4 Key building indicators



Source:
 a) National Atmospheric Emissions Inventory (2022) *Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland: 1990-2020*;
 b) BEIS (2022) *Subnational total final energy consumption statistics: 2005 to 2020*;
 c) BEIS (2022) *Subnational total final energy consumption statistics: 2005 to 2020*.

Figure 2.5 Buildings emissions by building type



Source: Welsh Government.

Notes: GHG stands for greenhouse gas. The global warming potential values used are those without carbon feedback from the IPCC's Fifth Assessment Report.

(b) Policy assessment

The policies and plans associated with each sub-sector/policy area for this sector are assessed in Table 2.4 to determine if they are credible and on track, according to the criteria outlined in Annex 1. Detailed recommendations for this sector are given in Annex 2 and in filterable and searchable tables on our website, with a reference provided to each unique recommendation ID within the table.

Table 2.4

Policy scorecard for buildings

Sub-sector / policy area	Welsh Government policy progress, assessment and next steps
Buildings (Overall)	Significant risks (O)
Joint responsibility	<p>Progress: The Welsh Government is:</p> <ul style="list-style-type: none"> Supporting the delivery of Local Area Energy Plans across all local authorities in Wales. These are due to be completed by April 2024.¹ Delivering schemes to decarbonise socially rented homes by retrofitting energy efficiency measures and low-carbon heat. Planning to decarbonise public buildings.

	<p>To be addressed:</p> <ul style="list-style-type: none"> The Welsh Government needs a credible, detailed plan for decarbonising all buildings, drawing on the details in Local Area Energy Plans (priority recommendation R2023-039). This should include deployment targets and investment costs for delivering energy efficiency measures and low-carbon heat. This would support planning of investment and monitoring progress, and clarify requirements for action by the Welsh and UK governments. <p>Risks due to UK Government action: High.</p> <ul style="list-style-type: none"> Most of the powers required to deliver decarbonisation of buildings are reserved to the UK Government, limiting the levers available to the Welsh Government to deliver on its targets. There are currently significant risks in UK Government policies across the joint responsibility sub-sectors, including energy efficiency and low-carbon heat in non-fuel-poor homes.
<p>Owner-occupied and private-rented homes (non-fuel-poor)</p>	<p>Mostly reserved</p> <p>Progress:</p> <ul style="list-style-type: none"> The Welsh Government has commenced its Optimised Retrofit Programme.²¹ This targets socially rented homes but enables the trial and refinement of digital tools to support a wider decarbonisation programme. <p>To be addressed: The Welsh Government:</p> <ul style="list-style-type: none"> Needs a credible strategy for decarbonising existing owner-occupied and private-rented homes, and a clear understanding of the scale of this challenge (priority recommendation R2023-039). It is largely reliant on UK Government policies but would benefit from a plan setting out the scale of the challenge and preferred solutions, to identify areas it can influence and requirements for investment, and clarify its expectations of the UK Government. Could develop more ambitious plans for enabling delivery of low-carbon heating and energy efficiency in those areas where it has powers, such as skills and investment. <p>Risks due to UK Government action: High.</p> <ul style="list-style-type: none"> Powers required for policies to decarbonise existing owner-occupied and private-rented homes are largely reserved. Many policies which will be critical to decarbonising buildings are still being developed by the UK Government, including: the market-based mechanism for low-carbon heat; updated minimum energy efficiency standards for private rented homes; phase-out dates for fossil fuel boilers; financial incentives to support widespread building retrofits; and improvements to EPCs and EPC assessments.
<p>Social housing</p> <p>Mostly devolved</p>	<p>Significant risks (O)</p> <p>Progress: The Welsh Government has:</p> <ul style="list-style-type: none"> Commenced its Optimised Retrofit Programme, involving works to around 1,700 socially rented homes, and enabling the trial and refinement of digital tools to support the wider decarbonisation of homes.²¹ Consulted on updating the Welsh Housing Quality Standard, including a requirement for retrofitting all social housing to achieve an EPC 'A' rating.²² <p>To be addressed:</p> <ul style="list-style-type: none"> Retrofitting houses to achieve an EPC 'A' rating is costly and unlikely to be a cost-optimal approach to decarbonising homes (considering the overall investment and operational costs and savings). The Welsh Government should carefully consider whether requiring EPC 'A' ratings is a sensible approach to decarbonising the social housing stock – as opposed to delivering a more moderate improvement in energy efficiency and decarbonising through use of heat pumps – before finalising the Welsh Housing Quality Standard (priority recommendation R2023-040). The Welsh Government needs to fully assess the level of investment required to decarbonise social housing and make long-term plans for delivering the funding required (priority recommendation R2023-040). <p>Risks due to UK Government action: Low.</p>

<p>Fuel-poor homes Mostly devolved</p>	<p>Progress:</p> <ul style="list-style-type: none"> The Welsh Government's fuel poverty strategy identifies reducing carbon emissions from homes as a goal.²³ The Welsh Government's Warm Homes Programme supports retrofitting of energy efficiency and low-carbon heating in lower income households in owner-occupier and private-rented sectors. The Welsh Government has consulted on the next phase of the programme and is considering widening eligibility for support.²⁴ <p>To be addressed:</p> <ul style="list-style-type: none"> The Welsh Government needs to fully assess the level of investment required in fuel-poor homes and make long-term plans for delivering the funding required (recommendations R2022-111 and R2023-112). <p>Risks due to UK Government action: Low.</p>
<p>New homes Mostly devolved</p>	<p>Some risks (Y)</p> <p>Progress:</p> <ul style="list-style-type: none"> The Welsh Government has implemented an update to Part L of the Building Regulations, requiring a reduction in carbon emissions from new homes. The standards will not completely prevent developers from installing fossil-fuel boilers, and it is unclear whether they will sufficiently incentivise uptake of low-carbon heating. <p>To be addressed:</p> <ul style="list-style-type: none"> Plans are being developed for a revision of Part L in 2025 – the Welsh Government should take this opportunity to ensure that all new homes incorporate zero-emissions heating and ultra-high levels of fabric efficiency (recommendation R2023-043). Energy standards could be improved by using absolute targets for energy use rather than comparison against notional buildings. Improvements to building standards enforcement are needed, including expanding the use of performance testing, to ensure that the actual performance of new buildings aligns with expectations and to hold contractors to account for quality and performance. <p>Risks due to UK Government action: Low.</p>
<p>Heat networks Joint responsibility</p>	<p>Significant risks (O)</p> <p>Progress:</p> <ul style="list-style-type: none"> The Welsh Government is supporting the delivery of Local Area Energy Plans across all local authorities in Wales. These should identify areas where heat networks are to be prioritised.¹ The Welsh Government Energy Service provides support for delivering low-carbon heat in the public sector, including using heat networks.²⁵ <p>To be addressed:</p> <ul style="list-style-type: none"> The Welsh Government opted out of participating in the Green Heat Network fund. This potentially leaves a lack of support for investment in larger heat network schemes. The Welsh Government should ensure that plans are put in place to support delivery of heat networks where a need for these is identified in Local Area Energy Plans. <p>Risks due to UK Government action: Medium.</p>
<p>Commercial buildings Joint responsibility</p>	<p>Some risks (Y)</p> <p>Progress:</p> <ul style="list-style-type: none"> The Welsh Government has implemented an update to Part L of the Building Regulations, requiring a reduction in carbon emissions from new buildings. The standards will not completely prevent developers from installing fossil-fuel boilers and it is unclear whether they will sufficiently incentivise uptake of low-carbon heating.

	<ul style="list-style-type: none"> From April 2023, UK Government regulations will require all privately rented non-domestic buildings to achieve a minimum EPC 'E' rating. <p>To be addressed:</p> <ul style="list-style-type: none"> Plans are being developed for a revision of Part L in 2025 – the Welsh Government should take this opportunity to ensure that new buildings incorporate zero-emissions heating and ultra-high levels of fabric efficiency (recommendation R2023-043). Energy standards could be improved by using absolute targets for energy use rather than comparison against notional buildings. Improvements to building standards enforcement are needed, including expanding the use of performance testing, to ensure that the actual performance of new buildings aligns with expectations and to hold contractors to account for quality and performance. <p>Risks due to UK Government action: High.</p> <ul style="list-style-type: none"> Powers required for policies to decarbonise commercial buildings are largely reserved. Many policies which will be critical to decarbonising non-residential buildings are still being developed by the UK Government.
<p>Public buildings Mostly devolved</p>	<p>Significant risks (O)</p> <p>Progress:</p> <ul style="list-style-type: none"> The Welsh Government's Net Zero Strategic Plan includes a plan to decarbonise the Government's administrative estate by 2030.²⁶ The Welsh Government Energy Service provides technical advice and grants to public sector organisations and community enterprises for reducing emissions, including through energy efficiency and low-carbon heating measures.²⁵ Plans are in place to continue the service to 2027. The Wales Funding Programme provides interest-free loans to public sector organisations to support energy efficiency projects. <p>To be addressed:</p> <ul style="list-style-type: none"> The Welsh Government has set out a route map for decarbonising all public sector buildings by 2030.²⁷ However, this does not identify the detailed actions required, or funding requirements and sources (priority recommendation R2023-041). The current Energy Service grant scheme is due to end in June. The Welsh Government needs to make plans to ensure adequate funding continues to be available to support public sector decarbonisation. <p>Risks due to UK Government action: Medium.</p> <ul style="list-style-type: none"> Emissions from some public buildings, such as prisons and departmental offices, are under the control of the UK Government. Decarbonisation of these buildings relies on plans by the UK Government, but their emissions contribute to the emissions apportioned to Wales.
<p>Enabling policy Joint responsibility</p>	<p>Significant risks (O)</p> <p>Progress:</p> <ul style="list-style-type: none"> The Welsh Government is supporting the delivery of Local Area Energy Plans across all local authorities in Wales. These are due to be completed by April 2024.¹ <p>To be addressed: The Welsh Government:</p> <ul style="list-style-type: none"> Has published a Net Zero Wales Skills Action Plan, but has not yet quantified the skills and workforce requirements, or developed policies for skills delivery (recommendation R2023-045).²⁸ Needs to develop long-term solutions for financing low-carbon heat and energy efficiency, using its devolved powers where possible, and working with the UK Government on solutions which are outside its powers (priority recommendation R2023-039). Should improve public engagement on Net Zero and raise awareness of the changes required to decarbonise buildings (recommendation R2023-044).

- Should review planning policies, including details of permitted development rights, which may currently restrict installations of low-carbon heating and energy efficiency measures **(recommendation R2023-042)**.

Risks due to UK Government action: Medium.

- Public funds available for investment in decarbonising buildings are constrained by spending decisions made by the UK Government.
- Regulation of the finance sector is under the control of the UK Government. Incentivising private investment in decarbonisation through regulation of the finance sector is reliant on UK Government policy decisions.

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- ¹⁷ Roads Review Panel (2023) *The future of road investment in Wales*, <https://www.gov.wales/roads-review>.
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Chapter 3

Progress in largely-reserved policy areas

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Introduction and key messages

The Welsh Government has influence over the progress of decarbonisation in every sector. However, emissions reduction in Wales relies on significant progress in sectors with policies largely reserved to the UK Government. Most notably industry, which is Wales's highest-emitting sector.

In this chapter we track indicators of decarbonisation progress in these sectors and determine whether they are on track compared to the Welsh Government's milestones. If Welsh Government milestones are not available, or if ambition is too low, we track against CCC milestones from our updated Balanced Pathway for Wales. We also summarise and assess policy progress and outline key next steps.

Our key messages for this chapter are:

- **Industry.** Decarbonisation of Welsh industry is at risk from insufficient action at UK Government level, especially in the steel sector. The Welsh Government plans to continue working with the UK Government to advocate for more support for industrial decarbonisation in Wales. It is also using its limited powers to enable industrial decarbonisation, for example by setting up Net Zero Industry Wales to support all Welsh industrial clusters.
- **Electricity supply.** By 2030, Wales aims to generate renewable electricity equal to 70% of its electricity consumption. Welsh renewables capacity has increased over time but at a slower rate since 2016. Wales must now work with the UK Government in reserved areas to deliver strong policy consistent with decarbonising electricity supply by 2035 (e.g. on standards for new-build power plants). In addition, Wales must now take Welsh-specific programmes and devolved policy forward to support decarbonisation (e.g. on planning and consenting for new low-carbon developments and networks, participating in a Minister-led infrastructure delivery group).
- **Fuel supply.** The Welsh Government has announced the intent to prevent further extraction of fossil fuels, including preventing the expansion of the coal industry, and restricting new oil and gas extraction projects in Wales. Alongside delivering this, next steps should include assessing the potential for large-scale hydrogen production and supporting infrastructure in Wales, coordinating with the UK Government on how Wales can best contribute to UK-wide hydrogen plans and developing a Bioenergy Action Plan to clarify its position on bioenergy in Wales.
- **Aviation.** Aviation decarbonisation requires UK Government action to reduce the carbon-intensity of UK aviation and manage demand. There should be no net airport expansion across the UK, including Wales, until the sector is outperforming its emission reduction pathway and an airport capacity management framework is in place. Further recommendations on UK aviation demand and airport capacity will be in the Committee's 2023 Progress Report to the UK Parliament. The Welsh Government should also set out an aviation decarbonisation pathway to 2050, how it will be accommodated in Welsh Carbon Budgets and how Wales will prepare for the roll-out of new technologies.
- **Engineered removals.** The Welsh Government should carry out a feasibility study that assesses the potential for engineered removals in Wales, taking into account proximity to biomass feedstocks, access to CCS networks and potential impacts on energy systems. The Welsh Government should also

publish a Timber Industrial Strategy that sets out clear plans and policies for increasing the volumes of timber used in Welsh construction.

In the rest of this Chapter, we discuss progress in the following sectors:

1. Electricity supply
2. Industry
3. Fuel supply
4. Aviation
5. Shipping
6. F-gases
7. Engineered removals

1. Electricity supply

The electricity supply policy area is mostly reserved to the UK Government.

(a) Indicators of progress

Emissions have fallen by 64% since 2015 but are still slightly higher than the CCC pathway.

Emissions for the electricity supply sector were 5 MtCO_{2e} in 2020, 0.5 MtCO_{2e} higher than the CCC's pathway (Figure 3.1a). It is too early to tell whether this is off track, as any difference for 2020 mainly reflects uncertainty in the CCC pathway due to data lags. Given the closure of coal capacity in Wales, future progress compared to the CCC pathway will also depend upon when the remaining unabated gas plant close, as well as the load factors of those that remain open.

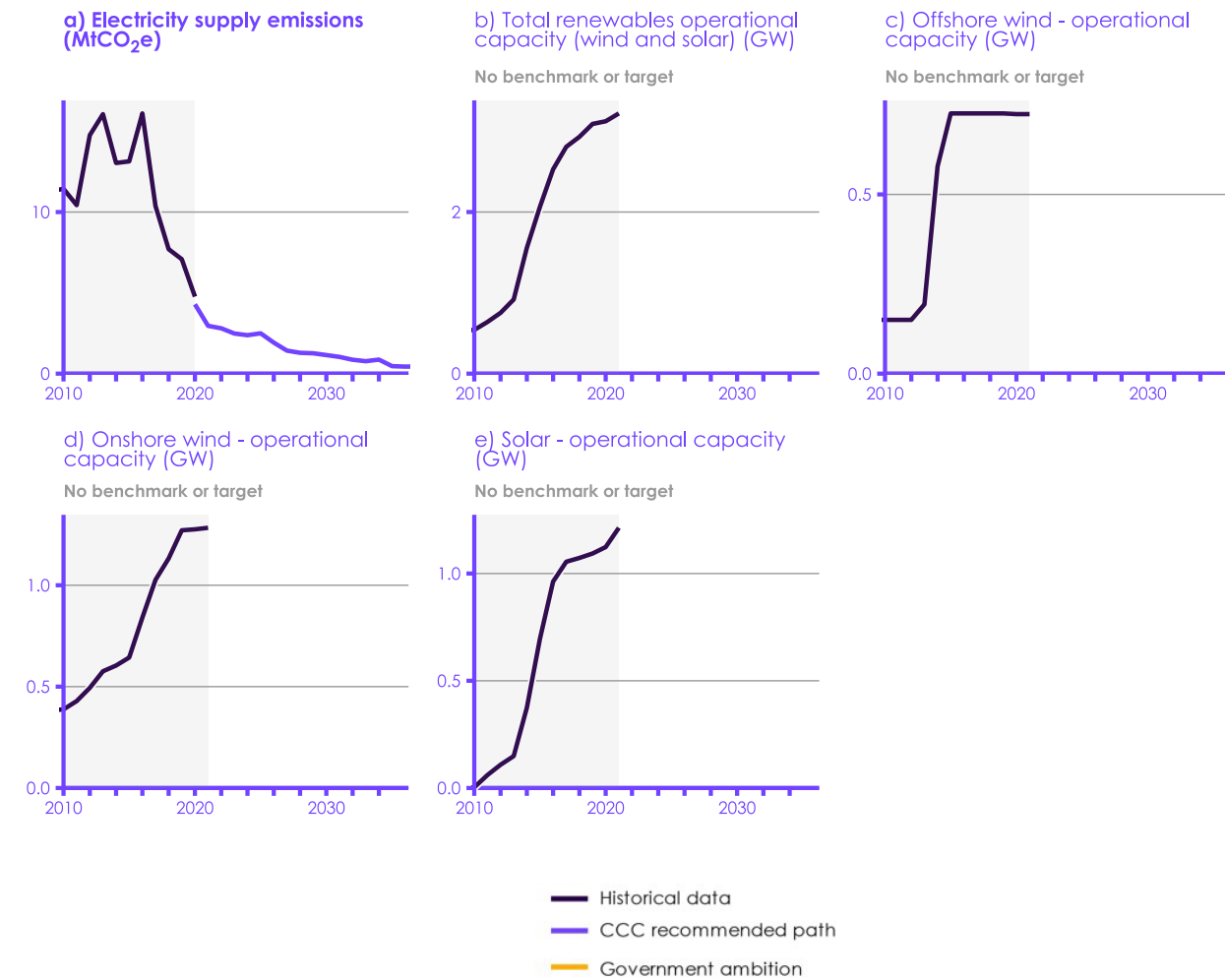
- From 2010 to 2015, there were significant fluctuations in emissions due to the successive replacement of nuclear generation with coal, and then coal generation with gas.
- Since 2015, emissions have fallen by 64%. Over the First Carbon Budget period the power sector performed better than our pathway, largely as the result of reserved policies, with emissions from both gas-fired and coal-fired generation lower than we had assumed:
 - The cessation of electricity generation by the Aberthaw coal power station in 2019, meant that its substantial contribution to Wales's emissions was eliminated.
 - Emissions from Welsh gas-fired power stations were also lower than projected, as load factors were lower than projected in our 2017 pathway.

Policy to deliver low-carbon capacity is largely reserved. Deployment of renewables in Wales has slowed in recent years.

Low-carbon capacity deployment. In 2020, generation of renewable electricity in Wales equated to 56% of Welsh electricity consumption.¹ By 2030, the Welsh Government aims to increase this to 70%. Welsh renewables capacity, including wind and solar power, has increased over time, reaching 3 GW by 2020 (Figure 3.1b). However, since 2016 renewables deployment has slowed.

- The CCC and the Welsh Government do not have a target for the total renewable energy operational capacity in Wales (Figure 3.1b), and policy to deliver this is largely reserved.
- Offshore wind capacity increased by 26% in 2015 (Figure 3.1c). After that, it stagnated, with no increase in operational capacity between 2016 and 2020.
- Operational capacity of onshore wind increased by 12% in 2019 and largely plateaued thereafter (Figure 3.1d).
- Solar operational capacity increased by 38% in 2016 (Figure 3.1e). Installation of solar capacity increased at a slower rate since 2016, with 0.27 GW of capacity installed in 2016 compared to 0.03 GW in 2020.

Figure 3.1 Key electricity supply indicators



Source:

a) National Atmospheric Emissions Inventory (2022) *Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland: 1990-2020*;
b - e) BEIS (2022) *Renewable electricity – installed capacity by region 2003 – 2021*.

(b) Policy assessment

The policies and plans associated with each sub-sector/policy area for this sector are assessed in Table 3.1 to determine if they are credible and on track, according to the criteria outlined in Annex 1. Detailed recommendations for this sector are given in Annex 2 and in filterable and searchable tables on our website, with a reference provided to each unique recommendation ID within the table.

Table 3.1

Policy scorecard for electricity supply

Sub-sector / policy area	Welsh Government policy progress, assessment and next steps
Electricity supply	<p>Mostly reserved</p> <p>Progress:</p> <ul style="list-style-type: none"> • Renewable energy targets. In 2023, the Welsh Government published a Review of Wales's renewable energy targets.² The current aim, set in 2017, is to generate renewable electricity equivalent to 70% of Wales's electricity consumption by 2030. To align with the requirements of Net Zero, the consultation proposes that the Welsh Government set a target to meet the equivalent of 100% of annual Welsh electricity consumption from renewable electricity by 2035. In addition, two new freeports are to be established in Wales, enabling development in green industries, including renewable energy (see Chapter 4).³ • Standards for new power plants. In 2021, the UK and Welsh Governments jointly published a call for evidence (CfE) on updating decarbonisation readiness standards for new-build power plants.⁴ Following the CfE, the UK Government published a consultation covering projects in England: the changes proposed cover new build and substantially refurbished combustion power plants, and require developers to demonstrate decarbonisation readiness through either carbon capture and storage (CCS) or hydrogen conversion. The Welsh Government will publish a separate response to the CfE.⁵ • Electricity networks. The Future Energy Grids for Wales project is underway and expected to be published in 2023. This aims to develop a long-term assessment of the likely future energy and network requirements for Wales, and the steps needed to deliver these. • National planning. In 2021, the Welsh Government published Future Wales: The National Plan 2040.⁶ This identified a series of 'Pre-Assessed Areas for Wind Energy' which now have a presumption in favour of large-scale energy developments. In addition, in July 2022 the Welsh Government announced a new Bill on Infrastructure Consenting. This is intended to replace existing statutory regimes for the consenting of Welsh infrastructure projects, reducing the number of authorisations required to consent projects. • Local planning. A programme to develop Local Area Energy Plans is underway and the intention is to scale these up to create a national energy plan by 2024. <p>To be addressed:</p> <ul style="list-style-type: none"> • Wales must now work with the UK Government in reserved areas to deliver strong policy consistent with decarbonising electricity supply by 2035 (e.g. on standards for new-build power plants) and take Welsh-specific programmes and devolved policy forward to support decarbonisation. • The Welsh Government should work closely as part of a Minister-led infrastructure delivery group, and in conjunction with the new Electricity Networks Commissioner, to ensure enabling initiatives for energy infrastructure are taken forward at pace and necessary policy changes are implemented in Wales, to deliver a decarbonised and resilient power system by 2035 (priority recommendation R2023-131). <p>Risks due to UK Government action: High.</p> <ul style="list-style-type: none"> • Almost all powers are reserved to the UK Government, including on energy policy and regulation of energy markets and networks, and planning for nationally significant infrastructure projects. • The UK Government has made good progress developing policy and decarbonising electricity supply, and the overall strategic objective aligns at both UK and Welsh levels (i.e. to decarbonise electricity supply by 2035). • However, the UK Government still lacks a delivery strategy for their 2035 objective, and Welsh targets are therefore dependent on UK policy and supporting infrastructure (e.g. networks and grid connections) delivering sufficiently at scale and to time.

2. Industry

The industry sector in Chapter 1 merges the industry and fuel supply sectors to align with the sector definitions used by the Welsh Government's Low Carbon Delivery Plan. They are presented separately in this chapter to provide a clearer distinction between their different statuses on policy and decarbonisation rates.

Policy to decarbonise industry is mostly the responsibility of UK Government.

(a) Indicators of progress

Emissions fell by 5% to 9.9 MtCO₂e in 2020 (Figure 3.2a). This reflects a drop in output during the pandemic rather than decarbonisation policy progress. While this means that, in 2020, Wales was on track compared to the CCC's recommended pathway, UK-wide industry emissions rebounded back to close to 2019 levels in 2021, with Wales likely to have seen a similar trend.

Energy-intensity of output. The energy consumption per unit of GVA of Welsh industry has been steadily falling over time, and in 2020 it was at 2.7 TWh/GVA, which is about 49% lower than in 2005, but 5% higher than in 2019 (Figure 3.2b).

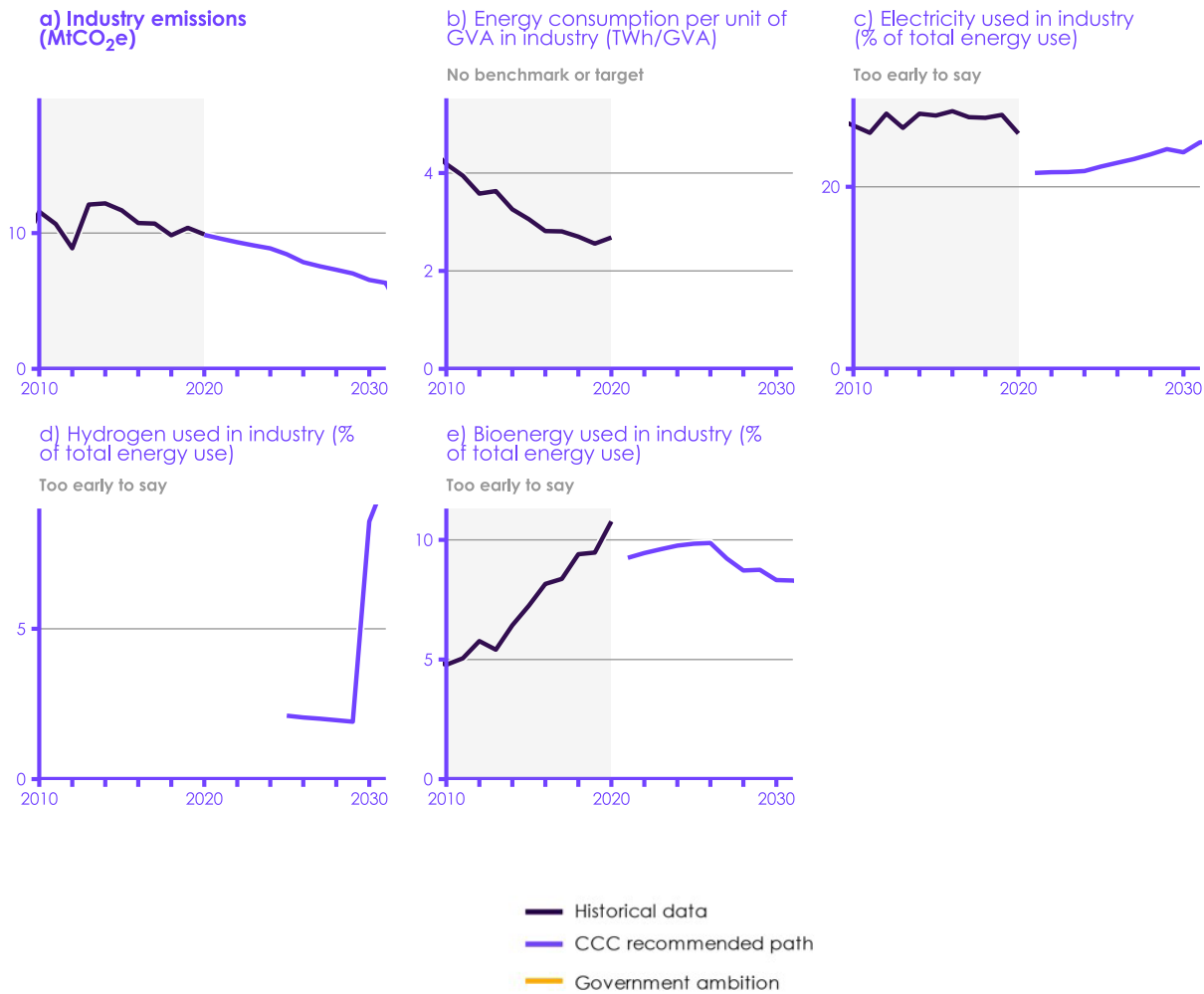
Fuel switching. It is too early to say whether Wales is on track compared to the pathway for industrial bioenergy uptake and electricity usage (Figures 3.2e and 3.2c). There is not yet any industrial use of low-carbon hydrogen, with uptake in the CCC's pathway starting in 2024 (Figure 3.2d).

- Electricity use in industry plateaued between 2015 and 2019, before it fell in 2020, reflecting the lower output of the sector that year (Figure 3.2c). The CCC's pathway does not include any substantial increases in electrification until the mid-2020s.
- Bioenergy use* in industry as a percentage of total energy use was 11% in 2020 (Figures 3.2e). This is 49% higher than it was in 2015. It is not clear what has driven this growth or whether bioenergy use is being adequately prioritised. The CCC's pathway recommends that use of bioenergy in industry stays at a similar level to 2020 and decreases after 2026 as electrification and hydrogen use in the sector ramp up.

Energy consumption per unit of GVA of Welsh industry has fallen by 49% since 2005.

* Also includes waste.

Figure 3.2 Key industry indicators



Source:

a) National Atmospheric Emissions Inventory (2022) *Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland: 1990-2020*;
 b) BEIS (2022) *Subnational total final energy consumption statistics: 2005 to 2020 and Stats Wales, Gross Value Added in Wales by industry*;
 (c-e) BEIS (2022) *Total final energy consumption at regional and local authority level: 2005 to 2020*.

Notes: The Welsh Government's Carbon Budget 1 final statement tracks 'total industry energy consumption' while we monitor 'energy consumption per unit of GVA in industry'. Wales's energy use data includes both commercial and industrial sector emissions, whereas our pathways include only industrial energy use.

(b) Policy assessment

The policies and plans associated with each sub-sector/policy area for this sector are assessed in Table 3.2 to determine if they are credible and on track, according to the criteria outlined in Annex 1. Detailed recommendations for this sector are given in Annex 2 and in filterable and searchable tables on our website, with a reference provided to each unique recommendation ID within the table.

Table 3.2

Policy scorecard for industry

Sub-sector / policy area	Welsh Government policy progress, assessment and next steps
Industry	<p>Mostly reserved</p> <p>Progress:</p> <ul style="list-style-type: none"> The South Wales Industrial Cluster (SWIC), a private-sector initiative supported by the Welsh Government, has continued to develop: <ul style="list-style-type: none"> In 2021 SWIC launched its Phase 2 Deployment Project which involves engineering studies of decarbonisation options.⁷ In 2022 SWIC was awarded £21.5 million by the UK Government to progress Phase 2.⁸ A further £17.6 million has been contributed by SWIC partner companies.⁹ In March 2023 SWIC launched A Plan for Clean Growth – a roadmap for decarbonising industry in South Wales.¹⁰ The plan sets out an ambition for decarbonisation of the cluster by 2040 and presents 30 policy drivers to help achieve this. The Welsh Government established Net Zero Industry Wales to support all developing industrial clusters in Wales, including SWIC.¹¹ The new body aims to facilitate continued collaboration between industry, government and others. It will also develop Net Zero pathways for industry in Wales and support industrial decarbonisation policy development. The Welsh Government published Beyond Recycling, a circular economy strategy which aims to reach zero waste by 2050 through greater re-use, repair, remanufacture and recycling (see Waste chapter).¹² Achieving this would improve industrial resource efficiency. The Welsh Government commissioned a report and sensitivity analysis on the feasibility of, and options for, a CCUS network for Wales.¹³ The Welsh Government will use this information to inform discussions with UK Government on the new CCS business models. The Welsh Government asked the Development Bank of Wales to develop a scheme supporting businesses on their Net Zero transition. This led to the launch of the bank's Green Business Loan Scheme which enables Welsh businesses to invest in decarbonisation and energy efficiency.¹⁴ The updated Manufacturing Action Plan released in May 2023 includes industrial decarbonisation as a strategic objective.¹⁵ It sets out the Welsh Government's approach to improving industrial energy efficiency and productivity and embedding circular economy principles. The Innovation Strategy for Wales identifies Net Zero and decarbonisation as one of six priorities for RD&I investment decisions.¹⁶ A delivery plan is planned to be published in summer 2023. The Welsh Government is working with SWIC and HyNet industrial clusters on deployment approaches for hydrogen. <p>To be addressed:</p> <ul style="list-style-type: none"> The Welsh Government should continue to work with the UK Government and advocate for more support for industrial decarbonisation in Wales (priority recommendation R2023-027). The National Energy Plan for Wales and Local Area Energy Plans (due in 2024) are an opportunity to identify the local and national requirements for, and opportunities from, industrial decarbonisation (recommendation R2023-026). There is a need to identify the skills needed to decarbonise Welsh industry and develop and implement plans to train the workforce in those skills (recommendation R2023-052). <p>Risks due to UK Government action: High.</p> <ul style="list-style-type: none"> Industrial policy is mostly reserved to the UK Government. Welsh industry has a major role to play in the UK's pathway to Net Zero as it represents 16% of UK industrial emissions. However, the decarbonisation of Welsh industry is at risk from insufficient action at the UK level. We will address

UK policy progress in industrial decarbonisation in greater detail in our upcoming UK Progress Report.

- The lack of UK-level action is particularly evident for industrial electrification and resource efficiency – two vital areas of industrial decarbonisation. There is also a lack of clarity of what some UK policies mean for Wales. For example, as SWIC is not a Track 1 cluster, it is not clear how Welsh industry will be supported to adopt CCS and hydrogen.
- The UK Government has detailed policy mechanisms for both CCS and hydrogen. However, these are currently focussed on industrial clusters with access to local storage of carbon dioxide. It is unclear how most industrial sites in Wales will be supported to adopt these technologies.
- To achieve industrial decarbonisation in Wales the UK Government must introduce policies to protect local industry from high-carbon imports.

3. Fuel supply

The industry sector in Chapter 1 merges the industry and fuel supply sectors to align with the sector definitions used by the Welsh Government's Low Carbon Delivery Plan. They are presented separately in this chapter to provide a clearer distinction between their different statuses on policy and decarbonisation rates.

The fuel supply policy area is mostly reserved to the UK Government.

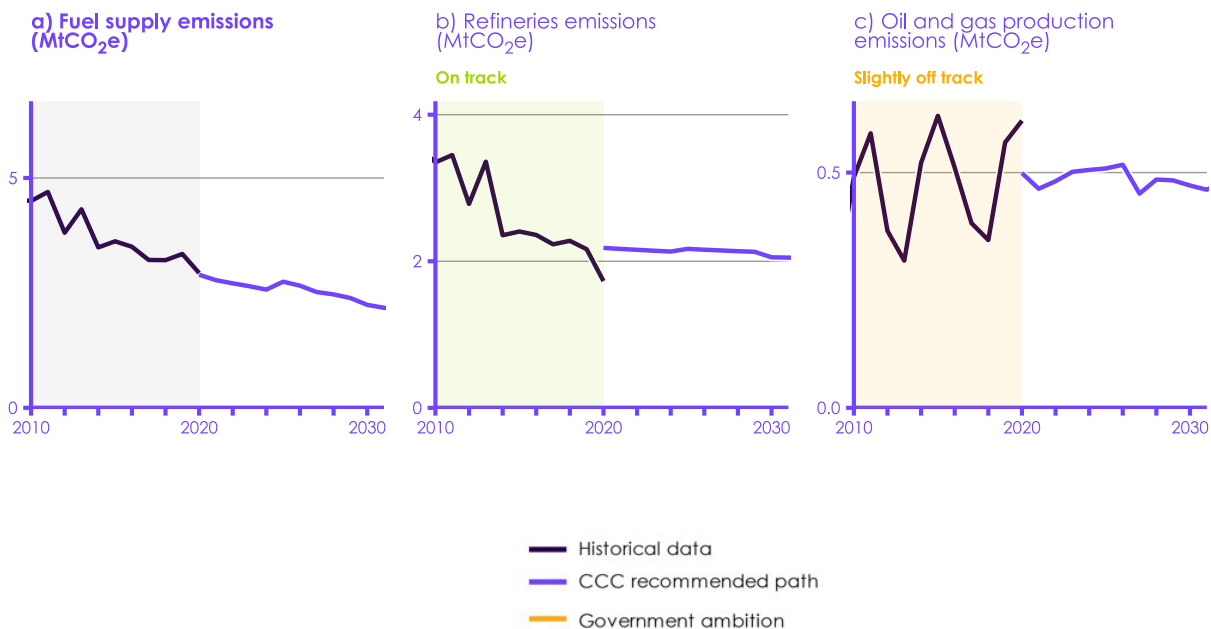
(a) Indicators of progress

Fuel supply emissions fell by 12% in 2020, as refinery activity reduced during the pandemic. Given the potential for rebound, it is too early to say if the sector is on track.

Emissions fell by 12% in 2020 to 3 MtCO₂e, as refinery activity reduced due to the pandemic.

- Emissions have been steadily decreasing since 2014 but increased in 2019 before reducing in 2020 as refinery activity reduced due to the pandemic. Emissions may have rebounded since 2020. It is too early to say if the sector is on track compared to the CCC's pathway (Figure 3.3a).
- This fall in 2020 emissions was driven by a fall in refineries emissions (Figure 3.3b) and partially balanced by an increase in oil and gas production emissions from 2018 to 2020 (Figure 3.3c), which have fluctuated around 0.5 MtCO₂e for the past decade.

Figure 3.3 Key fuel supply indicators



Source:

a) National Atmospheric Emissions Inventory (2022) *Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland: 1990-2020*;
b-c) CCC (2020) *The Sixth Carbon Budget*; CCC analysis.

(b) Policy assessment

The policies and plans associated with each sub-sector/policy area for this sector are assessed in Table 3.3 to determine if they are credible and on track, according to the criteria outlined in Annex 1. Detailed recommendations for this sector are given in Annex 2 and in filterable and searchable tables on our website, with a reference provided to each unique recommendation ID within the table.

Table 3.3 Policy scorecard for fuel supply	
Sub-sector / policy area	Welsh Government policy progress, assessment and next steps
Fossil fuel supply	Mostly reserved
	<p>Progress:</p> <ul style="list-style-type: none"> In 2021, the Welsh Government published a 'Coal Policy Statement', setting out policy on coal extraction and use in energy generation.¹⁷ The Welsh Government has set out policy to not consent new mines, extend the lifetime of existing mines or permit an expansion to existing mines, except in exceptional circumstances (e.g. to safely decommission). It has stated that the use of coal for power generation will not be permitted. The Welsh Government has announced that it will not issue new licenses for onshore oil and gas extraction in Wales (offshore exploration is reserved).¹⁸ Any land-based elements required for offshore oil and gas developments are required to be compatible with the Welsh Government's decarbonisation approach through the Welsh National Marine Plan, published in 2019.¹⁹ <p>Risks due to UK Government action: High.</p> <ul style="list-style-type: none"> The Welsh Government's powers on fossil fuel supply are broadly limited to planning and consenting. Powers relating to the approval of licences for coal-mining operations were devolved through the Wales Act 2017, with the Coal Authority remaining responsible for licencing coal mines.²⁰ Powers relating to licencing onshore oil and gas extraction were also devolved through the Wales Act 2017. The UK Government is responsible for the fiscal regime and regulation of the oil and gas industry. We have set out in recent letters to Government our view of the overwhelming evidence against new consents for coal exploration or production, and our support for tighter limits on UK oil and gas production, with stringent tests and a presumption against exploration.^{21,22}
Hydrogen supply	Mostly reserved
	<p>Progress:</p> <ul style="list-style-type: none"> The Welsh Government has set out a pathway for developing the hydrogen energy sector in Wales.²³ In the pathway, the Government has committed to establish at least one renewable hydrogen production site of at least 10 MW by 2023-24, scope large-scale hydrogen production sites and support local projects (e.g. Holyhead Hydrogen Hub). In addition, it was recently announced that two freeports in Wales are to be established, aiming to develop low carbon technologies, including hydrogen. In 2021, a Hydrogen Business Research & Innovation for Decarbonisation competition was launched to provide funding for research and innovation in hydrogen.²⁴ <p>To be addressed:</p> <ul style="list-style-type: none"> The potential for larger-scale hydrogen production and supporting infrastructure in Wales beyond 2023-24 should be assessed. Assessments and plans should consider potential sites (including freeports) and associated capacity; approaches to minimise the length of the

	<p>licensing and consenting process; and co-ordination with UK Government to determine how Wales can best contribute to UK wide plans (recommendation R2023-024).</p> <p>Risks due to UK Government action: High.</p> <ul style="list-style-type: none"> • While Wales can support the consenting of hydrogen production sites and supporting infrastructure, the fiscal regime is within the control of the UK Government. Furthermore, key decisions (e.g. hydrogen for heat) that will shape the demand and scale of hydrogen production and storage required are reserved. • We have called on the UK Government to finalise funding mechanisms to support the development of low-carbon hydrogen production and accelerate the development of business models for hydrogen transportation and storage, both seen as crucial to the delivery of a hydrogen industry.
<p>Bioenergy supply</p>	<p>Mostly reserved</p>
	<p>Progress:</p> <ul style="list-style-type: none"> • The Welsh Government has committed to develop its position on the long-term role of biomass in a sustainable energy system and clarify its role in reaching Net Zero before the end of its Second Carbon Budget period (2021-25).¹⁸ <p>To be addressed:</p> <ul style="list-style-type: none"> • A Bioenergy Action Plan should be developed, clarifying the Welsh Government's position on bioenergy, setting out its best use, key delivery mechanisms, available funding, licensing requirements and future timelines (recommendation R2023-025). <p>Risks due to UK Government action: High.</p> <ul style="list-style-type: none"> • The majority of powers are reserved to the UK Government. The UK Government has previously committed to publishing a Biomass Strategy in 2022, which should inform the Welsh Government's Action Plan. However, this is not yet published.

4. Aviation

The surface transport, aviation and shipping sectors are treated separately in this chapter, to provide a clearer distinction of the different policies taking place and the decarbonisation rates. In Chapter 1 they were combined into an overall transport sector to align with the sector definitions used by the Welsh Government in its Low Carbon Delivery Plan, which outlines how Wales intended to meet its First Carbon Budget.

The aviation policy area is mostly reserved to the UK Government.

(a) Indicators of progress

Emissions. In 2019 aviation emissions were 0.17 MtCO₂e and fell by 66% in 2020 to 0.06 MtCO₂e (Figure 3.4a) due to the pandemic. Wales's international aviation emissions were 0.04 MtCO₂e in 2020, while non-international emissions were 0.02 MtCO₂e. It is too early to say if emissions are on track compared to the CCC's provisional pathway, as it depends how the sector rebounds from the pandemic.

Demand management. Cardiff Airport is the only civilian airport in Wales. The Welsh Government intends to support airline growth at Cardiff Airport.

Data is not currently collected on the number of Welsh passengers travelling to English airports to fly, meaning CCC indicators do not reflect total Welsh aviation demand.

Welsh passengers tend to take flights from English airports, such as Bristol, Manchester and Birmingham. Data on where airport passengers travel from is not regularly reported on, therefore CCC indicators will not capture all Welsh aviation demand. A Civil Aviation Authority passenger survey report from 2019 collected data on passenger origin, which shows that 4.5 million passengers travelled from Wales to English airports.²⁵ For reference, in 2019 Cardiff Airport processed 1.6 million terminal passengers, and Welsh passenger-km per capita was 444 compared to 5392 passenger-km per capita for the UK as a whole.*

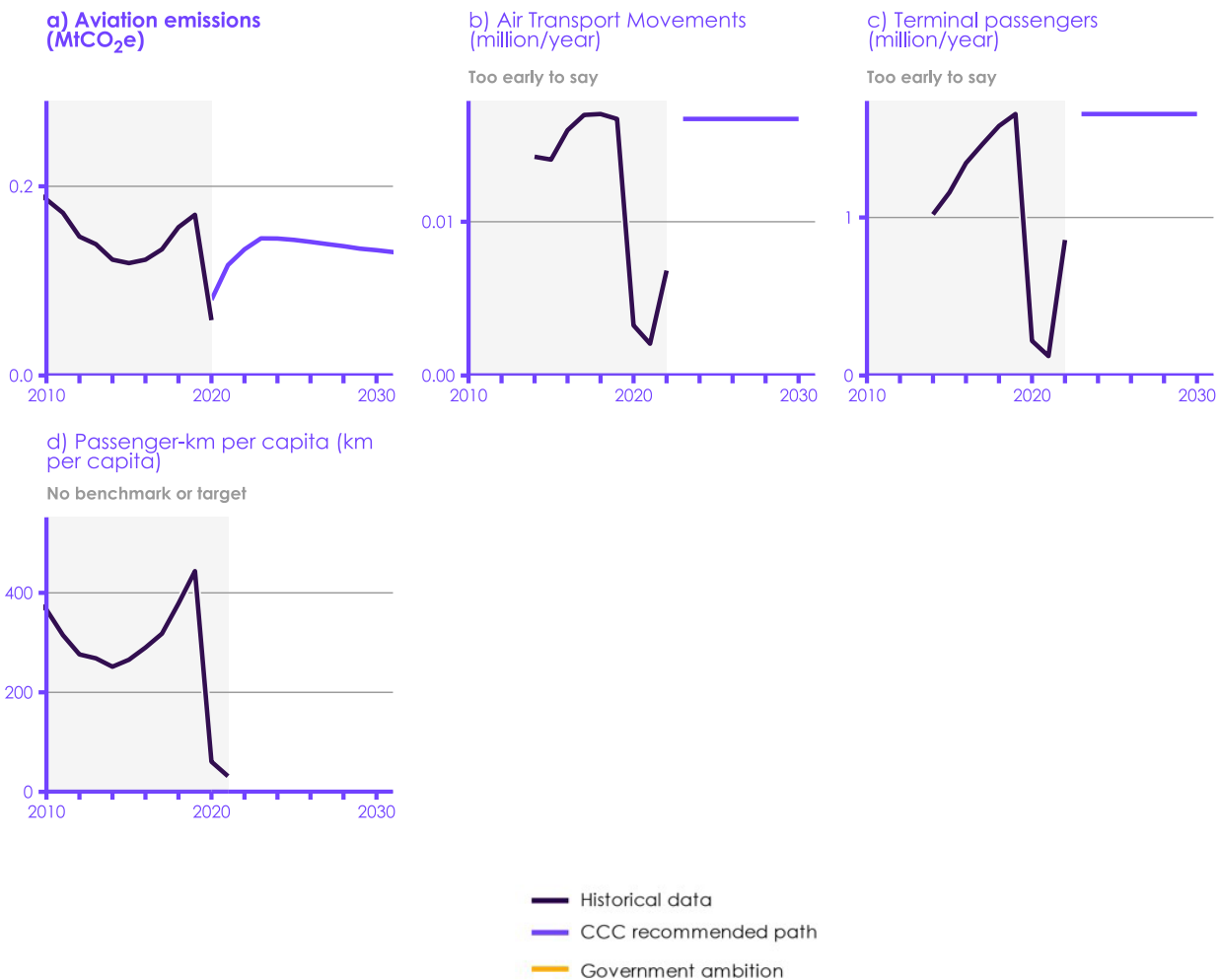
Aviation demand has not yet rebounded to pre-pandemic levels.

For the air transport movements, terminal passengers and passenger-km per capita indicators, data are only available for Cardiff Airport.

- Compared to 2019 levels, the number of air transport movements in Wales fell by 80% in 2020 during the pandemic, decreasing further in 2021. They increased in 2022 but remain 59% below pre-pandemic levels (Figure 3.4b).
- The number of terminal passengers saw similar trends, and it was still 48% below pre-pandemic levels in 2022 (Figure 3.4c).

* Note the passenger survey report does not exclude passengers travelling from Wales who do not permanently live there.

Figure 3.4 Key aviation indicators



Source:

a) National Atmospheric Emissions Inventory (2022) *Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland: 1990-2020*;
 b-d) DfT (2023) *Seat-km & passenger-km flown to/from UK airports on passenger services, 2021 (unpublished)*; ONS (2023) *Population estimates*; CCC analysis; Civil Aviation Authority, Annual airport data Table 05, Air Transport Movements; Civil Aviation Authority, Annual airport data, Table 09 Terminal and Transit Passengers.

(b) Policy assessment

The policies and plans associated with each sub-sector/policy area for this sector are assessed in Table 3.4 to determine if they are credible and on track, according to the criteria outlined in Annex 1. Detailed recommendations for this sector are given in Annex 2 and in filterable and searchable tables on our website, with a reference provided to each unique recommendation ID within the table.

Table 3.4

Policy scorecard for aviation

Sub-sector / policy area	Welsh Government policy progress, assessment and next steps
<p>Demand management</p> <p>Mostly reserved</p>	<p style="background-color: #ff0000; color: white; padding: 2px;">Insufficient plans (R)</p> <p>Progress:</p> <ul style="list-style-type: none"> Wales is making progress in modal shift and creating low-carbon alternative transport means. See Chapter 2 for more detail. <p>To be addressed:</p> <ul style="list-style-type: none"> In 2013 the Welsh Government purchased Cardiff Airport. The Welsh Government has a role in supporting the airport commercially, as well as creating “an environment to encourage growth of airlines.”²⁶ The Wales Transport Strategy commits to maintaining aviation capacity in Wales, whilst recognising the challenges this creates for meeting decarbonisation targets.²⁷ There is no aviation pathway for Wales that describes how the aviation sector will be decarbonised in line with Wales’s Carbon Budgets and the Net Zero target (recommendation R2023-008). No data are currently available that consistently tracks Welsh passengers travelling to English airports (recommendation R2023-015). <p>Risks due to UK Government action: High.</p> <ul style="list-style-type: none"> Air Passenger Duty is not devolved to the Welsh Government, unlike Northern Ireland and Scotland. The UK Government’s Jet Zero Strategy commits to increasing terminal passengers by 70% compared to 2018 levels by 2050.²⁸ The UK Government’s pathway for aviation relies on nascent technology being scaled and deployed relatively quickly for commercial use. There is no policy framework in place that would mitigate demand growth if these technologies were not deployed as planned.
<p>Sustainable Aviation Fuel (SAF)</p>	<p style="background-color: #cccccc; padding: 2px;">Mostly reserved</p> <p>Progress:</p> <ul style="list-style-type: none"> The UK Government has published its response to the first SAF mandate consultation and issued a second consultation. The 2023 UK Progress Report will provide a full assessment of the mandate. <p>To be addressed:</p> <ul style="list-style-type: none"> Plans must be in place to ensure Cardiff Airport has the support required to enable SAF uptake to help meet the UK Government’s 10% SAF target by 2030 (recommendation R2023-009). <p>Risks due to UK Government action: High.</p> <ul style="list-style-type: none"> Developing and deploying SAF is reserved to the UK Government. The SAF mandate consultation is delayed and needs to be operational by 1 January 2025.

5. Shipping

The surface transport, aviation and shipping sectors are treated separately in this chapter, to provide a clearer distinction of the different policies taking place and the decarbonisation rates. In Chapter 1 they were combined into an overall transport sector to align with the sector definitions used by the Welsh Government in its Low Carbon Delivery Plan, which outlines how Wales intended to meet its First Carbon Budget.

The shipping policy area is mostly reserved to the UK Government.

(a) Indicators of progress

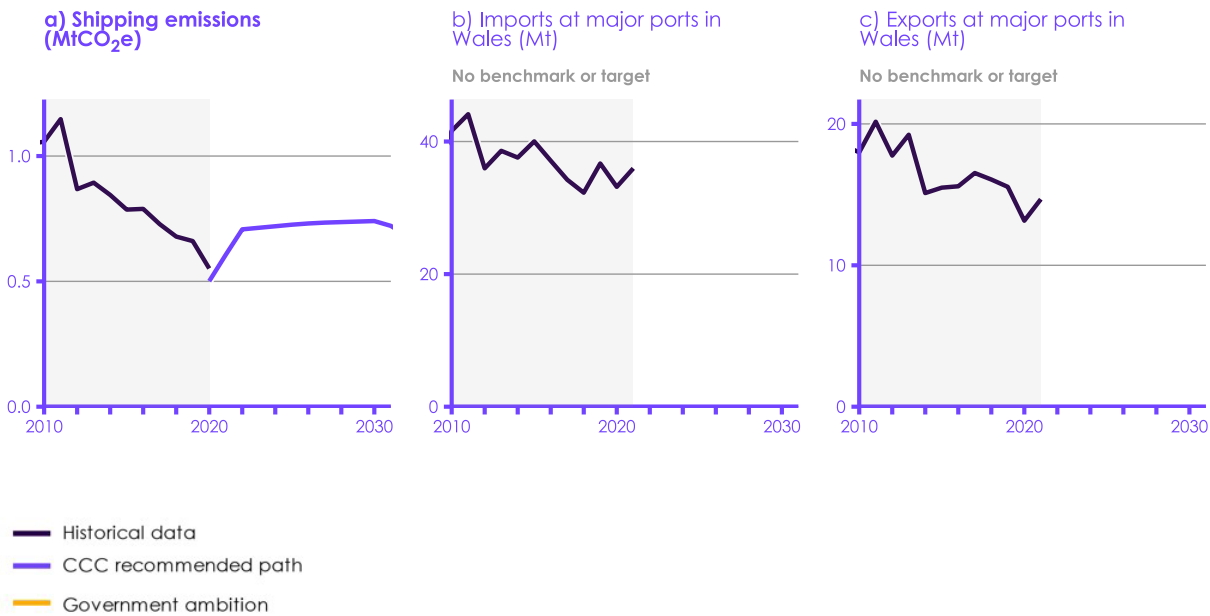
The shipping sector is mostly reserved to the UK Government. Emissions fell by 17% between 2019 and 2020 due to the pandemic.

Emissions. Shipping emissions in Wales were 0.6 MtCO₂e in 2020, a fall of 17% compared to 2019 levels, due to the pandemic (Figure 3.5a). Similar to the UK picture, Welsh shipping emissions were steadily decreasing prior to this, with 2019 emissions being 41% below 1990 levels. Emissions are likely to have increased since then, as suggested by the demand indicators.

Shipping demand. The recent decrease in shipping emissions has been driven by a reduction in demand.

- Between 2010 and 2019, imports at major Welsh ports decreased, from 41.6 Mt to 36.7 Mt of imports (Figure 3.5b). In 2020 imports dropped to 33.2 Mt and in 2021 they increased to 36.0 Mt. Similarly, historical export data shows an overall downward trend between 2010 and 2019, from 18.0 Mt to 15.5 Mt (Figure 3.5c). Exports further decreased to 13.2 Mt in 2020 and increased to 14.7 Mt in 2021.

Figure 3.5 Key shipping indicators



Source:
 a) National Atmospheric Emissions Inventory (2022) *Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland: 1990-2020*;
 b) StatsWales (2022) *Foreign and domestic freight traffic at major ports in Wales, by cargo category*;
 c) StatsWales (2022) *Quarterly imports and exports at major ports in Wales*.

(b) Policy assessment

The policies and plans associated with each sub-sector/policy area for this sector are assessed in Table 3.5 to determine if they are credible and on track, according to the criteria outlined in Annex 1. Detailed recommendations for this sector are given in Annex 2 and in filterable and searchable tables on our website, with a reference provided to each unique recommendation ID within the table.

Table 3.5
 Policy scorecard for shipping

Sub-sector / policy area	Welsh Government policy progress, assessment and next steps
Cross-cutting Mostly reserved	Insufficient plans (R)
	<p>Progress:</p> <ul style="list-style-type: none"> The National Transport Delivery Plan 2022 commits to publishing a new National Ports and Maritime Plan for Wales and recognises the importance of delivering training and skills to local people.²⁹ <p>To be addressed:</p> <ul style="list-style-type: none"> Planning and consent are devolved to the Welsh Government. The Welsh National Marine Plan commits to the future growth and increases in port facilities and vessel size. There is no decarbonisation pathway for the Welsh shipping sector (recommendation R2023-014). <p>Risks due to UK Government action: High.</p>

	<ul style="list-style-type: none"> Shipping is reserved to the UK Government. Wider maritime decarbonisation is dependent on uptake of zero-emission vessels by national and multinational shipping operators and provision of the required refuelling infrastructure at destination ports across the rest of the UK and overseas (recommendation R2023-011).
<p>Low-carbon fuels</p> <p>Joint responsibility</p>	<p>Insufficient plans (R)</p> <p>Progress:</p> <ul style="list-style-type: none"> The National Transport Delivery Plan 2022 recognises the role of ports in decarbonising shipping by providing green fuel and shore supplies to ships.²⁹ <p>To be addressed:</p> <ul style="list-style-type: none"> Welsh ports must be prepared to transition to low-carbon fuels and electrified shipping (recommendation R2023-013).

6. F-gases

The F-gas policy area is mostly reserved to the UK Government with the introduction of the F-gas regulation in 2021.

(a) Indicators of progress

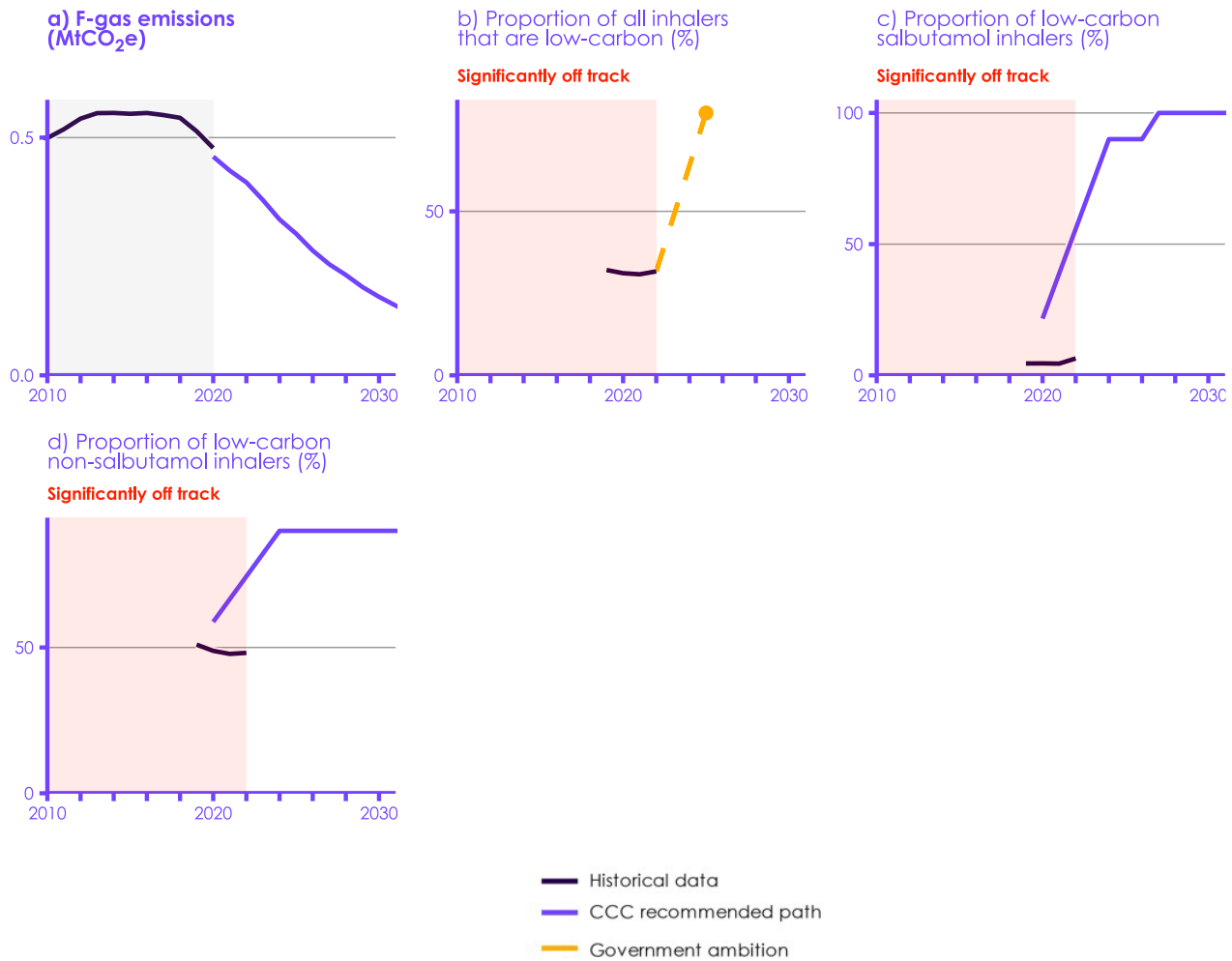
Emissions in 2020 were 0.48 MtCO₂e. Progress in reducing F-gas emissions was broadly stagnant during the first years of the First Carbon Budget, with falling emissions from 2018 (Figure 3.6a).

Inhalers and other aerosols represent 13% of the F-gases emissions in Wales.

- 32% of all inhalers in 2022 were low-carbon* (Figure 3.6b). This proportion has remained steady since 2019 and it will need to increase to reach the 80% Government target by 2035. Wales is significantly off track in meeting this target.
- In 2022, 6% of salbutamol inhalers and 48% of non-salbutamol inhalers were low-carbon (Figures 3.6c & 3.6d). The proportion of such non-salbutamol inhalers is below the 74% recommended by the CCC for 2022, and it is significantly off track against the CCC's pathway. Similarly, the percentage of low-carbon salbutamol inhalers is significantly off track compared to the CCC's recommended pathway of 56% in 2022.

* A low-carbon inhaler is defined as either (1) a non-metered dose inhaler (MDI) inhaler, or (2) an MDI inhaler using propellants with a GWP below 200 times that of CO₂.

Figure 3.6 Key F-gases indicators



Source:

a) National Atmospheric Emissions Inventory (2022) *Greenhouse Gas Inventories for England, Scotland, Wales & Northern Ireland: 1990-2020*;

b-d) NHS Wales (unpublished).

Notes: A low-carbon inhaler is defined as either (1) a non-metered dose inhaler (MDI) inhaler, or (2) an MDI inhaler using propellants with a GWP below 200 times that of CO₂.

(b) Policy assessment

The policies and plans associated with each sub-sector/policy area for this sector are assessed in Table 3.6 to determine if they are credible and on track, according to the criteria outlined in Annex 1. Detailed recommendations for this sector are given in Annex 2 and in filterable and searchable tables on our website, with a reference provided to each unique recommendation ID within the table.

Table 3.6

Policy scorecard for f-gases

Sub-sector / policy area	Welsh Government policy progress, assessment and next steps
<p>F-gases Mostly reserved</p>	<p style="background-color: yellow;">Some risks (Y)</p> <p>Progress:</p> <ul style="list-style-type: none"> • There has been positive progress through the NHS Wales Decarbonisation Strategic Delivery Plan 2021-2030 (published in March 2021). • The All Wales Medicines Strategy Group (AWMSG) have since endorsed optimising inhaler use and recommended that stakeholders transition from high global warming potential (GWP) inhalers to alternative lower GWP inhaler types where deemed suitable. <p>To be addressed:</p> <ul style="list-style-type: none"> • Review the use of F-gases in Wales's health service and take action to educate clinicians and patients on the global warming impacts of inhalers (recommendation R2023-003). • Participate in the planned GB-wide F-gas cap scheme, either administered by the Environment Agency or through a Welsh regulator (recommendation R2023-002). <p>Risks due to UK Government action: High.</p> <ul style="list-style-type: none"> • Most of the F-gases regulation is reserved.

7. Engineered removals

For engineered removals technologies using CCS, some areas, including planning and permitting of installations, are devolved and some areas, including permitting of offshore infrastructure, are mostly reserved. In practice, funding support for early deployment of engineered removals is likely to be delivered through UK Government business models and CCUS cluster development programmes. The levers for deploying wood in construction are mostly devolved.

The Welsh Government is yet to set out its ambition on engineered removals.

There are currently no engineered removals projects operating in Wales. The Welsh Government has not yet defined the role it expects engineered removals to play in delivering Net Zero in Wales.

(a) Policy assessment

The policies and plans associated with each sub-sector/policy area for this sector are assessed in Table 3.7 to determine if they are credible and on track, according to the criteria outlined in Annex 1. Detailed recommendations for this sector are given in Annex 2 and in filterable and searchable tables on our website, with a reference provided to each unique recommendation ID within the table.

Table 3.7 Policy scorecard for engineered removals	
Sub-sector / policy area	Welsh Government policy progress, assessment and next steps
Bioenergy and Carbon Capture (BECCS) and Direct Air Carbon Capture (DACCS)	Mostly reserved
	<p>Progress:</p> <ul style="list-style-type: none"> In the Second Carbon Budget, the Welsh Government has committed to undertaking a feasibility study for different engineered removals approaches.¹⁸ The Welsh Government has also committed to engaging in UK Government discussions and decision-making on the governance and regulation of engineered removals.¹⁸ <p>To be addressed:</p> <ul style="list-style-type: none"> A feasibility study should be carried out as soon as possible (recommendation R2023-049). The study should identify potential new-build and retrofit sites by considering the proximity to biomass feedstocks, access to CCS networks and impacts on energy systems. The outcomes of the study should also contribute to a Welsh Government view on the role it expects engineered removals to play in delivering Net Zero in Wales. The Welsh Government should explore the public acceptability of engineered removals in Wales, sharing clear information on how different types of engineered removals work and taking the public's views into account when determining the technologies' role in its Net Zero pathway. The Welsh Government should work with industry to identify potential engineered removals projects within the South Wales Industrial Cluster. <p>Risks due to UK Government action: Medium.</p> <ul style="list-style-type: none"> There is an urgent need for the UK Government to provide clarity on engineered removals business models and produce guidance on MRV and biomass sustainability. Delays to these actions pose significant risk to the UK Government's ability to meet its 2030 5 MtCO₂/year

	<p>removals ambition and Wales's ability to begin development of engineered removals sites in this decade.</p> <ul style="list-style-type: none"> • BECCS and DACCS deployment rely on access to a functioning CCS network. Delays to the establishment and expansion of the Track 1 and Track 2 clusters also pose risks to the UK Government's 2030 engineered removals target and to the Welsh Government's ability to deploy engineered removals this decade.
<p>Wood in construction</p> <p>Mostly devolved</p>	<p>Some risks (Y)</p> <p>Progress:</p> <ul style="list-style-type: none"> • The Welsh Government has committed to develop a Timber Industrial Strategy and clarify its planned uses of biomass, giving preference for high value add, long-life uses (such as wood in construction). • The Welsh Government and EU Rural Development Programme funded the Powys County Council's Home Grown Homes programme, completed in 2021. This programme has piloted local measures that attempt to grow the Welsh timber construction supply chain and deliver low-carbon social housing. <p>To be addressed:</p> <ul style="list-style-type: none"> • Publish the Timber Industrial Strategy, which was due to be released by the end of 2022 (recommendation R2023-050). • A target for timber used in construction in buildings in Wales could send a clear signal to industry on the expected increases in volume they may need to service. • The Welsh Government should build on learnings from programmes such as the Home Grown Homes to consider how policies and initiatives can be used to both encourage more Welsh-grown timber to be used in construction and to encourage the use of timber in construction of buildings in Wales, particularly social housing. <p>Risks due to UK Government action: Low.</p> <ul style="list-style-type: none"> • Levers that address the use of wood in construction are mostly devolved.

Endnotes

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- ² Welsh Government (2023) *Review of Wales' Renewable Energy Targets*, <https://www.gov.wales/review-wales-renewable-energy-targets>.
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- ¹⁶ Welsh Government (2023) *Innovation strategy for Wales*, <https://www.gov.wales/innovation-strategy-wales>.
- ¹⁷ Welsh Government (2021) *Coal Policy*, <https://www.gov.wales/coal-policy-statement>.

- ¹⁸ Welsh Government (2021) *Net Zero Wales Carbon Budget 2 (2021 to 2025)*, <https://www.gov.wales/net-zero-wales-carbon-budget-2-2021-2025>.
- ¹⁹ Welsh Government (2019) *Welsh National Marine Plan*, <https://www.gov.wales/welsh-national-marine-plan>.
- ²⁰ UK Government (2017) *Wales Act 2017*, <https://www.legislation.gov.uk/ukpga/2017/4/contents>.
- ²¹ Climate Change Committee (2022) *Climate compatibility of new oil and gas fields*, <https://www.theccc.org.uk/publication/letter-climate-compatibility-of-new-oil-and-gas-fields/>.
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Chapter 4

Cross-cutting issues

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Introduction and key messages

This chapter assesses whether cross-cutting areas of society and the economy are supporting Net Zero, and policy progress in this regard.

The Net Zero transition will involve all of society and will rely on actions from many actors including individuals, businesses and financial institutions. The transition will impact on different groups in society in different ways, with a shift in the nature of jobs and individual lifestyles depending on characteristics such as income and location.

Across all these aspects of society, the Welsh Government can shape the wider environment in which these actors operate, to ensure their actions actively align with, and don't slow, progress to Net Zero.

Effective governance structures and mechanisms are vital to coordinate and lead the delivery of Net Zero, which requires action in all sectors of the economy. The Welsh Government should ensure that relevant actors work together constructively and understand the contributions for which they are responsible.

This chapter covers policy developments and requirements in cross-cutting areas of the economy. We discuss developments in people and business, and in governance.

Our key messages for this chapter are:

- **Public engagement.** In 2022 Wales launched several public engagement campaigns related to action on climate change and a draft Strategy for Public Engagement and Action on Climate Change was published for consultation in 2022.¹ In this area, Wales is a step ahead of UK-level progress and should now prioritise delivering on time and evaluating impacts.
- **Workers and skills.** The Welsh Government has published a Net Zero Skills Action Plan, which aims to identify Net Zero skill requirements across sectors.² This is encouraging, and better than what is happening at the UK level, but the Welsh Government need to move to firm and more specific actions in this area.
- **Business.** Two Freeports are to be established in Wales to unlock renewable energy opportunities. The Development Bank of Wales is set to offer businesses favourable investment terms for renewables and energy efficiency upgrades. More guidance and removal of barriers to decarbonisation is needed for smaller businesses and the Welsh Government should embed Net Zero more fully in its procurement to drive changes in business practices.
- **Governance.** The Welsh Government has made progress towards embedding Net Zero across its activities, for instance by setting out a public sector decarbonisation route map and introducing a Net Zero test for future road-building schemes. More work is needed to build on this, especially to develop a shared understanding of the role for local government and how this will be coordinated and funded. The Welsh Government should also develop a plan for how it will manage interdependencies with UK policies.

Wales is a step ahead of the UK in public engagement and skills but needs to translate plans into specific actions across both areas.

There are promising developments to support investment in renewable energy, but smaller businesses need support to engage with Net Zero.

The Welsh Government has taken steps to embed Net Zero across its activities but needs to clarify the role and resources of local government.

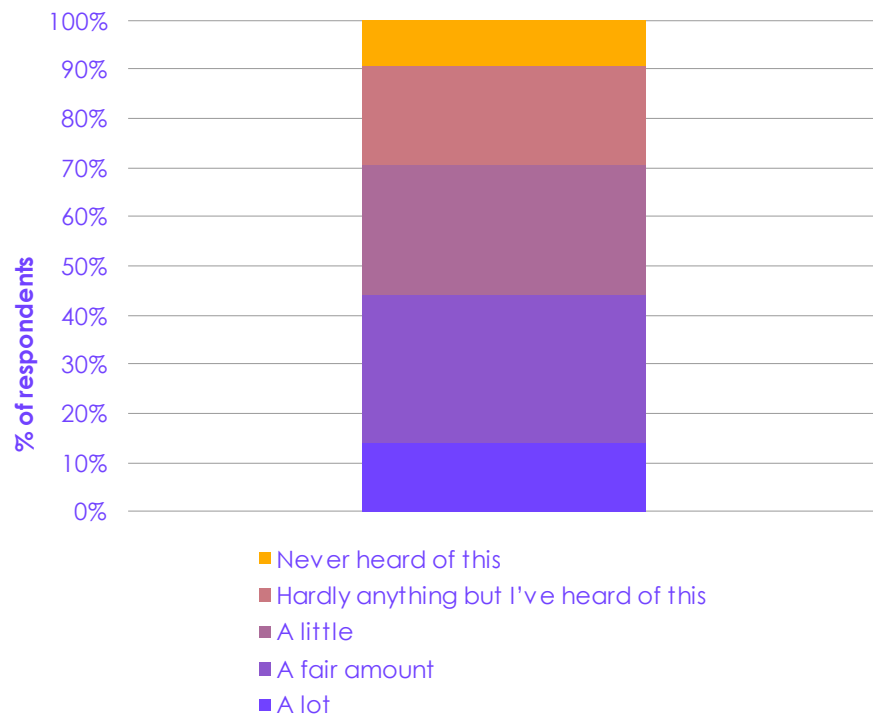
1. People and business

(a) Indicators of progress

Concern around climate change and knowledge and awareness of Net Zero are relatively high in Wales, similar to the wider UK (Figure 4.1). In winter 2022, 79% of respondents in Wales stated that they are either very concerned or fairly concerned about climate change.³

Public knowledge and awareness of 'Net Zero' in Wales is relatively high.

Figure 4.1 Knowledge and awareness of 'Net Zero'



Source: BEIS (2022) *Public Attitudes Tracker (PAT)*, Winter 2022. Region: Wales.

Notes: Survey question for knowledge and awareness of 'Net Zero' was 'Before today, how much, if anything, did you know about the concept of 'net zero'?'. Data collection was carried out via push-to-web methodology. Results for Wales need to be interpreted with caution due to small sample size per region.

Business surveys indicate small businesses are struggling to engage with Net Zero.

The CCC do not have formal indicators for business progress in Wales, but note several findings from business surveys which cover Wales:

- 45% of Welsh businesses indicated that 'offering solutions to environmental problems, such as climate change or food waste' was important to them – around 10% higher than for businesses in England.⁴
- Small businesses in Wales, as with other parts of the UK, are struggling to engage with Net Zero, citing a lack of certainty about how to respond. Only 14% of Welsh businesses reported having implemented a strategy to reduce emissions in 2021.⁵

(b) Policy progress

In Table 4.1 a summary of recent progress and what still needs to be addressed is given. The detailed recommendations for these areas are given in Annex 2 and in filterable and searchable tables on our website, with a reference provided to each unique recommendation ID within Table 4.1. The policies and plans associated with each area are assessed here to determine if they are credible and on track, according to the criteria outlined in Annex 1.

Table 4.1 Policy scorecard for people and business	
Sub-sector / policy area	Welsh Government policy progress, assessment and next steps
Public engagement and awareness Partly devolved	<p>Credible plans (G)</p> <p>Progress:</p> <ul style="list-style-type: none"> In 2022 Wales launched a number of campaigns interlinked with action on climate change including a new Be Mighty campaign (focused on recycling of food waste), a Real Social Network campaign led by Transport for Wales (with an active travel element) and a Winter campaign (delivered as part of the NEST Warm Homes programme).^{6,7} A draft 'Strategy for Public Engagement & Action on Climate Change' was published for consultation in October 2022, with a final Strategy due to be published in summer 2023.¹ It will be informed by a behavioural science research project completed in early 2023. Plans are underway to develop a repeatable bi-annual tracking survey, deepening the evidence on people's knowledge, awareness and attitudes on climate change. A new national 'Climate Action Wales' campaign and accompanying website will be launched in summer 2023 to build knowledge, increase intention and encourage action in the areas of green travel, home energy, food and consumption behaviours.⁸ Wales is showing leadership in actively considering promoting dietary shifts, including through a Food Bill introduced last year that aims to promote a more sustainable food system and healthier diets, and cross-departmental work on promoting a 'healthier and suitable diet'.^{9,10} Although the latter does not explicitly target sustainability, a shift to healthier diets may include diets with lower emissions intensity. <p>To be addressed:</p> <ul style="list-style-type: none"> Move forward with plans to develop a long-term strategy to promote a dietary shift, explicitly integrating sustainability considerations and considering setting targets for dietary shifts (recommendation R2023-046). Publish the new 'Strategy for Public Engagement & Action' and the new national 'Climate Action Wales' campaign and website in summer 2023, including key topics such as road and air travel, diet and home heating. Establish an effective monitoring approach to track the effectiveness of public engagement communications and campaigns, and share lessons learnt with the UK Government and other Devolved Administrations (recommendation R2023-047). Consider the role of a Welsh Climate Assembly, including to address aspects of climate change policy which most significantly interact with people's everyday lives or may be challenging (recommendation R2023-055). As discussed in Chapter 2 on agriculture and land use, develop and maintain a sustained dialogue with farmers on a rural just transition (recommendation R2023-159). As discussed in Chapter 2 on buildings, raise awareness of the changes required to decarbonise buildings (recommendation R2023-044). As discussed in Chapter 3 on aviation, there is not currently an aviation demand pathway for Wales (recommendation R2023-008).

	<p>Risks due to UK Government action: Medium.</p> <ul style="list-style-type: none"> Some areas particularly significant to public engagement, such as buildings and transport, are partly reserved powers, where progress is more dependent on UK Government decisions. However, agriculture and land use and waste are largely devolved.
<p>Fair funding and affordability</p>	<p>Mostly reserved</p>
	<p>Progress:</p> <ul style="list-style-type: none"> Funding and grant programmes that relate to Net Zero fairness and affordability are largely reserved, and for the few grants that are Wales-specific (e.g. for energy efficiency improvements) there have not been significant shifts since 2021. <p>Risks due to UK Government action: High.</p>
<p>Workers and skills</p> <p>Joint responsibility</p>	<p>Some risks (Y)</p>
	<p>Progress:</p> <ul style="list-style-type: none"> In early 2023, the Welsh Government published its Net Zero Skills Action Plan which set out priority actions to identify Net Zero skill requirements across sectors while building inclusive partnerships to deliver skills policy.² The plan is underpinned by pilots that have been supported by the Government to understand how to deliver Net Zero skills across different sectors. Fairness and the just transition are embedded in the ambition of the Skills Action Plan to 'prevent existing labour market inequalities being carried through into the new net zero and digital economies'. The Personal Learning Accounts, which support workers in reskilling and upskilling to access growing and priority sectors for Wales, have increasingly focussed on Net Zero sectors.¹¹ A £2 million pilot was introduced to target training and qualifications for Net Zero skills in construction, energy, engineering and manufacturing.² The Welsh Government is providing £4.5 million through its Flexible Skills Programme to help employers with training and upskilling of their employees, which could benefit Net Zero skills.¹² <p>To be addressed:</p> <ul style="list-style-type: none"> The Welsh climate commitments will require faster and growing support for Net Zero Skills. A thorough review of existing schemes is required to assess their ability to close Net Zero Skills gaps in Wales (recommendation R2023-051). More is needed from the Welsh Government on the delivery of a just transition, which should be informed by the recent Just Transition consultation and Mainstreaming Equality Policy Framework (recommendation R2023-048).¹³ <p>Risks due to UK Government action: Medium.</p> <ul style="list-style-type: none"> While the UK Government will provide signals on the low-carbon economy and funding for education and skills, education and skills policy are designed and delivered at the local level.
<p>Business and finance</p> <p>Joint responsibility</p>	<p>Some risks (Y)</p>
	<p>Progress:</p> <ul style="list-style-type: none"> The 'Net Zero Wales Carbon Budget 2' report sets out several measures to support and enable Welsh businesses on the journey to Net Zero, including Net Zero as a priority within the Development Bank of Wales Corporate Plan, embedding Net Zero in Welsh Government procurement and supporting Welsh firms' Net Zero responses through Business Wales.¹⁴ Dedicated support and funding schemes to support businesses' Net Zero activities in Wales were launched in 2022, including the Net Zero Start-up Grant and Net Zero Industry Wales.^{15,16} The Development Bank of Wales launched an 'invest to save' initiative in 2022, to provide favourable terms to businesses looking to invest in energy efficiency projects.¹⁷ This compliments the Green Business Loans Scheme which combined free energy saving advice from Business Wales with access to discounted loans and long-term capital.¹⁸

- In March 2023 it was announced that [two new green-industry Freeports](#) are to be established in Wales.¹⁹ The sites in Anglesey and Port Talbot will enable development in key emerging Net Zero industries such as floating offshore wind, carbon capture, utilisation and storage (CCUS), hydrogen and tidal power.
- The Welsh Government has sent several clear signals around putting Net Zero at the centre of their infrastructure investment and development strategy, including moratoriums on new road building and Energy from Waste projects (without carbon capture and storage (CCS). These signals will give the private sector greater clarity and confidence around the Welsh Government's commitment to develop infrastructure consistent with Net Zero.
- Wales is introducing reforms to improve business recycling, including mandating separate collections and providing advice to improve resource efficiency through Business Wales.

To be addressed:

- Small Welsh businesses must be enabled to participate in and benefit from the transition to Net Zero, for example by removing planning barriers to low-carbon technologies in rural areas and providing grid connectivity. The Welsh Government should provide small businesses with guidance and support to understand and effectively respond to Net Zero (**recommendation R2023-007**).
- The Welsh Government should publish a decarbonisation strategy for Welsh Businesses, including a review of opportunities to use its powers, procurement, lending and funding to strengthen incentives and requirements for businesses to adopt and deliver low-carbon solutions. This could include introducing key performance indicators (KPIs) to track the emissions intensity of public contracts (**recommendation R2023-006**).

Risks due to UK Government action: Medium.

- The UK Government holds some important levers for guiding business action, including electricity markets and regulation, CCUS and in corporate regulatory requirements. However, Wales has a high degree of agency in key areas, particularly the extent to which it can support businesses to respond to Net Zero, changes to planning regulations and building and waste regulations.

2. Governance

(a) Policy progress

The assessment of Welsh governance is split into two parts. The first section considers the governance processes and mechanisms within Wales, including policymaking approaches, coordination of delivery and partnership with local government. The second section then addresses the structures for coordinating actions between the Welsh and UK Governments, including questions around how interdependencies and synergies will be identified and managed.

(i) Progress in Wales

In Table 4.2, a summary of recent progress and an assessment according to the criteria outlined in Annex 1 is given. The detailed recommendations are given in Annex 2 and in filterable and searchable tables on our website, with a reference provided to each unique recommendation ID within the table.

This table assesses the Welsh Government's governance processes and mechanisms in two broad areas to determine if they are credible and suitable for enabling effective and accountable delivery, according to the criteria outlined in Annex 1. The first area is alignment of policy and coordination across Welsh Government, and the second is partnership working with local government.

Table 4.2
Policy scorecard for governance

Sub-sector / policy area	Welsh Government policy progress, assessment and next steps
Policy alignment and coordination	<p data-bbox="312 1305 469 1339">Some risks (Y)</p> <p data-bbox="312 1373 419 1406">Progress:</p> <ul data-bbox="323 1422 1493 2040" style="list-style-type: none"> <li data-bbox="323 1422 1493 1547">• The Net Zero Wales plan sets out the overall vision for delivering decarbonisation in Wales.²⁰ In 2022, the Welsh Government published a Net Zero Strategic Plan which sets out the actions that will need to be taken to deliver this.²¹ Importantly, it identified 54 specific initiatives that will be reviewed in 2025 and 2030. <li data-bbox="323 1563 1493 1778">• Coordination of delivering the Net Zero pathway is governed through a dedicated Climate Change Ministry, which was established in 2021. <ul data-bbox="363 1641 1493 1778" style="list-style-type: none"> <li data-bbox="363 1641 1493 1704">– At official level, this is supported by a portfolio board which is chaired by the senior official responsible for climate change and includes lead officials from each key emitting sector. <li data-bbox="363 1720 1493 1778">– The Programme for Government for 2021-26 identifies 'embedding our response to the climate and nature emergency in everything we do' as a key commitment.²² <li data-bbox="323 1794 1493 1888">• The Welsh Government has taken the step of aligning its financial budgeting cycles with its carbon budget periods, allowing spending decisions to be more directly linked to the decarbonisation actions that are required. <li data-bbox="323 1904 1493 2040">• The Welsh Government's recent decision on how it will consider future road-building schemes represents the sort of Net Zero Test that the CCC has called for across the economy. <ul data-bbox="363 1989 1493 2040" style="list-style-type: none"> <li data-bbox="363 1989 1493 2040">– This effectively reverses the presumption that schemes should be approved unless they are shown to be harmful, instead requiring all schemes to proactively demonstrate how they will

	<p>reduce carbon emissions, support modal shift and adapt to the impacts of climate change if they are to be approved.</p> <ul style="list-style-type: none"> – This sits alongside the commitments in the Well-being of Future Generations Act, which ensures that long-term impacts must be taken into account in policy development and implementation. • The Welsh Government has set a target for the Welsh public sector (comprising 65 identified bodies) to be Net Zero by 2030 and has set out a route map towards delivering this as well as reporting guidelines.^{23, 24} <p>To be addressed:</p> <ul style="list-style-type: none"> • In 2022, Audit Wales highlighted that public bodies need to do more to meet the 2030 public sector decarbonisation goal. The Committee echoes these recommendations. The Welsh Government should require all public bodies to identify the actions needed to deliver on the 2030 public sector decarbonisation goal and embed these within their corporate plans and reporting (recommendation R2023-028). • The Welsh Government should build on the approach taken in its response to the Roads Review to ensure that other areas of decision-making are similarly aligned to the Net Zero pathway.²⁵
Partnership with local government	<p>Significant risks (O)</p> <p>Progress:</p> <ul style="list-style-type: none"> • 19 of Wales's 22 local authorities have declared a climate emergency, with 14 of these having a climate action plan.²⁶ • The Welsh Local Government Association has received Welsh Government funding to deliver a decarbonisation support programme, aimed at offering guidance to local authorities in developing these plans.²⁷ <p>To be addressed:</p> <ul style="list-style-type: none"> • The Welsh Government should work together with local authorities to develop a shared understanding of where the roles and responsibilities for various aspects of Net Zero delivery lie between central and local government, as well as how these will be coordinated (recommendation R2023-029). • In Climate Emergency UK's 2021 scorecard exercise, Welsh local authorities' climate action plans received an average score of 31%.²⁸ This is below the national average of 50%, with shortfalls across all assessed areas. Only Cardiff Council (70%) scored above this national average. The Welsh Government should seek to share lessons from this exercise to help authorities improve the quality of their plans (recommendation R2023-030). • The Active Travel Fund's approach of allocating core funding to all local authorities on the basis of assessed need, in addition to capital funding available through competitive bidding processes, is a positive step.²⁹ The Welsh Government should build upon this to develop a programme of longer-term funding for local authority delivery on Net Zero that is aligned to their identified roles and responsibilities (recommendation R2023-031).

(ii) Coordination with UK Government

Delivery of Wales's decarbonisation objectives will depend on complex interactions with UK policies. The Welsh Government should ensure it understands these interactions and develops plans for how to manage them.

Delivery of the emissions reductions required to meet Wales's decarbonisation objectives will depend on a range of complex interactions between devolved and reserved powers. This includes not just regulatory dependencies, but also reliance on shared UK markets and infrastructure. The Welsh Government should develop a plan for how it will manage areas in which these dependencies pose significant risks to the deliverability of its decarbonisation pathways (**recommendation R2023 032**).

- Table 4.3 sets out a summary of the key interdependencies for the transport sector, emphasising that there are risks posed by Wales's dependency on

the UK Government for ambitious regulation as well as on wider UK markets and shared UK infrastructure. This most directly affects aspects of the transition that rely on the adoption of new technologies and energy-using products.

- The Welsh Government should conduct an equivalent mapping exercise across all sectors and should use this to develop a plan for how it will manage areas in which these dependencies pose significant risks to the deliverability of its pathways. The map of how responsibilities for policy and delivery are shared across governments, local authorities and the private sector in the recent National Transport Delivery Plan is a good example of this.³⁰
- Wales's decarbonisation pathways are particularly dependent on reducing industrial emissions, which entails substantial reliance on both national regulation and the development of UK-wide infrastructure. It will be particularly important for the Welsh Government to understand these interdependencies and work effectively with the UK Government to manage them and ensure that barriers to delivery are resolved.
- These interdependencies pose a risk to cost-effective and timely delivery of the pathways required and should be managed actively through collaboration between the UK and Welsh governments.

There are coordinating structures for collaboration between the UK and devolved governments, but it is not yet clear that these are working effectively for Net Zero.

The UK Government's Net Zero Strategy recognised the need for joined-up action across the UK to deliver the Net Zero pathways. This has been supported by the introduction of coordinating structures, which have been used to facilitate discussions on shared objectives that have fed into various recent UK-wide strategies, although it is not clear that these are yet reliably leading to effective engagement between the nations.

- The UK Government has established a bimonthly Net Zero, Energy and Climate Change Inter-Ministerial Group to bring together ministers from all four nations to discuss emerging policies. This is supported by a cross-departmental official-level board, as well as direct engagement between corresponding departmental officials.
- The ability for devolved administrations to effectively engage with the development of the UK Net Zero Strategy was limited. In developing its recent Carbon Budget Delivery Plan, the UK Government consulted with devolved governments although the final outputs still lack transparency on what delivery outcomes are being assumed across each nation. This risks missing opportunities for enhanced collaboration to deliver on shared objectives that could help in delivering on both UK and devolved emissions reduction goals.
- The structures that enable collaboration between the nations should be used to involve the devolved administrations in early-stage policy development and decision-making on areas that will affect their jurisdictions. These discussions should explore synergies between the respective governments' goals and plans to maximise the benefits that can be delivered across the UK.

Table 4.3

Interdependencies between UK and Welsh powers in the surface transport sector

Sub-sector	Dependencies on reserved powers	Dependencies on UK markets	Dependencies on shared UK infrastructure	Outcomes that are independent of the wider UK
Zero-emission vehicles	Significant dependencies beyond devolved powers			
	<p>Regulations on what vehicles can be sold (e.g. zero-emission vehicle (ZEV) mandate) likely to be based on trajectories required for UK.</p> <p>Main price signals (e.g. vehicle taxes/subsidies and fuel duties) are set by the UK Treasury.</p>	<p>Manufacturing strategies based on larger UK/EU market could restrict ability to go faster.</p> <p>UK-focused vehicle advertising strategies will influence consumer demand (e.g. for hybrids).</p>	<p>Low-carbon power for use in electric vehicles (EVs) comes from a shared electricity grid.</p> <p>Hydrogen supply and refuelling facilities are likely to be planned nationally.</p>	<p>Procurement of ZEVs for public fleets.</p> <p>Developing workforce skills to build and maintain ZEVs.</p>
Reducing demand for carbon-intensive travel	Minor dependencies beyond devolved powers			
	<p>Decisions on national taxation schemes (e.g. road pricing) that could shape demand are made by the UK Government.</p>	<p>Many public transport services are operated by UK-wide businesses.</p> <p>Public behaviours likely shaped by both UK and Welsh engagement.</p>	<p>Improvements to cross-border rail links and services depend on UK investment.</p>	<p>Investment to improve public/active/shared travel infrastructure.</p> <p>Local schemes to manage traffic.</p> <p>Education policy and public information campaigns can influence public choices.</p>

3. Adaptation

Further climate change in Wales over the coming decades is inevitable. The recent average land temperature is 0.9°C warmer than in the period of the mid-1970s to the mid-2010s and there are increases in annual mean rainfall and incidences of extreme heat events. These changes are now having clear impacts on Wales's people and ecosystems. The most recent UK Climate Risk Assessment highlighted critical areas where more action is needed in Wales to adapt to these current and future climate risks in areas such as flooding, coastal erosion, increasing high temperatures and risks to the natural environment.³¹

(a) A resilient Net Zero society

Emissions-cutting measures should be combined with strong adaptation policies to respond to these climate risks. Without proactive and well-planned adaptation action, many of the climate risks facing Wales will put efforts to reduce emissions at risk.

- **Increasing long-term carbon storage.** There are risks and opportunities from climate change for the ability of land to contribute to Net Zero. For example, degradation of peatlands under a warmer climate could lead to higher carbon emissions, as well as the loss of vital ecosystems. Tree and hedgerow planting and catchment-sensitive farming can have benefits for increasing climate resilience and biodiversity, as well as carbon sequestration. However, careful planning about species mix, location and management is necessary to ensure such benefits are maintained over the long term despite a changing climate.
- **Maintaining a resilient power system.** A decarbonised energy system will not be reliable if it is not climate resilient. The cascading impacts of electricity failure on critical services will continue to grow as the economy becomes increasingly electrified and as extreme weather events become more common and severe. The consequences of failure will be more acutely felt by the more vulnerable in society. The growing dependence on electricity and the move towards an energy system with high levels of variable renewables makes it essential that changing climate hazards are considered in energy system planning. Much of the Net Zero electricity system is yet to be built and requires significant additional investment to replace existing generation assets and significantly expand the system. This investment must not lock in poor climate resilience.
- **Decarbonisation of the building stock.** Without consideration of the future climate when undertaking retrofit programmes, emissions reduction measures, such as increasing energy efficiency of homes, may inadvertently increase the risk of overheating in buildings and worsen indoor air quality.

The Committee will provide an assessment of adaptation progress in the upcoming Welsh Adaptation Progress report later this year, along with a separate briefing on the interrelationships between adaptation and decarbonisation.

Endnotes

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- ³¹ Netherwood, A. (2021) *Third UK Climate Change Risk Assessment Technical Report: Summary for Wales*, <https://www.ukclimaterisk.org/wp-content/uploads/2021/06/CCRA-Evidence-Report-Wales-Summary-Final.pdf>.



Policy scorecards

(a) Key for policy scorecards

The credibility of the Welsh Government's policies and plans is scored using the criteria in Table A1. In addition, we have scored the risk to progress posed by UK Government action in each policy area. This is highly relevant in sectors where policy is mostly reserved to Westminster; for sectors where decision-making is devolved to the Welsh Government, the score is meant to account for indirect impacts that can affect progress in that sector (for example, through the development of relevant market forces).

Our scoring criteria for the risk due to UK Government action are as follows:

- **High.** there is a high dependency on the UK Government for progress in this area, and a high probability of them not taking the action necessary in time for Wales to make sufficient progress.
- **Medium.** there is either a high dependency on the UK Government but a low probability of that being an issue, or a low dependency but a high probability of it being an issue.
- **Low.** there is both a low dependency on the UK Government and a low probability of that being an issue.

Table A1 Scoring criteria for assessing policies and plans	
	Overall score
Credible plans (G)	Credible plans with funding, enablers and timelines in place.
Some risks (Y)	Some adjustment to plans may be needed to mitigate uncertainties and delivery or funding risks.
Significant risks (O)	Plans under development and/or further work needed to enact policies and overcome uncertainties and delivery or funding risks.
Insufficient plans (R)	Plans are either missing, clearly inadequate, or lack funding, and new proposals are needed.

Recommendations

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1. Recommendations – Priority

ID	Sector	Priority recommendations	Timing
Priority: R2022-199	Cross-cutting	Publish a transparent and quantified link between policies and milestones, and the emissions reduction they correspond to in the sectoral pathways set out in the Second Welsh Carbon Budget. Responsibility: Mostly devolved	2022 Overdue
Priority: R2023-029	Cross-cutting	Work with local authorities to develop an agreed framework of what aspects of Net Zero central and local government are responsible for and how these will be coordinated. This should lead to a clearer shared understanding of roles and responsibilities which can be communicated across local government. Responsibility: Mostly devolved	2023
Priority: R2023-034	Agriculture & land use	Urgently address the funding gap for new land management actions in the farmed landscape for the year 2024, between the Glastir Scheme ending in late 2023 and the new Sustainable Farming Scheme beginning in 2025, to ensure delivery does not lose momentum. Responsibility: Mostly devolved	Q3 2023
Priority: R2022-043	Agriculture & land use	Provide detail on how post-CAP agricultural subsidies and schemes in Wales will target incentives and delivery for climate mitigation alongside wider environmental goals such as climate change adaptation and biodiversity. Responsibility: Mostly devolved	2022 Overdue
Priority: R2023-054	Agriculture & land use	Implement a strategy to address non-financial barriers to achieve annual tree-planting rates of at least 4,500 hectares/year in Wales by 2030, rising to 7,500/year by 2035. Responsibility: Mostly devolved	H1 2024
Priority: R2022-327	Waste	Set ambitious recycling targets for 2030 and beyond, improving on the 70% target for 2025. Responsibility: Mostly devolved	H1 2024
Priority: R2023-004	Waste	Set out policies or support to capture methane emissions from landfill sites, in addition to improving the monitoring of emissions. Responsibility: Mostly devolved	H1 2024
Priority: R2023-005	Waste	Set out how Wales's pathway for reducing emissions in the waste sector will be achieved - including policies, funding/investment needs and provision, and any dependencies or implications for other UK nations. Responsibility: Mostly devolved	H1 2024

Priority: R2023-018	Surface transport	Monitor EV uptake in Wales and assess whether there are opportunities for further policies and incentives to drive adoption forward more quickly than through the ZEV mandate alone. This should consider opportunities to maximise emissions savings and deliver co-benefits for Welsh people. Responsibility: Mostly devolved	Ongoing
Priority: R2023-020	Surface transport	Develop and publish a full delivery plan for how to realise the ambition of reducing per-person car demand by 10% by 2030. This should include consideration of how measures that limit car usage will interact with those that enable more sustainable modes. Responsibility: Mostly devolved	H1 2024
Priority: R2023-039	Buildings	Develop a detailed plan for decarbonising buildings and reaching Net Zero targets, incorporating data from Local Area Energy Plans. The plan should include estimates of investment requirements and yearly targets for deployment of low carbon heating and energy efficiency measures. It should identify policy areas which are under Welsh Government control and those which require coordination with the UK Government. Responsibility: Equal responsibility	2024
Priority: R2023-040	Buildings	Fully assess the level of investment required to decarbonise social housing and make long-term plans for delivering the funding required. Evaluate the cost effectiveness of retrofitting social housing to reach an EPC 'A' rating, and review the proposed target. Responsibility: Mostly devolved	H1 2024
Priority: R2023-112	Buildings	Fully assess the level of investment required to decarbonise fuel poor homes and make long-term plans for delivering the funding required. Responsibility: Mostly devolved	H1 2024
Priority: R2023-041	Buildings	Fully assess the level of investment required to decarbonise public buildings and make long-term plans for delivering the funding required. Responsibility: Mostly devolved	H1 2024
Priority: R2023-131	Electricity supply	Work closely as part of a Minister-led infrastructure delivery group, and in conjunction with the new Electricity Networks Commissioner, to ensure enabling initiatives for energy infrastructure are taken forward at pace and necessary policy changes are implemented in Wales, to deliver a decarbonised and resilient power system by 2035. Wales's spatial planning regime should adequately balance local impacts on natural capital with the need for sufficient electricity network capacity, delivered in a timely fashion, to accommodate expansion of renewable electricity generation capacity in line with UK Government targets and Welsh Government ambition. Responsibility: Mostly reserved	2023
Priority: R2023-027	Industry	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. Responsibility: Mostly reserved	Ongoing

2. Recommendations - Cross-cutting

ID	Sector	Cross-cutting recommendations	Timing
Priority: R2022-199	Governance	Publish a transparent and quantified link between policies and milestones, and the emissions reduction they correspond to in the sectoral pathways set out in the Second Welsh Carbon Budget. Responsibility: Mostly devolved	2022 Overdue
Priority: R2023-029	Governance	Work with local authorities to develop an agreed framework of what aspects of Net Zero central and local government are responsible for and how these will be coordinated. This should lead to a clearer shared understanding of roles and responsibilities which can be communicated across local government. Responsibility: Mostly devolved	2023
R2023-006	Business and Finance	Publish a decarbonisation strategy for Welsh Businesses, including a review of opportunities to prioritise Net Zero objectives within Welsh Government incentives, procurement requirements, finance provisions and planning policy levers. Responsibility: Mostly devolved	H1 2024
R2023-007	Business and Finance	Strengthen support available to SMEs in Wales to respond to Net Zero, including through expanding assistance available through Business Wales and Development Bank of Wales. Responsibility: Mostly devolved	Ongoing
R2023-028	Governance	Require all public bodies to identify the actions required to meet the 2030 public sector decarbonisation goal and embed these actions within their corporate plans and reporting. Responsibility: Mostly devolved	Q1 2024
R2023-030	Governance	Share best practice to enable local authorities to improve the quality of their climate action plans. Responsibility: Mostly devolved	2023
R2023-031	Governance	Build on the approach taken in the Active Travel Fund to develop a programme of longer-term funding for local authority delivery on Net Zero that is aligned to their identified roles and responsibilities. Responsibility: Mostly devolved	2024
R2023-032	Governance	Map out interdependencies between reserved and devolved powers and how they might impact decarbonisation in all economic sectors and use the results to identify significant risks to the delivery of Net Zero and construct a plan to manage them. Responsibility: Joint responsibility	H1 2024

R2023-048	Just transition	Set out a strategy to support a just transition. Responsibility: Mostly devolved	2024
R2023-046	Public engagement	Move forward with plans to develop a long-term strategy to promote a dietary shift, and consider explicitly integrating sustainability considerations and considering setting targets for dietary shifts. Responsibility: Mostly devolved	H1 2024
R2023-047	Public engagement	Publish the new 'Strategy for Public Engagement and Action', and the new national 'Climate Action Wales' campaign and website in summer 2023, including key topics such as road and air travel, diet and home heating. Establish an effective monitoring approach to track the effectiveness of public engagement communications and campaigns, and share lessons learnt with the UK Government and other Devolved Administrations. Responsibility: Mostly devolved	Q3 2023
R2023-055	Public engagement	Build on the UK Climate Assembly process and consider the creation of a Welsh Climate Assembly, including to address aspects of climate change policy which most significantly interact with people's everyday lives or may be challenging. Responsibility: Mostly devolved	2024
R2023-051	Workers and skills	Review existing skills and training programmes in coordination with Scotland, Northern Ireland, and England and set out how these will close Net Zero Skills gaps and where new schemes are needed to address gaps. Responsibility: Joint responsibility	Q1 2024

3. Recommendations – Agriculture and land use

ID	Sector	Recommendations for agriculture and land use	Timing
Priority: R2023-034	CAP reform	Urgently address the funding gap for new land management actions in the farmed landscape for the year 2024, between the Glastir Scheme ending in late 2023 and the new Sustainable Farming Scheme beginning in 2025, to ensure delivery does not lose momentum. Responsibility: Mostly devolved	Q3 2023
R2023-033	CAP reform	Move beyond the voluntary nature of current CAP replacement schemes by setting a strong regulatory baseline that strengthens rules such as those under the Basic Payment Scheme and retains them in Welsh legislation. Responsibility: Mostly devolved	2024
Priority: R2022-043	CAP reform	Provide detail on how post-CAP agricultural subsidies and schemes in Wales will target incentives and delivery for climate mitigation alongside wider environmental goals such as climate change adaptation and biodiversity. Responsibility: Mostly devolved	2022 Overdue
R2023-035	Peatlands	Ensure that funding and incentives are set at the correct level to meet the Welsh Government peatland restoration target of 1800 hectares per year by 2030. By 2035, 58% of peatland should be under restoration management, and 79% by 2050. All upland peat should be under restoration management by 2045. Responsibility: Mostly devolved	H1 2024
Priority: R2023-054	Forestry	Implement a strategy to address non-financial barriers to achieve annual tree-planting rates of at least 4,500 hectares/year in Wales by 2030, rising to 7,500/year by 2035. Responsibility: Mostly devolved	H1 2024
R2023-122	Forestry	Proposals to attract private sector investment into woodland creation need to be firmed up as soon as is practicable Responsibility: Mostly devolved	Q3 2023
R2023-036	Agroforestry and hedgerows	Maintain and enhance incentives to support agroforestry and hedgerows in the Welsh farmed landscape over the transition to the new post-CAP framework. Plant trees on 2% of farmland by 2025 while maintaining its primary use, rising to 5% by 2035, and extend hedgerows by 20% by 2035 and better manage existing hedgerows. Responsibility: Mostly devolved	H1 2024
R2023-123	Bioenergy	Where appropriate, the SFS should consider rewarding the environmental benefits that the planting of perennial energy crops can deliver on arable land in the same way that England's Sustainable Farming Incentive has confirmed it will Responsibility: Mostly devolved	2024

R2023-159	Public engagement	<p>Develop and maintain a sustained dialogue with rural communities to understand and embed their views into a rural just transition.</p> <p>Responsibility: Mostly devolved</p>	2024
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4. Recommendations – Waste

ID	Sector	Recommendations for waste	Timing
Priority: R2022-327	Waste prevention	Set ambitious recycling targets for 2030 and beyond, improving on the 70% target for 2025. Responsibility: Mostly devolved	H1 2024
R2022-328	Waste prevention	Set out and implement additional policies necessary to achieve waste reduction and recycling targets, as part of delivering the Beyond Recycling Strategy more broadly. Specifically, greater focus on removing plastics and textiles from residual waste as well as greater focus on waste prevention and circular economy are needed. Responsibility: Mostly devolved	2023
Priority: R2023-004	Landfill	Set out policies or support to capture methane emissions from landfill sites, in addition to improving the monitoring of emissions. Responsibility: Mostly devolved	H1 2024
Priority: R2023-005	Strategy	Set out how Wales's pathway for reducing emissions in the waste sector will be achieved - including policies, funding/investment needs and provision, and any dependencies or implications for other UK nations. Responsibility: Mostly devolved	H1 2024

5. Recommendations – Surface transport

ID	Sector	Recommendations for surface transport	Timing
R2023-017	Electric cars and vans	Work with other devolved administrations and the UK Department for Transport to ensure that published vehicle licensing statistics present an accurate picture of EV uptake by nation. Responsibility: Joint responsibility	H1 2024
Priority: R2023-018	Electric cars and vans	Monitor EV uptake in Wales and assess whether there are opportunities for further policies and incentives to drive adoption forward more quickly than through the ZEV mandate alone. This should consider opportunities to maximise emissions savings and deliver co-benefits for Welsh people. Responsibility: Mostly devolved	Ongoing
R2023-019	Charging infrastructure	Increase chargepoint deployment to meet the ambition to provide one public chargepoint for every 7-11 EVs by 2025. Responsibility: Mostly devolved	2025
Priority: R2023-020	Car demand	Develop and publish a full delivery plan for how to realise the ambition of reducing per-person car demand by 10% by 2030. This should include consideration of how measures that limit car usage will interact with those that enable more sustainable modes. Responsibility: Mostly devolved	H1 2024
R2023-021	Active travel	Agree and publish funding settlements for active travel beyond 2024/25. Ideally, these should provide certainty on funding availability for a number of years. Responsibility: Mostly devolved	2023
R2023-022	Public transport	Develop a more joined-up, straightforward, and affordable system of public transport fares across Wales. Responsibility: Mostly devolved	2023
R2023-023	Freight demand	Publish the National Freight and Logistics Plan, including policies on demand-side measures such as urban consolidation and modal shift. Responsibility: Mostly devolved	2024

6. Recommendations – Buildings

ID	Sector	Recommendations for buildings	Timing
Priority: R2023-039	Buildings decarbonisation	Develop a detailed plan for decarbonising buildings and reaching Net Zero targets, incorporating data from Local Area Energy Plans. The plan should include estimates of investment requirements and yearly targets for deployment of low carbon heating and energy efficiency measures. It should identify policy areas which are under Welsh Government control and those which require coordination with the UK Government. Responsibility: Joint responsibility	2024
Priority: R2023-040	Residential buildings	Fully assess the level of investment required to decarbonise social housing and make long-term plans for delivering the funding required. Evaluate the cost effectiveness of retrofitting social housing to reach an EPC 'A' rating, and review the proposed target. Responsibility: Mostly devolved	H1 2024
R2022-111	Fuel-poor homes	Drawing on the recommendations of the Auditor General for Wales, publish plans for future iterations of the Warm Homes Programme to tackle fuel poverty and decarbonise homes, addressing the scheme's reliance on fossil fuel heating and slow roll-out. Responsibility: Mostly devolved	2023
Priority: R2023-112	Fuel poor homes	Fully assess the level of investment required to decarbonise fuel poor homes and make long-term plans for delivering the funding required. Responsibility: Mostly devolved	H1 2024
R2023-043	New buildings	Update building regulations to ensure that all new buildings are resilient to climate change impacts, and incorporate ultra-high energy efficiency standards and low-carbon heating. Ensure that these new standards will be in place by 2025. Ensure that the standards mean that no new buildings are connected to the gas grid from 2025. Define clear transitional arrangements which will require any buildings which have not meaningfully commenced on site within a year of the implementation date to meet the new standards. Responsibility: Mostly devolved	2024
Priority: R2023-041	Public buildings	Fully assess the level of investment required to decarbonise public buildings and make long-term plans for delivering the funding required. Responsibility: Mostly devolved	H1 2024
R2023-045	Workers and skills	Quantify the skills and workforce requirements for decarbonising buildings, and develop policies to support meeting these requirements. Responsibility: Mostly devolved	H1 2024

R2023-044	Public engagement	Design and implement a public engagement strategy which will raise awareness of the changes required to decarbonise buildings and provide advice to consumers on retrofitting homes. Responsibility: Joint responsibility	2024
R2023-042	Planning regulations	Conduct an urgent review of planning policies (including the details of permitted development rights) which may restrict installations of low-carbon heating and energy efficiency measures, and amend regulations where appropriate. Responsibility: Mostly devolved	H1 2024

7. Recommendations – Electricity supply

ID	Sector	Recommendations for electricity supply	Timing
Priority: R2023-131	Networks; Renewables	<p>Work closely as part of a Minister-led infrastructure delivery group, and in conjunction with the new Electricity Networks Commissioner, to ensure enabling initiatives for energy infrastructure are taken forward at pace and necessary policy changes are implemented in Wales, to deliver a decarbonised and resilient power system by 2035. Wales's spatial planning regime should adequately balance local impacts on natural capital with the need for sufficient electricity network capacity, delivered in a timely fashion, to accommodate expansion of renewable electricity generation capacity in line with UK Government targets and Welsh Government ambition.</p> <p>Responsibility: Mostly reserved to the UK Government</p>	2023

8. Recommendations – Industry

ID	Sector	Recommendations for industry	Timing
Priority: R2023-027	Business	<p>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.</p> <p>Responsibility: Mostly reserved to the UK Government</p>	Ongoing
R2023-026	Planning	<p>Identify local and national requirements for, and opportunities from, industrial decarbonisation in the National Energy Plan for Wales and Local Area Energy Plans.</p> <p>Responsibility: Mostly reserved to the UK Government</p>	2024
R2023-052	Workers and skills	<p>Define the skills and workforce requirements for low-carbon manufacturing in Wales and develop policies to support meeting them.</p> <p>Responsibility: Joint responsibility</p>	2024

9. Recommendations – Fuel supply

ID	Sector	Recommendations for fuel supply	Timing
R2023-024	Hydrogen	<p>Assess the potential for large-scale hydrogen production and supporting infrastructure in Wales beyond 2023/24 and coordinate with the UK Government on how Wales can best contribute to UK wide plans.</p> <p>Responsibility: Mostly reserved to the UK Government</p>	Q1 2024
R2023-025	Bioenergy	<p>Produce a Bioenergy Action Plan clarifying the position on bioenergy in Wales, setting out its best use, key delivery mechanisms, available funding, licensing requirements and future timelines.</p> <p>Responsibility: Mostly reserved to the UK Government</p>	2024

10. Recommendations – Aviation

ID	Sector	Recommendations for aviation	Timing
R2023-008	Demand	<p>Set out an aviation decarbonisation pathway to 2050 in line with Wales's Carbon Budgets and Net Zero target.</p> <p>Responsibility: Mostly devolved</p>	H1 2024
R2023-015	Demand	<p>The Welsh Government should work with the Civil Aviation Authority to begin collecting passenger origin data to track Welsh passengers travelling to English airports to fly.</p> <p>Responsibility: Mostly devolved</p>	Q3 2023
R2023-009	Sustainable aviation fuel	<p>Work with the UK Government to ensure that Cardiff Airport is prepared for SAF uptake from 2025 onwards. This includes an enabling regulatory environment, infrastructure and locally upskilled workers.</p> <p>Responsibility: Mostly reserved to the UK Government</p>	Ongoing

11. Recommendations – Shipping

ID	Sector	Recommendations for shipping	Timing
R2023-011	International	Support the UK Government in pushing for inclusion of a Net Zero 2050 target in the International Maritime Organisation's 2023 update of its Greenhouse Gas Strategy. Responsibility: Mostly reserved to the UK Government	H1 2023
R2023-014	Cross-cutting	Set out in the Wales National Ports and Maritime Plan a shipping decarbonisation pathway in line with Wales's Carbon Budgets and Net Zero target and how Ports will enable uptake of low carbon shipping fuels and electrification. Responsibility: Mostly reserved to the UK Government	Q3 2023
R2023-013	Low carbon fuels	Develop a plan for deploying shore power and electric recharging infrastructure at all of Wales's major ports. This should include identifying roles and responsibilities for delivery and providing support and incentives to drive investment. This could be included in the Welsh National Ports and Maritime Plan. Responsibility: Joint responsibility	Q3 2023

12. Recommendations – F-gases

ID	Sector	Recommendations for f-gases	Timing
R2023-003	F-gases	Review the use of F-gases in Wales's health service and take action to educate clinicians and patients on the global warming impacts of inhalers. Responsibility: Mostly reserved to the UK Government	Ongoing
R2023-002	F-gases	Participate in the planned GB-wide F-gas cap scheme, either administered by the Environment Agency or through a Welsh regulator. Responsibility: Mostly reserved to the UK Government	2023

13. Recommendations – Engineered removals

ID	Sector	Recommendations for engineered removals	Timing
R2023-049	Engineered removals	<p>Carry out a feasibility study that assesses the deployment potential of different engineered removals technologies, considering input requirements including biomass, access to CCS networks and impacts on energy systems.</p> <p>Responsibility: Mostly reserved to the UK Government</p>	2024
R2023-050	Wood in Construction	<p>Publish the Timber Industrial Strategy. This document should set out an ambitious target for increased use of Welsh-grown timber in construction and introduce policies that encourage the use of timber in the construction of buildings in Wales.</p> <p>Responsibility: Mostly devolved</p>	2023

June 2023

Progress report:
Reducing emissions in Wales

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