

## Submission on proposals and policies to enable Carbon Budgets to be met (“s.13 advice”)

### Issue

1. Sets out the current package of proposals and policies that, in our view, enable Carbon Budgets 4, 5 and 6 (CB4, CB5 and CB6) to be met. To meet the Court Order and to fulfil your duties under the Climate Change Act 2008 (CCA), you are required to make a judgement and be satisfied that this package will enable those carbon budgets to be met.

### Recommendation

2. **Note** the current package of proposals and policies to enable Carbon Budgets 4, 5 and 6 to be met, and **note** the matters outlined in this submission and Annexes A-F.
3. **Approve** the level of detail to be published in the Carbon Budget Delivery Plan and a draft version of that document (Annex F), ahead of approving a final version of the document later this week.
4. **Agree** that the package of proposals and policies as a whole will enable carbon budgets through to CB6 to be met.

### Background

5. To meet the Court Order and fulfil your statutory duties under the Climate Change Act 2008 (CCA), you have a duty to prepare a package of proposals and policies that you consider will enable carbon budgets to be met, with a view to meeting the 2050 net zero target.
6. When making this decision, you should consider the quantified and unquantified proposals and policies, particularly timescales and delivery risks (**Annex B, Appendix B**). As there is a gap between the total quantified emissions savings of our proposals and policies and what is required to meet Carbon Budget 6, you must also consider whether the unquantified proposals and policies or wider factors are sufficient to enable Carbon Budget 6 to be met. Finally, you must take into account wider matters in connection with carbon budgets under section 10 of the CCA, the contribution of these proposals and policies to sustainable development, and your duties under the Public Sector Equality Duty (**Appendix E of Annex B, Annex C**). You must also have regard to the need for UK domestic action on climate change.

### Quantified savings to meet Carbon Budgets

7. Any emissions savings forecast contains inherent uncertainty due to the long-term nature of a 15 year transition and the complexity of the net zero system. Broader macroeconomic factors will determine the exact quantity of emissions savings required to meet carbon budgets meaning that we will continue to review and adapt the proposals and policies in this package, especially those at earlier stages of development.
8. Based on current projections, our view is that the package of proposals and policies that we can quantify will deliver sufficient quantified savings to meet CB4 and CB5, and 97% of CB6. This incorporates recent Budget announcements, comments from [REDACTED], and the response to Skidmore recommendations. We are projecting we have 94% quantified savings for the Nationally Determined Contribution (NDC), which falls in the

same time period as CB5 but is more ambitious. We are not legally required to report against the NDC in the Carbon Budget Delivery Plan (further advice on the NDC Annex B)

9. The Technical Annex (Annex D) sets out the methodology for the quantification of proposals and policies. You should note that this quantification relies on the package of proposals and Policies being delivered in full. Our advice is that it is reasonable to expect this level of ambition – having regard to delivery risk (see Annex B) and the wider context.

**Considerations to enable carbon budgets to be met** (further detail in Annex B)

10. You must be satisfied that further, as yet, unquantified emissions savings can be made in CB6 to judge that the package will enable carbon budgets to be met. We are confident that further savings can be delivered through proposals and policies that will deliver emissions savings but cannot currently be quantified, e.g. by early-stage proposals and policies where the evidence is still being assessed. See Table 3 of Appendix B (Annex B).
11. The package is further strengthened through the inclusion of a range of cross-cutting proposals and policies which do not directly deliver emissions savings but enable and support our quantified proposals and policies – whether through leveraging the investment needed for technological growth or delivering the green jobs needed for the transition. This supports with de-risking delivery across the package. We can also expect that some of these areas could lead to additional carbon savings: for example our package of policies to drive innovation is likely to lead to new low-carbon technologies which may accelerate the transition.
12. Wider factors may also impact our ability to meet carbon budgets. Areas of uncertainty in our modelled projections could lead to delivery of emissions savings being faster or slower than expected. The package also does not fully reflect emissions savings from policies developed outside central government: such as in local councils and Devolved Administrations, nor does it reflect potential future shifts in consumer behaviour (Annex B).

**Delivery risk and further considerations** (further detail in Annex B)

13. To assess whether the proposals and policies are sufficient, you must consider the risks to delivery of the emissions savings that each of the proposals and policies carries, see Tables 2 and 3 of Appendix B (Annex B). We have included summaries of key delivery risks for each sector to aid your understanding in Appendix D (Annex B). A number of proposals and policies across sectors currently carry high delivery risk. This is expected given that many of these will be implemented over the next 15 years. We expect delivery confidence for many of these proposals and policies to improve as they are implemented (demonstrated by the high delivery confidence attached to significant savings already in delivery phase) and have suggested potential mitigations to improve delivery confidence outlined in Tables 2 and 3 of Appendix B (Annex B).

**Legal assessment**

14. [REDACTED]
15. [REDACTED]

<b>Value for Money</b>	This submission does not include spending proposals.
<b>Analytical Assurance</b>	Full analytical advice on emissions savings modelling can be found in the Technical Annex.
<b>Public Sector Equality Duty</b>	Policy measures covered in the Energy Security Plan, Net-Zero Growth Plan, Green Finance Strategy and the Carbon Budget Delivery Plan have been reviewed concurrently and we have not identified any cumulative equality impacts. All individual policy measures within these documents will remain under close review and Ministers will be advised of PSED implications accordingly. The analysis for the policies and proposals in the Net Zero Growth Plan and Carbon Budget Delivery Plan is at Annex C.
<b>Legal issues</b>	
<b>Net Zero</b>	This submission refers to the package of proposals and policies to meet Carbon Budgets.

### **Presentation and handling**

This advice asks you to make a judgement on whether you are satisfied that your package of proposals and policies will enable Carbon Budgets to be met. You will receive final advice on the full package of March announcements in due course.

### **Annexes**

Annex A – Legal advice on the package of proposals and policies

Annex B - Explanatory covering text to the policy lists

Appendix B to Annex B - Lists of proposals and policies

Annex C – Equality Impact Assessment

Annex D – Technical Annex

Annex E – Net Zero Growth Plan

Annex F – Draft s.14 report

**THIS PAGE IS FOR REFERENCE AND SHOULD NOT BE IN THE SUBMISSION.**  
**In the covering email for Private Office you must include:**

The **timing** and **urgency** of the decisions requested, particularly if there is a fixed date by which an action or decision is required, and for which there is no control over (e.g. a Cabinet deadline), please state the date and justification.

The recipients for the submission, which will always include the Secretary of State.

Recipient	To Note / Comment	To Approve / Decide
Name of Minister Minister Stuart	X	X
Permanent Secretary		
Special Advisers (SpAds)	X	X

The clearance checklist below.

Team		Outcome of conversation
Finance	Does the advice have spending implications, either for existing budgets or a pressure for future budgets? If the answer is 'yes' it <b>must</b> be cleared with Finance before being submitted to SpAds / Ministers.	N/A
Communications	Has the Communications team been consulted about the public presentation of the proposed course of action?	Advice to follow.
Better Regulation	Impact assessments must be cleared by the Director of Analysis and the Central Analysis team.	N/A
Legal	Are there legal implications that Ministers need to be aware of, and what did BEIS/ DESNZ legal advisers advise?	████████████████████ ████████████████████
Public Sector Equality Duty	The <a href="#">Public Sector Equality Duty</a> (PSED) is a legal obligation and failure to account for this could lead to judicial review. Where relevant, your advice should demonstrate how this duty is being met and include any material impacts that you have identified on people, and proposed mitigations. If you conclude there are no equality impacts OR the impacts are not considered significant OR it is too early to conduct a full assessment, then you should consider including this either in the submission or in an annex as appropriate. See guidance on <a href="#">BoB</a> for further information. More detail, such as the associated Equality Impact Assessment, can be added in an annex if appropriate; if so, the submission should identify the duty and direct the Minister to the annex, stating <i>"The duty in s.149(1) Equality Act applies to the exercise of functions. Annex [relevant annex] sets out the material points for consideration by the minister in complying with the PSED."</i> Contact the BEIS/DESNZ PSED lead for further advice at <a href="mailto:hrcultureandengagement@beis.gov.uk">hrcultureandengagement@beis.gov.uk</a>	A full Equalities Impact Assessment is included at Annex C.

Delivery	Does the proposal have delivery challenges associated with them and what did the Implementation and Delivery Directorate advise?	N/A
Devolution & the Union	Does the proposal have devolution or Scotland/Wales/Northern Ireland implications? If so, have you considered these, and/or consulted the BEIS/DESNZ Devolution & the Union team?	The package has been prepared in consultation with DAs.
Analysis	Has the lead analyst seen the submission and agreed with the conclusions drawn from the evidence?	N/A
Other	Does the proposal have implications for other teams eg HR, Chief Scientific Adviser, Parliamentary, commercial, digital functions? If so, use this table to record the outcome of consultation with the expert function(s).	N/A

And any comments for the private secretary.

*For further assistance when completing / submitting your submission, please refer to full submissions guidance [here](#).*

*Please email your submission to [submissions@beis.gov.uk](mailto:submissions@beis.gov.uk)*

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# Background to package of proposals and policies to enable carbon budgets to be met

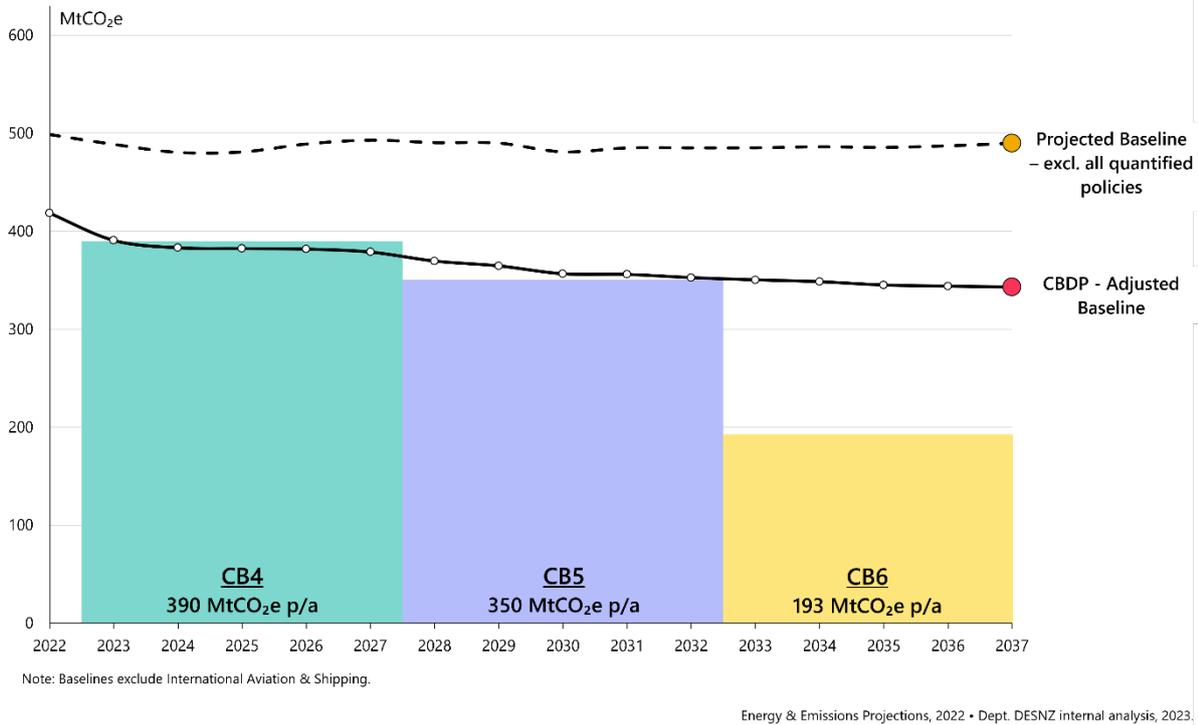
## Baseline and savings required

1. To determine the total additional emissions reductions required to enable carbon budgets to be met, we take an adjusted version of the government Energy and Emissions Projections (EEP 2021-2040) as a “baseline” for future emissions and compare this to the legislated carbon budget levels.
2. EEP 2021-2040 is based on assumptions of future economic growth, fossil fuel prices, electricity generation costs, UK population and other key variables. They also incorporate ‘EEP Policies’ policies that have already been implemented, adopted or planned as of January 2022 (July 2022 for power sectors).<sup>1</sup> The Technical Annex includes further detail on the latest 2021-2040 Energy and Emissions Projections and what that means for our baseline.<sup>2</sup>
3. The current package of proposals and policies to enable carbon budgets to be met comprises the policies already incorporated in EEP 2021-2040, as well as the proposals and policies yet to be implemented, adopted or planned as of January 2022 (July 2022 for power sectors), but which will enable emissions savings up to Carbon Budget 6. Table 1 in Appendix B sets out the full list of policies currently included in EEP 2021-2040 and Tables 2 and 3 in the same appendix outline additional proposals and policies which will enable the carbon budgets to be met.
4. From the projected baseline, EEP policies are expected to deliver over [100]% of the carbon savings needed for Carbon Budget 4 (CB4), and over [40]% of the savings required for Carbon Budget 6 (CB6), compared to projections with no government policy included (see Graph 1).
5. EEP 2021-2040 was published in 2022, with the next update expected in autumn 2023. However, recent changes in the greenhouse gas inventory and underlying trends in some areas have affected baseline emissions. For the purposes of this report, we have made adjustments to the EEP 2021–2040 baseline to reflect these. When making the adjustments we have taken a conservative approach, resulting in a higher baseline than the EEP 2021-2040 baseline by [4 Mtp.a.] in CB6. More detail on baseline adjustments is set out in the Technical Annex.
6. The difference between the adjusted baseline and a given Carbon Budget represents the level of emissions savings required to enable the carbon budget to be met - this is the reduction in emissions we are trying to achieve through the proposals and policies set out later in this document [Appendix B]. When the total quantified savings for a given Carbon Budget are discussed as a percentage, this percentage relates to the gap between the baseline and the Carbon Budget.
7. After the baseline adjustment have been made, which incorporate the impact of EEP-policies, we project that CB4 will be met with 7Mt p.a. of headroom.. The amount of savings required from further proposals and policies to meet CB5 and CB6 are 9Mt p.a and 199 Mt p.a, respectively.

<sup>1</sup> More detail on adjustments made to the EEP baseline can be found in the Technical Annex to the NZGP.

<sup>2</sup> [Energy and emissions projections: 2021 to 2040 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/101422/energy-emissions-projections-2021-to-2040.pdf)

**Graph 1 – CBDP adjusted baseline with EEP quantified policy, CBDP adjusted baseline and Carbon Budget targets.**



### Projected quantified emissions against current and future carbon budgets

8. Table 1 shows the expected emissions savings against Carbon Budgets 4, 5 and 6. For each Carbon Budget, the savings from new and early-stage proposals and policies are subtracted from the baseline to produce a figure for residual emissions. This is then compared to the 'budget limit' to establish expected total quantified emissions savings. Where there is a positive figure in this last row of the table, it indicates that we expect to have reduced emissions beyond the level required by the carbon budget; and where this is negative, it indicates that further emissions savings will be required to enable the carbon budget to be met. Unquantified proposals and policies that will contribute to achieving carbon budgets are set out separately. [

**Table 1 – total projected emissions against CB4 – CB6 (MtCO<sub>2</sub>e)**

**[NB – These numbers are subject to ongoing analysis and final QA.]**

Years covered	CB4 5-yr average (p/a)	CB5 5-yr average (p/a)	CB6 5-yr average (p/a) (includes IAS)
2023 - 2027	2028 - 2032	2033 - 2037	965 (193)

Baseline - includes EEP policies and baseline adjustments	1917 (383)	1799 (360)	1958 (392)
Savings from new and early-stage proposals and policies	89 (18)	449 (90)	965 (193)
Residual emissions - after policy savings	1828 (366)	1350 (270)	993 (199)
Years covered	2023 - 2027	2028 - 2032	2033 - 2037
Budget limit	1950 (390)	1752 (350)	965 (193)
Baseline - includes EEP policies and baseline adjustments	1917 (383)	1799 (360)	1958 (392)
Savings from new and early-stage proposals and policies	89 (18)	449 (90)	965 (193)
Residual emissions - after policy savings	1828 (366)	1350 (270)	993 (199)
Performance against carbon budgets	122 (24)	402 (80)	-28 (-6)

## Sectoral overview

9. The table below sets out the projected sectoral emissions across the Carbon Budgets. These figures represent the projected residual emissions, after our proposals and policies have taken effect. The figures shown for each Carbon Budget are total emissions over the five-year period. Alongside this, we have shown the actual emissions over the single year of 2021 to show current performance.

**Table 2 - Summary of sectoral residual emissions across carbon budgets (MtCO<sub>2</sub>e)**

**[NB – These numbers are subject to on-going analysis and final QA.]**

<b>Sector</b>	<b>Current (2021, p.a)</b>	<b>CB4 5-yr average (p/a)</b>	<b>CB5 5- yr average (p/a)</b>	<b>CB6 5-yr average (p/a)</b>
Agriculture & LULUCF	49	231 (46)	207 (41)	183 (37)
Buildings	88	350 (70)	320 (64)	217 (43)
Domestic transport	109	546 (109)	422 (84)	254 (51)
Fuel supply	20	93 (19)	69 (14)	48 (10)
Industry	76	340 (68)	207 (41)	111 (22)
Power	54	143 (29)	63 (13)	42 (8)
Waste and F-gases	30	124 (25)	93 (19)	71 (14)
Greenhouse Gas Removals	N/A	0 (0)	-32 (-6)	-117 (-23)
Intl aviation and shipping (IAS)	20	N/A	N/A	184 (37)
<b>Total excluding including IAS</b>	<b>426</b>	<b>1828 (366)</b>	<b>1350 (270)</b>	<b>809 (162)</b>
<b>Total including IAS</b>	<b>446</b>	<b>N/A</b>	<b>N/A</b>	<b>993 (199)</b>

## 2030 Nationally Determined Contribution

10. Based on current projections, the package of proposals and policies that we can quantify will deliver sufficient quantified savings to meet CB4, significantly overperform for CB5 by 81Mt of savings, and we have quantified 97% of the emissions savings that will enable CB6 to be met. We project we have 94% quantified savings for the NDC, which falls in the same time period as CB5 but is more ambitious. Under the Paris Agreement, we will start reporting every 2 years to the United Nations Framework Convention on Climate Change (UNFCCC) on progress towards meeting the 2030 NDC from 2024. The matters set out in Tables 2 and 3 Appendix B) for addressing the CB6 shortfall will largely close the gap for the NDC.

To note, we intend to extend the UK's ratification of the Paris Agreement to the 17 Crown Dependencies and Overseas territories (CDOTs) who are eligible, and who request it, which will bring them into scope of the UK's NDC. This could make it more difficult to meet

the NDC, if the CDOTs do not reduce emissions sufficiently by 2030. We are committed to working closely with all CDOTs on implementation of the Paris Agreement and to encourage highest possible ambition. We will be following up with further advice on this shortly.

## Considerations for assessing progress on carbon budgets

### Factors determining the level of emissions savings

11. In order to assess the package of proposals and policies against carbon budgets, we first calculated the expected emissions savings for all proposals and policies where this could be quantified at this stage (see Table 2, Appendix B). A range of analytical models, designed to represent the sectors described in this report, and analytical techniques were used to derive the estimates, using consistent assumptions on shared inputs (such as GDP and fuel prices), and set against an appropriate baseline for each sector. Further detail on the methodological approach underpinning these estimates can be found in the technical annex.
12. We then combined these savings with the baseline described above, to calculate the difference between savings and carbon budgets. This difference, together with further unquantified savings from unquantified proposals and policies, has then been considered, alongside wider factors that are anticipated to impact upon emissions savings, in order to make an overall assessment of whether the package of proposals and policies will enable the carbon budgets to be met.

### Unquantified policies

1. As outlined, our quantified proposals and policies provide [over 100]% of savings required to enable Carbon Budgets 4 and 5 to be met and 97% of the savings required to enable Carbon Budget 6 to be met.
2. Whilst the savings deliverable from the quantified proposals and policies are likely to exceed Carbon Budgets 4 and 5, there is a judgement to be made as to whether the package of proposals and policies identified at this stage is sufficient to enable Carbon Budget 6 to be met.
3. In addition to our quantified proposals and policies, the package also includes **unquantified measures** –These are proposals and policies for which we cannot currently quantify associated emissions savings, for example in relation to some early-stage proposals, where we are still assessing the available evidence. However, we are confident that these measures will be able to deliver additional savings.
4. Proposals and policies we expect to deliver additional emissions savings, beyond those currently quantified, are identified in Table 3 of Appendix B. Examples of areas where we expect further savings are proposals and policies related to promising areas of future research in the Agriculture and LULUCF sectors, as well as proposals and policies to further improve the energy efficiency of buildings and place-based transport interventions that will reduce emissions locally.
5. In addition, the package is further strengthened through the inclusion of a range of cross-cutting proposals and policies which will enable and support our other

proposals and policies – whether through leveraging the investment needed for technological growth or delivering the green jobs needed for the transition. This supports with de-risking delivery across the package. We can also expect that some of these areas could lead to additional emissions savings beyond what we have currently quantified: for example our package of policies to drive innovation is likely to lead to new low-carbon technologies which will lower costs and accelerate the transition to Net Zero.

## Wider factors that impact our ability to enable carbon budgets to be met

6. In addition to the quantified and unquantified proposals and policies discussed above, there are a number of wider factors that are anticipated to interact with the package and so should be considered. For example, these have the potential to deliver or support additional emissions savings, or they could make the transition to Net Zero more challenging or slower than projected. The net effect of these different trends and factors is a complex predictive judgement. These principal wider factors are set out below:

### ***Baseline modelling uncertainty***

7. As described above, we use an adjusted<sup>3</sup> version of government's Energy and Emissions Projections (EEP 2021-2040) as a "baseline" for future emissions and compare this to the legislated carbon budget levels. EEP 2021-2040 is based on assumptions of future economic growth, fossil fuel prices, electricity generation costs, UK population and other key variables, and so are sensitive to macro-economic and other input assumptions.
8. For instance, since EEP 2021-2040 was published projections of future Growth Domestic Product have been revised by the Office for Budget Responsibility, in March 2023. These revisions came out too late to incorporate into this modelling. However, without these updates our baseline emissions are higher than they would otherwise be, because the most recent OBR medium and long-term projections of GDP growth are lower than those used in EEP 2021-2040. Lower projected growth would be expected to decrease baseline emissions, reducing the emissions savings needed from government proposals and policies to enable carbon budgets to be met.
9. There is also increased uncertainty over long-term fossil fuel prices, in part a consequence of the war in Ukraine. The EEP 2021-2040 reference case used in modelling assumes that electricity prices return to their recent, historical average around 2025. However, prices may remain elevated beyond this, which would result in decreased baseline emissions from reduced energy demand compared to our current projections.
10. On balance, our judgement is that because of the cautious approach taken to estimate the baseline, it would be reasonable to assume that the relevant trends here could lead to lower emissions than we have assumed, helping to enable the carbon budgets to be met.

### ***Technology performance and impact of international policies***

<sup>3</sup> More detail on adjustments made to the EEP baseline can be found in the Technical Annex to the NZGP.

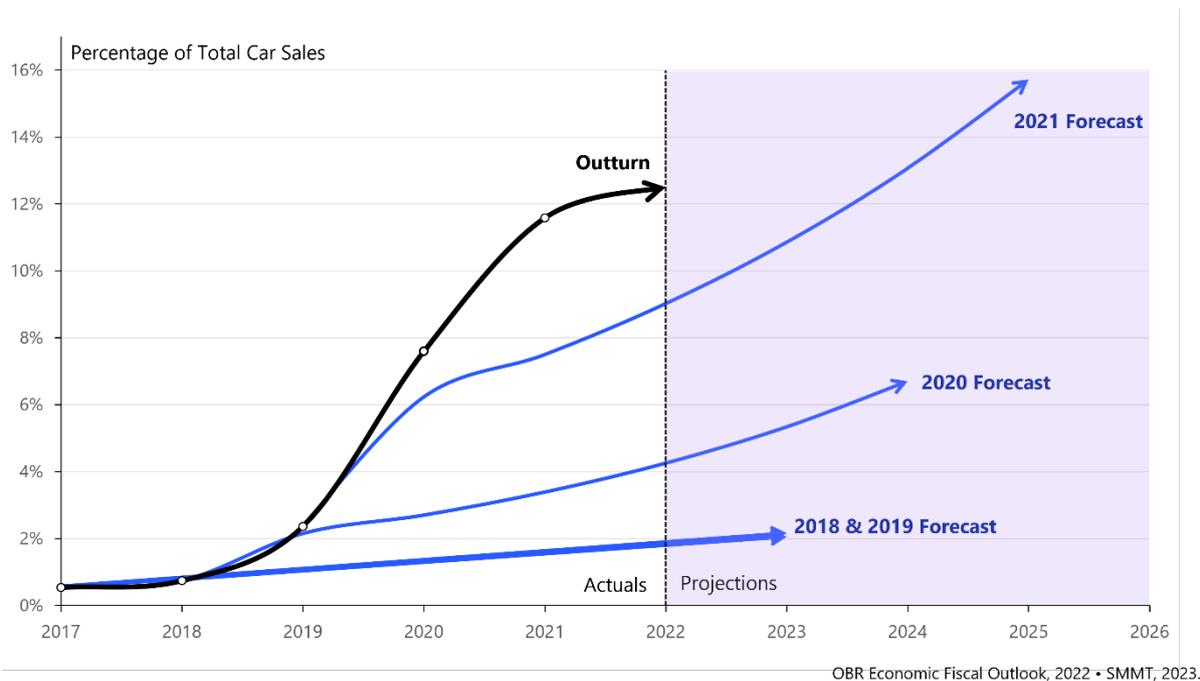
11. Historically, we have underestimated cost reductions and technology performance, with costs falling faster than expected in many areas. For example, between 2016 and 2020 the actual costs of offshore wind fell by 70% more than BEIS 2016 BEIS' projections.
12. Modelling approaches which are typically used to underpin assessments of global and national carbon abatement potential have historically underestimated cost reductions in renewable technologies by not accounting for “experience” or “learning” curves. Increased production reduces costs as experience and innovation produce savings. This could result in faster than expected deployment of technologies.
13. In addition, international policies such as the US Inflation Reduction Act and the EU's Green Deal Industrial Plan are expected to drive further investment in green technologies. While not UK proposals and policies, these are likely to further accelerate innovation and reduce costs of the transition. There may also be negative impacts if increased competition for investment and constrained supply chains curtail our deployment of clean energy technologies, for example in the automotive and CCUS sectors, or if they undermine our international rules-based system that is vital for the global transition to net zero. However, on balance, our view is that the net effect of these factors would support greater technology adoption, through lower cost, which in turn would be expected to reduce emissions more quickly than we have currently assessed.

### ***Consumer and business behaviour***

14. Consumer and business behaviour underpins a significant proportion of the emissions reductions needed for CB6. There are some reasons to expect that shifts in behaviour could happen faster than currently anticipated. For example, in recent years the uptake of electric vehicles has consistently exceeded forecasts (see Figure 1). However, some areas of modelling already assume ambitious pathways for consumer take-up or the expansion of production. There may therefore be some areas where deployment could be slower than currently anticipated.
15. Public concern and awareness of climate change and net zero is increasing: the BEIS Public Attitudes Tracker shows that public concern about climate change is high, having doubled since 2016 with 85% in the UK either concerned or very concerned. Increased engagement with net zero is important for building public support for the target and proposals and policies to meet it. There may therefore be shifts in consumer behaviour separate to government policy that lead to additional emissions savings.

### **Figure 1: Uptake of electric vehicles in the UK relative to recent OBR forecasts**

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### Systemic feedback effects

16. In taking a systems approach to net zero, we consider the different sectors of the net zero challenge as parts of an interconnected system, where changes to one area can directly or indirectly impact others. The net zero system is inherently complex with a range of interdependencies across the different sectors. Modelling cannot always consider systemic feedback effects, which are hard to quantify, such as co-benefits from technology roll-out or price reductions as markets mature. These may result in improvements to the position against carbon budgets.

17. Potential examples of these effects include:

- a. Proposals and policies to support roll out of EVs are likely to result in further investment in technology and extensive charging infrastructure, facilitating further uptake.
- b. Deployment of long duration energy storage and interconnectors could reduce renewable curtailment, providing greater incentives to deployment of renewables.
- c. Efficiency standards for homes could create a larger workforce for installation of efficiency measures, bringing down costs and supporting further installation.

18. The above are examples of feedback loops identified with our net zero systems tools. Further systemic analysis will be necessary to give us a clearer understanding of these effects over time, as well as their potential to further support meeting carbon budgets or to provide new opportunities to make positive interventions.

### Impact of actions by the Devolved Administrations

19. Many policy areas related to enabling carbon budgets to be met are partially or fully devolved. For some of these areas, such as buildings, agriculture, forestry and other land use (AFOLU) and waste, we make assumptions about potential emissions savings that could be delivered by the Devolved Administrations, where it is

reasonable to do so, based on our understanding of Devolved Administrations' plans and ambitions.

20. Given we do not have detailed quantified emissions savings estimates from Devolved Administrations and that their plans are designed over different timescales to the UK-wide carbon budgets, we apply 'scalars' to estimate their emissions savings proportionately to commensurate England-only measures, using factors such as population, number of households, and energy use. This provides an approximation of what emissions savings might be delivered by the Devolved Administrations in these sectors, for those policy areas where scalars are applied.
21. However, there are other policy areas that are devolved but for which we do not make any assumptions about potential emissions savings from Devolved Administrations, for example in transport.
22. As such, there are a number of areas where the Devolved Administrations are taking action beyond what is reflected in our assumptions, but that we have not been able to fully factor into our analysis.
23. In setting out the total emissions savings in Appendix B, an assumption of overall emissions savings at a UK level are assumed for policies in the buildings sector. The agriculture, forestry and other land use (AFOLU) and waste sectors have England and Devolved Administrations emission savings set out separately. F-gas have GB and Northern Ireland emission savings set out separately.

### ***Impact of action by local authorities***

24. Local authorities play an essential role in driving local climate action, with significant influence in many of the national priorities across energy, housing, and transport, which will be needed to enable carbon budgets to be met. Local authorities are responsible for 2-5% of local emissions but have the potential to influence around 80% of all UK emissions.
25. Many local authorities have committed to achieving net zero emissions in their areas: of the ten city regions with elected mayors, eight have plans for carbon neutrality or net zero emissions by 2050. This local focus on net zero is also being reflected in Local Devolution deals and in Local Growth funds which have a Net Zero Principle for all projects.
26. The Government-funded Prospering from the Energy Revolution programme is looking at smart local energy systems where transitions in heat, power and transport alongside demand management come together at a local area identifying ways to make the transition more cost effective. This has led to work on Net Zero Neighbourhood pilots and a new UKRI programme 'Net Zero Living' to tackle the non-technical barriers to local delivery.
27. Local government can access funding through existing government schemes (such as the Public Sector Decarbonisation Scheme), which are factored into our analysis, but we know that many local authorities are taking action on net zero beyond this and are looking at securing commercial investment to do so. The Government is working closely with local government to help the sector attract commercial investment through:

- a. The work of the Government-funded Local Net Zero Hubs, which help local authorities develop net zero projects and attract commercial investment; and
- b. Supporting work to develop new business models, for example funding the 3ci project led by the Connected Place Catapult, as well as work supported by UKRI's 'Net Zero Living' programme.

### Conclusion on enabling carbon budgets to be met

28. Our overall assessment, taking account of the uncertainty in wider trends and factors, is that the unquantified proposals and policies will enable Carbon Budget 6 to be met when considered alongside the quantified proposals and policies set out in Table 2, Appendix B.

### The full list of proposals and policies are presented in Appendix B. Delivery risks and wider factors impacting the package of proposals and policies

#### Overview of delivery risk

29. To assess whether the proposals and policies are sufficient for enabling carbon budgets to be met, you must consider the risks to delivery of the associated emissions savings that each of the proposals and policies carries.
30. These risks are captured against each proposal and policy in Tables 2 and 3n Appendix B.
31. Part of the consideration on delivery risk is the extent to which we are able to mitigate said risk in order to ensure emissions savings are realised from the proposal or policy. Therefore, next to these risks we have identified the mitigating actions we are undertaking to address them. Taken together, these allow you to come to a view on whether you have confidence in the package of individual proposals and policies to deliver their associated emissions savings.
32. Given the length of the policy lists, to aid your judgement we have included, in Appendix D, sector level summaries of the delivery risk picture, including commentary on the most significant risks and associated mitigating actions. These summaries will be published as part of the Carbon Budget Delivery Plan to ensure Parliament and the public can understand the key risks to the package of proposals and policies.
33. We have limited information on the delivery risks relating to Devolved Administrations' individual proposals and policies. We will continue to work with Devolved Administrations to support UK-wide delivery, including through enhanced information sharing on these risks to help mitigate this. We will revert with further advice on this in due course.

#### Further considerations

34. The UK ETS Authority has just agreed to a cap for 2024-2030 at the top of the range that was consulted on in 2022. This could result in emissions reductions in the traded sector being lower than anticipated. This could impact the carbon emission savings in CB4 and potentially require us to rely further on policies in the non-traded sector. However, this does not change the recommendation in this advice.
35. You have an ongoing duty under section 13 of the CCA to prepare proposals and policies with a view to meeting the net zero by 2050 target. Whilst we advise that this

package, taken as a whole, enables the carbon budgets to be met, you should be aware that:

- There are a number of fossil fuel developments that have received planning consent but are not yet in operation. For example, the proposed coal mine at Whitehaven, which has projected emissions impacts of 2.6 MtCO<sub>2</sub>e to 2037, and 4.5 MtCO<sub>2</sub>e from 2038 to 2050. These figures represent a conservative estimate based on the higher, unmitigated scenario modelled by the mine's promoter in recognition of the uncertainties around the effect of proposed mitigation strategies. We will need to consider the impact of the coal mine further when setting CB7 and preparing proposals and policies for meeting that carbon budget, but are not of the view that these emissions will materially impact the baseline or the quantified emissions savings up to CB6.
- Due to changes in the evidence base, import assumptions, and reductions to UK energy crop planting rates, we are updating our understanding of biomass supply and have developed a range of biomass availability scenarios. This primarily reflects uncertainty in import assumptions. Given this, it is possible we may have lower biomass than previously projected in CB6 and beyond to 2050, potentially impacting technologies relying on biomass, including power and hydrogen BECCS, which are both critical negative emission technologies. Crucial to our ability to secure enough biomass for CB6 and beyond is ensuring the UK has access to sufficient biomass and biofuel imports, which are subject to uncertainty. We will monitor this situation and revert with further recommendations on biomass projections and mitigating actions in due course.

### Impact of Net Zero Review recommendations on the package of proposals and policies

36. We have accepted a number of recommendations from the Independent Review of Net Zero.
37. From an initial analysis, we are uncertain about whether the recommendations accepted will play a significant role in delivering further savings. Certain policies, such as a second REMA consultation and Ofgem agreement to maintain focus on market-wide half-hourly settlement, have the potential to either deliver a small amount of new emissions savings, or enable the quicker delivery of already planned savings.
38. We have a higher degree of certainty that a number of the accepted recommendations could, when implemented, materially improve our delivery confidence and will therefore be important in enabling carbon budgets to be met. These have been reflected in Tables 2 and 3 of Appendix B.
39. A few examples of these are:
  - a. Firm commitment in response to recommendation 116 to launching the Heat Pump Investment Accelerator in 2023
  - b. Commitments in areas of Hydrogen and CCUS to greater clarity of plans and funding.
  - c. In response to recommendations 73 and 43, we aim to publish non road mobile machinery and biomass strategies in 2023.

### Policy changes following [REDACTED]

40. A small number of changes have been incorporated into the package of proposals and policies following [REDACTED]. However, on balance these changes have not had a material impact upon our projected position versus the carbon budgets, which remains the same.

## Wider impacts of the transition to net zero

### Consideration of s10 and Sustainable Development factors

See appendix E for detail sitting behind the table.

<b>Factor</b>	<b>Consideration in S13 Advice</b>	<b>Conclusion</b>
Scientific Knowledge	See "Climate Science and Adaptation" section of Appendix E.  Analysis is based on the latest science available. We have adjusted emissions to account for the latest climate science.	The scientific case for strong action on climate change remains definitive.
Technology	See the Technical Annex, including Sector Modelling section, and "Climate Science and Adaptation" section of Appendix E.	The latest evidence on relevant climate technologies has been used for all emissions analysis
Economic	See "Economic and Fiscal" section of Appendix E	There are many economic and competitiveness impacts of the transition, with some potential significant economic benefits, particularly when compared against inaction on climate change. However, the economic impacts and interactions of reaching net zero are complex.
Fiscal	See "Economic and Fiscal" section of Appendix E.	The full fiscal impact of the transition is not yet known and will depend on varied policy decisions and economic outcomes.
Sustainable Development	See Natural Capital section of Appendix E. Other aspects of sustainable development are addressed in the economic, fiscal and social sections.	There are both positive and negative natural capital impacts associated with emissions reduction policies but the overall contribution to sustainable development is likely positive.
Energy Policy	Analysis in this report has accounted for latest policy developments, including the response to recent energy price spike and recent announcements to ensure long-term security of supply.	Delivering our carbon budgets has the potential to reduce demand for gas, coal, oil and transport fuels which could improve security of supply by diversifying away from primarily imported fossil fuels. Other measures will mean increases in electrification and the simultaneous deep decarbonisation of electricity supply, which carries security of supply risks.
Social	See "Social Considerations" section of Appendix E.	Price and bill impacts will depend on electricity market developments and consumption patterns. Government has mitigated some of the worst impacts of recent energy price increases, saving typical

		households £1,500 factoring in the extension of the Energy Price Guarantee to June. Policies that improve energy efficiency of homes will reduce bills and benefit fuel poor households.
International Aviation and Shipping	IAS emissions are factored into analysis and into presentation of the sixth carbon budget.	IAS emissions will be included from the sixth carbon budget onwards and will use the bunker fuel sales method to calculate emissions.
International and European	The UK revisited its world leading 2030 Nationally Determined Contributions and strengthened it with plans to expand the territorial scope to include the UK's Crown Dependencies and Overseas Territories.	The UK has world leading ambition on climate change and is committed to advancing global climate action.  The UK has left the EU and is no longer bound by EU climate policies.
Devolved Circumstances	In addition to UK-level policy, the analysis has used scaling factors for some sectors to account for savings from Devolved Administrations where appropriate. Further detail on the methodology is provided in the Technical Annex. In short, an assumption of overall emissions savings at a UK level are assumed for policies in the buildings sector. The agriculture, forestry and other land use (AFOLU) and waste sectors have England and Devolved Administrations emission savings set out separately. F-gas have GB and Northern Ireland emissions savings set out separately.	The proposals and policies in this report will deliver emissions savings across the nations of the UK, depending on their differing circumstances. There is potential for further savings where the Devolved Administrations are taking action beyond what is reflected in our assumptions.

## Level of detail included in the Carbon Budget Delivery Plan

41. We have provided all relevant information to you in order for you to determine whether the package of proposals and policies enables carbon budgets to be met. It does not follow that the same information must be published in the Carbon Budget Delivery Plan, however the purpose of the section 14 report is to promote transparency and Parliamentary scrutiny of the Government's climate measures. We therefore propose publishing the full list of individual proposals and policies (quantified and unquantified) that we consider enables us to meet carbon budgets, including their associated emissions savings and the timescales over which they are expected to take effect. However, we do not consider that it would be appropriate or necessary to set out information about specific delivery risks for each of the proposals and policies as we have to you – which enables you to look at the contribution of each measure and its associated delivery risk. Instead, we propose publishing sector summaries of delivery risk in the Carbon Budget Delivery Plan, rather than outlining delivery risks of each individual proposal or policy (see Appendix

D), Annex F to the submission includes a draft of the Carbon Budget Delivery Plan for your approval.

## Appendices

### Appendix A: Sector definitions

**Table 3: Sector definitions**

<b>NZS Sector</b>	<b>Sector definition</b>
<b>Power</b>	Emissions from power stations (Major Power Producers only), including those generating energy from waste.
<b>Fuel Supply</b>	Emissions from the extraction, processing, and production of fuels (chiefly oil, coal, gas and hydrogen).
<b>Industry</b>	Emissions from industrial processes, manufacturing, and production, including fuel combustion and product use in industrial buildings, as well as emissions from refineries and construction machinery. Includes emissions from non-Major Power Producers auto-generation and Combined Heat and Power.
<b>Heat and Buildings</b>	Emissions from public, commercial, and residential buildings, including domestic product use such as garden machinery and composting.
<b>Domestic Transport</b>	Emissions from all forms of road and rail transport, domestic aviation and domestic shipping (including fishing vessels).
<b>International Aviation and Shipping</b>	Emissions from fuel used in international aviation and international shipping, as measured by UK bunker fuel.
<b>Agriculture</b>	Covers emissions from livestock, crop soils and agricultural machinery.
<b>Forestry and Other Land Use</b>	Emissions and removals from land use change, forestry, peatlands and agro-forestry
<b>Resources and Waste</b>	Emissions from the treatment and disposal of solid and liquid waste and landfill, including emissions from incineration not used to generate energy (e.g. incineration of chemical waste).
<b>Fluorinated Gases (F-gases)</b>	Fluorinated gas emissions, primarily from refrigeration, air conditioning, heat pumps, aerosols, and high voltage switchgear.
<b>Greenhouse Gas Removals</b>	Negative emissions from engineered removal technologies, including direct air and bio-energy carbon capture and storage.

## Appendix B: Proposal and policy tables – see separate attachment

Within this appendix, we list the individual proposals and policies which will enable the carbon budgets to be met. These are set out over four tables:

- Table 1 - Policies captured in the Energy and Emissions Projections (EEP);
- Table 2 - Quantified proposals and policies; and
- Table 3 - Unquantified proposals and policies.

### Notes to accompany Table 5 - Quantified proposals and policies

#### **Explanation of “scenarios” in modelled emission savings:**

1. In some areas the technology pathway is more uncertain than others. For example, the Government continues to support the potential deployment of hydrogen in heat (through commercialising hydrogen deployment through funding via the Net Zero Innovation Fund, for instance) and also the electrification of heat (for instance through increased deployment of heat pumps).
2. For most of the proposals and policies in the package, we show savings under a high electrification scenario because their savings do not vary across the different scenarios. However, we have modelled different decarbonisation pathways for parts of the buildings and fuel supply sectors that vary depending on the level of deployment of hydrogen across the economy. This applies to three policy areas covering heat pump deployment, buildings “on the gas grid”, and the emissions associated with hydrogen production. The modelled scenarios show how differing uptake rates of hydrogen may displace some electrification across the economy.
3. These scenarios are mutually exclusive. This means that emissions savings from the high electrification scenario cannot be summed together with those from a “medium” or “high” hydrogen scenarios, as only one or the other policy would be implemented. Likewise, savings from “high” and “medium” hydrogen scenarios cannot be summed together. Although our list includes proposals and policies in different scenarios, we do not double count these emissions savings in analysis presented elsewhere in this report. Across all sectors, the three scenarios achieve the same emissions savings as each other – we do not expect emissions savings across the whole economy to vary materially depending on which of the three scenarios is taken forward through to 2050.

### **Explanation of power policies represented by a single emissions figure.**

4. DESNZ simulates the power sector using the Dynamic Dispatch Model<sup>4</sup> (DDM), with emissions savings determined by comparing indicative Net Zero consistent scenarios against a scenario where no further government action is taken to decarbonise the power sector (which does not need to be Net Zero compliant). For all scenarios, the model builds sufficient capacity to ensure security of supply, with the capacity mix balanced to keep system costs low. Although specific capacity mixes are required by these scenarios, DDM modelling has shown that there are a range of capacity mixes that can achieve Net Zero.<sup>5</sup>
5. We provide a single emissions savings figure for the whole sector because power sector proposals and policies all contribute to a single interlinked dynamic system. Calculating individual emissions savings (where capacity for a single technology does or does not materialise because of the proposal or policy) will yield significantly different values depending on whether that proposal or policy is evaluated in isolation or in conjunction with one or more other proposals or policies. This non-additive nature also means that single proposal or policy emissions savings are sensitive to the exact configuration of the chosen scenario, so two Net Zero consistent scenarios may yield different emissions savings for the same proposal or policy.
6. In this context, generating emissions savings for individual proposals or policies is likely to be both misleading and inaccurate. Risks to power sector decarbonisation are therefore not defined by the level of emissions savings for a given proposal or policy but rather in how each one facilitates and accelerates the delivery of low carbon capacity and whether the proposal or policy retains optionality; that is, provide avenues for a large number of technologies to participate in the power sector, diversifying the technology mix and, in doing so, de-risking the system as a whole.
7. Emissions savings attributed to greenhouse gas removal technologies such as power-BECCS are accounted for in the Greenhouse Gas Removal section; whereas the contribution of that technology to low-carbon power generation as part of the power system are represented as part of the single Power carbon accounting line.

### **Explanation of UK-wide approach to emissions.**

8. The carbon budgets apply to the whole of the UK economy and society. In preparing this package of proposals and policies, we have consulted with Devolved Administrations who we continue to work with to deliver our UK-wide carbon budgets. Emission reduction figures are generally included at a UK wide level, with the exception of the agriculture, forestry and other land use (AFOLU) and waste

<sup>4</sup> <https://www.gov.uk/government/publications/dynamic-dispatch-model-ddm>

<sup>5</sup> <https://www.gov.uk/government/publications/modelling-2050-electricity-system-analysis>

sectors, where the England and DA emissions are separate. F-gas figures are included at a GB wide level only where the GB and Northern Ireland emissions are separate. Further detail on the methodology is included in the Technical Annex.

#### **Explanation of approach to presenting timescales of policy effects.**

9. To fulfil the statutory requirement to set out the period over which the proposals and policies are expected to take effect, the table of quantified proposals and policies [Table 2] indicates the year in which our modelling anticipates emissions savings would start. For some proposals and policies, it is highly uncertain when they may be implemented and when emissions savings could be expected to start. In these cases we have indicated the Carbon Budget period in which our modelling currently assumes that emissions savings would start.
10. In all cases, the timescales over which we expect proposals and policies to take effect are not commitments – these may change according to developments in the evidence underpinning the modelling, the timing of implementation (unless the implementation date is an existing public commitment) and decisions on future spending (where applicable). All proposals and policies are expected to deliver or support the delivery of emissions savings until at least 2037, the end of Carbon Budget 6.

## Appendix C: Deployment assumptions

The table below shows real-world deployment assumptions for each sector, based on the emissions profile of policies and proposals in this report. Ranges indicate where values differ between the electrification and hydrogen pathways set out in the strategy for the heat and buildings sector. In some cases, these assumptions represent early-stage assessments based on maximum technical potential. Given ongoing uncertainties, the policy mix that will meet carbon budgets, and related deployment assumptions, are subject to change; these are illustrative and should not be interpreted as government targets.

Sector	Deployment assumption	Unit	2021	2025	2030	2035
Power	Electricity generation	TWh	307	315	370	460* - 495
	Low carbon GB generation as a percentage of total projected generation required in 2035	%	34% - 38%*	37% - 41%*	67% - 71%*	99%
	Low carbon fuels <sup>a</sup> consumption as a percentage of final energy consumption in industry**	%	40%	40%	50%	60%
Industry	Resource and energy efficiency savings	MtCO <sub>2</sub> e	See policy savings tables for resource and energy efficiency policy savings			
	Industry demand for Industrial CCUS (including BECCS)	MtCO <sub>2</sub> e	0	0	6	10

Fuel Supply	Low carbon hydrogen production	TWh	0	10***	55 - 65	80 - 140*
	Electrical power demand from offshore oil and gas installations as a percentage of their total power demand	%	0%	0%	25%	29%
Heat & Buildings	Cumulative heat pumps installed domestically	Million installations	0.3	0.9	3.6* - 3.8	7.1* - 11.5
	Cumulative homes converted to 100% hydrogen for heat	Million homes	0	0	0 - 0.2*	0 - 4.0*
	Yearly homes treated by new domestic energy efficiency measures	Million homes	0.2	1.5	0.4	0
	Low carbon fuels <sup>a</sup> consumption as a percentage of total fuel consumption in commercial buildings (excluding heat networks)	%	59%	61%	65%	73%
	Yearly heat supplied via heat networks	TWh	15	17	27	35
	Yearly biomethane injected into the grid	TWh	4	7	12	13
Agriculture & LULUCF	Yearly area of peatland under restoration in England	Ha	1,600	14,000	14,000	7,000
	Yearly area of afforestation in the UK	Ha	13,300	7,500	8,900	10,300

	Yearly additional area of perennial energy crop and short rotation forestry planted	Ha	0	0	9,600****	15,000****
	Farmers engaging with low carbon farming practices as a percentage of total farmers	%	56%	70%	75%	85%
Waste & F-gases	Level of HFC consumption relative to a 2015 baseline level (percentage of bulk gas use only in 2015 use)	%	45%	31%	21%	21%
Removals	BECCS and DACCS	MtCO <sub>2e</sub>	0	0	5.6	22.9
	ZEVs as a percentage of total car fleet	%	0.9%	7%	25%	52%
	ZEVs as a percentage of total van fleet	%	0.5%	3%	16%	43%
Domestic transport	ZEVs as a percentage of total HGV fleet	%	0.1%	0.4%	9%	37%
	ZEVs as a percentage of total bus and coach fleet	%	0.8%	14%	35%	61%
	Low carbon fuels <sup>a</sup> used in road transport as a percentage of total fuel use (in litres)	%	6%	9%	10%	11%

	Proportion of short journeys (less than 5 miles) in towns and cities that are walked or cycled	%	45%	46%	50%	55%
	SAF use in domestic aviation as a percentage of total fuel use (in tonnes)	%	0%	4%	10%	15%
	Low carbon fuels <sup>a</sup> use in domestic shipping as a percentage of total fuel use (in TWh)	%	0%	0%	1%	42%
IAS	SAF use in international aviation as a percentage of total fuel use (in tonnes)	%	0%	4%	10%	15%
	Low carbon fuels use <sup>a</sup> in international shipping as a percentage of total fuel use (in TWh)	%	0%	0%	1%	28%
Overall	GDP carbon intensity	tCO <sub>2</sub> e/ GDP£m2021	184	140	93	64
	GDP energy intensity	MWh/ GDP£m2021	670	630	540 - 550*	450 - 470*

\*Reflects demand in the high hydrogen pathway

\*\*This metric has been changed from "Low carbon fuel switching" published in the Net Zero Strategy due to methodological issues. Figures for low carbon fuel switching, including BECCS, are 122TWh for 2021, 115TWh for 2025, 120TWh for 2030, and 160TWh for 2035.

\*\*\*Figure reflects hydrogen production in the mid-2020s (rather than 2025 specifically)

\*\*\*\*Energy crop and short rotation forestry area figures are indicative and may vary, for example, based on precise mix of crop varieties

<sup>a</sup> The table includes several deployment assumptions covering relevant low carbon fuels in different sectors. The low-carbon fuels included are the following: electricity, biofuels, solid biomass, hydrogen, ammonia and methanol. All of these deployment assumptions include electricity and hydrogen both in the numerator and denominator, with the exception of low-carbon fuels used in road transport (from which electricity and hydrogen are completely excluded).

The metric 'Single track kilometres electrified per year' has been removed while we develop an appropriate metric to reflect the policy on rail electrification

## Appendix D: Sectoral summaries of delivery confidence

### Power

#### Introduction

1. Delivering deep decarbonisation of power is key both to delivering sector emissions savings and unlocking the path to net zero across transport, industry, and heating buildings. Meeting growing demand while achieving the goal of decarbonising the power system by 2035 subject to security of supply needs substantial expansion of renewable low carbon generation. This will require appropriate planning arrangements, expansion of electricity networks and grid connections, strong supply chains, deploying sufficient flexible capacity capable of replicating the role of unabated gas on the electricity system and the delivery of new nuclear capacity. We must catalyse private investment in low carbon infrastructure to deliver the level, pace and scale of ambitions. Given the scale and pace at which the power sector will need to deliver generating infrastructure to meet demand, and the risks to delivery and deployment, power must retain optionality on which generating technologies deploy to deliver lower cost solutions.
2. The Energy White Paper, Net Zero Strategy, British Energy Security Strategy, and the Energy Security Plan set out our strategy for decarbonising the power sector, including how we are developing and delivering a portfolio approach to mitigate the delivery risk of any individual project or technology.

#### Risks and mitigation

3. An efficient planning system for nationally significant infrastructure is essential for the deployment of large scale low carbon electricity generation technologies like offshore wind, nuclear power and power-CCUS at the pace and scale we need to meet Carbon Budget 6. The Government is undertaking several actions to review planning and consents, such as the Action Plan for reform published in February, making the system faster, fairer and more effective, as well as changes to Permitted Development Rights to simplify obtaining planning consent for solar installations. The Government has also issued a Call for Evidence on Land Rights and Consenting for electricity networks. The Government is also updating the National Policy Statements to ensure that we have a planning policy framework to support infrastructure required for net zero and has set up taskforces to support the development and deployment of infrastructure.
4. The electricity network will need to be expanded so that the new generating capacity can connect to the grid. The electricity network will need to be able to manage an additional capacity required on the electricity system for Carbon Budget 6. We are developing proposals and policies to meet this onshore and offshore, including delivering the Electricity Networks Strategic Framework, focused on how government and Ofgem would enable the transformation of the network at the scale and pace required; and delivering the Centralised Strategic Network Plan with Ofgem and National Grid ESO; and Holistic Network Design with National Grid ESO.
5. Nuclear capacity is a key technology in the decarbonisation of the power sector, and faces legislative, planning, policy and financing challenges. We manage this by planning on taking one project to FID this Parliament and two projects in the next Parliament, legislating in 2022 for the Regulated Asset Base, setting up Great British Nuclear and taking forward Sizewell C. Further

action to mitigate risk includes work on a nuclear siting consultation as a first step towards a new National Policy Statement for nuclear; implementing the Action Plan published last month for reforming the planning process for all nationally significant infrastructure; and exploring the potential for streamlining the planning process further. In addition, the Government has launched Great British Nuclear (GBN) which will be funded to lead delivery of our programme of new nuclear project. The first priority for GBN is to launch a competitive process to select the best small modular reactors (SMR ) technologies. We will also be exploring research and development of advanced modular reactors (AMRs) and fusion.

6. At current the UK relies heavily on unabated gas to provide flexibility in the electricity system. Reducing emissions in the power sector will also depend on bringing forward flexible technologies that are capable of replicating the role of unabated gas in the electricity system. These include technologies such as power CCUS, hydrogen to power, and energy storage. To boost confidence and funding clarity for CCUS we are taking forward Track 1 negotiations including one power CCUS project; setting out plans for Track 2 and expansion of Track 1 clusters, and setting out a longer term vision to give investors, industry and regulators clarity on our 2030s approach. For hydrogen to power we intend to consult on the need and potential design options for market intervention and we will develop appropriate policy to enable investment in large scale long duration storage by 2024. We are also taking forward actions set out in the Smart Systems and Flexibility Plan. This includes legislating for enabling powers in the Energy Security Bill and consulting on proposals for a Secure and Smart Electricity System.
7. Power BECCS is a technology that can deliver both low carbon generation to support the decarbonisation of the power sector, as well as negative emissions. To support the deployment of power BECCS the Government is developing Power BECCS business models to incentivise negative emissions and power generation.

## Industry

### Introduction

Industry is a major source of CO<sub>2</sub> emissions. Industrial sectors in 2021 produced 18% (76 Mt CO<sub>2e</sub>) of UK emissions, with just over half of these emissions concentrated in specific 'clusters' – geographical areas with large concentrations of industry. We set out a plan to decarbonise industry in the Industrial Decarbonisation Strategy (2021) and in the Net Zero Strategy.

### Risk and mitigation

8. The ambition we have set out in our strategies is stretching. We are addressing the challenge in depth of decarbonisation by looking at what could be delivered with higher ambition on resource and energy efficiency, fuel switching and CCUS. We increased our ambition in the Net Zero Strategy to capture and store industrial emissions (from 3 MtCO<sub>2</sub> per year to 6 MtCO<sub>2</sub> by 2030, and to 9 MtCO<sub>2</sub> per year by 2035); are now committed to delivering more fuel switching to low carbon alternatives, with our initial ambition to replace around 20 TWh of fossil fuels per year by 2030 – potentially increasing to 50 TWh per year by 2035; and decarbonising the iron and steel sector in the 2020s and early 2030s. We are also developing proposals for

industry through the Energy Efficiency Taskforce, as part of the 15% reduction in energy use target, which will increase delivery confidence for industrial energy efficiency and resource efficiency.

9. A lot of our efforts are focused on major industrial clusters, which account for just over half of total industry emissions, and there has been less focus on support on remaining emissions in more 'dispersed' industrial sites. To address this, we have launched the Local Industrial Decarbonisation Plan (LIDP) to allow industries outside industrial clusters to develop strategic plans to decarbonise. Plans will be reviewed to ensure they continue to present value for money and are delivering on the carbon savings expected.
10. Many industries continue to highlight carbon leakage as a risk preventing investment. We are addressing this by ensuring there is a clear plan for carbon leakage mitigation that gives industry confidence to invest ahead of upcoming changes to the ETS cap.
11. The delivery of the industrial decarbonisation pathway is heavily reliant on new and emerging technologies, alongside significant investment. This is a long-term package that will be adapted as our understanding of the technical and economic potential for industrial decarbonisation continues to develop.

## Fuel supply

### Hydrogen production

12. We have an ambition to have up to 10GW low carbon hydrogen production capacity by 2030, subject to affordability and value for money, with at least half of that coming from electrolysis. Growing the sector from an extremely low starting point naturally entails challenges in either high hydrogen or high electrification scenarios.
13. Hydrogen production alone will not generate emissions savings, but we expect it to enable emissions savings in several sectors including industry, power, transport and potentially buildings by replacing high-carbon fuels used today.
14. Policies intended to meet this stretching 2030 ambition and CB6 carry delivery risks, some of which are inevitable given pace and scale of deployment. We have higher certainty in the delivery and funding of some policies in the near term, having launched the Net Zero Hydrogen Fund, Hydrogen Production Business Model, and the Low Carbon Hydrogen Standard. Confidence should grow as government and industry action provides clarity on long term funding, production, and legislating for Transport and Storage business models by 2025.
15. Up to 50% of the 2030 hydrogen production ambition depends on Carbon Capture Use and Storage (CCUS), which carries delivery risks which could materially affect the successful delivery of the associated carbon savings for 2030. Progress on Track 1 and 2 plans provide significant mitigation for these risks.
16. We know that industry has a potential pipeline of almost 20GW of low carbon hydrogen projects across the UK. Our plans will be set out in a Hydrogen Production Delivery Roadmap later this year. We are announcing the successful applicants of the first competition window for Strands 1 and 2 of the Net Zero Hydrogen Fund, and later this year will award contracts totalling

up to 250MW of capacity from the first electrolytic allocation round, subject to affordability and value for money.

## **Oil & Gas**

17. The oil and gas sector continues to make good progress in decarbonising in line with North Sea Transition Deal (NSTD) for upstream; and steady progress on the midstream gas approach. NSTD projects are primarily focused on offshore infrastructure electrification, and cessation of routine flaring and venting, which require industry action and new approaches so entail delivery risks.
18. Factors driving the delivery risks include the high cost of infrastructure change, regulatory complexity, bottlenecks in network capacity and scheduling, recent amendments to the tax regime, and a challenging investment climate. These could affect the speed at which we electrify and decarbonise. We do not assume that all platforms will electrify.
19. Government continues to work with the industry and regulators to help mitigate these risks, including by responding to questions regarding the regulatory environment and encouraging investment in infrastructure.
20. The oil and gas sector's expertise and supply chain is key to supporting technologies that will help us enable carbon budgets to be met, including offshore wind, CO2 storage, and hydrogen; while ensuring UK energy security as we transition to net zero by 2050.

## **Heat and Buildings**

### **Introduction**

21. The Buildings sector accounted for around 17% of UK GHG emissions in 2019 and therefore has a significant contribution to make to enable the carbon budgets to be met. We have a high level of confidence that our plans are achievable through proposed actions on finance, regulation and driving consumer behaviour change.

### **Risks and Mitigation**

22. Delivery is dependent on government taking decisions in relation to future CB periods to provide additional funding and to regulate for changes. This will be subject to technological developments, societal changes, stakeholder views, future spending arrangements and broader policy developments.
23. Over a third of the policies require consumers to make choices to achieve the emissions savings. There are risks that these choices may not occur due to several factors including concerns around costs and lack of clear information for the consumer to make informed choices, which could mean there would be no widespread adoption of policy measures. In July 2022 Government launched a home retrofit tool on GOV.UK, 'Find ways to save energy in your home', and a phonenumber service that will help provide consumers in England with tailored and impartial information about how to improve the energy performance of their homes. Consumer awareness of the benefits of heat pumps and the Boiler Upgrade Scheme is also being raised through a targeted marketing campaign.
24. There is also a risk that retrofit and low carbon heat supply chains do not grow or upskill sufficiently to enable meeting our energy efficiency and clean heat

deployment targets. This sector can face capacity issues as the majority of businesses are small to medium enterprises that may require support to upskill or retrain staff. Also, within the labour market there are challenges for attracting workers with the right skillset for insulation measures, which we are addressing with skills funding across heat decarbonisation and buildings retrofit. The £15m Home Decarbonisation Skills Fund commits to future support for training for people who want to work in the energy efficiency sector and has already funded 18 projects. We have also recently announced the £5m Heat Training Grant for heat pump and heat network skills.

25. Product supply may not meet demand at an affordable price which makes the achievement of targets more expensive. This is driven by current costs of technologies or measures and the potential to reduce these, as well as by inflation, transport costs and competing demand from other markets. Product supplies are not directly within government control but are influenced by demand generated by government schemes or policies. For clean heat measures, we are growing the heat pump market and supply chain through the Boiler Upgrade Scheme, Clean Heat Market Mechanism, Heat Pump Investment Accelerator and through off-gas grid regulations. An insulation products strategy is in development with key industry partners to enable management of peaks in demand and overall costs.
26. Distortions between electricity and gas prices may continue to disincentivise technologies such as heat pumps. We are committed to rebalancing prices between gas and electricity which will ensure low carbon technologies are comparatively cheaper to run over time, but energy prices may not be re-balanced quickly enough or to a sufficient extent.
27. The external risks outlined above present delivery challenges to emissions savings in the buildings sector, however we are confident that the agreed and funded schemes will deliver on their targets with appropriate mitigation. Schemes without allocated funding or in an early stage of development carry inherently higher risk and are subject to future decision-making.

## Natural Resources, Waste and F-Gases

### Introduction

28. The Natural Resources, Waste and F-Gases (NRWF) sectors accounted for 18% of UK GHG emissions in 2021, meaning that delivery of emissions savings in this sector are important to enabling cross-economy carbon budgets carbon budgets to be met. Action on these areas can also support economic growth, a circular economy, and co-benefits for nature.
29. Many of the delivery risks faced in these sectors are due to a need for further research and innovation, dependencies on other stakeholders to deliver, supply chain and sector capacity issues and the need to manage potential trade-offs with other priorities, such as food production. There is increased risk to delivery as many of our proposals and policies are in the early stages of development. It is crucial we maintain flexibility to adapt our pathway to ensure we maximise co-benefits with priority outcomes. Some of the most significant delivery risks are detailed below. There are links and interdependencies between the different thematic risks.

### Risks and Mitigations

## Data, Evidence and Research and Development

30. Various measures that form part of the package of proposals and policies are dependent on R&D and improved data. We are addressing this risk through Defra's commitment to spend £75 million on Net Zero R&D for the NRWF sectors during the current spending review period and through a £270 million Farming Innovation Programme.

## The role of external stakeholders

31. Many actions are dependent on external stakeholders. For example, waste policies such as the consistent collections of recycling are dependent upon successful implementation of the reforms by businesses and local authorities and response from households. We are working closely with businesses and local authorities to support detailed waste policy development. Also, in order to restore and manage lowland peatlands, government and industry need to work together to ensure the correct water infrastructure exists to facilitate water management.
32. Many of the agriculture and wider land use measures will be delivered through our environmental land management schemes, which are voluntary schemes and depend on sufficient uptake. For agriculture and land use measures, information on the schemes' funding was published in January 2023, including the announcement of six new Sustainable Farming Incentive standards. The second round of Landscape Recovery focuses on net zero, protected sites and habitat creation, including creating and enhancing woodland and peatland. Government will monitor uptake and implementation and will consider adjustments.

## Land Use

33. There is a risk that competing priorities for land affects delivery of emissions savings. We have a finite amount of land and this needs to support the delivery of net zero as well as other objectives, like improving biodiversity and water quality, as well as maintaining food production. To address this, Government will publish a Land Use Framework later this year, setting out how our land can play an important role in delivering multifunctional landscapes.

## Early stage proposals and policies

34. Many proposals and policies, such as policy relating to domestic biomass planting and some aspects of waste decarbonisation, are at early stages of development. Key risks to delivery of the biomass pathway include establishment of the business model for sustainable biomass cultivation, linked with demand from end use sectors including bioenergy with carbon capture and storage, and confidence in uptake of new models for land use. R&D and policy work is ongoing to increase delivery confidence. For delivery of waste emissions savings, we committed in the Environmental Improvement Plan to launch a call for evidence to support detailed policy development to achieve the near elimination of biodegradable municipal waste to landfill from 2028.
35. Government is taking action to manage and mitigate risks to delivery of emissions savings across the NRWF sector, including by supporting stakeholders in various ways such as incentivising action to reduce emissions and enabling industry to better understand their carbon footprints. Government is managing trade-offs and co-benefits between priorities, as well as funding R&D to support policy development and delivery.

## Transport

## **Introduction**

36. In 2020 transport remained the biggest emitting sector of the UK economy, responsible for 24% of UK greenhouse gas emissions. Reducing transport emissions is therefore a clear priority to successfully enable carbon budgets to be met. To tackle transport emissions, in July 2021 DfT published the Transport Decarbonisation Plan (TDP). This included 78 ambitious commitments – covering all types of transport – to decarbonise the sector and set it on the path to net zero. We have made good progress on delivering these commitments and must continue on this trajectory. Despite the intrinsic uncertainties of long-term sectoral emissions projections, we still have a reasonable to high level of confidence that the proposed package of proposals and policies will deliver in line with what is needed to enable carbon budgets to be met.

## **Risks and Mitigations**

37. Road transport accounts for around 90% of domestic transport emissions, with nearly three quarters coming from cars and vans. A principal risk is that the regulation and incentives we are putting in place are insufficient to drive the transition to zero emission vehicles at the speed required to enable carbon budgets to be met. However, we have confidence in the established mechanisms for transitioning the car and van fleet to zero emission alternatives, and there are already signs for optimism. Evidence shows that deployment of electric cars and vans in the time since publication of the 2021 Net Zero Strategy has outstripped expectations – both domestically and in international comparators – indicating that these technologies are attractive to consumers. The adoption of battery electric cars has also increased dramatically with nearly 17% of new cars sold in 2022 battery electric. Regulation will come into force, most notably the ZEV mandate from 2024 and phase out dates for the sale of all types of new non-zero emission vehicle by 2040 at the latest. There will also be continued investment in enabling measures – such as the Local EV Infrastructure Fund and Project Rapid – to support the rollout of essential charging infrastructure. We will continue to monitor progress in this space, and should our confidence change, we will consider additional measures to support the transition to ZEVs.

38. Another risk is that we see considerable, unanticipated growth in transport demand, going beyond our high-end projections. DfT analysis is based on the latest available demand projections for road transport and aviation. However, the impacts of recent lower GDP projections on road traffic projections and the impact of COVID on aviation demand are not yet fully factored in, and these factors may mean growth in demand is lower than current projections. This helps to mitigate this risk, and critically, should future demand be lower than current projections, emissions will be lower than previously forecast.

39. Risks to delivery are highest where there is a reliance on nascent or immature technologies and associated markets, such as zero emission vehicle or flight technologies or utilisation of lower carbon fuels. To mitigate this risk, stakeholder groups and R&D funding are being used to explore how technologies can be expedited and supported through development. For example, zero emission maritime technologies are supported through the UK SHORE R&D programme whilst the Zero Emission Road Freight Demonstrator is supporting development of zero emission freight technologies. The Zero Emission Flight Delivery Group (part of the Jet Zero Council) has been

established to explore the UK's capabilities to deliver zero emission technologies.

40. A more general potential risk applying to all sectors is the need to maintain appropriate Government funding in future, where this is necessary to decarbonisation efforts. However, the majority of transport decarbonisation will be achieved through regulatory measures. Funding is not currently considered an issue, given the multi £ billion funding allocated to transport decarbonisation in the current Parliament.
41. As committed to in the TDP, DfT will review progress against our pathway at least every five years and consider as necessary additional options to support delivery of UK carbon budget targets.

## Greenhouse Gas Removals

### Introduction

42. Engineered greenhouse gas removals (GGRs) are essential for meeting net zero and enabling carbon budgets to be met. We have an ambition of 5 Mtpa by 2030, with analysis suggesting 30 Mtpa removals are required by 2037 at the end of carbon budget 6. However, this is a nascent sector, with inherent associated uncertainty as new technologies and markets for engineered removals are in their infancy. We are addressing this uncertainty and enabling the sector through progress on policy and through innovation funding. This includes developments on GGR and power BECCS business models, monitoring, reporting and verification (MRV), access to carbon capture and storage (CCS) infrastructure and exploring integration with the UK ETS.

### Risks and mitigation

43. Key to managing the uncertainty and risk in this emerging sector is supporting development across a range of GGR technologies and projects. Through this portfolio approach and our ongoing policy development, we are confident that we are developing a world-leading approach to GGRs and enabling the delivery of engineered removals for carbon budgets.
44. New technology scale-up carries inherent delivery risk and Government's innovation funding is crucial for de-risking this. The GGR sector needs to pull through a portfolio of First of a Kind (FOAK) technologies to commercialisation. We are addressing this through the DAC and Greenhouse Gas Removals Innovation Programme, last year we announced over £54m of government funding across 15 GGR pilot projects.
45. Business models are essential to address the risk of financial barriers to deployment and provide investors with certainty in early GGR projects. In 2022, we consulted on both a GGR and FOAK power BECCS business model, and we intend to respond later this year. In December 2022, the Industrial Carbon Capture (ICC) Business Model and Waste ICC Business Model also updated policy positions on how potential GGR credits will be incorporated into the business models.
46. A well-functioning negative emissions market will be essential to reduce investment risk for the private sector. We are exploring options for different market options to support deployment. We will work within the UK ETS Authority to consider options for integrating GGRs in the UK ETS subject to the outcomes of last year's UK ETS consultation, a robust monitoring, reporting and verification (MRV) regime being in place, and the management of wider impacts - including market stability and the permanence of the emissions stored by the

GGRs. Further detail will be provided in the Government Response to the UK ETS consultation. We recognise the integrity offered by the UK ETS could unlock investment at scale in the UK's greenhouse gas removal sector by providing an integrated market where businesses can make economically efficient choices on how to decarbonise or remove their emissions.

47. Robust MRV will be critical to reduce market risks and increase public certainty through ensuring the credibility of GGRs. We are developing our MRV policy through consultation and we intend to review the existing landscape, to determine which of these standards, if any, might form the basis of 'MRV eligibility criteria' for business model support in the near-term. For biomass GGRs, the *Biomass Strategy* is due to be published in 2023 and will outline recommendations for enhancing the UK's existing biomass sustainability criteria.
48. Access to CCS clusters is critical to achieve the volumes of removal needed. For technologies that rely on long-term geological storage, such as direct air capture with carbon capture and storage (DACCS) and bioenergy with carbon capture and storage (BECCS) access to CCS is important for large scale removals. We have confirmed that engineered GGRs will be eligible to apply to both Track-1 Expansion and Track-2 of the CCUS cluster sequencing process, subject to criteria currently being developed. We have also published a project submission process for power BECCS projects to enable project selection and announced the outcome of this assessment.

## Appendix E: Section 10 Considerations

### Sustainable Development

Sustainable development concerns the stability and prosperity of society, and its capacity to provide for future generations. Sustainable development also incorporates social, economic, and environmental dimensions of sustainability. The Climate Change Act requires that the proposals and policies we put in place to enable our carbon budgets to be met, taken as a whole, must be such as to contribute to sustainable development. The main outcomes of the proposals and policies in this report will have a positive impact on the UK's contribution to the global Sustainable Development Goals, in particular goal 7, targeting affordable and clean energy, and goal 13, targeting climate action.

In this section, we set out how this package of policies and proposals will contribute to sustainable development. The social considerations section considers the impact on different social groups of climate policies and the net zero transition, and what mitigation the government is putting place, where necessary. The Natural Capital section considers the impact on the continuation and improvement of environmental functions, and stability and renewal of natural assets. This is most relevant to the Sustainable Development Goals 6, 14 and 15, which target protection of water and life on land and marine habitats.

### Social Considerations

#### Energy prices

Over the last decade there have been changes in the underlying costs of energy bills, which have been partially mitigated through energy efficiency measures, helping consumers to use less energy. Electricity prices have trended upwards due to rising network costs and support for low carbon infrastructure and vulnerable households.

Since 2021, historically high wholesale energy prices have further added significant pressure to household and businesses energy bills, driving inflation up and making the cost of living a real challenge for many households. This increase has been driven by rising international gas prices, which increased more than four-fold. This bill increase has been particularly challenging for low income, vulnerable and fuel poor households, many of whom were struggling to heat their homes sufficiently before the price increases.

The Government has supported households and businesses, through the Energy Price Guarantee for domestic consumers – a scheme the Chancellor extended until June 2023 at Spring Budget - and the Energy Bills Relief Scheme until March 2023 for non-domestic energy consumers. Further support for non-domestic customers will be provided through the Energy Bills Discount Scheme from April 2023 to April 2024. Additional support for the most vulnerable households is available through specific cost of living payments.

The Government's support package will save the typical family £1,500, factoring in the extension of the Energy Price Guarantee to June and Energy Bills Support Scheme. This comes on top of targeted measures that government has run for most vulnerable in society, such as the Warm Homes Discount. However, we also need to move this to a sustainable footing with more than £14bn in support provided under these schemes to date in the UK.

The Government intends to move away from universal bill support for households and towards a scheme better targeted at those most in need after June 2023. This comes

alongside the Chancellor's announcement at Spring Budget to end the premium that over 4 million households pay on their prepayment meter, bringing their charges into line with comparable customers who pay by direct debit. In addition, retail market reform will be critical to enabling consumer choice and participation as the energy system decarbonises.

### **Transition from fossil fuels**

The proposals and policies set out in this report will help insulate consumers from the over-reliance on fossil fuels they face today, and help to shield households, business, and the wider economy from the destabilising effects of this reliance.

How electricity and gas bills will change on the path to net zero depends on factors such as technology costs, patterns of consumer energy use and the government's approach to rebalancing where social and policy costs fall. The nature of costs in a smart, clean energy system will be different. The largest part of the electricity bill is currently the cost to energy suppliers from buying power. This cost has traditionally been determined by the underlying price of gas or coal, but this is changing. Gas will continue to play a role in setting the electricity price for some years to come but, over time, will be less of a contributing factor, as more and more low carbon generation (such as wind and solar) connect to the electricity system - consistent with the commitment to a fully decarbonised power system by 2035. This will help put downward pressure on wholesale electricity prices.

### **Energy consumption**

Patterns of energy consumption will also change. Most households and businesses are likely to increase their use of electricity (especially if electrification of heat displaces the use of gas-for-heating), but reduce gas and petrol/diesel consumption, as they shift to low carbon forms of transport and heating (such as electric vehicles and heat pumps). It is essential to ensure that price incentives are fair and help support this transition away from fossil fuels.

It will remain the case that households and businesses who install energy saving measures will reap significant savings. Government measures in this report, such as the Social Housing Decarbonisation fund, will help those who are least well off benefit from these savings.

### **Fuel poverty**

As we progress towards net zero, the Government is committed to ensuring the costs of decarbonising the energy system are fair and affordable for all energy users. We are considering both the benefits and the costs of different pathways holistically across the economy and will work with industry and consumers to keep costs down.

The impact of decarbonisation on progress in tackling fuel poverty will be determined by changes in electricity and fuel prices, and energy efficiency improvements in the housing stock. In particular, policies to improve energy efficiency in homes - such as the Social Housing Decarbonisation Fund, Home Upgrade Grant, Energy Company Obligation and proposals on Minimum Energy Efficiency Standards - will help to improve the building performance for the homes of those in or at risk of fuel poverty. These, and similar schemes, are vital in delivering energy efficiency measures to households who would not otherwise be able to afford them. Further, some of these schemes provide low carbon heating to low income, vulnerable and fuel poor households. As such, the timing of incentivising and disincentivising different heating types must be considered carefully and support provided to vulnerable households.

Financial support is available to support low income, vulnerable and fuel poor households, such as the Warm Homes Discount which provides eligible households with £150 off their energy bill in the winter. The Warm Home Discount has been extended until 2026.

Fuel poverty is a devolved matter. In England, the fuel poverty target is to ensure that as many fuel poor homes as is reasonably practicable achieve a minimum energy efficiency rating of Band C, by 2030. Scotland, Wales and Northern Ireland have their own fuel poverty targets and are also working to improve the energy efficiency of their building stock.

## Natural Capital

The independent Natural Capital Committee defined natural capital as ‘those elements of the natural environment which provide valuable goods and services to people’. Nature underpins the UK’s economy and society: the energy, food, and water we consume; the air we breathe; our access to green space; and biodiversity, which is crucial in underpinning all our ecosystem and abiotic services, and in maintaining ecological function. Nature is a major economic sector in its own right – as a productive asset it provides market and non-market services of £25 billion each year. In line with HM Treasury Green Book, a natural capital perspective is taken to analyse these implications, whereby the impact of proposals and policies on the natural assets on which the economy depends is assessed. It is not yet possible to provide a complete assessment of the delivery implications of all of the proposals and policies described in this plan, as many are still subject to design and implementations upon which the impacts are dependent. The extent that the natural capital impacts are mitigated will be dependent on the options considered in policy specific delivery analysis.

To assess the potential natural capital impacts of a proposal or policy, a series of screening questions are used. Following this, the main benefits and risks associated with such proposals or policies are listed for different natural capital stocks. This is an indicative assessment of the natural capital impacts due to the limitations described above. As such, the large majority of proposals and policies in this report require further natural capital assessment. All proposals and policies will be assessed for natural capital benefits and risks in their impact assessments and business cases according to Green Book guidance. This includes considering the implications of proposals and policies for natural assets and any associated effects on wider economic welfare. More information on the natural capital approach can be found in the Green Book supplementary guidance and the Enabling a Natural Capital Approach guidance.

Delivery of these proposals and policies will need to consider the UK’s other legally binding environmental commitments and any trade-offs against these acknowledged and mitigated through careful planning. Policies and actions can be designed that deliver multiple outcomes in support of the UK’s net zero, 25 Year Environment Plan and 2023 Environmental Improvement Plan ambitions. It will be important to monitor and evaluate the wider impacts of proposals and policies in this report and mitigate negative impacts by using synergies with environmental ambitions wherever possible. This would ensure that the twin challenges of biodiversity loss and climate change are tackled in an efficient way.

Government has laid the final environmental principles policy statement before Parliament. The policy statement sets out how policymakers should interpret and proportionately apply five environmental principles to support environmental protection and sustainable development. Ministers of the Crown will be required to have due regard to the statement when making policy from 1 November 2023.

This package of proposals and policies is expected to have a significant net benefit to natural capital and thus sustainable development. Moving away from i) fossil fuels towards a greater share of renewable energy, ii) petrol and diesel cars towards lower-emissions alternatives such as electric vehicles iii) gas boilers to lower carbon heating sources and iv) high carbon land uses towards afforestation and other land-based carbon dioxide removals, are just a few examples that will provide significant benefits.

However, some negative impacts to some natural capital stocks are likely to arise and impacts will likely be specific and localised. The impact from the significant land use change required to deliver proposals in this report and meet net zero will depend on how and where this change is enacted, with a systemic and spatial approach more likely to deliver on net zero while providing natural capital benefits. Further in-depth appraisal of the natural capital impacts of specific policies and policy mixes will need to be undertaken as proposals are developed following this report. This will be done through the normal channels of Impact Assessments and Business Cases, to ensure trade-offs are managed and impacts mitigated.

**Air Quality:** As climate change and air pollution have many of the same contributing emission sources, the decarbonisation of the UK economy offers major opportunities to significantly reduce air pollution and therefore improve human health and reduce the impact of some air pollutants on ecosystems. This is primarily driven through the reduction of petrol and diesel cars towards green alternatives, as well as the continual shift away from fossil fuels in heat and power generation. Urban and peri-urban tree planting will help to reduce levels of particulate matter (PM10 and PM2.5) in the urban environment, as well as targeted planting acting as an ammonia sink and helping to protect vulnerable sites of scientific importance from excess nitrogen deposition.

However, some proposals and policies could result in significant negative air quality impacts at both regional and local scales, for example emissions of fine particulate matter from biomass combustion, ammonia from the use of anaerobic digestion, and NO<sub>x</sub> emissions from hydrogen combustion in domestic or industrial settings. Unmitigated, these are likely to impact our ability to reach statutory national emissions ceilings, increase exposure to harmful pollutants and cause some uneven health burdens. Furthermore, the impacts of air pollution can also impact the delivery of climate targets. For example, should England's forests and peatlands continue to be damaged by harmful emissions – particularly ammonia – which impact their ability to provide the ecosystem services required to meet our climate goals, including carbon sequestration and flood mitigation. Historic pollution loading across all habitats may also need to be ameliorated to maximise the potential of restoring them to meet the biodiversity targets in the Environment Bill.

Government will appraise and evaluate these impacts as proposals develop and provide advice on tailoring our pathway to mitigate harmful impacts as much as possible. Continuous improvements in emission requirements and innovation in abatement technologies will also be necessary to deliver a pathway to net zero that maximises air quality benefits.

**Recreation:** Enabling the carbon budgets to be met with a view to meeting net zero could have positive impacts for recreation and the provision of landscape amenity, with a transition to a low carbon economy providing spaces to enjoy nature. This will primarily be driven by new woodland creation for recreation and forestry more widely (where access permitted), woodland management and restoring peatlands. Green transport will also provide the opportunity to regularly access green spaces, parks and woodlands. However, the need for new infrastructure to meet net zero will need to be balanced with wider land use priorities.

**Biodiversity:** In the long-term, the proposals and policies in this package, for example, afforestation and peatland restoration, can be positive for biodiversity, preservation, connectivity, resilience and reducing ecological stress caused by climate change. However, locations and extent of future policies must seek to minimise any negative impacts, including displacement, air and noise pollution, and habitat loss, for example through housing or industry development. This could be minimised through further work on net gain principles which would seek to leave the environment in a better position. Other risks include ensuring land use changes (i.e. afforestation, biomass feedstocks, settlement expansion) do not lead to unacceptable biodiversity loss, although the new statutory long term target for tree canopy and woodland cover states that all woodland contributing to the target will comply with the UK Forestry Standard (and regulatory framework for woodland creation) which helps to ensure no negative impacts on biodiversity. Mitigating actions and trade-offs will be considered when designing policies for reaching climate targets, including for low carbon technologies, greenhouse gas removals, marine policies, land management, and agricultural intensification.

**Floods:** Global temperature rise is leading to increased precipitation levels within the UK. There are a number of nature-based solutions such as the creation of new woodlands, planting of biomass crops such as willow, increased levels of upland peatland restoration, and strategically located natural flood management measures which can have positive impacts on flood risk management. For example, increased upland water storage improves the capacity of the UK's waterbodies to prevent floods downstream. This will have varied benefits through reducing damages from floods to property, agricultural land and health, and reduced carbon emissions from floods. Conversely, rewetting lowland peatlands may reduce the spare water storage capacity of those landscapes as the peatlands will become a water store, with possible impacts on local flood risk during significant rainfall events, requiring mitigation

**Water availability and quality:** Whilst many proposals and policies have positive impacts on water availability and quality, for example through upland peatland restoration and strategic planting of trees, some low carbon technologies are water-intensive and large-scale implementation could result in pressures on water demand. For example, nuclear power and hydrogen production require high levels of water input for cooling and electrolysis, respectively and certain biomass crops (for use in BECCS) have high water demand. This is set against a backdrop of increasing global water scarcity in a changing climate. The UK is no exception, with increasing likelihood of warmer, drier summers. Therefore, water demand both regionally and nationally should be considered at a systems level, to ensure sustainable demand.

**Raw materials:** Resource efficiency proposals and policies will have a net benefit to pressures on raw material availability, reducing raw material demand and consumption. Reduced resource extraction and processing will also benefit other natural capital assets. For example, 90% of global biodiversity loss and water stress is caused by resource extraction and processing. Moving towards a circular economy, where priority is placed on extending the lifetime and lifecycle of a product through sharing, reusing, repairing, redesign and recycling, is likely to have a positive impact on a number of natural capital stocks, primarily water quality and availability, air quality and reducing pressures on land use.

**Rare metals:** Some low carbon technologies are dependent on critical raw materials, many of which are found in unique locations and are in high demand globally, for example cobalt, lithium and nickel. Many of these rare earth metals are sourced internationally and extraction of them may place pressure on the natural capital stock in the country of origin. There are

risks associated with overreliance on specific technologies where raw material scarcity may grow and geopolitics may determine access, for example, rare earth elements such as neodymium for use in magnets. Whilst markets are responsible for the development and commercialisation of technologies using rare metals, there is a role for Government in understanding and where necessary mitigating potential side-effects. These risks will be assessed in policy appraisal and in monitoring of market activity. Negative impacts have the potential to be mitigated, at least in part, through policy to support greater resource efficiency, re-use and recycling. The critical minerals strategy sets out the government's plans for improving the resilience of critical minerals supply chains and increasing our security of supply.

Land Use: Meeting carbon budgets places demand on land, for example, for food, shelter, goods and service production, ecosystem services and greenhouse gas abatement. This will result in changes to land use and management. Proposals and policies in this report will require land use changes linked to areas such as tree planting, peat restoration and growing perennial energy crops or short rotation forestry for use as biomass, as well as for energy and renewables infrastructure, such as onshore wind and solar. This change will impact on the extent and condition of natural capital assets and the ecosystem services they provide. The direction of impact (positive or negative) and its magnitude will depend on how and where land conversion happens. A systemic and spatial approach to land use, that considers net zero, socio- environmental objectives, and various socio- economic factors such as population and economic growth, is necessary to enact land use changes that delivers net zero as well as environmental outcomes in line with the 25 Year Environment Plan and we have committed to publishing a land use framework for England in 2023. Such an approach enables trade-offs to be managed among different objectives while facilitating win-win outcomes- for instance with flood protection and recreation.

## Economic and Fiscal Considerations

### Economic

There will be many economic consequences from the delivery of carbon budgets and the transition to net zero. The economic effects will be complex working through a myriad of different channels. At a simplistic level net zero requires significant investment, which in turn leads to significant returns. Exact requirements are still uncertain but it is clear that patterns of investment will have to change and investment will be required in both physical and human capital as new jobs will also be created, and these jobs will require different skills and education. Consumption and production behaviours will also shift towards greener choices, and different places and sectors in the UK could face different economic opportunities and challenges.

Government cost benefit analysis of the sixth carbon budget, conducted before the invasion of the Ukraine, showed significant benefits to the transition to net zero. The net present value of meeting the sixth carbon budget and net zero target, compared to no further action, was estimated as a net benefit of £266 billion. Other quantified co-benefits included improvements to air quality were valued at £35 billion to 2050, fuel savings at £123 billion and other benefits to natural capital at £5 billion. These calculations did not quantify many other potential beneficial effects, such as reduced noise pollution from cars, improved health from walking and cycling and warmer homes from energy efficiency measures, nor wider macroeconomic modelling such as the effect on inflation.

Quantified macro-economic impacts were conducted at the time by the Bank of England and the Office for Budget Responsibility (OBR). They found that the costs of failing to get climate change under control, which relies on global effort, would be much larger than those of bringing emissions down to net zero. In terms of transition costs, scenarios in which the level of UK GDP changes relative to the baseline by between -4.6% and +1.6% by 2050, with a central estimate of -1.4% for early action on climate change compared to -4.6% for late action. These changes are small when set against expected growth of over 50% in real GDP to 2050 compared to today's levels. Such costs were also found to be more than offset by the net present value of benefits (when monetising the value of carbon savings and co-benefits, such as improved air quality and operational savings from fuels) in the impact assessment for the sixth carbon budget. Further information on the economic impacts of the transition to net zero are set out in the HM Treasury *Net Zero Review* published alongside the Net Zero Strategy in October 2021.

However, since October 2021, domestic and global economic conditions have changed significantly in ways that are highly likely to have increased the economic benefits from net zero. Most notably following the invasion of Ukraine the UK's gas and electricity prices rose significantly, contributing to sharp increases in inflation, to which the Monetary Policy Committee (MPC) has responded by tightening monetary policy, including raising Bank Rate to 4.0%. As the UK is a net importer of energy, higher energy prices have significantly harmed the UK potential output and through higher inflation has eroded real wages and reduced living standards. Rising energy costs have also necessitated significant government intervention (see more in fiscal section below). The invasion has also highlighted that fossil fuels are now an insecure and high-risk energy source.

Analysis from the OBR has shown that higher fossil fuel prices could lead to an additional £116bn benefit from lower fuel operating costs. The recent independent Review of Net Zero, has reinforced this message finding the UK is well placed to take advantage of a market opportunity worth over £1 trillion for British businesses by 2030.

## Competitiveness

The transition to net zero can stimulate innovation that increases domestic competitiveness and global comparative advantage for some UK industries, providing potential export opportunities. Updated internal analysis based on the Energy Innovation Needs Assessment estimates that just over half of the £60 billion GVA potential from sectoral decarbonisation in 2050 comes from export related opportunities.

The magnitude of competitiveness effects in international markets is dependent on global climate ambition as well as domestic policy. If other countries, particularly the UK's trading partners, increase their industrial decarbonisation ambition in line with the UK's, and face similar transition impacts, then competitiveness effects will be smaller. Similarly, where the UK's path to net zero creates export opportunities for UK businesses, the size of these will depend on the actions of the rest of the world. High global climate ambition will result in a large market for decarbonisation technologies and services, drive down costs, but may also result in more global competition in those markets.

Since the publication of the Net Zero Strategy, we have seen increased international ambition on climate change – net zero pledges increased from 30% of GDP to 90% through our COP Presidency – this is welcome as increased investment in net zero globally will help lower the cost of clean technologies and create opportunities for UK businesses.

Particularly important changes have occurred in the US and EU. The US has introduced its Inflation Reduction Act (IRA), allocating \$370bn to clean energy and manufacturing. This

public spending is broadly equivalent to the UK once standardised on an annual and per capita basis. The EU has set out ambitious plans to grow green industries through its Green Deal Industrial Plan (GDIP), though as much of the impact will vary by Member States the effects are uncertain. The impacts of both IRA and GDIP are likely to vary significantly across sectors and within sector at different points of the value chain. There are potentially many benefits to both IRA and GDIP, from the impact of the commitments to meeting climate goals globally, to faster transition in technology reducing the cost of net zero, as well as export opportunities for parts of the value chain where the UK holds a comparative advantage. Though for some parts of sectoral value-chain the UK may face increasingly competition to secure investment and export opportunities.

The UK does not wish to enter a discriminatory subsidy race, and will instead cement its position as a leading destination for internationally mobile investment by providing long-term policy certainty in a range of areas that play to its strengths.

The UK's approach is typified by measures that seek to provide funding and legislative certainty, for example in hydrogen which seeks to put the emerging sector in the UK on a firmer long-term footing. The approach is similar in the CCUS sector with the announcement of a funding envelope for the first set of successful CCUS projects and a clear plan for their successors.

There are risks to sectors and industries susceptible to competitiveness impacts, particularly those that are trade-exposed and/or carbon intensive. Where UK firms lose market share to international firms with lower environmental standards, there is a risk of carbon leakage. There is little empirical evidence of this occurring in the UK to date, but risks could increase as further policy is implemented.

Historically, the UK's approach to mitigating competitiveness impacts and carbon leakage risk has been through issuing free allowances under the EU ETS. This approach has been carried over to the UK ETS, and possible changes to free allowances are currently under review. Government also provides compensation to certain energy intensive industries for the indirect emission cost due to the UK ETS and some sectors receive a reduction in energy consumption tax via Climate Change Agreements. The eventual impact of decarbonisation on firms at risk will depend on future policy development, particularly relating to the UK ETS. The forthcoming consultation "*Addressing carbon leakage risk to support decarbonisation*" considers a range of domestic policy options to protect against carbon leakage, including both a carbon border adjustment mechanism (CBAM) and mandatory product standards.

## Fiscal

The overall fiscal impacts of the transition to net zero will depend on many as yet unknown factors, including the financing mechanisms used to fund the policies and proposals, and the macroeconomic impacts of the transition, for example through changes in GDP growth or inflation. There are some known fiscal impacts, such as the erosion of direct tax receipts like fuel duty that depend on carbon intensive activity, and increased tax receipts from other policies, such as revenue from the UK ETS.

HM Treasury's Net Zero Review and the OBR's recent fiscal risks report provide a more detailed overview of the channels through which the net zero transition can impact the UK's fiscal position, and the factors which will determine the overall magnitude of this impact. While noting uncertainties, the OBR concluded that there could be significant fiscal benefits from transitioning to net zero sooner rather than later. However, as the NZR highlighted,

decisions on public spending will be dependent on the economic, fiscal and decarbonisation context of the time.

A transition to net zero and cleaner energy production would help to mitigate fiscal shocks caused by a reliance on fossil fuels. The invasion of Ukraine created a large energy shock impacting countries across Europe, which contributed to global high inflation. The OBR forecasts that energy support measures for households are expected to cost £35.8 billion in 2022-23 and £4.8 billion in 2023-24 whilst business support measure will cost a further £6.7 billion and £0.5 billion respectively.

## Climate Science and Adaptation

### Why we must act

Science is clear: the world is warming and there is no doubt that human activities have caused these widespread and rapid changes to the climate. Continued warming would be deeply harmful, not just to the natural world, but also to human security and wellbeing. 2021 to 2023 saw the publication of the Intergovernmental Panel on Climate Change (IPCC's) Sixth Assessment Report which brings together the most up-to-date physical understanding of the climate system and climate change, with an assessment of the impacts of climate change on global populations and the capacity to adapt, and the potential mitigation pathways. The main findings of these reports and other recent publications are summarised below.

Global average temperatures have already risen by around 1.1°C and 2022 concluded the earth's warmest 10-year period on record. We are already seeing the impacts of climate change across all parts of the world, with many types of extreme weather becoming more frequent and more intense - causing droughts, wildfires and flooding. The record breaking heatwave in India and Pakistan in March 2022 led to 90 deaths, triggered forest fires, and caused a reduction in crop yields. Evidence indicates this event was 30 times more likely due to climate change. The UK is experiencing a trend towards warmer and wetter winters, and hotter, drier summers, which is projected to continue in the future. In 2022, temperatures in the UK exceeded 40°C for the first time, impacting infrastructure and human health, and triggering fires. The melting of glaciers and ice sheets is accelerating, with sea levels currently rising at 3.7mm annually.

These changes are already having tragic and irreversible effects on human lives and natural systems. As a result, many species are being driven closer to extinction, crop growth and livestock are being negatively impacted, and the changing climate is having an adverse effect on the health and livelihoods of people across the world. These impacts of climate change will continue to escalate as the climate continues to warm. Climate change disproportionately affects poor and disadvantaged people, with rural, coastal, and indigenous communities facing greater risks from impacts such as rising sea levels, drought, and food shortages. Adaptation measures must be put in place to reduce future impacts. The IPCC found that, while we have already reached the point where adaptation cannot address some impacts, there are lots of adaptation options still available and these could provide wider benefits to communities, such as improved air quality. There is a need for transformational change and collaboration at a global level to invest in adaptive measures and prepare for a changing climate.

There is still uncertainty over the sensitivity of global temperatures to changes in greenhouse gas emissions; the IPCC estimate that a doubling of pre-industrial CO<sub>2</sub> levels would result in warming in a range of 2.5°C - 4°C. The higher temperatures rise, the greater the risk of seeing dangerous low-likelihood, high-impact outcomes. These could include abrupt responses and tipping points such as dieback of the Amazon Rainforest, melting of the polar ice sheets, and

the collapse of key ocean currents controlling global weather, which cannot be ruled out. To mitigate these risks, strong and decisive action is needed to reduce emissions. Limiting further warming decreases the likelihood of more severe and potentially irreversible impacts on people and ecosystems. Action would also provide other co-benefits, such as improving biodiversity and air quality. Every additional fraction of a degree of global warming counts - with every 0.5°C of warming there are clearly discernible increases in the intensity of and frequency of impacts. This is why we should aim to reduce global emissions to net zero as quickly as is practically possible.

## **Global temperature goals and emissions pathways**

Rapid and deep cuts to emissions are essential to avoid the most dangerous impacts of climate change. Greenhouse gas concentrations and global temperatures will continue to rise until emissions are reduced to net zero<sup>21</sup>. In 2015, the Paris Agreement was signed, where 196 parties committed to hold “the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognising that this would significantly reduce the risks and impacts of climate change”. The Agreement recognised that, to achieve this goal, global emissions of greenhouse gases would need to peak as soon as possible, reduce rapidly thereafter, and reach a net zero level in the second half of this century.

As part of the Paris Agreement, countries also committed to reduce or limit their greenhouse gas emissions. These commitments are contained in their ‘Nationally Determined Contributions’ (NDCs). Although the NDCs pledged at COP26 in Glasgow (2021) would decrease future global temperature rise, further ambition is required to keep warming under 1.5°C<sup>22</sup>.

The United Nations Environment Programme (UNEP), in its Emissions Gap Report 2022, estimates that a continuation of currently implemented global policies is consistent with a global temperature rise of around 2.8°C. If countries deliver on the targets set out in their NDCs, estimated global temperature rise is reduced to 2.4-2.6°C, and if countries also implement their net zero targets in full estimated global temperature rise could be as low as 1.8°C. These estimates are broadly consistent with those from other organisations such as the International Energy Agency and the Climate Action Tracker.

The IPCC found that limiting warming to 1.5°C or 2°C requires rapid transformation across all aspects of society. However, the growth of cities, the falling cost of renewables and other green technologies including in transport, industry, housing and buildings, behavioural changes, and sustainable land use all present huge opportunities for progress.

## **Adaptation in the UK**

Responding to the complexity of climate change demands a multifaceted approach. Regardless of global success in reducing greenhouse gas emissions, some future temperature rises are already locked in by historical emissions up to the present day. Furthermore, future global emissions pathways are highly uncertain, so it is essential that the UK’s adaptive capacity is rapidly developed to prepare for, and bolster our resilience to, the inevitable near-term and potential future impacts of climate change.

To prepare for these eventualities, the UK is already assessing climate risks and the associated actions required to overcome these through its five-yearly policy cycle of a Climate Change Risk Assessment followed by a National Adaptation Programme (NAP), required under the Climate Change Act 2008. The Government’s Third Climate Change Risk

Assessment (CCRA3) was published in January 2022 and set out the key risks and opportunities the UK will face from climate change. The Climate Change Committee's 2021 Independent Assessment of UK Climate Risk, which informed CCRA3, identified eight risk areas that will require the most urgent attention before the third National Adaptation Programme. These are applicable even if global warming is limited to 1.5°C.

- Risks to the viability and diversity of terrestrial and freshwater habitats and species from multiple hazards
- Risks to soil health from increased flooding and drought
- Risks to natural carbon stores and sequestration from multiple hazards leading to increased emissions
- Risks to crops, livestock and commercial trees from multiple hazards
- Risks to supply of food, goods and vital services due to climate-related collapse of supply chains and distribution networks
- Risks to people and the economy from climate-related failure of the power system
- Risks to human health, wellbeing and productivity from increased exposure to heat in homes and other buildings
- Multiple risks to the UK from climate change impacts overseas

The NAP is a cross-department collaboration, bringing together government's policies on managing climate risks in one place. The third NAP report is due in summer 2023 and will set out how we will address the 61 climate risks and opportunities identified in CCRA3 for the period 2023 to 2028. We plan for the third NAP to address the risks and opportunities for a 2°C warming scenario, to continue to build a more resilient country. NAP3 will address the eight priority risk areas and all other risks to the natural environment, business and industry, infrastructure, health, communities and the built environment and the risks posed to the UK from climate impacts overseas.

### **Future developments in climate science**

In recent years the debate and focus of scientific research has shifted from understanding the causes of climate change, to investigating the range of the expected impacts and the level of action required to address climate change through a combination of adaptation and mitigation. In order to prepare, we need to better understand the nature, magnitude and rate of climate change, and investigate how these impact at a local level. Mitigation research focusing on the emissions reductions required and their associated impacts is needed to inform climate policy that can get us to net zero.

Building on the advances in climate change science, key research priorities are focused around four questions the UK Government posed to the Met Office Hadley Centre Climate Research Programme in 2021.

- What current weather and climate risks and impacts are expected globally and in the UK?
- What are the future risks and impacts from weather and climate that we need to avoid or need to adapt to?
- What are the carbon budget and mitigation scenarios that will avoid the most dangerous impacts of global climate change?
- What impacts and opportunities from mitigation and adaptation actions are needed to proceed towards a resilient and net zero future?

In 2021, the UK committed £1.2 billion of funding to develop a new state-of-the-art supercomputer for the Met Office. This will help ensure government, industry and communities are better placed to understand mitigation options and prepare for the impacts from a changing

climate. This will be achieved by running a greater number of model scenarios which integrate more environmental and social data and focus at a more localised scale. One example of how this could be used is to provide detailed localised climate information to improve city planning and public transport infrastructure.

Appendix B to Annex B of the Section 13 Advice on Carbon Budgets

- Table 1 – Policies captured in the Energy and Emissions Projections
- Table 2 – Quantified proposals and policies
- Table 3 – Unquantified proposals and policies

Table 1 – Policies captured in the Energy and Emissions Projections

We have taken the EEP policy table directly from Annex D which is published as part of the EEP 2021-2040: <https://www.gov.uk/government/publications/energy-and-emissions-projections-2021-to-2040>.

Policy Characteristics					Savings															
Number	Policy name	Policy Description	Implementation status	Implementation date	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	
1	Active travel spending	Committed active travel spending from 2011/12 onwards including from ring-fenced and non-ringfenced funds including the Local Growth Fund, Other Government Infrastructure Funds (e.g. the Housing Infrastructure Fund), Highways Maintenance Fund, Transforming Cities Fund, Integrated Transport Block, Local Sustainable Transport Fund and Cycling Ambition Cities Fund	Implemented	2011	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2	Agricultural Policies	Agricultural Policies are a group of English, Scottish and Welsh policies and programs: the Agricultural Action Plan (England), the Climate Change Plan (Scotland), and the Climate Smart Agriculture (Wales). These policies aim to reduce emissions through a range of resource-efficiency and land management measures. Relevant policies are quantified in the aggregate 'Agricultural policies'.	Implemented	Various	1.3	1.3	1.4	1.5	1.5	1.6	1.7	1.7	1.8	1.9	1.9	1.9	1.9	1.9	1.9	
3	Boiler Plus (technical standards for domestic boiler installations)	The policy objectives are to deliver additional energy and carbon savings from the domestic heating sector in England by lowering overall gas demand from domestic properties. It aims to do this by increasing the deployment of devices which increase the efficiency of domestic heating systems, through controls and measures to make gas boilers heat homes more efficiently. The policy instrument is a technical standard set through statutory guidance under the Building Regulations framework. This requires existing households in England to install an additional energy saving measure from a choice list at the point of installing a new or replacement combi gas boiler in an existing dwelling	Implemented	2018	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.7	0.6	0.6	0.5	0.5	
4	Boiler Upgrade Scheme (BUS)	The Boiler Upgrade Scheme (BUS) is a £450m, 3year scheme offering upfront capital grants (£5000 for ASHP & Biomass, £6000 for GSHP) to property owners to install heat pumps and in some limited circumstances, biomass boilers, to replace fossil fuel heating systems. The scheme will open in spring 2022 until 31 March 2025.	Implemented	2022	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
5	Building Regulations Part L (2002+2005/6)	Building Regulations set minimum energy performance standards for new buildings and when people carry out controlled 'building work' to existing properties including extensions, conversions and certain categories of renovation and replacement windows and boilers.	Implemented	2002	8.7	8.2	7.6	7.1	6.6	6.0	5.5	5.1	4.6	4.1	3.7	3.2	2.7	2.3	1.8	
6	Building Regulations 2010 Part L	Building Regulations set minimum energy performance standards for new buildings and when people carry out controlled 'building work' to existing properties including extensions, conversions and certain categories of renovation and replacement windows and boilers.	Implemented	2010	6.0	6.1	6.4	6.5	6.1	5.6	5.2	4.8	4.6	4.5	4.3	4.1	3.9	3.8	3.6	
7	Building Regulations 2013 Part L	Building Regulations set minimum energy performance standards for new buildings and when people carry out controlled 'building work' to existing properties including extensions, conversions and certain categories of renovation and replacement windows and boilers.	Implemented	2013	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	

Policy Characteristics					Savings															
Number	Policy name	Policy Description	Implementation status	Implementation date	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	
8	Car policies	<p>EC Regulation 443/2009 sets fuel efficiency targets for new cars to be achieved by 2015 and 2020. The regulation translates a fleet average CO2 tailpipe emissions target for new vehicles sold into the EU market into specific targets for individual manufacturers according to the mass of their fleet. Heavy fines are imposed for non-compliance. The 2021 target is for a fleet average of 95g CO2/km across the single market, with a transition period where 95% of a manufacturer's fleet must meet the 95g target by 2020.</p> <p>New stretching CO2 reduction targets (EU Regulation 2019/631) have been introduced for 2025 and 2030 based on the 2021 Worldwide Harmonised Light Vehicle Test Procedure (WLTP) measurements. As a result, the new passenger cars and light duty vehicles CO2 regulation came into force in January 2020. The Road Vehicle Emission Performance Standards (Cars and Vans) (EU Exit) (Amendment) Regulations 2019 in March 2019 ensure the UK's existing ambition and targets out to 2024 still apply even in the event of the UK leaving the EU without a deal in January 2020. Complementary measures are a collection of technologies that could improve 'real world' fuel efficiency of cars which would not be fully captured in new car CO2 target and could improve fuel efficiency within the existing fleet. These include gear shift indicators, tyre pressure monitoring systems more efficient mobile air-conditioning and low rolling resistance tyres. EC Regulation 661/2009 sets minimum requirements and introduce labelling for the rolling resistance, wet grip and external rolling noise of tyres.</p> <p>Measures to support the uptake of ultra-low emission vehicles include the Plug-in Grant funding for ultra-low emission vehicle (ULEV) cars, vans, motorcycles and taxis as well as various tax incentives including lower rates for Vehicle Excise Duty and Company Car Tax. Electric vehicle (EV) infrastructure is directly supported through the Workplace Charging Scheme grants for EV chargepoints for employees and fleets, the Electric Vehicle Homecharge Scheme grants towards home EV chargepoints, the On-street Residential Chargepoint Scheme and the public-private £400 million Charging Infrastructure Investment Fund, launched in September 2019. Highways England have committed £15 million to ensure that 95% of the Strategic Road Network will be within 20 miles (32.2km) of a charging point.</p>	Implemented	2012	6.2	8.5	10.8	13.3	16.0	19.1	22.0	25.1	27.6	30.0	32.3	34.5	36.8	38.7	40.3	
9	Carbon Trust measures	The Carbon Trust provides a range of measures from general advice to in-depth consultancy and accreditation, to reduce emissions and save energy and money to businesses and public sector organisations of all sizes.	Expired	2002	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
10	Carbon Emissions Reduction Target (CERT) Uplift and Extension (2010-12)	CERT extension - increased the targets originally set under CERT by 20% and required domestic energy suppliers with a customer base in excess of 50,000 (later increased to 250,000) to make savings in the amount of CO2 emitted by householders. The extension also refocused subsidy towards insulation measures and away from electricity saving measures such as low energy lighting - and introduced a super priority group (households in receipt of certain means-tested benefits) to make energy reductions in low income and vulnerable households.	Expired	2010	1.5	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	
11	Community Energy Saving Programme (CESP)	Community Energy Saving Programme (CESP) - area based regulation that targeted households across Great Britain, in areas of low income, to improve energy efficiency standards, and reduce fuel bills. CESP was funded by an obligation on larger energy suppliers and also the larger, electricity generators.	Expired	2009	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
12	CRC Energy Efficiency Scheme	The CRC (formerly the Carbon Reduction Commitment) is a mandatory UK-wide emissions trading scheme (launched in 2010). It encourages the uptake of energy efficiency measures in large non-energy intensive private and public sector organisations that use energy not covered by the EU ETS or Climate Change Agreements. It covers around 5000 medium and large users of energy across the business and public sector. The scheme is split into phases. Phase 1 ran from 1 April 2010 until 31 March 2014. Phase 2 runs from 1 April 2014 until 31 March 2019. In the 2016 Spring Budget, the Chancellor announced there would be no further sales of CRC allowances after Phase 2 (i.e. following the 2018/19 compliance year) and legislation was laid in July 2018 to close the scheme after Phase 2. From April 2019, the CCL will be increased to recover the revenue forgone from CRC allowances and a new streamlined energy and carbon reporting framework for quoted companies of all sizes and large unquoted companies and large Limited Liability Partnerships will come into force UJ-wide.	Implemented	2010	0.9	0.9	0.9	0.6	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

Policy Characteristics					Savings															
Number	Policy name	Policy Description	Implementation status	Implementation date	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	
13	Energy Company Obligation (ECO) 3	The reformed scheme (ECO 3) will run from autumn 2018 to March 2022. The scheme focuses completely on low income and vulnerable households. Supplier thresholds were lowered to 200,000 domestic customers from 2019, and 150,000 domestic customers from 2020. A new 'Innovation' element was introduced to incentivise new better performing measures and cost-effective delivery techniques (up to 10% of scheme), and up to a further 10% of scheme for a monitoring regime to better understand measure performance. The LA Flexible Eligibility mechanism was increased to up to 25% of the scheme.	Implemented	2018	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	
14	Energy Company Obligation (ECO) 4	n/a	Implemented	n/a	0.2	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
15	Energy company obligation (ECO) Extension	The 2015 Spending Review announced that ECO will be replaced with a new, lower cost scheme that will run for 5 years (to March 2022) and will tackle the root causes of fuel poverty. The 5-year extension will take place in the two phases, with the ECO Extension (April 2017 - Sept 2018) acting as a bridge between the expired ECO scheme and the new fuel poverty focused scheme, ECO 3, which will run from December 2018 to March 2022. The Local Authority Flexible Eligible mechanism was introduced under ECO2 Extension, enabling LAs to determine eligibility and refer households to obligated suppliers. Up to 10% of Affordable Warmth could be delivered through this route.	Implemented	2017	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
16	Energy company obligation (ECO)	The Energy Company Obligation (ECO) is a statutory obligation on energy suppliers with over 250,000 domestic customers and delivering over a certain amount of electricity or gas to make reductions in carbon emissions or achieve heating cost savings in domestic households. ECO focuses on insulation measures, and also heating improvements to low income and vulnerable households. It ran until March 2017. ECO initially ran to March 2015 (also known as 'ECO1') and was extended in April 2014 to March 2017 ('ECO2').	Expired	2013	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
17	EEC1 (energy efficiency commitment), EEC2 (2002-2008) & Baseline Carbon Emissions Reduction Target (CERT) (2008-2010)	EEC I: GB wide regulation that required all electricity and gas suppliers with 15,000 or more domestic customers to achieve a combined energy saving of 62 TWh by 2005 by incentivising their customers to install energy-efficiency measures in homes.  EEC II - energy suppliers with more than 50,000 domestic customers required to deliver a total of 130 TWh lifetime energy use reductions in GB households, primarily through the promotion of energy efficiency measures.  Carbon Emission Reduction Target (CERT) – GB regulation that required all domestic energy suppliers with a customer base in excess of 50,000 domestic customers to make savings in the amount of CO2 emitted by householders.	Expired	2002	2.6	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	
18	Energy Performance of Buildings Directive (EPBD; UK transposition)	Energy Performance Certificates (EPCs) are required when any building is sold, rented out or constructed, and sometimes after refurbishment work. EPCs give information on a building's energy efficiency in a sliding scale from 'A' (very efficient) to 'G' (least efficient).	Implemented	2007	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
19	Energy Savings Opportunity Scheme (ESOS)	A mandatory energy assessment scheme for all large undertakings (non-SMEs) in response to requirements contained Article 8 of the EU Energy Efficiency Directive (2012/27/EU). Organisations which employ 250 or more people, or employ fewer than 250 people but have both an annual turnover exceeding £38.9m and an annual balance sheet total exceeding £33.4m, must measure their total energy consumption and carry out audits of the energy used by their buildings, industrial processes and transport to identify cost-effective energy saving measures, by 5 December 2015 and every four years thereafter. It is estimated that around 10,000 organisations will participate in the scheme.	Implemented	2014	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	
20	F-gas regulations	The F-gas regulations introduced a 79% phase down in the quantities of hydrofluorocarbons that can be placed on the EU market and was delivered via a gradually reducing quota system; a number of bans on the use of certain F gases in some new equipment; a ban on the use of very high GWP HFCs for the servicing of certain types of refrigeration equipment; and some strengthening of obligations in the 2007 regulation relating to leak checking, repairs, F gas recovery and technician training. These regulations were introduced by the EU in 2014 and passed into UK law in 2015.	Implemented	2014	3.8	4.3	4.6	4.9	5.2	5.5	5.7	6.0	6.2	6.5	6.8	7.1	7.4	7.6	7.9	
21	Forestry policies	Forestry policies are a range of post-2009 policies aimed at driving afforestation and reforestation. Relevant policies are quantified in the aggregate 'Forestry policies'.	Implemented	Various	-0.3	-0.3	-0.3	-0.2	-0.1	0.0	0.0	0.1	0.2	0.3	0.5	0.6	0.7	0.9	1.0	

Policy Characteristics					Savings														
Number	Policy name	Policy Description	Implementation status	Implementation date	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
22	Green Gas Support Scheme	The Green Gas Support Scheme (GGSS) is a tariff subsidy to support the generation of biomethane by anaerobic digestion, for injection into the gas grid. It launched in November 2021 and will be open for applications until 2025, operating in England, Scotland and Wales. It is funded through the Green Gas Levy.	Implemented	2021	0.3	0.4	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
23	Green Heat Network Fund (GHNf)	GHNf is £328m fund that provides capital support to develop low carbon heat network infrastructure. Its objective is to accelerate the low carbon transition of new and existing heat networks and increase waste heat recovery from heat sources not currently exploited. GHNf supports greater deployment of large heat pumps (air-source, ground-source and water-source), waste-heat recovery (including heat exchangers and heat pumps boosting heat from industrial/commercial processes and energy-from-waste plants), solar thermal with storage, and biomass (where this is sustainably sourced and complies with air-quality legislation).	Implemented	2021	0.1	0.1	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
24	Green Homes Grant Local Authority Delivery Scheme	The GHG Local Authority Delivery Scheme (LAD) is a scheme of up to £500m for energy efficiency low-carbon heating improvements for low-income households.	Implemented	2020	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
25	Green Homes Grant Voucher Scheme	The Green Homes Grant voucher scheme was announced in 2020 as an economic stimulus scheme. It opened on 30th September 2020, but early closure was announced resulting in applications ending on 31st March 2021. Up to £320m budget is allocated for FY21/22, but current applications will come out of this budget. Policy savings represent an estimate of savings as a result of estimated installations later on in the year as a result of applications to the scheme, which have now closed, and so estimated energy savings could change significantly.	Expired	2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	Heat Networks Investment Project	The Heat Networks Investment Project (HNIP) is a capital funding scheme across England and Wales to encourage the development of heat networks. The HNIP is expected to support up to 200 projects by 2021 through grants and loans and other mechanisms and to lever in up to wider investment, reducing bills, cutting carbon and forming a key part of wider urban regeneration in many locations. The scheme will be open for applications from heat networks for up to three years and allocate commercialisation and construction funding through a competitive process. The key objective of the project is to build a sustainable market for heat networks to support the decarbonisation of heat in buildings, helping the UK reach the carbon budget targets.	Implemented	2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
27	Heat Networks Metering and Billings Regulations	The Heat Network (Metering and Billing) Regulations 2014 aim to introduce fairer billing and incentivise energy savings, by requiring heat suppliers to install heat metering devices where cost-effective and to bill based on consumption. The approach to assessing cost-effectiveness was suspended in 2015 due to methodological issues. Since then, this aspect of the Regulation has not been enforced. Amendments to the Regulation are required to support the installation of customer-level metering devices, reduce administrative burden, support wider UK climate goals, and enable consistency across heat network customers and compliance with the requirements of the Energy Efficiency Directive (EED).	Implemented	2020	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0

Policy Characteristics					Savings															
Number	Policy name	Policy Description	Implementation status	Implementation date	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	
28	Heavy Goods Vehicles (HGV) Policies	<p>EC Regulation 661/2009 sets minimum requirements and introduces labelling for the rolling resistance, wet grip and external rolling noise of tyres. Industry and Government are taking a range of actions to reduce freight emissions, including the Freight Transport Association's Logistics Carbon Reduction Scheme, which encourages members to record, report and reduce emissions from freight. The Mode Shift Revenue Support scheme encourages modal shift from road to rail or inland waterway where the costs are higher than road, and where there are environmental benefits to be gained. It currently helps to remove around 800,000 lorry journeys a year from Britain's roads. A similar scheme, Waterborne Freight Grant, can provide assistance with the operating costs associated with coastal or short sea shipping.</p> <p>A voluntary, industry-supported commitment to reduce HGV greenhouse gas emissions by 15% by 2025, from 2015 levels, was introduced in 2018.</p> <p>The Regulation (EU) 2019/1242 setting CO2 emission standards for heavy-duty vehicles entered into force on 14 August 2019. The Regulation also includes a mechanism to incentivise the uptake of zero- and low-emission vehicles, in a technology-neutral way.</p> <p>From 2025 on, manufacturers will have to meet the targets set for the fleet-wide average CO2 emissions of their new lorries registered in a given calendar year. Stricter targets will start applying from 2030 on.</p> <p>The targets are expressed as a percentage reduction of emissions compared to EU average in the reference period (1 July 2019-30 June 2020): from 2025 onwards a 15% reduction, from 2030 onwards a 30% reduction.</p> <p>The 2025 target can be achieved using technologies that are already available on the market. The 2030 target will be assessed in 2022 as part of the review of the Regulation.</p>	Implemented	2012	0.9	1.1	1.4	1.7	2.0	2.2	2.5	3.0	3.5	3.9	4.3	4.6	4.9	5.2	5.4	
29	Industrial Energy Transformation Fund (IETF)	<p>The Industrial Energy Transformation Fund (IETF) was announced in the autumn Budget in 2018. The Fund will support businesses with high energy use, such as energy intensive industries, to transition to a low carbon future. It will help companies cut their energy bills and carbon emissions through investing in energy efficiency and low-carbon technologies. The IETF has a UK-wide budget of £315m over five years to 2024.</p>	Implemented	2019	0.2	0.5	0.8	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
30	Industrial Heat Recovery Support (IHRS)	<p>The policy aims to increase industry confidence to invest in the technology potential to recover heat from industrial processes, and increase the deployment of such technologies across manufacturing and data centres in England and Wales. It establishes a fund for feasibility studies that examine the potential for industrial businesses to adopt heat recovery technologies and a fund to subsidise the deployment of heat recovery technologies.</p>	Implemented	2018	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

Policy Characteristics					Savings															
Number	Policy name	Policy Description	Implementation status	Implementation date	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	
31	Van Policies	<p>EC Regulation 510/2011 sets fuel efficiency targets for new Light Commercial Vehicles (LCV) to be achieved by 2017 and 2020. EC Regulation 661/2009 sets minimum requirements and introduces labelling for the rolling resistance, wet grip and external rolling noise of tyres. The regulation translates a fleet average CO2 tailpipe emissions target for new vehicles sold in the EU market into specific targets for individual manufacturers according to the mass of their fleet. Heavy fines are imposed for non-compliance. The 2020 target is for a fleet average of 147g CO2 /km and represents a reduction of 19% from the 2012 average. EC Regulation 510/2011 sets fuel efficiency targets for new Light Commercial Vehicles (LCV) to be achieved by 2017 and 2020. EC Regulation 661/2009 sets minimum requirements and introduces labelling for the rolling resistance, wet grip and external rolling noise of tyres. The regulation translates a fleet average CO2 tailpipe emissions target for new vehicles sold into the EU market into specific targets for individual manufacturers according to the mass of their fleet. Heavy fines are imposed for non-compliance. The 2020 target is for a fleet average of 147g CO2 /km and represents a reduction of 19% from the 2012 average. New stretching CO2 reduction targets (EU Regulation 2019/631) have been introduced for 2025 and 2030 based on the 2021 Worldwide Harmonised Light Vehicle Test Procedure (WLTP) measurements. As a result, the new passenger cars and light duty vehicles CO2 regulation came into force in January 2020. The Road Vehicle Emission Performance Standards (Cars and Vans) (EU Exit) (Amendment) Regulations 2019 in March 2019 ensure the UK's existing ambition and targets out to 2024 still apply even in the event of the UK leaving the EU without a deal in January 2020. To help address payload penalty issues and encourage uptake of cleaner vans, a derogation from the European Union third Driving Licence Directive (2006/126/EC) has been introduced to allow Category B (car) licence holders to operate alternatively fuelled vehicles up to a maximum authorised mass of 4.25 (rather than 3.5) tonnes.</p> <p>Complementary measures to support the uptake of ultra-low emission vans include the Plug-in Van Grant and various tax incentives; for instance zero emission vans only pay a small proportion of the van benefit charge and are not subject to the van fuel benefit charge. Electric vehicle (EV) infrastructure is directly supported through the Workplace Charging Scheme grants for EV chargepoints for employees and fleets, the Electric Vehicle Homecharge Scheme grants towards home EV chargepoints, the On-street Residential Chargepoint Scheme and the public-private £400 million Charging Infrastructure Investment Fund, launched in September 2019. Highways England have committed £15 million to ensure that 95% of the Strategic Road Network will be within 20 miles (32.2km) of a charging point.</p>	Implemented	2012	1.2	1.3	1.6	1.9	2.1	2.4	2.6	3.1	3.6	4.1	4.7	5.2	5.7	6.3	6.8	
32	Products Policy (Implemented 2009 - 2016)	The EU Ecodesign Directive and the Energy Labelling Framework Regulation operate by setting minimum performance and information requirements (respectively) for energy-using products. They aim to take the least efficient products off the market and to give consumers clear energy use-related information to guide their purchasing decisions. This is implemented through product-specific EU regulations, replicated in UK law.	Implemented	2009	2.8	2.7	2.9	2.8	2.7	2.3	2.3	2.0	2.2	2.2	2.3	2.2	2.0	2.0	2.0	
33	Products Policy (Implemented 2008)	The EU Ecodesign Directive and the Energy Labelling Framework Regulation operate by setting minimum performance and information requirements (respectively) for energy-using products. They aim to take the least efficient products off the market and to give consumers clear energy use-related information to guide their purchasing decisions. This is implemented through product-specific EU regulations, replicated in UK law.	Implemented	2008	2.8	2.4	2.4	2.0	1.8	1.3	1.2	0.9	1.1	1.1	1.1	1.0	0.8	0.8	0.7	

Policy Characteristics					Savings															
Number	Policy name	Policy Description	Implementation status	Implementation date	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	
34	Private Rented Sector (PRS) Energy Efficiency Regulations	There are two distinct parts to the Private Rented Sector Energy Efficiency Regulations. The first part represents the 'Tenants' energy efficiency improvements' provisions, which came into force in 2016. The second part represents the 'Minimum level of energy efficiency' provisions which were implemented in 2018. This implies a requirement for any properties rented out in the private rented sector to have a minimum energy performance rating of E on an Energy Performance Certificate (EPC), unless the property meets the conditions for an exemption, and that exemption has been registered on the PRS Exemptions Register. The regulations came into force for new lets and renewals of tenancies in England and Wales with effect from 1 April 2018 and for all longer-term tenancies on 1 April 2020 (1 April 2023 for non-domestic properties). In April 2019 these regulations were further strengthened with respect to the domestic sector only, to require a contribution of up to £3,500 from landlords towards the cost of improving their property towards EPC Band E (previously landlords of domestic properties were only required to take action where third party funding was available to meet the improvement costs). It will be unlawful to rent a property which breaches the requirement for a minimum E rating, unless one of the limited number of exemptions applies. There is no minimum requirement for private rented sector properties in Northern Ireland currently.	Implemented	2016, 2018	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
35	Public service vehicles (PSV) Policies	The Green Bus Fund (GBF) allowed bus companies and local authorities in England to compete for funds to help them buy new low carbon emission buses. The four rounds of the fund, which ran from 2009- 2014, added around 1250 Low Carbon Emission Buses onto England's roads. The GBF has now been replaced by the Low Emission Bus Fund (LEBS) which offered £30m for bus operators and local authorities across England and Wales to bid for low emission buses and supporting infrastructure. This scheme funding is open from 2016-2019 and the successful bidders were announced in July 2016, adding more than 300 extra low emission buses to fleets. In Autumn 2016, a further £100m was announced to increase the amount of low emission buses on the road. £11.1m was used to fund those who narrowly missed out on LEBS funding, and £48m formed the Ultra-Low Emission Bus Scheme which was launched in March 2018. Winners of this scheme were announced in February 2019. The remaining funding formed the Clean Bus Technology Fund, which was used to fund retrofitting solutions for existing bus fleets to a minimum Euro VI standard, and the winners of this fund was announced in February 2018. This was in addition to the previous £27m of Clean Bus Technology Fund rounds in 2013 and 2015. There was also a £5m Clean Vehicle Technology Fund in 2014. These funding schemes have contributed to an extra 5000 low emission buses on the road.	Implemented	2006	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.8	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0
36	Public Sector Decarbonisation Scheme	The Public Sector Decarbonisation Scheme provides grants for public sector bodies to fund heat decarbonisation and energy efficiency measures. This return includes the £1bn of funding allocated in phase 1 of the scheme, £0.075bn of funding made available in phase 2, and £1.425bn of funding made available in phase 3.	Implemented	2020	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
37	Public Sector Energy Efficiency Loans Scheme - Pre-LCTP & Post-LCTP	The Public Sector Energy Efficiency Loans Scheme, managed by Salix Finance Ltd, provides interest-free loans in England, Scotland and Wales to public sector organisations for energy efficiency schemes. These loans are intended to provide the capital cost of energy efficiency retrofit work and other measures to be installed. These loans have a payback period of five years (eight for schools) during which the repayments are met with the energy bill savings from the energy efficiency measures. Thus, once the loan has been paid off, the organisations continue to benefit from energy savings for the lifetime of these measures. This funding is then recycled once it has been returned to the Scheme and once again loaned out. BEIS provides the most amount of funding to the Scheme but there is also some funding from the Scottish Government, the Welsh Government and the Department for Education.	Implemented	2004	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Policy Characteristics					Savings															
Number	Policy name	Policy Description	Implementation status	Implementation date	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	
38	Public Sector Energy Efficiency Loans Scheme - Pre-LCTP & Post-LCTP	The Public Sector Energy Efficiency Loans Scheme, managed by Salix Finance Ltd, provides interest-free loans in England, Scotland and Wales to public sector organisations for energy efficiency schemes. These loans are intended to provide the capital cost of energy efficiency retrofit work and other measures to be installed. These loans have a payback period of five years (eight for schools) during which the repayments are met with the energy bill savings from the energy efficiency measures. Thus, once the loan has been paid off, the organisations continue to benefit from energy savings for the lifetime of these measures. This funding is then recycled once it has been returned to the Scheme and once again loaned out. BEIS provides the most amount of funding to the Scheme but there is also some funding from the Scottish Government, the Welsh Government and the Department for Education.	Implemented	n/a	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	
39	Renewable heat incentive (RHI)	The Non-Domestic Renewable Heat Incentive (RHI) is a Great Britain (GB) wide scheme which provides financial incentives to increase the uptake of renewable heat by businesses, the public sector and non-profit organisations. Eligible installations receive quarterly payments for 20 years based on the amount of heat generated. The Domestic RHI is a GB wide scheme which provides financial incentives to promote the use of renewable heat in domestic properties. Eligible installations receive quarterly payments for seven years based on either the estimated amount of renewable heat generated, or their metered heat use. In Northern Ireland, separate Renewable Heat Incentive schemes operated before being suspended on 29 February 2016.	Implemented	2011 non-domestic GB, 2014 domestic GB	5.1	5.2	5.2	5.2	5.2	5.2	5.2	5.1	5.1	5.1	4.9	4.5	3.7	2.9	2.2	
40	Smart metering	The smart metering programme will replace 53 million meters with smart electricity and gas meters in all domestic properties, and smart or advanced meters in smaller non-domestic sites in Great Britain by the end of 2025. Smart meters will deliver consumers with near-real time information on their energy consumption to help them control energy use, so avoiding wasting energy and money. It will deliver energy networks with better information upon which to manage and plan current activities. Smart meters will also assist the move towards smart grids which support sustainable energy supply and will help reduce the total energy needed by the system. There are now 28.8 million smart and advanced meters operating across Great Britain. In January 2022, the Smart Metering Implementation Programme began a new 4-year targets-based framework to maintain roll out momentum.	Implemented	2012	1.8	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
41	Small and Medium Enterprises (SME) Loans	The Carbon Trust provided interest free loans of £3,000 - £400,000 for small and medium sized businesses to invest in energy efficiency equipment and renewable technologies. These loans were designed so that in most cases the forecast reduction in energy costs would be similar to the total repayment amount.	Expired	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
42	Social Housing Decarbonisation Fund	The Social Housing Decarbonisation Fund (SHDF) Demonstrator is a £60mn innovation project that looks at applying whole house retrofit to social housing over 2021.	Implemented	2021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
43	Streamlined Energy and Carbon Reporting for business (SECR)	SECR is a reporting framework which obligates all large (as defined by the Companies Act 2006) UK registered companies to report their energy use and associated emissions relating to electricity, gas and transport in their annual reports. Companies will also be required to provide an intensity metric and disclose any energy efficiency actions undertaken during the reporting period. Quoted companies will in addition be required to report their global energy use and GHG emissions.	Adopted	2019	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
44	Renewable Transport Fuel Obligation, (RTFO) - 5% by volume	The RTFO set a 4.75% target for biofuel use by diesel and petrol suppliers to be achieved by 2014. Targets are by volume rather than by energy. Implemented the EU Renewables Directive (2009/28/EC).	Implemented	2007	3.1	3.1	3.1	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	
45	Renewable Transport Fuel Obligation, (RTFO) - Increase target to meet RED	This policy sets enhanced overall targets of 9.75% (by volume) for biofuel use by diesel and petrol suppliers by 2020 and at least 12.4% in 2032. It implements the EU Renewables Directive (2009/28/EC) as amended by the ILUC Directive (2015/1513).	Implemented	2018	4.7	4.9	5.0	5.1	5.2	5.3	5.4	5.4	5.4	5.5	5.2	5.0	4.8	4.6	4.5	
46	Warm front	Warm Front installed heating and insulation measures to make homes warmer and more energy efficient for private sector households in England vulnerable to fuel poverty. The scheme offered a package of heating and insulation measures of up to £3,500 (or £6,000 where oil central heating or other alternative technologies are recommended).	Expired	2000	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	

Policy Characteristics					Savings															
Number	Policy name	Policy Description	Implementation status	Implementation date	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	
47	Warm Home Discount (WHD)	The Warm Home Discount (WHD) scheme provides an energy bill rebate to low income and vulnerable households. We assume that recipients will spend a portion of the rebate on increased energy consumption for heating. Upper and lower scenarios are derived from the uncertainty range in the labelling effect (the proportion of the WHD rebate that recipients spend on energy). The central estimate is 41%, with an uncertainty range of 15%-66%. The larger labelling effect (66%) is used for the "lower" EEP scenario, as this leads to a larger increase in energy consumption. The smaller labelling effect (15%) is used for the "upper" scenario, as this leads to a smaller increase in energy consumption. The source of the range in labelling effect is: "Cash by any other name? Evidence on labelling from the UK Winter Fuel Payment (2011)" <a href="https://www.ifs.org.uk/publications/5603">https://www.ifs.org.uk/publications/5603</a>	Implemented	2021	-0.4	-0.4	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
48	Electricity supply policies: recent decarbonisation policies in the electricity supply industry	Electricity supply policies' are a bundle of decarbonisation policies in the electricity supply industries. Recent policies (post-LCTP) are quantified in the aggregate 'Decarbonisation policies in the electricity supply industries'. Older policies are included in the baseline and mitigation impacts are not quantified.	All	Various	32.4	32.2	31.1	37.3	42.5	47.1	49.2	45.4	47.6	48.3	48.5	49.8	52.2	54.3	57.0	

Table 2 – Quantified proposals and policies

### 24.03 – S.13 Quantified Policy and Proposals Table

**\*\*\*Final Numbers Are Still Subject to QA and May Change\*\*\***

#	NZS Sector	Policy Name	Policy Description	Average Annualised Savings (MtCo2e pa)			Timescale From Which the Policy Takes Effect	Delivery Risks: Explanation	Delivery Risks: Mitigation
				CB4	CB5	CB6			
1	Power	Emissions savings associated with power sector decarbonisation. By nature of the power sector, HMG cannot allocate savings to the power policies so the aggregate savings will be captured here.	Emissions savings associated with power sector decarbonisation. By nature of the power sector HMG cannot allocate savings to the power policies so the aggregate savings will be captured here. An explanation for our accounting approach this interrelated set of policies can be found in the main report, Appendix B, para 6, and Technical Annex.	2.7	6.7	11.2	CB4	No mitigating actions are currently required for this policy	No mitigating actions are currently required for this policy

#	NZS Sector	Policy Name	Policy Description	Average Annualised Savings (MtCo2e pa)			Timescale From Which the Policy Takes Effect	Delivery Risks: Explanation	Delivery Risks: Mitigation
				CB4	CB5	CB6			
2	Power	Contracts for Difference (CfD) Allocation Rounds	A CfD is a long term contractual agreement between a low carbon electricity generator and Low Carbon Contracts Company (LCCC), designed to provide the generator with price certainty over the lifetime of the contract. Contracts for Difference Allocation Rounds will run annually. The first annual auction will be the fifth CfD Allocation Round (AR5) scheduled to open in March 2023. This is the government's main mechanism for supporting low-carbon electricity generating projects in Great Britain, including the goal to deliver up to 50GW offshore wind (including 5GW floating wind) by 2030 and up to 70GW solar by 2035.				<b>Live policy (AR1 projects live 2016/17)</b>	Allocation Round 5 - the first of a series of annual allocation rounds - is on track to open in March 2023. Design and planning for CfD AR6 (2024) is underway with an initial consultation with industry now completed.	No mitigating actions are currently required for this policy
3	Power	Review of Contracts for Difference (CfD) Mechanism	The Government will keep the Contracts for Difference (CfD) mechanism under review to ensure it remains investable and capable of addressing emerging barriers to renewable energy deployment. The Government will respond to the consultation published in December 2022, which sought views and supporting evidence on specific changes proposed for the sixth Allocation Round of the CfD scheme (AR6), as well as early views on longer-term policy considerations for future rounds. Through ensuring an effective functioning of the CfD allocation rounds, this policy will support the delivery of low carbon electricity generating projects.  On supporting repowered projects, ESP Energy Security Plan states that Government will consider how to ensure investment in repowered assets is appropriately valued in the market, to ensure locations with good energy resource continue to contribute to electricity security. This will include considering the potential of the CfD to support repowered projects, as part of a CfD consultation response by Spring.				<b>Early CB5 (assumes consultation implements reform)</b>	We are examining future reform options of the CfD to support accelerated deployment and supply chain growth ambitions. This policy will not lead to carbon savings directly, however, through ensuring an effective functioning of the CfD allocation rounds it will enable our policy to deliver low carbon capacity through the CfD mechanism.	No mitigating actions are currently required for this policy
4	Power	Non Price Factors in the Contracts for Difference (CfD) Scheme	The Government is launching a Call for Evidence in April 2023 on the potential introduction of non-price factors into the CfD. If implemented, this would mean that, when considering CfD applications, HMG could take into account additional factors of value to the system and not only the statutory considerations of value for money and maximising deployment. Any changes made to the CfD scheme under these proposed changes would support the delivery of low-carbon, low-cost electricity generation capacity.				<b>Late CB5 (assumes consultation implements reform)</b>	Policy thinking is at an early stage with a call for evidence planned in spring. While this policy will not lead directly to carbon savings, any changes to the CfD scheme as a result of this consultation would be expected to enable our policy to deliver low-carbon, low-cost generation capacity.	No mitigating actions are currently required for this policy
5	Power	Offshore Wind Manufacturing Investment Support Scheme (OWMIS)	This scheme supported investment in port infrastructure and manufacturing in the offshore wind supply chain. It was implemented to support development of offshore wind supply chain capacity. The scheme therefore indirectly supports emission reductions by de-risking the delivery of offshore wind capacity.				<b>Late CB4</b>	Scheme is nearing conclusion. A total of three manufacturing projects have been awarded grants under this scheme as well as providing support outside of	Continuing to look at further ways to grow the infrastructure and manufacturing base to support offshore wind deployment.

#	NZS Sector	Policy Name	Policy Description	Average Annualised Savings (MtCo2e pa)			Timescale From Which the Policy Takes Effect	Delivery Risks: Explanation	Delivery Risks: Mitigation
				CB4	CB5	CB6			
6	Power	Offshore Wind Acceleration Taskforce (OWAT)	<p>OWAT's work has helped put in place measures to accelerate the deployment of offshore wind and supported industry actions. The Government has worked with the OWAT, Ofgem, the National Grid, the Crown Estates and the Devolved Administrations to speed up planning and consenting for offshore wind farms.</p> <p>The Supply Chain and Infrastructure Working Group, established under OWAT, has also identified and addressed barriers to the development of the offshore wind supply chain.</p>			Mid CB5	<p>The OWAT concludes at the end of March 2023, alongside Tim Pick's role as Offshore Wind Industry Champion. The functions of OWAT and associated work priorities will be transitioned into the Offshore Wind Industry Council. However there is a risk that momentum will be lost.</p>	<p>Officials are working closely with the Offshore Wind Industry Council to design and reform this government/industry forum, ensuring it takes forward the priorities and recommendations emerging from OWAT and operates effectively to drive improvements to the sector.</p>	
7	Power	Offshore Wind Environmental Improvement Package (OWEIP)	<p>The Offshore Wind Environmental Improvement Package (OWEIP) will support the accelerated deployment of offshore wind, whilst maintaining environmental protections. The OWIEP will be implemented through regulations to adapt environmental assessments for offshore wind, enable strategic compensation and introduce industry funded Marine Recovery Funds. The Government is seeking to introduce legislation through the Energy Bill to deliver the OWEIP, alongside non-legislative measures. This package will de-risk the delivery of offshore wind capacity including government's ambition to deploy up to 50GW offshore wind by 2030.</p>			Early CB5	<p>Delivery timescales are tight and partly dependent on Energy Bill progress through Parliament. Policy issues also remain to be resolved with Devolved Administrations. Timescales on National Policy Statement consultation also challenging . The risks require attention but they appear soluble on the basis of the actions underway.</p>	<p>Working closely with Defra and DLUHC on design and implementation of OWEIP measures, including on parliamentary processes. Also significant engagement on devolution issues. Working closely with colleagues in Devolved administrations on detail of Bill clauses. Working with Defra, to ensure delivery of key non-legislative elements of the OWEIP to allow projects to benefit from these elements in advance of full implementation.</p>	
8	Power	Floating Offshore Wind Manufacturing Investment Scheme (FLOWMIS)	<p>This scheme, which will launch in March 2023, will provide up to £160m to kick start investment in port infrastructure projects needed to deploy and service the scale of the floating offshore wind pipeline. This will indirectly support carbon emission reductions by de-risking the delivery of offshore wind capacity.</p>			Mid CB5	<p>Scheme will launch shortly, high degree of delivery confidence, based on experience / track record.</p>	<p>Continuing to engage with industry</p>	

#	NZS Sector	Policy Name	Policy Description	Average Annualised Savings (MtCo2e pa)			Timescale From Which the Policy Takes Effect	Delivery Risks: Explanation	Delivery Risks: Mitigation
				CB4	CB5	CB6			
9	Power	Floating Offshore Wind Taskforce	The Government is working with the industry-led Floating Offshore Wind Taskforce to identify what investment in infrastructure is needed to support deployment of up to 5GW of floating offshore wind by 2030, and to support its further expansion into the 2030s and beyond. The taskforce will bring together companies from across the sector to coordinate their efforts, and speed up the further development.				Mid CB5	Taskforce phase 1 report identifying infrastructure investment requirements to support Floating Offshore Wind deployment ambitions is complete. Now moving on to scoping phase 2 (pathway to 2050/long term vision) work to examine the possible role of floating offshore wind in the net zero energy system and its steady state industrial footprint	No mitigating actions required.
10	Power	Floating Offshore Wind Demonstration Programme	The Floating Offshore Wind Demonstration Programme, using £31m government funding matched by £30m from industry, supports research and development to advance floating offshore wind technology. This work has the potential to enable the development and deployment of floating offshore wind capacity, and in doing so help the government achieve its ambition of up to 5GW floating offshore wind (part of the up to 50GW offshore wind ambition).				2022	The Floating Offshore Wind demo programme has been slightly affected by supply chain constraints and higher inflation. However, there is no major risk to achieve the objectives.	Regular contact with the projects to understand their needs and avoid any delays. Make sure to deliver before the end of SR.
11	Power	Radar and Offshore/Onshore Wind	<p>DESNZ is working with industry, the Ministry of Defence, and The Crown Estate to find both interim and enduring solutions to mitigate air defence radar interference from offshore wind turbines. Similarly, Government is working jointly with industry and the aviation sector to formulate a long-term strategy to address current and future civil radar interference issues.</p> <p>This policy is focussed on safety and security; and is not expected to lead to emissions savings. This package will de-risk the delivery of approximately 20GW of offshore wind capacity, and support ongoing deployment of onshore wind.</p> <p>The document 'Competition document: windfarm mitigation for UK Air Defence' on www.gov.uk notes, 'The continued development of wind turbine sites has the potential to cause a number of negative effects on civil and military air traffic control and defence. Offshore windfarms, when in the line of sight of radar, have a detrimental effect on Ministry of Defence's (MOD) primary surveillance radar capability used to deliver a recognised air picture for Air Defence.'</p>				Mid CB5	MoD have informed us that they are on track to submit their business case and launch their tender competition in Q3 this year, but there is a significant risk of slippage owing to negotiations on funding arrangements between MoD and developers of which there is a hard deadline of 4 April to resolve.	Officials are participating in various governance meetings looking to maintain progress and ministers are briefed and ready to engage as necessary. Taking forward this work aligns with the Net Zero Review recommendations.
12	Power	Local Partnerships for Onshore Wind (England)	The Government will consult on developing local partnerships for onshore wind in England so that those who wish to host new onshore wind infrastructure can benefit from doing so – a commitment made in the British Energy Security Strategy. The Government is due to launch a new consultation to seek views on how to improve the system of engagement and benefits in England. The proposals in the consultation				Mid CB4	Policy development for consultation developed, [REDACTED] issued and concluded with no conditions.. The policies included in the consultation will only be efficacious if other critical	Reforms to improve network access are underway and officials are also continuing to work with DLUHC to explore further changes to planning frameworks. Taking forward this

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				CB4	CB5	CB6			
			may help to indirectly reduce delays and improve the consenting of onshore wind planning applications by introducing policies to improve community support for onshore wind projects in England. However, the consultation does not include any policies that will directly drive the deployment of onshore wind.				blockers to the deployment of onshore wind in England are addressed, specifically in relation to planning and networks. The policies are intrinsically linked to DLUHC's open consultation on the National Planning Policy Framework, so further details on the nature of the reforms are dependent on the outcome, due to report until May/June.	work aligns with the Net Zero Review recommendations.	
13	Power	Marine Spatial Prioritisation Programme	The cross-government, Defra-led Marine Spatial Prioritisation programme aims to support strategic planning of offshore wind and other sea uses by optimising use of the marine space, maximising coexistence between different sea users and prioritising sea use when coexistence is not possible.				<b>Late CB5 (assuming outputs impact offshore wind projects)</b>	Risk of Departments pressing ahead with new commitments that increase pressure on the marine space and undermine future strategic management of marine-based energy deployment. Lack of strategic planning for sea use could affect ability to meet energy security and net zero targets.	Risks and mitigations are being managed through a DEFRA-led Board with cross-Whitehall and ALB membership
14	Power	Solar Taskforce and Roadmap	In line with the Skidmore Review recommendation, and to provide certainty to investors in the solar industry, the Government will publish a solar roadmap setting out a clear step by step deployment trajectory to achieve a fivefold increase (up to 70GW) of solar by 2035. Government will also establish a government/industry taskforce, covering both ground mounted and rooftop solar to drive forward the actions needed by government and industry to make this ambition a reality				<b>Late CB4</b>	This will require significant resource to deliver in the recommended timeframe. There is also a broader risk to solar deployment from possible supply chain disruption should proposed restrictions on imports linked to forced labour be implemented. If not mitigated, these risks could materially affect the successful delivery of the savings in full associated with the policy	Escalate resourcing risk, in order to deliver in the recommended timeframe. Taking forward this work aligns with the Net Zero Review recommendations.
15	Power	VAT Amendments for Solar in Spring Statement 2022	The Government has supported the rollout of rooftop projects by removing VAT on solar panels installed on residential accommodations, and introducing capital allowances for rooftop solar panels until March 2027. This policy will incentivise residential solar deployment and therefore help to de-risk the delivery of solar capacity and support the government's ambition to deliver up to 70GW solar by 2035.				<b>Live policy (announced in 2022)</b>	As part of the Spring Statement 2022, the Chancellor announced that VAT rates on solar and solar & storage packages will be reduced. This means that solar installations and battery storage supplied as part of installation of a qualifying energy saving	No mitigating actions are currently required for this policy

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16	Power	Permitted Development Rights (solar)	The Government is currently consulting on changes to permitted development rights. The proposed changes seek to simplify planning processes for larger commercial rooftop installations and introduce a new permitted development right for non domestic solar canopies. The consultation was published on 28 February.				Mid CB4 (assumes consultation implements reform)	The consultation is open for eight weeks, closing on 25 April. We expect responses to be positive on the whole, though there remains the small chance of pushback against some proposals.	DLUHC have worked closely with DESNZ on proposals within the consultation and we expect this to continue once responses are received, allowing us to influence finalised changes with the continued aim of further enabling the deployment of solar.
17	Power	Low-cost Finance for Solar for Homes and Small Businesses	To meet the demand for rooftop solar, the Government is looking at facilitating low-cost finance from retail lenders for homes and small business premises, aligning with recommendation in the Skidmore Net Zero Review.				Mid CB4 (assuming full implementation)	Research is being conducted and policy options developed. Government is engaging an appropriate consultancy and finalising contract details. Initial work is underway	No mitigating actions are currently required for this policy. Taking forward this work aligns with the Net Zero Review recommendations.
18	Power	Emerging Workforce Challenges (renewables, with a focus on solar)	The joint Government/industry Green Jobs Delivery Group is developing an action plan which will address key emerging workforce challenges for solar and other renewables. The solar sector is also working with training partners, certification scheme providers and local bodies such as Mayor of London to provide grants, learning tools, and training and placement programmes. DESNZ expect that the new solar taskforce will consider further actions to build supply chain resilience and strengthen skills capability. This policy is key to ensuring the relevant skills and supply chain needed to build solar capacity are available, enabling the delivery of solar capacity.				Late CB4, continuing into CB6	The Power and Networks working group has met several times over the last few months and has agreed a set of 'problem statements' that the renewables sector is facing in relation to skills and workforce and potential solutions. The group is developing a joint government-industry action plan, to be published by summer 2023. Some good progress by solar industry in setting up and facilitating local skills training but funding/ resources is a risk to roll out more widely across the country.	Encourage solar industry to actively participate in Power and Networks skills working group. Team will also continue to work with DBT, HMT, No 10 Office of Investment, UKIB etc to help identify any funding opportunities / other support for individual potential investors in UK supply chain on case by case basis. Once established, the new solar taskforce should prioritise work on delivering skills and supply chain capability.
19	Power	Consultation on Future Homes and Building Standards	The Government will explore how it can continue to drive onsite renewable electricity generation, such as solar panels, where appropriate in new homes and buildings. Bringing forward new renewables generation is a key component of decarbonising the power system.				Late CB4, continuing into CB6	Development of consultation on the Future Homes and Building Standards continues at pace.	Team to maintain frequent contact with DLUHC officials so that the opportunity to input into

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								The consultation was planned for publication in spring, but has been delayed.	consultation planning and text is fully utilised.
20	Power	National Planning Policy Framework (Local, England)	Recognising that onshore wind is an efficient, cheap and widely supported technology, Government has consulted on changes to planning policy in England for onshore wind to deliver a localist approach that provides local authorities more flexibility to respond to the views of their local communities. We will respond to the NPPF consultation in due course.				Early CB5	Consultation has concluded with amendments to the National Planning Policy Framework on track for publication in the Spring. However, feedback from industry is that they see no advantage in the proposals so further work is necessary to relieve planning constraints.	Continuing to work with DLUHC on the response to the consultation. Taking forward this work aligns with the Net Zero Review recommendations.
21	Power	Advice and Guidance to Public Sector Procurement	The Government will publish guidance to support the installation of solar technology on the Central Government and wider public sector estate. This will incentivise and enable the deployment of solar technology.				Mid CB4 (assuming full implementation)	Draft guidance in train and Cabinet Office are now leading the delivery element of publication.	Recruitment in train to support work.
22	Power	Biomass Strategy	The Government has committed to publishing a Biomass Strategy, which is due in 2023. The Strategy will set out how sustainable biomass could be best utilised across the economy to help achieve the government's net zero and wider environmental commitments while also supporting energy security. The Strategy will also establish the role which BECCS can play in reducing carbon emissions across the economy and set out how the technology could be deployed.				Mid CB5	Timely delivery depends on resource across government to support the development of the Strategy, the completion of the key analytical work, and rapid agreement on policy-relevant decisions on the priority uses of biomass. If not mitigated, the risk of delay could materially effect the successful delivery of the savings enabled and supported by policies within. Analysis to date for the Biomass Strategy shows that expected biomass supply (from domestic sources and imports) is lower than previously assumed during the Net Zero Strategy, potentially impacting on technologies relying on biomass from CB6 onwards to 2050. Crucial to our ability to secure enough biomass for CB6 and beyond is ensuring the UK has access to sufficient biomass imports. We intend to	Working closely with OGDs and with analysts to resolve any remaining issues and actively supporting analytical work wherever possible. Taking forward this work aligns with the Net Zero Review recommendations. The Skidmore review called for the publication of a Biomass Strategy, and government has committed to do this in 2023

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								present potential future biomass availability estimates in the Biomass Strategy and their impact on the net zero pathways.	
23	Power	Energy from Waste (EfW) and the UK Emissions Trading Scheme (UK ETS)	<p>The Government is exploring expanding the UK ETS to waste incineration and EfW by the mid-late 2020s. This would incentivise the development and uptake of decarbonisation technologies and practices to reduce emissions from waste incineration and EfW, principally by strengthening long-term investment incentives. For example, the scheme could enhance the pre-treatment of waste before it is incinerated to reduce fossil plastic in the waste stream. This is otherwise a costly and intensive process.</p> <p>The expansion of the UK ETS would also incentivise investment into Carbon Capture and Storage (CCS) to reduce CO2 emissions from EfW, depending on wider availability of the technology and infrastructure, and cost-benefit to the plant. Due to biogenic content present in waste streams, in future operators may be able to generate 'negative emissions' by applying CCS equipment to EfW plants, depending on the level of biogenic CO2 captured.</p> <p>As per the consultation in March 2022 in Developing the UK ETS, we propose to explore expanding the UK ETS to waste incineration and EfW by the mid-late 2020s i.e. around the end of CB4. Government will respond to this consultation shortly and will set out more detail on the intended timing</p>			Around end of CB4 (see description)	<p>CCUS: Progress is being made with a Waste Industrial Carbon Capture Contract to enable revenue support for CCUS projects in the EfW sector. However, any carbon savings from EfW CCUS projects will ultimately depend on project selection as it is not guaranteed any of the applicants will be awarded support contracts to enable CCUS build phase. These risks require attention, however appear resolvable based on the actions already underway.</p>	<p>CCUS: Mitigations include: Progressing the primary legislation via the Energy Bill as well as continuing to hit key milestones for capital support via CCS Infrastructure Fund and ongoing revenue support via IDHRS and business models, as well as progressing negotiations with shortlisted projects, will progress policy development and improve certainty in emissions savings; Work with HMT and the IPA to clear the Track 1 Negotiations Mandate; and, Deliver a detailed programme schedule covering all deliverables to support realistic delivery timeline assessment. Taking forward EfW with CCUS would align with the Net Zero Review recommendations. See line 2 of Table 3 for the overall assessment of the ETS programme consultation response for risks and mitigations</p>	
24	Power	Power Bioenergy with Carbon Capture and Storage (BECCS) Business Model	<p>The government is developing a first of a kind (FOAK) business model for power Bioenergy with Carbon Capture and Storage (BECCS) to incentivise negative emissions and low carbon electricity generation. Power BECCS is expected to play an important role in helping the UK to achieve net zero and to contribute significantly to the ambition to deliver five million tonnes of GGRs by 2030, whilst also delivering low-carbon electricity to contribute toward security of supply within Great Britain. The Government consulted on the proposed business model framework last summer; consultation considered actions the government can take to enable the deployment of power BECCS at scale, through addressing prevailing market failures, deployment barriers and risks to investment. The consultation also proposed a number of high level business model design options, included a question on the most appropriate negative emissions market and posed questions on the proposal to include supply chain emission thresholds.</p>			Mid CB5	<p>Uncertain delivery risk. Risk that power BECCS is not included in the final network design list due to storage constraints.</p>	<p>We are exploring opportunities for Power BECCS to be deployed under Track 1 expansion or Track 2 to ensure we're still on track to meet the 2030 5mt ambition.</p> <p>Taking forward work on powerBECCS BMs aligns with the Net Zero Review recommendations.</p>	

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			<p>The work on the business model will help to support our ambition to deploy power BECCS. A consultation response will be published imminently.</p> <p>Power BECCS provides two types of carbon savings. Within the Power sector, Power BECCS delivers carbon savings by displacing non-zero CO2 emissions electricity generation with low carbon electricity generation. Within the GGR sector, Power BECCS contributes carbon savings from generating negative emissions by capturing the CO2 emissions from biomass-to-power plants and storing those safely and permanently.</p>						
25	Power	Power Carbon Capture, Usage and Storage (CCUS)	<p>The Government has announced the project negotiating list for Track 1 carbon capture, usage and storage (CCUS) clusters. The negotiating list contains one power CCUS project. The government will provide up to £20 billion funding for early deployment of CCUS across all sectors. Further projects will be able to enter a selection process for Track 1 expansion launching this year, and 2 additional clusters will be selected through a Track 2 process.</p>	<p><b>Late CB4/Early CB5 subject to project negotiations, cluster negotiations, linked project delivery</b></p>			<p>Uncertain delivery risk, as funding is subject to future spending reviews.</p>	<p>Mitigations include:</p> <ul style="list-style-type: none"> <li>a) Work with HMT and the IPA to clear the Track 1 Negotiations Mandate</li> <li>b) Deliver a detailed programme schedule covering all deliverables to support realistic delivery timeline assessment.</li> <li>c) Deliver Project BOOST: a project commissioned by DESNZ to develop the geospatial data needed to make data driven decisions on CO2 storage and marine spatial planning.</li> <li>d) Ensure that funding is available to deliver the programme of work.</li> </ul>	
26	Power	Dispatchable Power Agreement (DPA)	<p>The Government has developed a Dispatchable Power Agreement (DPA) business model to bring forward a first of kind carbon capture, usage and storage (CCUS) power plant. The model will potentially supporting additional CCUS power plants in the future. When deployed, this first of a kind CCUS plant will provide low carbon electricity generation and reduce power sector emissions.</p>	<p><b>From late CB4/early CB5 subject to project negotiations, cluster negotiations, linked project delivery</b></p>			<p>Uncertain delivery risk, as funding is subject to future spending reviews.</p>	<p>Mitigations include:</p> <ul style="list-style-type: none"> <li>a) Work with HMT and the IPA to clear the Track 1 Negotiations Mandate</li> <li>b) Deliver a detailed programme schedule covering all deliverables to support realistic delivery timeline assessment.</li> <li>c) Deliver Project BOOST: a project commissioned by DESNZ to develop the geospatial data needed to make data driven decisions on CO2 storage and marine spatial planning.</li> <li>d) Ensure that funding is available to deliver the programme of work.</li> </ul>	

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27	Power	Hydrogen to Power	In the Energy Security Plan, Government announced our intention to consult in 2023 on the need and potential design options for hydrogen to power market intervention. To support the consultation development, Government has commissioned external research on the need and case for market intervention to support hydrogen to power plants. This policy could enable the accelerated deployment of hydrogen to power capacity and the support the decarbonisation of the power sector. Emission reductions would be dependent on the pace and scale of deployment and so reductions are unquantified at this stage.				<b>By mid CB5 or earlier depending on future policy decisions, market conditions, and linked policy delivery</b>	We have good certainty of delivering the consultation in 2023, however, emission reductions cannot be quantified at this stage because a decision has yet to be taken on a form or scale of market intervention. Emission savings would be dependent on the volumes of hydrogen to power generation intervention brings forward and whether any plant brought forward replaces through conversion unabated gas generation.	Hydrogen to power expected to be a key flexible technology to support the decarbonisation of the power sector. Policy work ongoing and required for enabling clear decarbonisation pathways for unabated gas generation. Further work ongoing for identifying and removing barriers to hydrogen to power deployment. If consultation feedback is opposed to market intervention, policy teams will develop a strategy to support hydrogen to power within existing policies and market frameworks.
28	Power	Decarbonisation Readiness	HMG published our Decarbonisation Readiness consultation in March 2023 on proposed updates to the 2009 Carbon Capture Readiness requirements. The proposals would require new build and substantially refurbishing combustion power plants to be built in such a way that they could easily decarbonise by converting to either 100% hydrogen generation or carbon capture technology. This policy does not have direct emission savings associated with it, but will enable emission savings				<b>July 2024 as proposed in the March 2023 Decarbonisation Readiness Consultation</b>	We have high certainty in the delivery of this policy and its enabling of carbon savings.	Previous industry engagement and call for evidence indicates general support for policy proposals. SI development in late stage with agreement on approach. Team are resourced for delivery of Government Response.
29	Power	Great British Nuclear	The Government is committing to a programme of new nuclear projects beyond Sizewell C, giving industry and investors the confidence, they need to deliver projects at speed, reducing costs through learning and replication. To deliver this, we have launched Great British Nuclear (GBN) which will be an arms-length body responsible for driving delivery of new nuclear projects, backed with funding it needs. GBN is being set up in interim form and via BNFL Ltd.  The first priority for GBN is to launch a competitive process to select the best SMR technologies. This will commence in April with market engagement as the first phase. The second phase – the down-selection process—will be launched in the summer, with an ambition to assess and decide the leading technologies by the end of the year.  We are working towards bringing forward legislation setting out Great British Nuclear’s statutory role when parliamentary time allows. In the meantime, work will continue at pace to achieve our ambition within the existing legal framework to support delivery of HMG’s ambitions.				<b>Mid to end CB6</b>	Ambitious timeline for the delivery of the Tech Selection by the end of this year and the full set up of GBN.  Once set up at the end of March, GBN capacities will need to be rapidly built.  To down select technologies by the end of this year, we will need to have finalised the process and the policy work so that the second phase (down selection process) can start this summer.	We will launch a Market Engagement asap (April) to inform the tech selection design and policy.  We will build on the work done so far and used DESNZ capacity to support GBN.  We will put in place a XWH process to ensure XWH alignment and enable a rapid and transparent decision making process. Taking forward this work aligns with the Net Zero Review recommendations.

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30	Power	Sizewell C Government Investment Decision	Following the Government's investment decision to take a £700m stake in Sizewell C, the Government will work with EDF as a co-shareholder in the project to continue its development. This includes plans to prepare for a capital raise later this year, using the newly established RAB model for nuclear. The Government's investment was an historic step, as our first direct investment in a nuclear project for 35 years. New nuclear projects like Sizewell C will work alongside renewables to help to ensure secure and stable, low-cost and low-carbon electricity system for the long-term.				Live	<p>Following the successful HMG investment in the project in Nov 22, we are now seeking to secure additional development funding to mature the Project pre-construction, and sufficient financing to take FID. This will be done through a capital raise, intended to begin in Q2 of 2023. The size of the capital raise, the balance sheet treatment of the Project, and the VfM of risk transfer to the private sector means that HMG are seeking steers from the Chx on the Project's capital structure – getting a clear decision made is key to maintaining the critical path to FID. In parallel, the Project continues to mature its leadership, resource and capabilities, and approach to commercials, to be able to engage credibly with private investors.</p> <p>Aside from decisions on capital structure, the majority of the HMG policy enablers are in place, with the finalisation of the project's generation licence, Funded Decommissioning Programme and subsidy control obligations still outstanding. These risks require attention, however appear resolvable once there is clarity on capital structure and capital raise strategy.</p>	We are working closely with HMT, EDF and advisors to develop an achievable and value for money capital structure. We are escalating across Whitehall as appropriate to drive decision-making, and scenario-planning for the Project's capital raise to move forward quickly once we have clarity.
31	Power	Regulated Asset Base Model	Following consultation and the passing of the Nuclear Energy (Financing) Act 2022, the government is implementing a Regulated Asset Base (RAB) model as an option for funding new nuclear projects. In November 2022, the Sizewell C project became the first to be				<b>RAB projects are targeted to begin contributing to the energy system mid-</b>	<p>Sizewell C is at a critical point. Following the successful HMG investment in the project in Nov 22, we are now seeking to secure</p>	We are working closely with HMT, EDF and advisors to develop an achievable and value for money capital structure. We are escalating

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			<p>designated to benefit from the RAB model, following a statutory consultation.</p> <p>In sharing risk between projects and consumers (overseen by an economic regulator) RAB has the potential to reduce the cost of project capital, the biggest driver of nuclear project costs.</p> <p>The appropriate funding model for each new nuclear project will be determined through negotiations between Government and the project's developer.</p> <p>Providing this option to developers will support the development of new projects, helping the government achieve its ambition to have up to 24 GW of nuclear capacity by 2050.</p>				<p>late CB6, subject to all project-specific approvals</p>	<p>additional development funding to mature the Project pre-construction, and sufficient financing to take FID. This will be done through a capital raise, intended to begin in Q2 of 2023. The size of the capital raise, the balance sheet treatment of the Project, and the VfM of risk transfer to the private sector means that HMG are seeking steers from the Chx on the Project's capital structure – getting a clear decision made is key to maintaining the critical path to FID.</p> <p>In parallel, the Project continues to mature its leadership, resource and capabilities, and approach to commercials, to be able to engage credibly with private investors.</p> <p>Aside from decisions on capital structure, the majority of the HMG policy enablers are in place, with the finalisation of the project's generation licence, Funded Decommissioning Programme and subsidy control obligations still outstanding. These risks require attention, however appear resolvable once there is clarity on capital structure and capital raise strategy.</p>	<p>across WH as appropriate to drive decision-making, and scenario-planning for the Project's capital raise to move forward quickly once we have clarity.</p>
32	Power	Advanced Nuclear Fund	<p>The Government has committed to spend up to £385 million to invest in the next generation of nuclear technologies. This includes up to £215 million for Small Modular Reactors (SMRs) to develop a domestic smaller-scale power plant technology design, and funding for a research and development programme to deliver an Advanced Modular Reactor (AMR) demonstration by the early 2030s.</p> <p>While this policy will not deliver emissions savings itself, it will play an</p>				<p>AMid-CB5 depending on policy development and commercial outcomes</p>	<p>Rolls Royce SMR have publicly stated that they will need to slow down work whilst they evaluate their confidence in a trajectory to FOAK. This could impact upon the timeline and scope of their work.</p>	<p>Continuing to work with RR SMR and our delivery partner UKRI to understand impacts and mitigate risks.</p> <p>Developing contingency plans in</p>

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			important role in enabling the nuclear sector to evolve, potentially delivering additional low-carbon, low-cost power and heat, and helping the government achieve its ambition of up to 24 GW of nuclear capacity by 2050					case of AMR programme not having sufficient successful bids.	
33	Power	Future Nuclear Enabling Fund (FNEF)	The Future Nuclear Enabling Fund (FNEF) is a £120m fund announced in the government's Net Zero Strategy: Build Back Greener in 2021. The fund is the first in a series of government interventions designed to achieve the government's ambition of deploying up to 24GW of nuclear capacity by 2050, as announced in the British Energy Security Strategy (BESS). The FNEF will help industry reduce project risks, so they are better positioned for anticipated future investment decisions. The FNEF is be targeted at applicants that could be in a position to take a Final Investment Decision (FID) within the next parliament, subject to Value for Money and all relevant approvals.				Mid-CB6 assuming value for money, and all relevant approvals	The department are currently evaluating applications and will publish information on the shortlist of applications progressing to stage 3 of the fund in due course. Grant awards will be subject to internal government assurance and approval processes and due diligence. Commencement of work packages is expected in Spring 2023 (indicative).  There is a risk of delay of the launch of FNEF funded projects beyond spring. A delay could reduce the time available for FNEF funded projects to utilise the funding to optimum effect - with potential impact to delivery of the FNEF Project objectives/benefits.	FNEF project on final stretch to release funding by spring target, Resources aligned to maximise the opportunity to achieve this outcome.
34	Power	Levelling-Up and Regeneration Bill (Energy Infrastructure)	The Government is making amendments to the Levelling-up and Regeneration Bill to give powers to the Secretary of State to improve the National Significant Infrastructure Projects (NSIP) system. Our aim is to bring forward and, where necessary, incentivise firm, flexible and variable low carbon technologies to meet anticipated demand and reduce reliance on unabated fossil fuel generation. This policy will enable the deployment of these low carbon technologies, which would be expected to lead to carbon emissions savings.				2024	The policy has yet to be consulted on to ensure the grid isn't a limiting factor. However, these risks appear resolvable based on strategic planning exercises (e.g. Holistic Network Design) but delivery is dependent on ability to implement reforms necessary to accelerate grid development.	We have confidence that these risks will be mitigated via the National Policy Statement consultation, aligned with DLUHC announcements on National Significant Infrastructure Project reform. This will underpin further planning reforms being delivered under the Energy Bill and Levelling Up and Regeneration Bill and assist with acceleration of offshore wind and networks deployment. Taking forward this

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								work aligns with the Net Zero Review recommendations.	
35	Power	Interconnectors	Ofgem's decision on Third Cap and Floor Window for Electricity Interconnectors and Ofgem's Multi-Purpose Interconnector Pilot Scheme (publicly available, confirms Ofgem decisions on project eligibility) will incentivise and encourage investment in electricity and multi-purpose interconnectors. The cap and floor regime will deliver a new generation of interconnectors and the multi-purpose interconnector pilot will enable investment in low carbon infrastructure and more effective coordination in the delivery of low-cost offshore networks.				Early/mid CB5	There have been some delays in the applications process and there is risk of further delay. While it is likely we will meet the ambition of at least 18 GW interconnection capacity by 2030, there is not yet full confidence in the pipeline of projects as Ofgem is still considering applications to its third window and several projects are still seeking regulatory approval in neighbouring countries. This risk requires attention however appears resolvable based on the actions already underway	We have confidence that these risks will be mitigated via working closely with Ofgem to ensure that DESNZ can provide support and communicate with developers as appropriate to maintain confidence in the pipeline of projects.
36	Power	Holistic Network Design and follow up exercise	The Government will support the National Grid ESO on The Pathway to 2030 Holistic Network Design and Follow Up Exercise. This is a network design, delivered by the ESO, to connect the offshore wind projects covered by the Pathway to 2030 workstream of the Offshore Transmission Network Review in a coordinated manner. The Holistic Network Design will incentivise investment in network infrastructure which is needed to connect new generation offshore wind assets and demand to the grid, and to avoid congestion and permit the most efficient electricity system.				Mid CB5	Delivery of the necessary grid reinforcements identified through these strategic planning exercises will be dependent on successful implementation of several reforms to planning necessary to accelerate grid development, the right regulatory environment being delivered on time, and successful engagement with a stretched global supply chain for key components. Implementation of these mitigations is challenging, and progress has been slower than expected in some areas. If not mitigated, these risks could mean some Offshore Wind is delayed or projects are cancelled.	Some risks around planning will be mitigated via National Policy Statements. This will underpin further planning reforms being delivered under the Energy Bill and Levelling Up and Regeneration Bill and assist with acceleration of offshore wind deployment. We are also supporting OWAT and the Offshore Wind Industry Champion, Tim Pick, to develop a report outlining progress by Taskforce and key remaining barriers to deployment. However, recommendations made may be difficult to implement and work is ongoing to mitigate some risks, particularly around supply chains and regulatory changes, where we are exploring further action required.

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				CB4	CB5	CB6			
37	Power	Consultation on National Policy Statements	The Government will update the National Policy Statements for energy to ensure they provide a suitable framework to support decision making for nationally significant energy infrastructure. This is the first time they have been updated since 2011. The policy need for energy has been strengthened and the language of the NPSs has been simplified and made more accessible. An initial consultation was issued in early 2022, and documents have been further updated to reflect the increased ambition set out in the NZS and BESS. Stronger National Policy Statements will ensure that HMG has a planning policy framework which can support the infrastructure required to transition to net zero.				<b>Late CB4 subject to further decision making and commercial activity.</b>	The revised draft NPS suite is in train and will underpin further planning reforms announced in the Action Plan and being delivered under the Energy Bill and Levelling Up and Regeneration Bill. Further reforms to the planning system under active consideration but there will inevitably be challenging trade offs in the existing checks and balances to ensure decisions are made fairly.	We have confidence that these risks will be mitigated via National Policy Statements. Taking forward this work aligns with the Net Zero Review recommendations.
38	Power	Offshore Transmission Network Review	The review looks into the way that the offshore transmission network is designed and delivered, consistent with the ambition to deliver net zero emissions by 2050. It brings together the key stakeholders involved in the timing, siting, design and delivery of offshore wind to consider all aspects of the existing regime and how this influences the design and delivery of transmission infrastructure. The review is determining whether changes need to be made to offshore transmission networks to enable new generation to operate effectively, connect both new generation assets and demand to the grid, and accelerate transmission and distribution infrastructure build to avoid congestion and permit the most efficient system. The outcomes of the OTNR will support the delivery of offshore wind generation assets by accelerating the delivery of the transmission required to move power to the centres of demand. It will also reduce the local and environmental impacts of transmission through an increase in coordinated infrastructure.				<b>Mid CB5</b>	Challenges include Developer coordination in East Anglia which is voluntary; consenting is complex; and challenging timescales on key publications. These risks require attention however appear resolvable based on the actions already underway.	We have confidence that these risks will be mitigated including through strong engagement in East Anglia. The Future Frameworks and a supporting Governance structure is being devised to address barriers to deployment and facilitate early planning of network infrastructure and streamline processes to ensure infrastructure is brought forward in a coordinated way. The Energy Bill is continuing its passage through parliament including progression through Report Stage in the House of Lords in February. And the OTNR operates a robust governance process with a clear Board structure, regular workstream planning and milestone re-baselining as well as regular workstream risk and mitigation reviews.
39	Power	Offshore Coordination Support Scheme	The Offshore Coordination Support Scheme provides grants to offshore energy projects to develop coordinated options for offshore transmission infrastructure. The secondary objective of the scheme is to learn lessons from funding activities to support coordination in late-stage projects that can be applied to later workstreams of the Offshore Transmission Network Review (OTNR). The Scheme will complement those other arrangements to facilitate coordination being made as part of the OTNR. The Scheme is a competitive process under which one or				<b>Mid CB5</b>	We have high certainty in the delivery of this policy as far as DESNZ is able to influence. The main dependency is around the policy changes, as requested by the developers of the specific projects the Scheme is targeting (being in part delivered by	Detailed mitigation plans are being actioned. Where other stakeholders e.g. Ofgem have control, we work closely with them and there are clear milestones and interim milestones to keep on track.

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			more Applications may receive Grant funding. The scheme will enable the development of offshore low carbon infrastructure. This will support and enable the delivery of offshore wind capacity and help in delivering the ambition of up to 50GW offshore wind by 2030.					DESNZ, but also by Ofgem and ESO and other partners). I	
40	Power	Onshore Networks: Competitive Tendering and Special Merger Regime	Through primary legislation in the Energy Bill and forthcoming secondary legislation, the government will introduce competitive tendering in onshore electricity networks and an Energy Networks Special Merger Regime. Introducing competition will provide new opportunities to invest in networks where it is efficient to do so. The creation of a new competitive market should improve efficiency in investment, foster innovative solutions to network needs, including increasing the opportunities for smart and flexible solutions, and reduce costs to consumers.				Early CB4	This is part of the Energy Bill, which is continuing its stages through Parliament.	Working with Bill team and external stakeholders to understand potential challenges to Bill's progress and develop mitigations e.g. responses to potential amendments.
41	Power	Electricity Networks Strategic Framework	Early stage policy development - this joint DESNZ and Ofgem publication sets out a strategic framework, and actions the government and Ofgem are taking, to ensure the electricity network can act as an enabler of a secure, resilient, net zero energy system - for example (per the publication) 'speeding up the connections process by reviewing minimum standards for connections (in particular, the time it takes a customer to connect to the distribution grid); introducing a penalty-only incentive for distribution network operators to deliver on major network connections)'. The focus of this work is to enable the necessary transformation of the network at the scale and pace required to accommodate decarbonisation and demand growth. It is therefore a key enabler of decarbonisation and of other decarbonisation targets such as the government's ambitions on offshore wind and solar generation and the 2035 phase out of new petrol and diesel cars and vans.				Early CB4 - framework is live	The strategic framework has already been published. It sets out a strategic framework to inform policy making and was not intended to be a programme management plan but Government is monitoring policy developments and delivery closely.	No mitigating actions are currently required for this policy
42	Power	Electricity Networks Commissioner's Recommendations	The government appointed Nick Winser as Electricity Networks Commissioner to advise the government, Ofgem and industry on actions to accelerate the delivery of electricity transmission network infrastructure. The Electricity Networks Commissioner is expected to make recommendations to Government in June. This will enable decarbonisation through the potential to accelerate network infrastructure build, therefore allowing new generation and demand to connect to the grid more quickly.				Mid CB4 subject to Commissioner recommendations being agreed and actioned	Nick Winser is on track to put forward his recommendations to Government in June 2023. We will then need to assess his recommendations and take a further view on confidence in delivery for recommendations put forward and the extent to which they can enable carbon savings.	No mitigating actions are currently required for this policy
43	Power	Response to Consultation on Options for Community Benefits	The Government has published a consultation on community benefit options for network infrastructure ('Community Benefits for Electricity Transmission Network Infrastructure' March 2023) and, pending responses, intends to produce guidance on community benefits. The consultation considers different types of community benefits and				Early CB4 subject to taking forward consultation responses and	We have high certainty in the delivery of this policy, but cannot guarantee that it will lead to associated carbon savings. This is because community support for	We have confidence that risks to delivery will be mitigated. Delivery of wider reforms will improve community support such as strategic network planning and planning

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		for Transmission Infrastructure	<p>how this can be implemented (e.g. voluntary or mandatory). The consultation proposes to introduce voluntary guidance on the appropriate levels and forms of benefits to give communities the knowledge, power and flexibility to decide what benefits they want in consultation with the project developer, with the option to move to a mandatory approach if necessary. The consultation proposes introducing a recommended level of funding for community benefits, which we believe will increase the level of funding from that seen in existing examples of community benefits for electricity transmission network infrastructure. The proposed guidance will focus on providing direct benefit payments to eligible individuals and wider community-focused benefits. Following consultation feedback, we intend to work with community and industry representatives to develop the guidance, which we intend to publish in 2023.</p> <p>The proposals enable decarbonisation by supporting the timely deployment of network infrastructure to connect low carbon generation and technologies, by improving community support and avoiding delays.</p>				publishing guidance	projects will be driven by a myriad of factors such as engagement and context specific issues.	reform. Consultants have been procured to help support in developing the guidance at pace to be published this year. Taking forward this work aligns with the Net Zero Review recommendations.
44	Power	Land Rights and Consenting for Electricity Networks	To understand whether the current land rights and consenting processes for electricity network infrastructure are fit for purpose, Government sought views on what improvements could be made in a call for evidence and will respond this year. This policy is likely to enable or incentivise timely deployment of electricity network infrastructure that will be necessary for connecting low carbon generation and demand to the grid.				Early CB4	We have reviewed responses to our call for evidence and are on track to publishing our government response this year. However, as we are at the early stages of developing proposals, it is difficult to assess the delivery risk to enabling carbon savings from specific proposals.	Despite potential minor resourcing constraints, we are identifying potential supplementary resourcing if needed, and are still fairly confident that we can publish the response to our call for evidence this year.
45	Power	Ofgem Decision on Accelerated Strategic Investment	Ofgem's Accelerating Strategic Transmission Investment work seeks to accelerate regulatory approval for delivery of key strategic transmission network projects to 2030. This work will act as an enabler for investment into electricity transmission networks, enabling decarbonisation by allowing timely connection of low carbon generation and demand to the grid.				Early CB5	This document was published by Ofgem in December 2022. We have had positive responses from stakeholders and are confident that it will enable carbon savings delivery by reducing delivery risks to building infrastructure that will connect to low carbon generation.	No mitigating actions are currently required for this policy
46	Power	Fast-track System for Nationally Significant Infrastructure Projects (NSIPs) Projects	DLUHC are designing a fast-track system for Nationally Significant Infrastructure Projects (NSIPs) that meet certain quality standards. The clauses are in the Levelling Up Regeneration Bill, which is going through Parliament, and pilots are expected to include offshore wind developments, de-risking the delivery of offshore wind capacity.				Start late 2023, having full effect from 2024 onwards	The Levelling Up and Regeneration Bill (LURB) has completed Commons stage and is entering the Lords. Royal Assent is anticipated in early summer. It is intended that the	We have confidence that the risks can be mitigated by the actions underway. DESNZ officials are feeding into the Parliamentary process. Detailed design work on the Fast Track (which covers all NSIP

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47	Power	RIO-ED2 Final Determinations	Ofgem Final Determinations for Distribution Network Operators (DNOs) on expenditure for the next electricity distribution price control (RIO-ED2) from 2023-2028. This policy will enable carbon savings as it will directly determine investment into electricity distribution networks that will be necessary for enabling the timely connection of low carbon electricity generation and demand.				2023	Ofgem published their final determinations in Nov 2022 for distribution network providing over £22bn in funding from 1 April 2023. We are confident that this will lead to carbon savings as to meet the demands from a system with more electrified heat and transport, £3.1bn of funding has been made available for network upgrades.	No mitigating actions are currently required for this policy
48	Power	Strategy and Policy Statement for Energy Policy	The Strategy and Policy Statement (SPS) set out the Government's strategic priorities and other main considerations of its energy policy, the policy outcomes to be achieved as a result of the implementation of that policy, and the roles and responsibilities of those who are involved in implementation of that policy. The SPS will enable emissions savings because the Energy Act 2013 and imposed new duties on Ofgem to have regard to the strategic priorities when carrying out its regulatory functions and to carry out those functions in the way it considers is best calculated to further the delivery of the specified policy outcomes.				Early CB4	The SPS is yet to be publicly consulted on but we plan to do this in spring 2023. We anticipate high stakeholder interest and a large number of consultation responses. The SPS needs to be laid in Parliament and debated in both Houses before it can be formally designated.  The Future System Operator (FSO) is currently planned to be created by, or in, 2024, at which	We are currently finalising the consultation. We plan to hold stakeholder roundtables while the consultation is live.  We have kept references to the FSO's roles and responsibilities at a higher level in this current version of the statement and instead plan to reflect how best to cover the FSO in its substantive role once it is established.

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49	Power	Future System Operator	The Government will be taking powers to establish the Future System Operator (FSO) through the Energy Bill. The FSO will build on the existing capabilities and functions of the Electricity System Operator, managing the electricity system in real time, as well as supporting its future development. It will also be responsible for gas strategic network planning, long-term forecasting and market strategy functions. No emissions savings have been quantified; it has no direct emission impacts but the body it enables (FSO) could be a significant driver of emission reductions.				<b>Depending on a number of factors, including timings of the Energy Bill and discussing timelines with key parties, our aim is for the FSO to be operational by, or in, 2024</b>	Risks to delivery of this joint DESNZ-Ofgem policy include: resource constraints in Ofgem; agreeing timelines with key parties, including National Grid; timings of the current energy Bill. These risks require attention however appear resolvable based on the actions already underway.	We have confidence that these risks can be mitigated by conversations between DESNZ, Ofgem and National Grid which are ongoing. Recruitment is ongoing across team vacancies. New rebaselined plan has been agreed for the project between DESNZ and Ofgem to ensure milestones remain on track. We have provided information into Bill process with regards to risk associated with Bill timings.
50	Power	Energy Code Governance Reform	Through the legislation in the Energy Bill the government will be creating a new governance framework for the energy codes. This will empower Ofgem to set a strategic direction for how the detailed rules of the energy system should evolve each year and create licensed code managers to ensure that direction is delivered. The reforms will allow Ofgem to drive strategic change across the codes, for example for the coordinated delivery of Net Zero priorities, alongside benefits for consumers and competition. The new code governance framework will also aim to remove potential barriers to innovation arising from the current arrangement, ensuring the codes governance process is better equipped to facilitate the widespread changes required to deliver Net Zero.				<b>Late CB4 depending on when Ofgem receives powers from the Energy Bill and is then able to issue the first Strategic Direction</b>	We have high certainty in the delivery of this joint DESNZ-Ofgem policy and in its significance as an enabler for Net Zero. The project is dependent on the timely passage of the Energy Bill, to empower Ofgem to make the necessary changes and continue with implementation work. There is a joint DESNZ/Ofgem consultation on secondary legislation planned late 2023 to continue project delivery.	We have built a good relationship with Ofgem to ensure work continues throughout passage of the Bill.
51	Power	Capacity Market 2023 Consultation	The Government has launched a consultation on "Capacity Market 2023: strengthening security of supply and alignment with net zero", which closed on 3rd March 2023. This policy aims to ensure that the capacity market remains fit for purpose while also looking at options for aligning the capacity market with the Government's Net Zero ambitions.				<b>2034 - subject to further analysis/policy development, and security of supply</b>	Timelines need development although as the emission limits would only take effect on 1 October 2034, there is still	To further manage timescales, we are likely to take a phased approach to implementation, prioritising those measures that are crucial to security of supply.

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								significant time to implement these measures.	
52	Power	Energy Markets Reform - Consultations and Call for Evidence	<p>On Retail Markets, Government are considering retail market reforms aimed at making sure the market supports the wider transformation of our energy system, whilst also working better for consumers and being more resilient and investable. We aim to publish a Call for Evidence in summer 2023 on how the retail regulatory framework needs to evolve to support new ways of offering energy supply.</p> <p>On the Review of Electricity Market Arrangements, the programme ('REMA') is exploring the reforms needed to (non-retail) electricity market arrangements to support delivery of a decarbonised power system by 2035, helping to deliver a cost-effective transition to a future net zero power sector, whilst maintaining a secure electricity supply. The government first consulted on REMA in 2022, and published the summary of responses in March 2023. We aim to publish a second REMA consultation in Autumn 2023.</p>				From mid CB4 subject to call for evidence and consultation responses,	<p>Retail market - announced in Energy Security Plan.</p> <p>REMA workstreams are making progress but there is a lot of complexity to manage as well as uncertainty in how quickly decisions can be made given the level of policy development still required. The team are clarifying what the business case and assurance pathway requirements will be for the programme and will begin the business case process in earnest over the quarter.</p>	<p>We have confidence that these risks can be mitigated by a fortnightly senior programme board with XWH representation.</p> <p>The team have also brought in new resource on the delivery side to progress the business case and assurance workstreams.</p>
53	Power	Energy Digitalisation Strategy	<p>Delivering the actions set out in the Energy Digitalisation Strategy. Continuing to work with Ofgem and Innovate UK, building on the joint response to the recommendations of the Energy Digitalisation Taskforce. The actions in the strategy will deliver greater digitalisation of the energy system and implementation of smart technologies needed to integrate low carbon technologies.</p>				2021	<p>We have high certainty in the delivery of this policy and its associated carbon savings. The actions and commitments set out in the Energy Digitalisation Strategy, and the response to the Energy Digitalisation Taskforce are all implemented or on track. The Department should now consider the next set of commitments necessary to progress the policy.</p>	<p>No mitigating actions are currently required for this policy</p>
54	Power	Smart Systems and Flexibility Plan	<p>The Government will deliver the actions set out in the Smart Systems and Flexibility Plan. This will remove barriers to flexibility on the electricity grid and reform markets to reward flexibility. This includes legislating for enabling powers in the Energy Security Bill and consulting on proposals for a Secure and Smart Electricity System, alongside learning from innovative approaches such as the National Grid Electricity System Operator's Demand Flexibility Service. These measures form part of our approach to bring forward and incentivise firm, flexible and low carbon technologies that are needed to meet demand and ensure</p>				2021	<p>The Smart Systems and Flexibility Plan contains 35 actions across government, Ofgem and industry. Within these, there are delivery risks including policies dependent on technologies that are nascent, requirements for industry coordination, and policies that require further appraisal of options. The Energy</p>	<p>We have robust governance processes in place to monitor and challenge progress across the plan actions. We remain committed to the important measures in the Energy Security Bill to deliver change in the energy system over the long term. We have contingencies in place for any potential knock-on effects on delivery timelines for energy smart</p>

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			security of supply and de-risking the delivery of emission reductions in the power sector.					appliances, load control, and electricity storage workstreams.	
55	Power	Large Scale Long Duration Storage (LLES)	Large scale, long duration storage (LLES) is a key enabler to a secure, cost-effective and low carbon energy system. It has an important role to play in achieving net zero, helping to integrate renewables, maximising their use, contributing to security of supply, and helping manage constraints in certain areas. LLES technologies provide low carbon flexibility, replacing some unabated gas generation. DESNZ will ensure the deployment of sufficient LLES to balance the overall system by developing appropriate policy to enable investment by 2024				Mid CB5 subject to policy design	We are on track to consult on the policy framework in 2023.	We are preparing to consult on policy options by Summer 2023 and are supporting innovative technologies to commercialise through the up to £68m Longer Duration Energy Storage competition.
56	Power	Longer Duration Energy Storage (LODES) Competition	Energy storage has the ability to significantly reduce carbon emissions by shifting low-carbon energy supply to meet demand. To support development of new energy storage technologies the Government has been running the Longer Duration Energy Storage (LODES) innovation competition. The first phase of the £68m LODES program, the feasibility phase, has successfully concluded. In November 2022 we announced £32.9 million of LODES funding awarded to successful Phase 2 projects (build and demonstration phase). DESNZ expect to announce further recipients of Phase 2 funding in early 2023 as part of the £1 billion Net Zero Innovation Portfolio.  While it is expected that these projects will deliver demonstration schemes. They are intended to be proofs of concept and so carbon emissions savings have not been determined for this competition.				2021	Individual projects will be subject to specific delivery risks, however overall we have high confidence in the successful delivery of this competition's objectives and that it will result in the building and commissioning of multiple innovative storage demonstrators.	No mitigating actions are currently required for this policy
57	Power	Flexibility Innovation Programme (FIP)	To support widespread electricity system flexibility, the Government has been running the Flexibility Innovation Programme (FIP), part of the £1 billion Net Zero Innovation Portfolio. This Programme, worth up to £65 million, is supporting over 40 innovation projects, and includes innovation action on Interoperable Demand Side Response, Alternative Energy Markets, Vehicle-to-Everything and Automatic Asset Registration. These projects are intended to support innovation, deliver proof of concepts, and deliver insights to policy development which will				2021	We have high certainty in the delivery of this policy. Despite the complexity of the FIP, the majority of the FIP projects are underway and delivering policy evidence or positive innovation programmes as expected. The remainder of the FIP programmes and projects are in development	No mitigating actions are currently required for this policy

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			enable decarbonisation of the energy system; and so carbon emissions savings have not been determined for this policy.					and this gives us confidence that the programme can be delivered as planned.	
HSM Note	Fuel Supply	Note on Hydrogen Scenario Modelling	HMG continues to support the potential deployment of hydrogen in heat (through commercialising hydrogen deployment through funding via the Net Zero Innovation Fund, for instance) and also support for electrification of heat, for instance through increased use of heat pumps. Because of this, we have modelled different decarbonisation pathways for parts of the buildings and fuel supply sectors that vary depending on the level of deployment of hydrogen across the economy. This applies to three policy areas covering heat pump deployment, buildings "on the gas grid", and the emissions associated with hydrogen production. Modelled scenarios show how differing uptake rates of hydrogen may displace some electrification across the economy. These scenarios are mutually exclusive of one another. Emissions savings from the high electrification scenario cannot be summed together with those from a "medium" or "high" hydrogen scenarios. Likewise, savings from "high" and "medium" hydrogen scenarios cannot be summed together. Although our list therefore includes policies and proposals in different scenarios, we do not double count these emission savings in analysis presented elsewhere in this report.						
58	Fuel Supply	10GW Low Carbon Hydrogen Production by 2030 and beyond - Net Zero Hydrogen Fund & Hydrogen Production Business Models (baseline assumption)	<p>Delivery of the 2030 ambition for 10GW low carbon hydrogen production capacity, with at least half from electrolytic hydrogen, will be supported through a range of measures.</p> <p>These include:</p> <p>a) £240m Net Zero Hydrogen Fund (capital funding)</p> <p>b) Hydrogen Production Business Model (funded via the Industrial Decarbonisation and Hydrogen Revenue Support Scheme)</p> <p>c) Industrial Decarbonisation and Hydrogen Revenue Support scheme (IDHRS), which will support both electrolytic ('green') and CCUS enabled methane reformation ('blue') low carbon hydrogen production.</p> <p>d) New business models for hydrogen transport and storage infrastructure by 2025, which will grow the hydrogen economy and provide security for producers of hydrogen.</p> <p>e) Working with industry and other stakeholders to develop a hydrogen production roadmap on the scaling up of hydrogen production and supply</p>	-0.051	-0.282	-0.299	Mid CB4	<p>Uncertain delivery risk - Funding is subject to a future spending decisions so therefore cannot be confirmed now, creating inevitable uncertainty; aspects of the policy have yet to be consulted on; the policy relies on passing the Energy Security Bill and additional research to inform further policy development. The hydrogen production group of policies (NZHF, IDHRS and future levy, T&amp;S, LCHS and certification) and reaction to date from industry to them, along with the known pipeline of UK hydrogen production projects, provides confidence that HMG is moving in the right direction to meet our 10GW ambition.</p> <p>However, the UK is still at a near zero base of low carbon hydrogen production. To deliver our ambition, we will require considerable support via IDHRS (i.e. initial exchequer and then future levy spend). The dependency of the HPBM levy and T&amp;S BMs on HMG funding</p>	<p>Delivering the projected savings is dependent on exchequer and levy funding for IDRHS and delivering legislation for the hydrogen production business models, and transport and storage business models. HPBM payments for projects awarded contracts through HAR1 will be funded by government until the hydrogen levy comes into effect, and securing this and the HPBM and T&amp;S legislation will keep us on track to deliver carbon savings, as recommended by the Review of Net Zero.</p> <p>Barriers to hydrogen fuel switching are being identified and addressed across sectors. Regulation and carbon pricing will prompt sectors to explore hydrogen use and funding for innovation and trials are helping develop nascent technologies necessary to unlock this demand. The HPBM also requires production facilities seeking support to locate and agree offtake with demand partners, incentivising the market for hydrogen to form without heavy government intervention.</p>

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			<p>chain growth across the decade</p> <p>We have announced on 30 March the shortlist of projects to take through to due diligence for the first electrolytic allocation round, which will offer support from our Net Zero Hydrogen Fund and from the Hydrogen Production Business Model.</p> <p>Please refer to the note on the first Hydrogen scenario (Hybase – line 58) for an explanation of our modelling in this sector.</p>				<p>and legislation is a significant risk.</p> <p>We are developing policies to support multiple off-takers of hydrogen, including the potential for blending as a demand sink, but there remains significant uncertainty from investors and industry to these policy signals.</p> <p>There are various significant dependencies (including funding and legislation) and external factors (including current levels of inflation) overlaying our ambitious policy programme which create further delivery risks. This means that hydrogen production is at risk of delay, which could reduce emissions savings from hydrogen use in end use sectors.</p> <p>Rapid developments and substantial public funding on offer/being developed in the US and EU mean the UK is now directly competing with other countries for the investment needed to support its hydrogen deployment ambitions. There is risk that mobile private investment will be drawn away from the UK while projects wait for certainty over the funding and timing for contract award, with associated implications for jobs and supply chain development. Anecdotal evidence from industry suggests increased risk in the next 12-18 months.</p>	<p>Decisions intended to be announced in the Net Zero Growth Plan and Energy Security Plan will help mitigate this risk by giving industry greater certainty over timing and extent of funding. These actions include publishing the shortlist of projects applying to the first electrolytic hydrogen allocation round which we will take forward to due diligence and the hydrogen projects being taken forward to negotiations under Track 1 of the CCUS Cluster Sequencing Process. We intend to launch the second electrolytic hydrogen allocation round later in 2023, and are working with industry to ensure UK supply chain opportunities and barriers are understood. Taking forward this work aligns with the Net Zero Review recommendations.</p>	

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59	Fuel Supply	10GW Low Carbon Hydrogen Production Capacity by 2030 and 18GW by 2037 and beyond - in an electrification pathway	<p>This is a modelled scenario covering hydrogen production capacity deployment to 2037 in a scenario where heating is electrified. It only includes production capacity which is additional to our 10 GW ambition, so it is additive to the '10 GW low carbon hydrogen production by 2030 and beyond' line. This scenario assumes hydrogen production capacity reaches a total of 18 GW by 2037, which is sufficient to meet demand for hydrogen in a scenario where heat is electrified. This scenario would require further policy development beyond 2030.</p> <p>Our production policies are grouped together to model our planned hydrogen production deployment. It is not possible to quantitatively split out the impact of the separate policies, as they each contribute to hydrogen production and are interlinked. Hydrogen production alone will not generate carbon savings, but we expect it to enable potential carbon savings in several sectors including industry, power, transport and potentially buildings by replacing high-carbon fuels.</p> <p>a) £240m Net Zero Hydrogen Fund (capital funding)  b) Hydrogen Production Business Model (funded via the Industrial Decarbonisation and Hydrogen Revenue Support Scheme)  c) Industrial Decarbonisation and Hydrogen Revenue Support scheme (IDHRS), which will support both electrolytic ('green') and CCUS</p>	0.000	0.000	-0.069	CB6	<p>Uncertain delivery risk - Funding is subject to a future spending decisions so therefore cannot be confirmed now, creating inevitable uncertainty; aspects of the policy have yet to be consulted on; the policy relies on passing the Energy Security Bill and additional research to inform further policy development. The hydrogen production group of policies (NZHF, IDHRS and future levy, T&amp;S, LCHS and certification) and reaction to date from industry to them, along with the known pipeline of UK hydrogen production projects, provides confidence that HMG is moving in the right direction to meet our 10GW ambition.</p> <p>However, the UK is still at a near zero base of low carbon hydrogen production. To deliver our ambition, we will require considerable support via IDHRS (i.e. initial exchequer and then future levy spend). The dependency of the HPBM levy and T&amp;S BMs on HMG funding and legislation is a significant risk.</p> <p>We are developing policies to support multiple off-takers of hydrogen, including the potential for blending as a demand sink, but there remains significant uncertainty from investors and industry to these policy signals.</p> <p>There are various significant</p>	<p>Delivering the projected savings is dependent on exchequer and levy funding for IDRHS and delivering legislation for the hydrogen production business models, and transport and storage business models. HPBM payments for projects awarded contracts through HAR1 will be funded by government until the hydrogen levy comes into effect, and securing this and the HPBM and T&amp;S legislation will keep us on track to deliver carbon savings.</p> <p>Barriers to hydrogen fuel switching are being identified and addressed across sectors. Regulation and carbon pricing will prompt sectors to explore hydrogen use and funding for innovation and trials are helping develop nascent technologies necessary to unlock this demand. The HPBM also requires production facilities seeking support to locate and agree offtake with demand partners, incentivising the market for hydrogen to form without heavy government intervention.</p> <p>Decisions intended to be announced in the Net Zero Growth Plan and Energy Security Plan will help mitigate this risk by giving industry greater certainty over timing and extent of funding. These actions include publishing the shortlist of projects applying to the first electrolytic hydrogen allocation round which we will take forward to due diligence and the hydrogen projects being taken forward to</p>

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			<p>enabled methane reformation ('blue') low carbon hydrogen production.</p> <p>d) New business models for hydrogen transport and storage infrastructure by 2025, which will grow the hydrogen economy and provide security for producers of hydrogen.</p> <p>e) Working with industry and other stakeholders to develop a hydrogen production roadmap on the scaling up of hydrogen production and supply chain growth across the decade</p> <p>We have announced on 30 March the shortlist of projects to take through to due diligence for the first electrolytic allocation round, which will offer support from our Net Zero Hydrogen Fund and from the Hydrogen Production Business Model.</p> <p>We are aiming to run annual allocation rounds for electrolytic hydrogen, moving to price competitive allocation by 2025 as soon as legislation and market conditions allow. This means that we aim to have up to 1GW of electrolytic hydrogen in construction or operational by 2025, with up to 2GW of production capacity overall (including CCUS-enabled hydrogen) in operation or construction by 2025. Please refer to the note on the first Hydrogen scenario line for an explanation of our modelling in this sector.</p>					dependencies (including funding and legislation) and external factors (including current levels of inflation) overlaying our ambitious policy programme which create further delivery risks. This means that hydrogen production is at risk of delay, which could reduce emissions savings from hydrogen use in end use sectors.	negotiations under Track 1 of the CCUS Cluster Sequencing Process. We intend to launch the second electrolytic hydrogen allocation round later in 2023, and are working with industry to ensure UK supply chain opportunities and barriers are understood.
60	Fuel Supply	10GW Low Carbon Hydrogen Production Capacity by 2030 and 34GW by 2037 and beyond	This is a modelled scenario covering hydrogen production capacity deployment to 2037 in a scenario where hydrogen is used for heating. It only includes production capacity which is additional to our 10 GW	0.000	-0.011	-0.361	CB5	Uncertain delivery risk - Funding is subject to a future spending decisions so therefore cannot be confirmed now, creating inevitable uncertainty; aspects of the policy have yet to be	Delivering the projected savings is dependent on exchequer and levy funding for IDRHS and delivering legislation for the hydrogen production business models, and transport and storage business

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		- in a hydrogen pathway	<p>ambition, so it is additive to the '10 GW low carbon hydrogen production by 2030 and beyond' line. This scenario assumes hydrogen production capacity reaches a total of 34 GW by 2037, sufficient to meet demand for hydrogen in a scenario where hydrogen is used for heat. This scenario would require further policy development beyond 2030.</p> <p>Our production policies are grouped together to model our planned hydrogen production deployment. It is not possible to quantitatively split out the impact of the separate policies, as they each contribute to hydrogen production and are interlinked. Hydrogen production alone will not generate carbon savings, but we expect it to enable potential carbon savings in several sectors including industry, power, transport and potentially buildings, as a replacement to high-carbon fuels.</p> <p>a) £240m Net Zero Hydrogen Fund (capital funding)  b) Hydrogen Production Business Model (funded via the Industrial Decarbonisation and Hydrogen Revenue Support Scheme)  c) Industrial Decarbonisation and Hydrogen Revenue Support scheme (IDHRS), which will support both electrolytic ('green') and CCUS enabled methane reformation ('blue') low carbon hydrogen production.  d) New business models for hydrogen transport and storage infrastructure by 2025, which will grow the hydrogen economy and provide security for</p>					<p>consulted on; the policy relies on passing the Energy Security Bill and additional research to inform further policy development.. The hydrogen production group of policies (NZHF, IDHRS and future levy, T&amp;S, LCHS and certification) and reaction to date from industry to them, along with the known pipeline of UK hydrogen production projects, provides confidence that HMG is moving in the right direction to meet our 10GW ambition.</p> <p>However, the UK is still at a near zero base of low carbon hydrogen production. To deliver our ambition, we will require considerable support via IDHRS (i.e. initial exchequer and then future levy spend). The dependency of the HPBM levy and T&amp;S BMs on HMG funding and legislation is a significant risk.</p> <p>We are developing policies to support multiple off-takers of hydrogen, including the potential for blending as a demand sink, but there remains significant uncertainty from investors and industry to these policy signals.</p> <p>There are various significant dependencies (including funding and legislation) and external factors (including current levels of inflation) overlaying our ambitious policy programme which create further delivery</p>	<p>models. HPBM payments for projects awarded contracts through HAR1 will be funded by government until the hydrogen levy comes into effect, and securing this and the HPBM and T&amp;S legislation will keep us on track to deliver carbon savings.</p> <p>Barriers to hydrogen fuel switching are being identified and addressed across sectors. Regulation and carbon pricing will prompt sectors to explore hydrogen use and funding for innovation and trials are helping develop nascent technologies necessary to unlock this demand. The HPBM also requires production facilities seeking support to locate and agree offtake with demand partners, incentivising the market for hydrogen to form without heavy government intervention.</p> <p>Decisions intended to be announced in the Net Zero Growth Plan and Energy Security Plan will help mitigate this risk by giving industry greater certainty over timing and extent of funding. These actions include publishing the shortlist of projects applying to the first electrolytic hydrogen allocation round which we will take forward to due diligence and the hydrogen projects being taken forward to negotiations under Track 1 of the CCUS Cluster Sequencing Process. We intend to launch the second electrolytic hydrogen allocation round later in 2023, and are working with industry to ensure UK supply</p>

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			<p>producers of hydrogen.</p> <p>e) Working with industry and other stakeholders to develop a hydrogen production roadmap on the scaling up of hydrogen production and supply chain growth across the decade</p> <p>We have announced on 30 March the shortlist of projects to take through to due diligence for the first electrolytic allocation round, which will offer support from our Net Zero Hydrogen Fund and from the Hydrogen Production Business Model.</p> <p>We are aiming to run annual allocation rounds for electrolytic hydrogen, moving to price competitive allocation by 2025 as soon as legislation and market conditions allow. This means that we aim to have up to 1GW of electrolytic hydrogen in construction or operational by 2025, with up to 2GW of production capacity overall (including CCUS-enabled hydrogen) in operation or construction by 2025. Please refer to the note on the first Hydrogen scenario line for an explanation of our modelling in this sector.</p>					risks. This means that hydrogen production is at risk of delay, which could reduce emissions savings from hydrogen use in end use sectors.	chain opportunities and barriers are understood.
61	Fuel Supply	Bio-Generation Emissions Associated with Future Framework/Scheme for Biomethane Support	This line represents emissions created as a by-product of our policy framework to deliver increased production of biomethane and associated carbon savings. Biomethane will play an important role in decarbonising the gas grid and supporting various pathways to Net Zero. This framework, which would be subject to public consultation, would build on the Green Gas Support Scheme (GGSS), which will increase the	-0.005	-0.236	-0.383	2027	This is not applicable as this line represents emissions created as a by-product of biomethane production and is not a proposal or policy.	This is not applicable as this line represents emissions created as a by-product of biomethane production and is not a proposal or policy.

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			amount of biomethane injected into the gas grid and closes to new applicants in 2025/6						
62	Fuel Supply	Flaring and Venting Abatement	Reduce emissions from the practice of gas flaring and venting in the oil and gas industry. This policy is in line with Government's commitment to the World Bank's 'Zero Routine Flaring by 2030' initiative, the North Sea Transition Deal and the sector's target for 50% reduction of emissions by 2030, and 100% by 2050.. The North Sea Transition Authority's Strategy includes the expectation that flaring, venting, and associated emissions will be at the lowest possible levels and requires new developments to be planned based on zero routine flaring and venting.	0.000	0.2	0.2	2031	We have high certainty in the delivery of this policy and its associated carbon savings. This target is well understood and owned by Industry with reasonable run in time for delivery.	No mitigating actions are currently required for this policy
63	Fuel Supply	Electrification of Upstream Oil and Gas Production	This is a policy to promote electrification of existing and new offshore oil and gas production assets in the North Sea via integration with the onshore grid and offshore renewables infrastructure, with the aim of reducing emissions by 50% by 2030, and 100% by 2050. The policy is in line with the North Sea Transition Deal and will be delivered by Government, key regulators including the North Sea Transition Authority and industry.	0.000	1.0	0.7	2028	Electrification has four key barriers to its deployment: high capital costs (including expensive infrastructure such as subsea cables), high operating cost (high cost of power), misaligned timelines for grid connection (Industry needs by or before 2027 but unlikely pre 2030) and unclear regulatory landscape (legislation was not designed with electrification in mind). If not mitigated, these risks could materially affect the successful delivery of the savings in full associated with the policy.	Electrification projects are deliverable from a technical standpoint. We have reasonable confidence industry can technically deliver this however, more work needed with Industry to succeed within regulatory constraints. BEIS/DESNZ is supporting industry to address regulatory and administrative barriers. Industry motivation for the expenditure is in retaining their social licence to operate in the UK.
64	Fuel Supply	Reducing Methane Leakage through the Distribution Network (Ofgem and HSE)	This is an Ofgem and Health and Safety Executive (HSE) policy to reduce methane leakage from the Gas Distribution Networks through the replacement of old iron mains pipes with new plastic pipes, through the	1.1	1.0	0.9	2018	As of March 2022, Ofgem informed BEIS that GDNs (according to their 2021 annual report), are on track to completing the replacements of iron mains with plastic pipes up	No mitigating actions are currently required for this policy

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			Ofgem/HSE Iron Mains Risk Reduction Programme (IMRRP). Ofgem funds this work through the RIIO-2 price control (as set out in the price control framework). Leakage rates for plastic pipes are around 99% lower than for metallic pipes.					to the end of the current price control - 2026. HSE is to undertake a review of the Iron Main Replacement Programme this year. We were informed that this would provide more information on the safety case and determine whether the scope of the programme would remain. The findings of this review may be a barrier to continuing with the replacement of iron mains but other factors, including the progression of low carbon alternatives would also be considered.	
65	Industry	Industrial Carbon Capture Business Models as part of the Track 1 CCUS Cluster Sequencing Process	Business model for Industrial Carbon Capture (ICC), comprising upfront capital support (via the CCS Infrastructure Fund) and ongoing revenue support (via the Industrial Decarbonisation and Hydrogen Revenue Support (IDHRS) scheme) as part of the Track 1 CCUS Cluster Sequencing process programme. DESNZ will work to evolve the business model and allocation process to enable us to contribute and deliver these long-term ambitions. Updated business model contracts with further technical contractual drafting are planned to be published in 2023. Preparations to lay relevant secondary legislation in 2023 (following the Energy Security Bill) are also being made. Note: The start date for this row contains a degree of uncertainty. The actual start dates are subject to successful project negotiations with multiple projects and clusters, and project delivery.	0.084	0.9	0.9	Late CB4 - Early CB5	This policy includes current CCS Infrastructure Fund, IDHRS and business models for ICC and waste CCS for Track-1. Emissions savings are dependent on successful negotiations with projects and delivery of projects (which are first of a kind).	Mitigations include: Progressing the primary legislation via the Energy Bill as well as continuing to hit key milestones for capital support via CCS Infrastructure Fund and ongoing revenue support via IDHRS and business models, as well as progressing negotiations with shortlisted projects, will progress policy development and improve certainty in emissions savings; Work with HMT and the IPA to clear the Track 1 Negotiations Mandate; and, Deliver a detailed programme schedule covering all deliverables to support realistic delivery timeline assessment.

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66	Industry	Industrial Carbon Capture Business Models for the additional carbon capture of industrial emissions needed to achieve 6 MtCO <sub>2</sub> p.a. in total by 2030	Building on the Industrial Carbon Capture (ICC) business models as part of the Track 1 CCUS Cluster Sequencing process develop further support for Industrial Carbon Capture (ICC) for the additional carbon capture of industrial emissions to achieve 6 MtCO <sub>2</sub> p.a. in total by 2030. Note that this scenario is the additional capture needed (after the Track-1 Cluster Sequencing scenario), and will not achieve the NZS ambitions without the scenario above. As such, it relies upon the delivery mechanisms set out under the Track 1 ICC sequencing process row. This is planned to be delivered via Track 2 of CCUS Cluster Sequencing process and expansion of Track-1 clusters. We plan to set out a vision for the UK CCUS sectors in 2023 to raise confidence and improve visibility for investors.	0.000	3.0	5.1	Mid CB5	This policy includes CCS deployment through Track-2 and Track-1 expansion. Uncertain delivery risk due to the early stage of policy development. Funding mechanism is in place but quantum unconfirmed as subject to future spending reviews.	We will be launching Track-2 of the CCUS Programme to identify at least two additional stores.
67	Industry	Industrial Carbon Capture Business Models for the additional carbon capture of industrial emissions needed to achieve 10 MtCO <sub>2</sub> p.a. in total by 2035	Business model for Industrial Carbon Capture (ICC) support needed to achieve 10 MtCO <sub>2</sub> p.a. in total by 2035. This includes the ambition to capture and store 9MtCO <sub>2</sub> pa of industrial emissions by 2035, as set out in the Net Zero Strategy. It is anticipated that an additional 1MtCO <sub>2</sub> pa could, if required, be delivered by industrial carbon capture, but the best mechanism for doing so remains under review. We will work to evolve the business model and allocation process to enable us to contribute and deliver these long-term ambitions. Note that this scenario is the additional capture needed (after the 6 Mt ambition), and will not achieve the NZS ambitions without the	0.000	0.3	3.6	Mid CB5	Uncertain delivery risk due to the early stage of policy development. This policy includes current CCUS ambition (Track 1, Track-1 expansion and Track 2). These savings go beyond existing policy. Key risks include lack of route for deployment and lack of appraised storage capacity.	Emissions saving partially deliverable via existing Track 1, Track 1 expansion and Track 2 programmes, and there is sufficient time to develop the policy framework to enable CCUS delivery to these estimates. Emissions savings deliverable provided a clear signal to the sector of the need for strategic investment in the CCUS project pipeline, including a clear vision for longer term delivery past Track 2. Mitigations include: Deliver Project BOOST, a project commissioned by DESNZ to develop the geospatial data needed to make data driven decisions on CO <sub>2</sub> storage and marine spatial planning; and, ensure

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			scenario above. As such, it relies upon the delivery mechanisms set out under the Track 1 ICC sequencing process and Track 2/Track 1 expansion rows . Updated business model contracts with further technical contractual drafting are planned to be published in 2023.					that funding is available to deliver the programme of work.	
68	Industry	Industrial Energy Transformation Fund	The Industrial Energy Transformation Fund (IETF) supports industrial sites with high energy use to transition to a low carbon future. The fund targets existing industrial processes, helping industry to cut energy bills by investing in more efficient technologies and reduce emissions by bringing down the costs and risks associated with investing in deep decarbonisation technologies. Grant funding is allocated through a competitive process aimed at supporting the highest quality and most transformational bids. The fund is open to a broad range of industrial sectors of all sizes and will support applicants based in England, Wales, and Northern Ireland, both within and outside of industrial clusters. Phase 2 of the Fund closed to new applications in February 2023. Note: The average annualised carbon savings presented in this table are not included in the EEP and are therefore in addition to those stated in table 4. Carbon savings associated with newly committed funding to extend the IETF for a Phase 3 round of applications are not included.	0.1	0.2	0.2	2022	The IETF is a demand led scheme, meaning its potential to deliver emissions savings is dependent on the nature and scale of the projects that apply to the fund, and are successful in the competitive process. External economic pressures and supply chain disruption are a further risk to the delivery of IETF funded projects.	The IETF has now closed and all applications are currently being assessed or are moving to delivery stage.  Later in 2023, modelled carbon savings for the IETF will be updated with an estimate based on emissions saving projections from the final portfolio of successful IETF projects. The IETF team is providing support and flexibility for applicants where possible to help them to manage external pressures that affect project delivery.
69	Industry	Steel Sector Decarbonisation	Proposal for steelmaking to be carried out through electrification by 2035 with recycled steelmaking supplemented with ore-based iron	0.3	7.6	10.3	2023	We have high certainty in the delivery of this policy and its associated carbon savings due to the deliverability and confidence	Progress on delivery depending on company decisions regarding support put forward by HMG. Timings of delivery are highly

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			imports. Limited near term savings are achieved through existing policies. The proposal could potentially be developed further to replace ore-based iron imports with domestic near-zero hydrogen iron-making as the next step process.					in steel making decarbonisation technologies being considered which impact majority of the emission reductions (such as using electric arc furnaces) which have been in use for decades and proven emissions savings. Remaining emission reductions can be considered part of next step in replacing ore-based imports.	uncertain owing to significant commercial and physical infrastructure considerations we will explore mitigations in due course including via consultation with industry.
70	Industry	Industrial Non-Road Mobile Machinery Decarbonisation	Publish an industrial non-road mobile machinery (NRMM) strategy to ensure that emissions savings are delivered. The strategy will set out how the sector can decarbonise while maintaining competitiveness, attracting investment and supporting growth. To deliver the strategy, Government is developing its evidence base on NRMM decarbonisation options through ongoing external research and a call for evidence planned for late 2023. Government has made support available for NRMM decarbonisation through schemes such as the £40m Red Diesel Replacement competition, the Industrial Energy Transformation Fund (IETF), and the Renewable Transport Fuel Obligation (RTFO).	1.0	2.5	4.5	End CB4	We are uncertain about the delivery of this policy and associated carbon dioxide savings due to the early stage of policy development. The policy requires additional evidence on emissions saving potential and consultation with stakeholders on emissions savings options.	We have announced that we are accepting the Skidmore recommendation to develop a strategy to decarbonise NRMM, with work starting in 2023. Risks are mitigated by this, as we will ensure that research is underway on possible decarbonisation options for different types of NRMM and we plan to publish a Call for Evidence in Autumn 2023.
71	Industry	Industrial Fuel Switching - Electricity	We expect our ambition to achieve 50TWh of industrial fuel switching to low carbon fuels by 2035 primarily to be reached via switching from fossil fuels to electricity and hydrogen. Bioenergy is an additional fuel source that could enable carbon savings where other low carbon alternatives aren't available or through BECCS to generate negative emissions. The split will depend on the availability, cost	0.1 (Total estimated savings from the industrial fuel switching)	2.3 (Total estimated savings from the industrial fuel switching)	7.6 (Total estimated savings from the industrial fuel switching policies in rows 71/72/73)	2025-2027	Uncertain delivery risk, this policy includes both electrification and hydrogen fuel switching options that are at exploratory stage. Action is required now, and mitigations are in place, however there is a large amount of uncertainty due to: a. Funding is subject to a future spending review round and therefore cannot be confirmed	There are mitigating actions in place, such as: gas and electricity price rebalancing workstreams; the implementation of the hydrogen production business model and awarding of the Net Zero Hydrogen Fund; the design of H2 transport and storage business models; and the continued capital funding for fuel switching projects through the Industrial Energy Transformation

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			and technical feasibility of the various fuel switching options We will explore measures to address barriers inhibiting the switch away from fossil fuels to electricity, including capital and operational costs such as the fuel cost barrier, through publishing a call for evidence in 2023. The call for evidence will seek industry's, and other stakeholders', views on overcoming barriers to electrification. This is part of a broader policy package to reach industrial fuel switching target of 50TWh low carbon fuels by 2035.	policies in rows 71/72/73 and should not be summed together)	policies in rows 71/72/73 and should not be summed together)	and should not be summed together)		now, creating inevitable uncertainty. b. The policy has yet to be consulted on. c. The policy uses a technology that is nascent, creating inherent uncertainties and risk d. The policy relies on another part of the NZ system/another NZ policy that is also not completed (Grid improvements to meet electrification and Hydrogen demand is inherently linked to availability of hydrogen supply) e. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development.	Fund. These agreed actions, being taken forward during 2023 and beyond, are expected to derisk both the electrification and hydrogen fuel switching options.
72	Industry	Industrial Fuel Switching - Hydrogen	We expect our ambition to achieve 50TWh of industrial fuel switching to low carbon fuels by 2035 primarily to be reached via switching from fossil fuels to electricity and hydrogen. Bioenergy is an additional fuel source that could enable carbon savings where other low carbon alternatives aren't available or through BECCS to generate negative emissions. The split will depend on the availability, cost and technical feasibility of the various fuel switching options.  Having published our response to the call for evidence on 'Enabling or requiring hydrogen-ready industrial boiler equipment', we will sponsor the BSI to ensure that hydrogen-ready industrial-sized boiler equipment is covered by a Publicly Available Specification (PAS). This will help	0.1 (Total estimated savings from the industrial fuel switching policies in rows 71/72/73 and should not be summed together)	2.3 (Total estimated savings from the industrial fuel switching policies in rows 71/72/73 and should not be summed together)	7.6 (Total estimated savings from the industrial fuel switching policies in rows 71/72/73 and should not be summed together)	2025-2027	Uncertain delivery risk, this policy includes both electrification and hydrogen fuel switching options that are at exploratory stage. Action is required now, and mitigations are in place, however there is a large amount of uncertainty due to: a. Funding is subject to a future spending review round and therefore cannot be confirmed now, creating inevitable uncertainty. b. The policy has yet to be consulted on. c. The policy uses a technology that is nascent, creating inherent uncertainties and risk d. The policy relies on another part of the NZ system/another NZ policy that is also not completed (Grid improvements	There are mitigating actions in place, such as: gas and electricity price rebalancing workstreams; the implementation of the hydrogen production business model and awarding of the Net Zero Hydrogen Fund; the design of H2 transport and storage business models; and the continued capital funding for fuel switching projects through the Industrial Energy Transformation Fund. These agreed actions, being taken forward during 2023 and beyond, are expected to derisk both the electrification and hydrogen fuel switching options.

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			establish best-practice for the production and installation of hydrogen ready equipment, designed to facilitate a switch to low carbon hydrogen. We will explore further measures to incentivise fuel switching through regulating out the use of unabated fossil fuels in industry. Measures under consideration include product regulation, environmental permitting, or a combination of the two. Any potential measures taken forward will be designed through consultation with relevant industries and stakeholders.					to meet electrification and Hydrogen demand is inherently linked to availability of hydrogen supply) e. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development.	
73	Industry	Industrial Fuel Switching - Biomass	<p>We expect our ambition to achieve 50TWh of industrial fuel switching to low carbon fuels by 2035 primarily to be reached via switching from fossil fuels to electricity and hydrogen. However bioenergy is an additional fuel source that could enable carbon savings where other low carbon alternatives are not available or through BECCS to generate negative emissions. The split will depend on the availability, cost and technical feasibility of the various fuel switching options.</p> <p>We will explore measures to direct the use of biomass, a limited resource, within the industrial sector to achieve industrial decarbonisation. The upcoming Biomass Strategy, due for publication in 2023 Q2, will review the amount of sustainable biomass available to the UK and how this resource could be best utilised across the economy. The outcomes of the strategy will guide the next stage where we will develop a policy</p>	0.1 (Total estimated savings from the industrial fuel switching policies in rows 71/72/73 and should not be summed together)	2.3 (Total estimated savings from the industrial fuel switching policies in rows 71/72/73 and should not be summed together)	7.6 (Total estimated savings from the industrial fuel switching policies in rows 71/72/73 and should not be summed together)	Late CB4	Limited risk for the policy. The upcoming strategy will provide input into the amount of sustainable biomass available, and priority uses for the sectors. The risks for industry are mainly focused around dependencies with the delivery of emerging technologies such as CCUS and outlining the best pathway for transitioning sectors from bioenergy.	Mitigating actions include continuing policy development and sector engagement.

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			package that strives to make best use of biomass as a transitional fuel, and generate negative emissions in combination with bioenergy with carbon capture and storage (BECCS).						
74	Industry	Industrial Resource Efficiency	This is a proposal in an early stage of development but government has recognised the importance of Industrial Resource Efficiency (RE) as a decarbonisation lever in HMG's Industrial Decarbonisation and Net Zero Strategies (2021). Research is underway to identify the full range of Industrial Resource Efficiency measures that, if implemented, could deliver against the modelled RE emissions savings in the Net Zero Pathway. We are supporting greater collaboration across government departments to accelerate and co-ordinate actions to encourage reuse, recycling, repair, remanufacture, and material substitution, supporting the development of new resource efficient business models.	1.2	5.6	7.0	2025-2027	Uncertain delivery risk. The emissions savings attributed to Resource Efficiency have been modelled using a top down approach that uses a high ambition scenario, in line with the figures used in the Climate Change Committee's sixth carbon budget report. Further work is required to test and validate the feasibility of this emissions saving pathway with industry, and to develop a bottom up assessment of the policy measures that could deliver the full scale of savings. Barriers to delivery are largely understood, and remaining uncertainty is linked to: a) Evidence gaps on the total and sector level emissions saving potential from RE measures and how this might be impacted by other decarbonisation and energy efficiency plans. b) Dependency on securing resources and investment to support RE measures through future spending reviews. Our delivery confidence is therefore weakest for the RE emissions savings that are due to be delivered in the mid-2020s.	Partial mitigating actions have been agreed, such as undertaking a research project to improve the robustness of modelled emissions savings. The research will improve our understanding of private sector action to deliver RE measures, barriers and areas for potential government intervention. Subject to securing resource and funding, we will devise an action plan to improve our delivery confidence and support the development of a bottom-up assessment of emissions saving potential from planned/implemented RE policies.
75	Industry	Industrial Energy Efficiency	This is a proposal in an early development stage that will look to tackle multiple barriers that businesses face to investing in energy efficiency measures with limited near term	0.7	2.5	2.8	2025-2026	Uncertain delivery risk. This policy is in an early stage of development however action is required as soon as possible to ensure that future policy savings	Work underway to develop and agree mitigating actions.

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			savings achieved through existing policies. This is in order to deliver wider HMG ambitions on Net Zero and energy security and the recently announced target to reduce total UK energy demand by 15% from 2021 levels by 2030. As part of this, we intend to launch a pilot which will offer advice, energy audits and grants to 4000 SMEs. The pilot will allow us to learn lessons and gather evidence to inform future policy making, and reduce energy use delivering bill savings.					can be achieved. Barriers to delivery are understood to some extent and appropriate actions are being developed but funding yet to be agreed.	
76	Industry	Non Domestic Energy Performance Certificate (EPC) Regulations - Private Rented Sector	Raising the Minimum Energy Efficiency Standards for industrial buildings.	0.044	0.1	0.1	2025	The policy requires further appraisal of options and a legislative vehicle to allow implementation.	Policy is deliverable, but requires further action including finalising Government response and legislation developed and implemented.
77	Industry	Non Domestic Energy Performance Certificate (EPC) Regulations - Point of Purchase	Minimum Energy Efficiency Standard of EPC Band B for owner-occupied industrial buildings at point of purchase.	0.068	0.2	0.4	End CB4	The policy requires further appraisal of options and advice to Ministers	Policy is deliverable, but requires further policy development and advice to Ministers.
78	Industry	Regulations to Phase Out Fossil Fuels in Off Gas Grid Industrial Buildings	The Government consulted on proposals in late 2021 and will publish the Government response in due course.	0.006	0.080	0.2	2026 subject to consultation response	There are uncertainties that need managing around timescales, further developing of options for properties currently not suitable for heat pumps and number of buildings impacted.	Policy is deliverable but will require political support and may also require additional financial support to support certain tranche of the non-domestic consumers affected by the regs (e.g SMEs). Further work to define properties currently not suitable for heat pumps will help define the scope more tightly making them easier to deliver. This is expected ahead of the second consultation in 2024. The Non-Domestic Building Survey will help build the evidence base to enable better design of the policy.

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				CB4	CB5	CB6			
79	Industry	Energy Saving Opportunity Scheme Improvements (Industrial Buildings)	A mandatory energy assessment scheme for large UK industrial businesses' energy use opportunities at least every four years, intended to identify practicable and cost-effective energy saving opportunities. ESOS is to be strengthened through the Energy Security Bill. The key changes are to strengthen requirements for audits and make them more standardised, to improve the quality of ESOS audits e.g. through better oversight of assessors and to require additional public disclosures from the audits. We have also announced the introduction for the next ESOS phase a requirement for the audits to include a net zero element and are sponsoring new PAS standard. Through the consultation we also sought views on the potential expansion to a wider range of businesses and requiring mandatory implementation of recommendations, which we are considering as options for future phases of ESOS.	0.004	0.000	0.000	2023	The policy requires further appraisal of options and savings are dependant on assumption that disclosure will drive further savings from business buildings.	Further work to finalise the policy and prepare for implementation is in train.
80	Industry	Phasing Out Fossil Fuel Systems in Non-Domestic Buildings on the Gas Grid (base high electrification scenario)  The "base high electrification scenario" should be taken in addition to one of the following three scenarios: - High electrification scenario	There will be a need to phase out fossil fuel systems in non-domestic building on the gas grid. The policy is split across four lines to represent various options to electrify heat or deploy hydrogen.  High electrification scenario: This is a modelled scenario for emission savings for policies to phase out fossil fuel heated systems in non-domestic buildings on the gas grid. There are a range of measures which would be subject to future consultation. For 2030 onwards, there are three different scenarios with involving a	0.000	0.2	0.2	2029	This policy is at very early concept stage. Currently no resourcing allocated for this policy development due to reprioritisation. Savings coming from a variety of different scenarios based on the possible pathways for on-gas heat decarbonisation, so increased uncertainty due to different possible future pathways.	Policy not due until later in the decade so can still be delivered when resourced at a later date. Strategic decision on hydrogen heat pathway in 2026 will enable clarity on most likely scenario.

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				CB4	CB5	CB6			
		- High hydrogen scenario - Medium hydrogen scenario	<p>different balance of deploying hydrogen and electrification. This is because if more hydrogen heating is rolled out, then less electrification (i.e. fewer heat pumps) are required to achieve the same carbon savings. To capture the full picture, this policy should be captured with one of the scenario policies listed below.</p> <ul style="list-style-type: none"> <li>- Assumes the deployment of little to no hydrogen, alongside heat pumps post 2030.</li> <li>- Assumes the deployment of a "High" level of hydrogen alongside heat pumps post 2030.</li> <li>- Assumes the deployment of a "Medium" level of hydrogen alongside heat pumps post 2030.</li> </ul> <p>The non-traded emissions are the same in each scenario but the traded emissions and hydrogen demand will change. Hydrogen scenario is dependent on the domestic hydrogen scenario.</p>						
81	Industry	Phasing Out Fossil Fuel Systems in Industrial Buildings on the Gas Grid (high electrification scenario) - in addition to the "base electrification scenario"	<p>There will be a need to phase out fossil fuel systems in industrial buildings on the gas grid. The policy is split across four lines to represent various options to electrify heat or deploy hydrogen.</p> <p>High electrification scenario: This represents early stage policies that to grow the heat pump market in industrial buildings on the gas grid to the extent that would be required in a high-electrification scenario (where hydrogen plays a limited or no role in heating). We will seek to grow the market and transition consumers, while continuing to follow natural</p>	0.000	0.2	0.8	2030	The policy is at very early concept stage and requires further appraisal of options. There is uncertainty reflecting that the hydrogen scenario is subject to strategic heat policy decisions using the evidence acquired by the Programme in 2026.	Uncertainty is inevitable pending strategic policy decisions in 2026, further appraisal of options will follow in due course. The high/mid hydrogen scenario provides alternative decarbonisation scenario should we conclude high/mid hydrogen heat deployment.

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				CB4	CB5	CB6			
			replacement cycles to work with the grain of consumer behaviour. For industrial buildings, we could focus initially on key segments of the building stock, for example based on tenure or building use.						
82	Industry	Phasing Out Fossil Fuel Systems in Non-Domestic Buildings on the Gas Grid - "high hydrogen scenario" (in addition to the "base electrification scenario")	<p>There will be a need to phase out fossil fuel systems in non-domestic industrial buildings on the gas grid. The policy is split across four lines to represent various options to electrify heat or deploy hydrogen.</p> <p>High hydrogen scenario: This represents early stage policies in a high hydrogen scenario would be taken in addition to base high electrification scenario measures to grow the heat pump market) in order to roll out hydrogen for heat to the extent required in a high hydrogen scenario. To note, a high hydrogen scenario would require chosen policy mechanisms to deliver a more extensive rollout of hydrogen for heat than in a medium hydrogen scenario.</p>	0.000	0.1	0.7	2030	The policy is at very early concept stage and requires further appraisal of options. There is uncertainty reflecting that the hydrogen scenario is subject to strategic heat policy decisions using the evidence acquired by the Programme in 2026.	Uncertainty is inevitable pending strategic policy decisions in 2026. The high electrification scenario provides alternative decarbonisation scenario should we conclude lower/no hydrogen heat deployment.
83	Industry	Phasing Out Fossil Fuel Systems in Non-Domestic Buildings on the Gas Grid - "medium hydrogen scenario" (in addition to the "base electrification scenario")	<p>There will be a need to phase out fossil fuel systems in non-domestic industrial buildings on the gas grid. The policy is split across four lines to represent various options to electrify heat or deploy hydrogen.</p> <p>Medium hydrogen scenario: This represents early stage policies which in a medium hydrogen scenario would be taken in addition to B8 (measures to grow the heat pump market) in order to roll out hydrogen for heat to the extent required in a medium hydrogen scenario. To note, a medium hydrogen scenario would require</p>	0.000	0.1	0.7	2030	The policy is at very early concept stage and requires further appraisal of options. There is uncertainty reflecting that the hydrogen scenario is subject to strategic heat policy decisions using the evidence acquired by the Programme in 2026.	Uncertainty is inevitable pending strategic policy decisions in 2026. The high electrification scenario provides alternative decarbonisation scenario should we conclude lower/no hydrogen heat deployment.

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			chosen policy mechanisms to deliver a less extensive rollout of hydrogen for heat than in a high hydrogen scenario. The non-traded emissions are the same in each scenario but the traded emissions and hydrogen demand will change. Hydrogen scenario is dependent on the domestic hydrogen scenario.						
84	Buildings	Non Domestic Energy Performance Certificate (EPC) Regulations - Private Rented Sector	[Raising the Minimum Energy Efficiency Standards for privately rented non-domestic buildings.	0.2	0.4	0.4	2025	The policy requires further appraisal of options and a legislative vehicle to allow implementation.	Policy is deliverable, but requires further action including finalising Government response and legislation developed and implemented.
85	Buildings	Non Domestic Energy Performance Certificate (EPC) Regulations - Point of Purchase	Minimum Energy Efficiency Standard of EPC Band B for owner-occupied commercial buildings at point of purchase.	0.083	0.3	0.5	CB4	Requires further appraisal of options and advice to Ministers.	Policy is deliverable, but requires further policy development and advice to Ministers.
86	Buildings	Building Regulations - Part L Interim Uplift 2021 for Existing and New Non-Domestic buildings	An uplift to the energy efficiency standards for non-domestic buildings was implemented in December 2021 and came into force in June 2022, delivered through changes to the Building Regulations and publication of statutory guidance.	-0.034	-0.060	-0.076	2022	We have high certainty in the delivery of this policy and its associated carbon savings. Policy is in delivery, with regulation in force	No mitigating actions are currently required for this policy
87	Buildings	Regulations to Phase Out Fossil Fuels in Off Gas Grid Non-Domestic Buildings	The Government consulted on proposals in late 2021 and will publish the Government response in due course.	0.012	0.081	0.1	2026 subject to consultation response	There are uncertainties that need managing around timescales, further developing of options for properties currently not suitable for heat pumps and number of buildings impacted.	Policy is deliverable but will require political support and may also require additional financial support to support certain tranche of the non-domestic consumers affected by the regs (e.g SMEs). Further work to define properties currently not suitable for heat pumps will help define the scope more tightly making them easier to deliver. This is expected ahead of the second consultation in 2024. The Non-Domestic Building Survey will help build the evidence base to enable better design of the policy.

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88	Buildings	Energy Saving Opportunity Scheme Improvements (Buildings)	A mandatory energy assessment scheme for large UK commercial businesses' energy use opportunities at least every four years, intended to identify practicable and cost-effective energy saving opportunities. ESOS is to be strengthened through the Energy Security Bill. The key changes are to strengthen requirements for audits and make them more standardised, to improve the quality of ESOS audits e.g. through better oversight of assessors and to require additional public disclosures from the audits. We have also announced the introduction for the next ESOS phase a requirement for the audits to include a net zero element and are sponsoring new PAS standard. Through the consultation we also sought views on the potential expansion to a wider range of businesses and requiring mandatory implementation of recommendations, which we are considering as options for future phases of ESOS.	0.046	0.031	0.031	2023	The policy requires further appraisal of options and savings are dependent on assumption that disclosure will drive further savings from business buildings.	Further work to finalise the policy and prepare for implementation is in train.
89	Buildings	Phasing Out Fossil Fuel Systems in Non-Domestic Buildings on the Gas Grid (base high electrification scenario) The "base high electrification scenario" should be taken in addition to one of the following three scenarios: - High electrification scenario - High hydrogen	There will be a need to phase out fossil fuel systems in non-domestic building on the gas grid. The policy is split across four lines to represent various options to electrify heat or deploy hydrogen.  High electrification scenario: This is a modelled scenario for emission savings for policies to phase out fossil fuel heated systems in non-domestic buildings on the gas grid. There are a range of measures which would be subject to future consultation. For 2030 onwards, there are three different scenarios with involving a	0.000	0.4	0.4	2029	This policy is at very early concept stage. Currently no resourcing allocated for this policy development due to reprioritisation. Savings coming from a variety of different scenarios based on the possible pathways for on-gas heat decarbonisation, so increased uncertainty due to different possible future pathways.	Policy not due until later in the decade so can still be delivered should resourcing be allocated to it at a later date. Strategic decision on hydrogen heat pathway in 2026 will enable clarity on most likely scenario. Further appraisal of options is underway as part of the Hy4Heat programme.

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				CB4	CB5	CB6			
		scenario - Medium hydrogen scenario	<p>different balance of deploying hydrogen and electrification. This is because if more hydrogen heating is rolled out, then less electrification (i.e. fewer heat pumps) are required to achieve the same carbon savings. To capture the full picture, this policy should be captured with one of the scenario policies listed below.</p> <ul style="list-style-type: none"> <li>- Assumes the deployment of little to no hydrogen, alongside heat pumps post 2030.</li> <li>- Assumes the deployment of a "High" level of hydrogen alongside heat pumps post 2030.</li> <li>- Assumes the deployment of a "Medium" level of hydrogen alongside heat pumps post 2030.</li> </ul> <p>The non-traded emissions are the same in each scenario but the traded emissions and hydrogen demand will change. Hydrogen scenario is dependent on the domestic hydrogen scenario.</p>						
90	Buildings	Phasing Out Fossil Fuel Systems in Non-Domestic Buildings on the Gas Grid (high electrification scenario) - in addition to the "base electrification scenario"	<p>There will be a need to phase out fossil fuel systems in non-domestic building on the gas grid. The policy is split across four lines to represent various options to electrify heat or deploy hydrogen.</p> <p>High electrification scenario: This represents early stage policies that to grow the heat pump market in non-domestic buildings on the gas grid to the extent that would be required in a high-electrification scenario (where hydrogen plays a limited or no role in heating). We will seek to grow the market and transition consumers, while continuing to follow natural</p>	0.000	0.4	2.0	2030	The policy is at very early concept stage and requires further appraisal of options. There is uncertainty reflecting that the hydrogen scenario is subject to strategic heat policy decisions using the evidence acquired by the Programme in 2026.	Uncertainty is inevitable pending strategic policy decisions in 2026. The high/mid hydrogen scenario provides alternative decarbonisation scenario should we conclude high/mid hydrogen heat deployment. Further appraisal of options is underway as part of the Hy4Heat programme.

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			replacement cycles to work with the grain of consumer behaviour. For non-domestic buildings, we could focus initially on key segments of the building stock, for example based on tenure or building use.						
91	Buildings	Phasing Out Fossil Fuel Systems in Non-Domestic Buildings on the Gas Grid - "high hydrogen scenario" (in addition to the "base electrification scenario")	<p>There will be a need to phase out fossil fuel systems in non-domestic building on the gas grid. The policy is split across four lines to represent various options to electrify heat or deploy hydrogen.</p> <p>High hydrogen scenario: This represents early stage policies in a high hydrogen scenario would be taken in addition to base high electrification scenario (measures to grow the heat pump market) in order to roll out hydrogen for heat to the extent required in a high hydrogen scenario. To note, a high hydrogen scenario would require chosen policy mechanisms to deliver a more extensive rollout of hydrogen for heat than in a medium hydrogen scenario.</p>	0.000	0.4	1.8	2030	<p>The policy is at very early concept stage and requires further appraisal of options. There is uncertainty reflecting that the hydrogen scenario is subject to strategic heat policy decisions using the evidence acquired by the Programme in 2026.</p>	<p>Uncertainty is inevitable pending strategic policy decisions in 2026. The high electrification scenario provides alternative decarbonisation scenario should we conclude lower/no hydrogen heat deployment. Further appraisal of options is underway as part of the Hy4Heat programme.</p>
92	Buildings	Phasing Out Fossil Fuel Systems in Non-Domestic Buildings on the Gas Grid - "medium hydrogen scenario" (in addition to the "base electrification scenario")	<p>There will be a need to phase out fossil fuel systems in non-domestic building on the gas grid. The policy is split across four lines to represent various options to electrify heat or deploy hydrogen.</p> <p>Medium hydrogen scenario: This represents early stage policies which in a medium hydrogen scenario would be taken in addition to the base high electrification scenario (measures to grow the heat pump market)) in order to roll out hydrogen for heat to the extent required in a medium hydrogen scenario. To note, a medium hydrogen</p>	0.000	0.4	1.8	2030	<p>The policy is at very early concept stage and requires further appraisal of options. There is uncertainty reflecting that the hydrogen scenario is subject to strategic heat policy decisions using the evidence acquired by the Programme in 2026.</p>	<p>Uncertainty is inevitable pending strategic policy decisions in 2026. The high electrification scenario provides alternative decarbonisation scenario should we conclude lower/no hydrogen heat deployment. Further appraisal of options is underway as part of the Hy4Heat programme.</p>

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			scenario would require chosen policy mechanisms to deliver a less extensive rollout of hydrogen for heat than in a high hydrogen scenario. The non-traded emissions are the same in each scenario but the traded emissions and hydrogen demand will change. Hydrogen scenario is dependent on the domestic hydrogen scenario.						
93	Buildings	Private Rented Sector Minimum Energy Efficiency Regulations	Proposals to strengthen the Minimum Energy Efficiency Standard Regulations for the domestic Private Rented Sector in England and Wales to EPC Band C by 2025 for new tenancies and 2028 for all tenancies. We will publish a summary of responses to the consultation on improving the energy performance of privately rented homes. Note: these savings reflect the consultation stage IA published in September 2020; the estimated carbon savings will be updated once final policy decisions have been made.	0.4	1.4	1.3	2026	Finalisation of policy approach is required following Government consultation.	Further advice to Ministers in train, following discussions with No10 on best approach to take for this tenure. This will include regulatory options for primary legislation and approach to implementation, including the supporting option of funding further enforcement pilots to increase compliance with existing regulations.
94	Buildings	Regulations to Introduce Social Rented Sector Minimum Energy Efficiency Standards	Early stage proposal to develop regulations to introduce Social Rented Sector (SRS) Minimum Energy Efficiency Standards (MEES), subject to consultation. Following the 2020 Social Housing White Paper, the 2021 Heat and Buildings Strategy committed Government to consider setting a new regulatory standard of EPC Band C for the social rented sector. We have committed to begin the consultation process on a minimum energy efficiency standard for the social rental sector, within six months of the Social Housing Regulation Bill receiving Royal Assent.	0.000	0.022	0.070	CB5	We are confident that the policy development can proceed and deliver ahead of the dates used for the projected carbon savings.	DLUHC have committed to consult within 6 months of the Social Housing Regulations Bill receiving Royal Assent.

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95	Buildings	Improving Home Energy Performance through Lenders	Take action following a Government consultation on proposals for mortgage lenders to support homeowners to improve the energy performance of their properties. A Government response will be published by the end of 2023. Note: these savings reflect the consultation stage IA published in November 2020; the estimated carbon savings will be updated once final policy decisions have been made.	0.6	1.5	1.6	2023	Further policy development needed on the back of the Government's consultation.	Policy is deliverable to achieve carbon savings, if decisions are made in 2023/4.
96	Buildings	Regulations to Phase Out Fossil Fuels in Off Gas Grid Homes	The Government consulted on proposals in late 2021 and will issue the Government response in due course.	0.052	1.4	3.4	2026 subject to consultation response	Further work required on the scope and approach for homes currently not suitable for heat pumps which will impact the size of carbon savings. This includes the number of homes that could fall within scope.	Policy is deliverable but will require political support and may also require additional financial support for certain consumers affected by the regs. Further work needed including defining properties currently not suitable for heat pumps.
97	Buildings	Future Homes Standard	Regulations from 2025 through the Future Homes Standard to ensure all new homes are ready for net zero by having a high standard of energy efficiency and low carbon heating installed as standard. The technical detail is subject to consultation.	0.3	1.0	1.3	2025	Policy development on track to deliver consultation on time but pressure remains from some developer stakeholders for delay and the timeline is tight.	Policy still deliverable with ambitious action from HMG.
98	Buildings	Building Regulations - Part L new Domestic Interim Uplift	Uplift to the energy efficiency standards for new domestic buildings, delivered through changes to the Building Regulations and publication of new statutory guidance. The standard applies when certain building works take place.	0.4	1.0	1.0	2022	We have high certainty in the delivery of this policy and its associated carbon savings. Policy is in delivery, with regulation in force	No mitigating actions are currently required for this policy
99	Buildings	Building Regulations - Part L Interim Uplift 2021 for Existing Domestic	Uplift to the energy efficiency standards for existing domestic buildings, delivered through changes to the Building Regulations and publication of new statutory guidance.	0.054	0.1	0.2	2023	We have high certainty in the delivery of this policy and its associated carbon savings. Policy is in delivery, with regulation in force	No mitigating actions are currently required for this policy
100	Buildings	Local Authority Delivery Scheme - Phase 3	LAD 3 to raise the energy efficiency of low income and low energy performance homes with a focus on energy performance certificate (EPC)	0.017	0.016	0.016	2022	Local Authority Delivery Scheme - Phase 3 has been delivering since April 2022. Has delivered 5,177 homes by end of Jan 2023 and	Ministerial Approval has been given for a Managed Closure until 30 September 2023. Recovery Plans being assessed, with 20-22,000

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			ratings of E, F or G. LAD 3 allocated £286.8m to Local Authorities (2022-2023).					Managed Closure change to delivery initiated in October 2022.	homes being targeted by the Local Authorities.
101	Buildings	Home Upgrade Grant - Phase 1	Up to £218m of grant funding for local authorities to improve the energy performance and heating systems of low income households living off the gas grid in England (2022-2023). Will achieve carbon saving through energy demand reduction in homes and transition from fossil fuel to low carbon heating. Scheme in delivery. .	0.014	0.014	0.014	2022	HUG 1 has encountered significant deliver challenges across its KPIs. Risks have included concurrent delivery with other funding opportunities, supply chain capacity issues and a challenging delivery window. If not mitigated, these risks could materially effect the successful delivery of the savings in full associated with the policy.	Lessons have already been incorporated into later phases. Proposals are currently being consulted on for additional time for delivery through a managed closure process which will secure additional delivery whilst securing delivery of HUG Phase 2.
102	Buildings	Home Upgrade Grant - Phase 2	Up to £630m in grant funding for local authorities to improve the energy performance and heating systems of low income households living off the gas grid in England (2023-2025). Will achieve carbon saving through energy demand reduction in homes and transition from fossil fuel to low carbon heating.	0.042	0.046	0.045	2023	Launched application window in September 2022 with 2 rounds of assessment/allocation over 4 month period. Round 1 successfully allocated £472m. Risk around under allocation in round 2 to issue remaining £228m and meet 60% rural ringfence, and successful LA delivery.	New challenge fund model (including batch delivery) is designed to improve delivery confidence. Issues around supply chain, LA capacity and timeframes for procurement/delivery remain, so project may need to utilise flexibility of timeframes to realise scheme benefits.
103	Buildings	Home Upgrade Grant - Consumer Led Route (pilot)	Up to £100m of funding for eligible consumers to improve the energy performance and heating systems of off gas grid homes in England. importantly, it would use an assessment of household income in order to approve eligibility. Scheme is at the policy development stage and is anticipated to be launched in financial year 24/25. .	0.003	0.005	0.005	2025	Delays to programme encountered.	We are exploring minimum viable product options. Resourcing and skills gaps are being addressed and recruitment for vacancies is underway to ensure a full project team is in place.
104	Buildings	Great British Insulation	The £1 billion Great British Insulation scheme (formerly ECO+) will see hundreds of thousands of homes across the country receive new home insulation, saving consumers around £310 a year. Great British Insulation	0.1	0.2	0.1	2023	Currently on track for scheme start in Spring.	Suppliers are legally required to meet their bill saving target or be subject to enforcement action from Ofgem.

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			will extend support to those in the least energy efficient homes in the lower Council Tax bands, as well as targeting the most vulnerable						
105	Buildings	Social Housing Decarbonisation Fund - Wave 1	The Government launched Wave 1 of the SHDF in August 2021. It has awarded around £179m of grant funding for delivery from 2022 into 2023, and will see energy performance improvements to up to 20,000 social housing properties.	0.013	0.013	0.013	2022	There are risks to delivery including product inflation and material availability.	Being effectively managed through a change control process and funding flexibilities across years to allow projects longer to deliver.
106	Buildings	Social Housing Decarbonisation Fund - Wave 2	£800m has been committed for the SHDF as part of the 2021 Spending Review settlement. The Wave 2.1 competition, which closed on 18 November 2022, will look to allocate up to £800m of grant funding to support the installation of energy performance measures in social homes in England. Successful projects are likely to be notified in March 2023. Delivery will continue until 2025.	0.041	0.045	0.045	2023	The highest risk aspect of Wave 2 delivery is the concurrent procurement of a Joint Delivery Partner with HUG2 and the associated governance, commercial and financial risks surrounding this.	The Delivery Partner procurement assessment has now been completed and the project is moving forward. These risks require attention, however appear resolvable based on aforementioned actions
107	Buildings	Social Housing Decarbonisation Fund - Future Phases (Wave 3 & 4)	The funding will upgrade a significant amount of the social housing stock currently below EPC C up to that standard, delivering warmer and more energy-efficient homes, reducing carbon emissions and bills, and tackling fuel poverty as well as supporting green jobs.	0.070	0.3	0.3	2025	Planning for Wave 3 has begun and will take place over the course of 2023, however planning is at an early stage so there are inevitable uncertainties about the specifications. These risks require attention, however appear resolvable based on the actions already underway.	Intention is for Wave 3 to launch before the end of Wave 2 to ensure that delivery overlaps over projects. Intention will be to ensure that there is a clear policy and delivery design to inform future spending reviews.
108	Buildings	Clean Heat Market Mechanism	A new market-based incentive for heating appliance manufacturers, similar to obligations in sectors such as low-emissions vehicles and renewable electricity generation, to support investment in increasing the proportion of low-carbon heating appliances installed relative to fossil fuel boilers over the years 2024 to 2028.	0.3	1.2	1.2	2024	Scheme design, legislation, and delivery preparation are proceeding well against target scheme launch of April 2024. Potential Scheme Administrators are questioning the feasibility of April 2024 launch (vs eg late 2024), and are projecting potentially higher programme costs . This could lead to a delay to	Work continuing to identify whether April 2024 launch can be maintained. However, impact of any delay extremely limited on carbon savings.

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								scheme launch but with likely only a very small effect on overall carbon savings.	
110	Buildings	Heat Network Market Framework previously 'Future Market Framework'	The Heat Networks Regulation will use new primary legislation to appoint Ofgem as the heat network regulator in GB and the CCNI in NI. Under this system of regulation consumers will be given equivalent levels of protection to those on electricity and gas with new regulatory powers to ensure all consumers are treated fairly and networks are run to high standards. We will also help operators run their heat networks as cost-efficiently as possible, delivering further savings for consumers and government will have powers to regulate the carbon emissions of heat networks so that they meet their 2050 net-zero target. Finally, it will make it easier for investors to enter the sector and level the playing field with other utilities.	0.064	0.2	0.4	2024	DLUHC led FBS consultation on track but timescales are tight. The risks require attention, however appear resolvable based on the actions already underway.	Renewed focus on developing and finalising the policy through the consultation phase.
111	Buildings	Green Heat Networks Fund - Extension	The Green Heat Network Fund (GHNF) is an existing capital grant support programme available for the development of new and existing low and zero-carbon heat networks within the current SR. This is a proposal to extend capital support to continue to grow the heat networks market. Carbon savings are achieved by displacing existing fossil fuel heating systems with heat networks supplied by low carbon sources which is achieved through competitive funding rounds and scheme design. .	0.014	0.2	0.3	2027	Funding secured at 2023 spring budget.	Policy deliverable and will utilise existing delivery mechanism.

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111	Buildings	Consumer information & advice (former Simple Energy Advice)- Enhancement	A "minimum viable product" one-stop shop where you can connect your EPC to your home and get bespoke advice on energy efficiency. The next stage will be to connect that advice to the government-funded schemes such as the Home Upgrade Grant and ECO	0.007	0.007	0.005	2025	We have high certainty in the delivery of this policy and its associated carbon savings. Policy is in delivery and does not deliver direct savings.	No mitigating actions are currently required for this policy
112	Buildings	Heat Network Zoning	Through new powers in the Energy Bill, Heat Network Zoning will be introduced by no later than 2025. Zoning will involve the identification and designation of areas where heat networks are expected to be the lowest cost solution for decarbonising heat. Carbon savings are achieved by displacing existing fossil fuel heating systems with heat networks supplied by low carbon sources.	0.3	1.4	2.7	2025	Dependent on the passage of the Energy Bill.	Carbon savings for zoning likely to be achieved. The heat networks team is reassessing staffing allocations to prioritise development of zoning within portfolio and reduce risks to delivery.
113	Buildings	Heat Network Efficiency Scheme - Main	The Heat Network Efficiency Scheme (HNES) will provide grant funding to existing heat network projects in England and Wales, in order to address customer detriment and deliver network efficiency improvements. The scheme grant budget is £32m, with eight funding windows planned across 23/24 and 24/25. This scheme follows on from the HNES Demo ran between Oct 21 and March 22 which delivered £3.8m of capital grants to improve performance of existing heat networks	0.008	0.009	0.009	2023	We have high certainty in the delivery of this policy and its associated carbon savings. Policy is in delivery and meeting expected savings	No mitigating actions are currently required for this policy
115	Buildings	Heat Network Efficiency Scheme - Extension	The Heat Network Efficiency Scheme (HNES) is an existing capital support programme that supports performance improvements to existing heat networks or communal heating projects within the current Spending Review period. This is a proposal to extend capital support to continue to support performance improvements in	0.002	0.007	0.007	2025	Further development and funding needed as this is about a future scheme	Carbon savings deliverable subject to further policy development and funding allocation

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			future years, subject to future Spending Reviews.						
116	Buildings	Energy-related Product Standards - Minimum Energy Efficiency Standards for Domestic Cooking Appliances	Ecodesign regulation to raise minimum energy performance standards for domestic cooking appliances (ovens and hobs) in order to phase out the worst performing appliances as the market towards more efficient and low carbon products, subject to consultation.	0.077	0.4	0.7	2025	Evidence gaps and industry and consumer acceptance are potential risks to delivery.	Further policy development in train, including relating to the evidence base. Policies, when developed, would be subject to stakeholder engagement and consultation.
117	Buildings	Energy-related Product Standards - Improved Information on Energy Labels including Lifetime Costs etc. (non-traded sector impact)	Improved information about energy consumption of energy using products provided on energy labels in order to allow consumers to make informed purchases and buy the most energy efficient products.	0.4	0.4	0.4	2025	Evidence gaps and industry and consumer acceptance are potential risks to delivery.	Further policy development in train, including relating to the evidence base. Policies, when developed, would be subject to stakeholder engagement and consultation.
118	Buildings	Energy-Related Product Standards - Minimum Energy Efficiency Standards for Non-Domestic Cooking Appliances	Ecodesign regulation to introduce minimum energy performance standards for non domestic cooking appliances, subject to consultation.	0.038	0.2	0.3	Second half of CB4	Evidence gaps and industry acceptance are potential risks to delivery.	Further policy development in train, including relating to the evidence base. Policies, when developed, would be subject to stakeholder engagement and consultation.
119	Buildings	Energy-Related Product Standards	Update to energy efficiency requirements and introduction of resource efficiency requirements for a range of products (starting with lighting and space heating appliances) following the work of the Energy-related Product Policy Framework, which identified a range of products with high potential for additional energy efficiency gains as well as other mitigation of other environmental impacts.	0.091	0.6	1.1	2025	Higher delivery risk as funding has not been allocated. Carbon savings are deliverable with resolution here	Carbon savings are retrievable if policy is funded.
120	Buildings	Boiler Efficiency Standards	A package of measures to improve domestic gas boiler heating system efficiency. The policy is aimed at ensuring gas boilers are operating at	0.2	0.8	1.1	2025	Currently consulting on proposals, stakeholder reaction and assessment of feasibility presents potential delivery risk.	Mitigating actions are not currently required for this policy.

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				CB4	CB5	CB6			
			their best after they have been fitted into homes, through a combination of energy saving technologies, better boiler product standards and supporting improved design and maintenance of heating distribution systems, following consultation in December 2022. This builds on the previous standards for domestic gas boilers, the Boiler Plus Standards, that were introduced in England in 2018.						
121	Buildings	Gasification Biomethane to the Grid	Drive forward commercial-scale gasification given its potential for biomethane production. The proposal is at an early stage of policy development and would be subject to consultation.	0.000	0.3	0.8	Early CB5	Policy is at an early stage of development. Policy delivery is subject to developing our evidence base, detailed design work and consultation. Delivery and level of carbon savings are therefore subject to uncertainty.	We are currently working to develop our evidence base to inform policy design. We expect to set out more details later this year.
122	Buildings	Biomethane - Future Support	Create a policy framework to deliver increased production of biomethane and associated carbon savings, subject to consultation. This will follow the current Green Gas Support Scheme (GGSS) and increase the amount of biomethane injected into the gas grid.	0.010	0.5	0.8	2026	Policy is at an early stage of development. Policy delivery is subject to developing our evidence base, detailed design work and consultation. Delivery and level of carbon savings are therefore subject to uncertainty.	We are currently working to develop our evidence base to inform policy design. We expect to set out more details later this year.
123	Buildings	Public Sector Decarbonisation Scheme - Future Phases	Future phases of the PSDS scheme, with the aim of reducing direct emissions from public sector buildings by 75% by 2037. Mechanism for delivery is a 2021-2032 grant scheme for Public Sector Organisations to decarbonise their heat and install energy efficiency measures.	0.5	2.7	5.0	2025	Currently consulting on proposals, stakeholder reaction and assessment of feasibility presents potential delivery risk	Proposals are currently being consulted on and potential risks may not materialise. Carbon savings therefore remain possible to achieve.
124	Buildings	Additional Retrofit Heat Pump Installations (2029 to 2037)- "High Electrification" Scenario Only	Part of the 'high electrification' pathway, requiring an increase in heat pump installations.  Drive forward mechanisms to increase the retrofitting of existing properties. Delivery mechanisms under consideration include through capital schemes to support consumers,	0.000	3.3	15.4	2029#	Policy in early stages of development. There are a high number of dependencies including heat pump affordability, consumer engagement, and networks / connections.	There remains significant lead time ahead of required introduction of policy. Actions to address dependencies are in progress. Policy for 2029 - 37 is in early stages of development. Further appraisal of options is underway as part of the Hy4Heat programme.

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			regulation to better incentivise industry and other methods of building the supply chain for heat pump manufacturing and installation.						
125	Buildings	Hydrogen Heating Deployment - "High Hydrogen" Scenario Only	<p>Part of the "high hydrogen" scenario in which hydrogen makes up a large proportion of the mix of clean heat technology.</p> <p>Convert the gas grid could be converted to handle hydrogen for heat (domestic &amp; non-domestic) required in high hydrogen scenario, in order for hydrogen heating to contribute to the replacement of the incumbent technology of natural gas for heating to deliver carbon savings.</p>	0.000	0.7	9.0	2030	The use of hydrogen for heat is not yet a fully established technology. There is uncertainty on the carbon savings associated with hydrogen heating policy until evidence has been assessed and strategic policy decisions made in 2026. Uncertainty reflects that any deployment of hydrogen for heating is subject to the strategic decisions in 2026.	The government is working with industry and regulators to support a range of research, development and testing projects, including pioneering hydrogen heating consumer trials. This work will determine the feasibility, costs and convenience of using hydrogen as an alternative to natural gas for heating, to allow strategic decisions in 2026 on the role of hydrogen heating. The high electrification scenario provides alternative decarbonisation scenario should we conclude no hydrogen heat deployment.
126	Buildings	Additional On Gas Grid Heat Pumps (2029 to 2037) - "High Hydrogen" Scenario Only	<p>Part of the "high hydrogen" scenario in which hydrogen makes up a large proportion of the mix of clean heat technology.</p> <p>For all hydrogen scenario policies: The deployment of heat pumps beyond 2028 will depend on wider commercial factors such as the cost of heat pumps (both their upfront costs and running costs) and the successful commercialisation of hydrogen to heat buildings - as well as continued government action through a range of measures. Heat pump deployment is lower in a scenario of greater hydrogen uptake. Government is planning to take a strategic decision on the role of hydrogen heating in 2026.</p>	0.000	2.6	6.2	2029	The deployment of heat pumps beyond 2028 will depend on wider commercial factors such as the cost of heat pumps and the successful commercialisation of hydrogen to heat buildings developing at sufficient pace to meet this deployment pathway.	Work has started on expansion to other sectors and a consultation will be required, with data collection and small pilots for each sector. Further appraisal of options is underway as part of the Hy4Heat programme.

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127	Buildings	Hydrogen heating deployment - "Medium Hydrogen" Scenario Only	Part of the "medium hydrogen" scenario in which hydrogen makes up a medium proportion of the mix of clean heat technology.  Convert the gas grid to handle hydrogen for heat (domestic & non-domestic) required in medium hydrogen scenario, in order for hydrogen heating to contribute to the replacement of the incumbent technology of natural gas for heating to deliver carbon savings.	0.000	0.5	5.0	2030	The use of hydrogen for heat is not yet a fully established technology. There is uncertainty on the carbon savings associated with hydrogen heating policy until evidence has been assessed and strategic policy decisions made in 2026. Uncertainty reflects that any deployment of hydrogen for heating is subject to the strategic decisions in 2026.	The government is working with industry and regulators to support a range of research, development and testing projects, including pioneering hydrogen heating consumer trials. This work will determine the feasibility, costs and convenience of using hydrogen as an alternative to natural gas for heating, to allow strategic decisions in 2026 on the role of hydrogen heating. The high electrification scenario provides alternative decarbonisation scenario should we conclude no hydrogen heat deployment.
128	Buildings	Additional On Gas Grid Heat Pumps (2029 to 2037) - "Medium Hydrogen" Scenario Only	Part of the "medium hydrogen" scenario in which hydrogen makes up a medium proportion of the mix of clean heat technology.	0.000	2.7	10.3	2029	The deployment of heat pumps beyond 2028 will depend on wider commercial factors such as the cost of heat pumps and the successful commercialisation of hydrogen to heat buildings developing at sufficient pace to meet this deployment pathway.	Work has started on expansion to other sectors and a consultation will be required, with data collection and small pilots for each sector. Further appraisal of options is underway as part of the Hy4Heat programme.
129	Domestic Transport	Accelerated Transition to Zero Emission Cars	The zero emissions vehicle (ZEV) mandate will set targets for a percentage of manufacturers' new car sales to be zero emission each year from 2024; alongside regulations that will require non-ZEV emissions to not worsen.	0.3	5.1	16.0	2024	Policy is progressing in line with expectations, but delivery of full projected savings is dependent on timely roll-out of regulation, sufficient uptake of zero emission cars and the rollout of enabling infrastructure across the UK.  Under delivery in any area, including slower uptake of zero emission vehicles by consumers, may lead to a slower than anticipated fleet turnover and extended on-the-road usage of the existing internal combustion engine fleet, reducing anticipated emissions savings.	The ZEV mandate has been developed in close consultation with industry and designed to deliver ambitious emissions savings. Alongside this, the Department has committed significant funding to support the transition to zero emission vehicles. Over £2bn has already been spent on reducing the purchase price of zero emission vehicles and deployment of charging infrastructure.  Future funding for charging infrastructure will primarily be available through the Local Electric Vehicle Infrastructure (LEVI) Fund and the Rapid Charging Fund.

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								DfT is also progressing policies to improve consumer experience of public charging.	
130	Domestic Transport	Accelerated Transition to Zero Emission Vans	The ZEV mandate will set targets for a percentage of manufacturers' new van sales to be zero emission each year from 2024; alongside regulations that will require non-ZEV emissions to not worsen.	0.6	3.5	7.4	2024	<p>Policy is progressing in line with expectations, but delivery of full projected savings is dependent on timely roll-out of regulation, sufficient uptake of zero emission vans, and the rollout of enabling infrastructure across the UK.</p> <p>Under delivery in any area may lead to a slower than anticipated fleet turnover and extended on-the-road usage of the existing internal combustion engine fleet, reducing anticipated emissions savings.</p>	<p>The ZEV mandate has been developed in close consultation with industry and designed to deliver ambitious emissions savings.</p> <p>Alongside this, the Department has committed significant funding to support the transition to zero emission vehicles. Over £2bn has already been spent on reducing the purchase price of zero emission vehicles and deployment of charging infrastructure.</p> <p>Future funding for infrastructure will primarily be available through the Local Electric Vehicle Infrastructure (LEVI) Fund and the Rapid Charging Fund. DfT has also confirmed the Plug in Van Grant until at least 2024/25.</p>
131	Domestic Transport	Accelerated Transition to Zero Emission Medium- and Heavy-Goods Vehicles (MHGVs)	The policy comprises a range of measures to support UK road freight's transition to net zero, including removing barriers to the uptake of zero emission medium and heavy goods vehicles, the Zero Emission Road Freight Demonstrator programme, financial incentives, and updating and introducing MHGV regulation aimed at delivering the 2035 phase out date for the sale of new, non-zero emission MHGVs 26 tonnes and under, and increased support for uptake in the interim.	0.1	1.6	5.4	2026	<p>Progressing in line with expectations, but delivery of full projected savings is dependent on successful implementation of regulation and demonstration of zero emission technologies. Also dependent on the rollout of sufficient enabling recharging and refuelling infrastructure, and will be further enabled by incentives to reduce up-front purchase price of zero emission alternatives.</p> <p>Under delivery in any area may lead to a slower than anticipated fleet turnover and extended on-</p>	<p>HGV phase out dates will be supported by a regulatory framework, currently under consideration.</p> <p>DfT will build on the success of the Zero Emission Road Freight Trials Feasibility Studies and demonstrate new HGV technologies through the Zero Emission Road Freight Demonstrator Programme.</p> <p>£582m has been announced to continue all plug-in vehicle grants until 2024/25, some of which will act as an incentive to encourage the</p>

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								the-road usage of the existing internal combustion engine fleet, reducing anticipated emissions savings	uptake of zero emission commercial vehicles.
132	Domestic Transport	Accelerated Transition to Zero Emission Buses (ZEBs), Coaches and Minibuses	The policy comprises a range of funding measures to support the ZEB markets, and policy/regulation to ensure in-scope zero emission vehicles are deployed at pace. Funding includes that delivered through the ZEB Regional Area Scheme and the All-Electric Bus City initiative. Following a consultation in Spring 2022, Government will announce an end date for the sale of new non ZEBs in due course. Take further action following recent calls for evidence on the decarbonisation of coaches and minibuses.	-0.001	0.3	0.9	2027	Ongoing funding support is necessary to enable the continued roll out of ZEBs and infrastructure. In time, this will need to be supported by the introduction of an end sale date for sale of new non ZEBs. We consulted on dates between 2025-32, the projected savings could be impacted by a later end sales date being implemented.	In January 2023 DfT Ministers approved £25m in scope increases for 4 existing Zero Emission Bus Regional Area (ZEBRA) projects. This takes funding committed this parliament to £348m.  To support this, we will soon announce the legal end date for sale of new non-zero emission buses. This has been developed following close consultation with industry.
133	Domestic Transport	Accelerated Transition to Zero Emission L-Category Vehicles	End the sale of new non-zero emission light-powered two, three and four wheeled (L-category) vehicles following Government consultation held in 2022.	0.002	0.039	0.1	2026	Delivery of full projected savings is dependent on timely roll-out of regulation, sufficient uptake of zero emission L-category vehicles, and the rollout of enabling infrastructure across the UK. Under delivery in any area, including slower uptake of zero emission L-category vehicles by consumers, may lead to a slower than anticipated fleet turnover and extended on-the-road usage of the existing internal combustion engine fleet, reducing anticipated emissions savings.	A Government consultation on when to end the sale of new non-zero emission L-category vehicles ran from 14 July to 21 September 2022.  This will help inform the end of sale date for new non-zero emission L-category vehicles.
134	Domestic Transport	Accelerating fleet turnover	This proposal requires further development. There are a number of potential national and local policy levers that could encourage vehicle owners to move towards cleaner vehicles faster than currently	0.000	2.6	3.6	CB5	The proposal is at the earliest stage of conception and requires further appraisal of options. As a result there is uncertainty as further development of potential	Uncertainty is inevitable pending further policy development to explore policy options. Mitigation measures to address delivery risks will be explored at the same time as policy development and Ministers

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			anticipated should this be required to stay on track to meet carbon budget obligations.					mechanisms to deliver the proposal is needed.	will ensure that reviews are carried out so that any future policy achieves its aims
135	Domestic Transport	Efficiency improvements to ICEV new sales and plug-in hybrid electric vehicle (PHEV) fleet	This proposal requires further development. PHEV performance could be improved through targeted technological improvements and changes in real-world use. We will consider different levers that could bring about such improvements, should this be required to stay on track to meet carbon budget obligations. Current projections assume limited improvements in the CO2 performance of internal combustion engine vehicles in the period of the ZEV mandate. Policy measures could be developed to incentivise consumers to opt for more fuel efficient (and lower CO2) petrol and diesel vehicles during this period.	0.000	0.5	1.0	CB5	The proposal is at the earliest stage of conception and requires further appraisal of options. As a result there is uncertainty as further development of potential mechanisms to deliver the proposal is needed.	Uncertainty is inevitable pending further policy development to explore policy options. Mitigation measures to address delivery risks will be explored at the same time as policy development and Ministers will ensure that reviews are carried out so that any future policy achieves its aims
136	Domestic Transport	Increasing average road vehicle occupancy	This proposal requires further development. We will consider measures that could reverse recent trends in declining average road vehicle occupancy, bringing the UK more in line with comparable countries and reducing overall vehicle miles travelled, should this be required to stay on track to meet carbon budget obligations	0.000	0.5	0.7	CB5	The proposal is at the earliest stage of conception and requires further appraisal of options. As a result there is uncertainty as further development of potential mechanisms to deliver the proposal is needed.	Uncertainty is inevitable pending further policy development to explore policy options. Mitigation measures to address delivery risks will be explored at the same time as policy development and Ministers will ensure that reviews are carried out so that any future policy achieves its aims
137	Domestic Transport	HGV and van logistics	This proposal requires further development. We will consider ensuring more support is available for HGV and van drivers to reduce total fuel used by HGV fleets, should this be required to stay on track to meet carbon budget obligations.	0.000	1.1	1.5	CB5	The proposal is at the earliest stage of conception and requires further appraisal of options. As a result there is uncertainty as further development of potential mechanisms to deliver the proposal is needed.	Uncertainty is inevitable pending further policy development to explore policy options. Mitigation measures to address delivery risks will be explored at the same time as policy development and Ministers will ensure that reviews are carried out so that any future policy achieves its aims

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138	Domestic Transport	Greater decarbonisation of the rail network	This proposal requires further development. We will consider decarbonisation of the rail network beyond currently funded electrification schemes through additional electrification and deployment of alternative traction trains, should this be required to stay on track to meet carbon budget obligations and subject to future Spending Reviews.	0.008	0.058	0.2	CB5	The proposal is at the earliest stage of conception and requires further appraisal of options. As a result there is uncertainty as further development of potential mechanisms to deliver the proposal is needed.	Uncertainty is inevitable pending further policy development to explore policy options. Mitigation measures to address delivery risks will be explored at the same time as policy development and Ministers will ensure that reviews are carried out so that any future policy achieves its aims
139	Domestic Transport	Reduced Use of Urea and Liquid Petroleum Gas	This policy is not additional - these emissions savings result from other measures indirectly reducing the use of urea and liquid petroleum gas in road vehicles.	0.036	0.1	0.3	2024	This policy is not additional - these emissions savings result from other measures indirectly reducing the use of urea and liquid petroleum gas in road vehicles.	
140									
141	Domestic Transport	Domestic Aviation Decarbonisation	Domestic aviation policy aligned with policy for international aviation, including rapid scale up of the use of Sustainable Aviation Fuels, introduction of zero emission aircraft from 2035, continued improvements in efficiencies of our airspace, aircraft and airports and carbon pricing. (See International Aviation section for more detail.)	0.029	0.093	0.2	2030	<p>Dependent on technology development in line with ambitious Jet Zero Strategy trajectory, particularly for zero emission flight.</p> <p>Feedstock availability is a key dependency to supply necessary quantities of SAF. Increased global demand for biomass could impact the deliverability of these projected savings. Upscaling of SAF use also dependent on industry willingness to invest in innovative technology.</p>	<p>DfT is working with DBT, HMT and industry (including through the Jet Zero Council) to ensure investment in aviation and aerospace is strongly focused on decarbonisation, with measurable outcomes. Funding schemes have supported aviation decarbonisation, including the Zero Emission Flight Infrastructure Project.</p> <p>Following publication of the Government response to the Developing UK ETS consultation, DfT will continue to consider how UK ETS can incentivise use of SAF. DfT continues to work with industry on options to further support the UK SAF industry and is working closely across Government to coordinate the approach to feedstocks.</p>

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								DfT has commissioned research to explore viable pathways towards achieving the Jet Zero Strategy's net zero 2040 target for domestic aviation. The research will also identify barriers to consider. DfT will continue its work by publishing a Call for Evidence later this year.	
142	Domestic Transport	High Annual Investment in Cycling and Walking Infrastructure and Policy	The second statutory Cycling and Walking Investment Strategy (CWIS2) and the Government's Gear Change Plan include delivery of a range of capital and revenue funded projects to enable more cycling and walking in line with the July 2021 Transport Decarbonisation Plan commitment to 'deliver a world-class cycling and walking network in England by 2040'.	0.045	0.1	0.2	2020	Local Authority Capability and Capacity may impact their ability to deliver investment in cycling and walking. Delivering the projected savings is therefore dependent on LAs being able to address this.	Active Travel England has been established. It will help local authorities develop and deliver feasible and high-quality projects with existing funding.  The Government remains committed to investing in active travel, with around £3bn committed up to 2025.
143	Domestic Transport	Maritime Decarbonisation Across Vessels and Ports	The 'Course to Zero' consultation will inform development of indicative decarbonisation targets and policy interventions. We have consulted on expanding the UK ETS to domestic shipping and will publish a government response in due course. R&D funding is being delivered through the £206m UK Shipping Office for Reducing Emissions (UK SHORE) programme, including the Clean Maritime Demonstration Competition and the Zero Emission Vessels and Infrastructure (ZEVl) competition.	0.020	0.3	3.0	2022	Delivery is dependent on successful implementation of regulation and demonstration of technologies. There is still uncertainty around which technologies should be pursued.  Evidence gaps in relation to maritime emissions and decarbonisation solutions will need to be closed.	Funding schemes under UK SHORE will support essential R&D, including competitions such as the Clean Maritime Demonstration Competition and the Zero Emission Vessels and Infrastructure competition.  DfT will publish the refreshed Clean Maritime Plan in 2023, supporting policy development and mitigating potential risks.  DfT is working with analytical experts, industry, academic stakeholders, and the wider science and technology community to identify and fill evidence gaps. This is alongside the commissioning of high-quality research.

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144	Domestic Transport	Rail Electrification Schemes	This policy includes electrification of the Transpennine Route Upgrade (due for completion 2036-41), the Midland Mainline to Sheffield and Derby (completion date TBC), and the Wigan-Bolton line (due for completion 2024).	0.003	0.071	0.1	2024	Maintaining funding is essential to delivery of these schemes.	The electrification of the Transpennine Route, the Midland Mainline to Sheffield and Derby, and the Wigan-Bolton line are all existing commitments with allocated funding.
145	IAS	International Maritime Decarbonisation	Pursue the ambitious emission reduction strategy and targets agreed at the International Maritime Organization (IMO) in 2018. The UK Government is playing a leading role in calling for even greater ambition during negotiations at the IMO.	0.047	0.4	3.2	2022	There is the risk that lack of global appetite hampers progress to secure an ambitious IMO GHG strategy.	We are working collaboratively with other high ambition States to secure support and we are applying the UK's international influence through all available channels to secure the most ambitious possible agreements through the International Maritime Organization (IMO).
146	Domestic Transport	Aircraft Support Vehicle Decarbonisation	This policy is not additional but is linked to delivery of the Government's target for airport operations in England to be zero emission by 2040.	0.017	0.2	0.4	2026	Time and cost requirements to implement technology change may prevent zero carbon airport operations by 2040.	Research commissioned by DfT shows that our target of zero emission airport operations by 2040 is feasible with the correct commercial model and incentives.  We are working with stakeholders to create an achievable strategy and a call for evidence on our zero emission airport operations target was published in February.
147	IAS	Increasing the Take Up of Sustainable Aviation Fuels	Promote the rapid scaling up of Sustainable Aviation Fuels (SAFs) in the aviation sector, in line with the high ambition scenario detailed in the Jet Zero Strategy, through the introduction of a SAF mandate. This policy will be supported by measures such as the £165m Advanced Fuels Fund and ongoing discussions with industry on action to tackle barriers to the production and use of SAF.	0.9	2.7	3.8	2025	Continued policy and funding support is necessary to support investment in increased production and uptake of SAF and to contribute to delivery against high ambition scenarios.  Feedstock availability is a key dependency to supply necessary quantities of SAF. Increased global demand for biomass could impact the deliverability of these projected savings.	The SAF mandate itself will provide a level of price support to industry, although it cannot stipulate UK production. Funding support has been provided through the £165m Advanced Fuels Fund, supplying capital funding to help projects progress towards commercialisation in the UK and access further private investment.  There is ongoing policy development to address remaining barriers to investment in the UK, which will help large scale SAF production reach a commercial level and overcome

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								<p>market failures. Following further stakeholder engagement through the Jet Zero Council, if required, we plan to launch a consultation on potential revenue certainty mechanisms for SAF that could support a UK industry in summer in 2023.</p> <p>There is also ongoing dialogue across Government and with industry on a coordinated approach to feedstocks.</p> <p>The UK is fully engaged in the work of the International Civil Aviation Organization to increase use of SAF globally, in line with the new global net zero 2050 target and in preparation for a major ICAO alternative fuels conference in Autumn 2023.</p>	
148	IAS	Zero Emission Flight (ZEF) from 2035	Introduction of zero emission aircraft from 2035 in line with the high ambition scenario detailed in the Jet Zero Strategy. Government is promoting development of ultra-low and zero emission technologies through its funding to the Aerospace Technology Institute Programme.	0.000	0.000	0.1	2035	<p>Zero emission flight technology is at an early stage of development and delivery of this ambition will be challenging. The availability of low carbon hydrogen at scale from 2030 onwards is likely to be critical.</p>	<p>A Zero Emission Flight Delivery Group of the Jet Zero Council has been established to help develop and deploy zero emission technologies. The Government is also providing funding to the Aerospace Technology Institute Programme between 2022-2025 for the development of ultra-low and zero emission technologies.</p>
149	IAS	High Fuel Efficiency Savings in Operational Aircraft	Promote continued improvements in efficiencies of airspace, aircraft and airports as set out in the Jet Zero Strategy. Government is providing funding to support airspace modernisation and is promoting development of ultra-efficient aircraft technologies through its funding to the Aerospace Technology Institute Programme.	-0.003	0.3	1.3	2027	<p>Achieving a step up in fuel efficiency improvement may be challenging if the sector cannot provide sufficient investment. For example, if airlines cannot afford to invest in modernising their fleets, if airports cannot invest in modernisation of their airspace, or if the aerospace sector cannot</p>	<p>Government is supporting airspace modernisation through £9.2m of funding between 2020-2023 and the development of ultraefficient aircraft technologies through £685m funding to the Aerospace Technology Institute Programme between 2022-2025.</p>

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								afford to invest in creating the necessary aircraft advancements.	
150	IAS	Carbon Pricing in Aviation	Introduce carbon pricing through the UK Emissions Trading Scheme and Carbon Offsetting Reduction Scheme for International Aviation (CORSIA) to incentivise in-sector reduction of emissions (e.g. through fuel efficiency, uptake of sustainable aviation fuels and zero emission flight). Carbon pricing assumptions in line with the high ambition scenario in the Jet Zero Strategy.	0.000	0.000	0.3	2036	<p>The recent success of the 2022 ICAO assembly has maintained the integrity of CORSIA, ensuring that offsetting will begin from 2024.</p> <p>However, continued international cooperation will be required to achieve appropriate carbon prices beyond 2035 when the current CORSIA scheme will end.</p>	<p>DfT is continuing to work with ICAO to influence ambition and further drive the consensus to continue progress.</p> <p>DfT is also working with the UK ETS Authority to respond to the developing UK ETS consultation which will be published in 2023.</p> <p>A second consultation on CORSIA implementation and interaction with the UK ETS will also be launched in 2023. This work will enable legislation for CORSIA to come into force by January 2024.</p>
151	Agriculture and LULUCF	Increase feed analysis and use of precision feeding to not exceed animal requirements.	Precision feeding involves the assessment of animal feed to ensure the composition and volume of feed meets, but does not exceed, animal requirements. This can reduce emissions and emissions intensity by maximising feed utilisation, stabilising fermentation in the stomach, improving animal health, and minimising nutrient excretion in manure. It is expected that industry adoption of precision feeding will increase as a market-led take up of precision feeding is already occurring. The AIC (Agricultural Industries Confederation) maintains a register of accredited feed nutritionists to facilitate this by providing technical advice on best feeding practice. In addition, precision mixing machinery is available for the preparation of mixed rations. The role of Government	0.00186	0.01020	0.02815	2022	Uncertain delivery risk. The policy requires further appraisal of options and uses a technology that is nascent, creating inherent uncertainties and risk. Savings will remain uncertain until innovation / R&D is complete. Innovation will need to provide evidence that increases confidence in technical feasibility.	All measures would need sufficient R&D investment through the Farming Innovation Programme or other means. Delivery levers will need to be identified to ensure necessary levels of uptake.

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				CB4	CB5	CB6			
			is in supporting and accelerating the take up of precision feeding. The Government will provide funding under the Farming Innovation Programme, which could support the development of technology related to precision feeding,						
152	Agriculture and LULUCF	Use of methane suppressing feed products (e.g. 3NOP, nitrate additives) to reduce methane emissions from livestock.	Methane-suppressing feed products (for example 3NOP, nitrate additives) within feed rations to reduce the amount of methane produced by ruminant livestock (e.g. cattle). Food Standard Agency (FSA) and Food Standards Scotland (FSS) are responsible for the authorisation process of feed additives in Great Britain. We will continue to work with the FSA and FSS, industry and the sector to explore suitable policy options to encourage rapid and extensive uptake of methane suppressing feed products with proven safety and efficacy, including exploring mandating methane suppressing feed products in compound feed for cattle in England. We have already published research on these products and recently ran a call for evidence on methane suppressing feed products to better understand the opportunities and challenges associated with their use. This will inform our next steps to encourage the extensive update of methane suppressing feed products.	0.9	1.6	1.6	2022	Uncertain delivery risk. The policy uses a technology that is nascent, creating inherent uncertainties and risk and policy requires further appraisal of options.	Next steps are to maximise outputs from the Call for evidence which closed in November 2022. Analysis of call for evidence responses will help identify options to mitigate risks and overcome barriers, and inform next steps through wider policy development throughout 2023. Defra officials are reviewing options to deliver this policy, including through regulatory intervention, voluntary industry led schemes, and incentives.
153	Agriculture and LULUCF	Use of conventional breeding practices (not genomics or gene editing) to breed cattle that have reduced emissions.	Using conventional production focussed breeding metrics such as Estimated Breeding Value (EBV – which do not require gene editing or genetic modification) reduces emissions intensity in cattle, without compromising welfare or fertility. This	0.01117	0.04487	0.1	2022	Uncertain delivery risk. The policy requires further appraisal of options. Delivery vehicle needed.	Competitions in the Farming Innovation Programme are developing this technology and equipment. The measure is ready for further rollout. A subsequent delivery vehicle is to be identified in discussion with industry.

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				CB4	CB5	CB6			
			process allows the identification of desirable genetic effects in individuals and enables cattle to be bred with lower rates of intestinal methane production. Continuing market-led uptake from farmers is expected. Ongoing research and development to improve breeding metric and measures such as funded annual animal health and welfare visits (to support improved fertility and reproduction rates) are expected to support that uptake.						
154	Agriculture and LULUCF	Increased milking frequency (using robotic milking systems not hormones).	Funding provided through Farming Investment Fund can help facilitate an increase in the rate of milk production, without the use of hormones, by moving from milking twice a day to three times a day, such as by supporting farmers to install robotic milking parlours and make changes to stock management (e.g., keeping cattle closer to the milking parlour).	0.00726	0.02707	0.07093	2022	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development.	Further evidence required could be explored in the Farming Innovation Fund. Farmers are currently able to apply for grants through the Improving Farm productivity theme of the farming transformation fund (e.g., Improve farm productivity using robotic or autonomous equipment & systems to aid crop and livestock production).
155	Agriculture and LULUCF	Multi-purpose breeds or multi-use of cows - (milk, calves and meat).	Monitor current market-led initiatives to increase integration of beef and dairy production chains (via dual purpose breeds or increasing use of dairy/beef cross calves) explore government's potential role and policy options to support delivery of this measure should the market-led response not meet the required uptake levels or emissions savings.	0.06434	0.2	0.6	2022	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development. The policy requires further appraisal of options - an approach to incentivising the measure will need to be identified, unless market forces are sufficient to drive action at the scale required.	A proportion of the sector is willing to make these changes. There are two main streams of work: (1) engage with the dairy and beef sectors and breeding societies to gauge appetite and technical suitability of breeds and (2) assess the role of markets (Industry has started to trial this). Defra are looking to commission a research project to better define this action. We will consider policy solutions, working with sector policy teams to understand the role of the market and supply chain commitments in influencing uptake of this measure, and to be better informed by the conclusions of the research.

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				CB4	CB5	CB6			
156	Agriculture and LULUCF	Reducing emissions from cattle by improving animal health, delivered through tackling endemic disease.	This measure is part of Defra's Animal Health and Welfare Pathway (launched in 2022 to support the gradual and continual improvement in farm animal health and welfare) and will be delivered through the in-development disease eradication programme focusing on Bovine Viral Diarrhoea (BVD) in England. Testing for BVD is also part of the recently launched Sustainable Farming Incentive Annual Health and Welfare Review which is the first step on the Pathway to improving the health of cattle herds across England.	0.02945	0.1	0.3	2022	Unclear how much further could go in different policy scenarios. These risks require attention, however they appear resolvable based on the actions already underway.	The Animal Health and Welfare team are undertaking a further evidence review of improving animal health to understand if and how much further we could potentially go in terms of carbon savings under different policy scenarios. Through our monitoring and evaluation programme we can track who is doing the action and where. We can then combine this with our environmental impact modelling to track live trajectories.
157	Agriculture and LULUCF	Reducing emissions from sheep by improving animal health, delivered through tackling endemic diseases.	This measure is part of Defra's Animal Health and Welfare Pathway (launched in 2022 to support the gradual and continual improvement in farm animal health and welfare) and will be delivered through the in-development disease reduction programme focusing on a range of diseases and conditions in sheep in England. Improving health of sheep can reduce emissions intensity by improving the efficiency of livestock production, through improved fertility, reducing mortality and morbidity. The recently launched Sustainable Farming Incentive Annual Health and Welfare Review will also improve sheep health by providing funding to test the effectiveness of worming treatments.	0.00591	0.02260	0.06066	2022	Unclear how much further could go in different policy scenarios. These risks require attention, however appear resolvable based on the actions already underway.	The Animal Health and Welfare team are undertaking further evidence review of improving animal health to understand if and how much further we could potentially go in terms of carbon savings under different policy scenarios. Same for all ELM actions - we have uptake forecasting and environmental impact modelling prior to release, and through our monitoring and evaluation programme can track who is doing the action and where, which we can combine with our environmental impact modelling to track live trajectories.
158	Agriculture and LULUCF	Using genetic testing (genomic tools) to develop improved livestock breeding goals and deliver permanent low emissions traits.	The measure involves improving breeding, using genetic testing (genomic tools), to ensure that breeding goals involve some low carbon traits. The measure involves farmers collecting performance information on the individual animals and genetic testing and feeding back	0.00019	0.00082	0.00339	2035	We have high certainty in the delivery of this policy and its enabling impacts on other policies. Further evidence and policy development required. Not projected to make a significant contribution by CB6. Potentially sensitive - will require	Evidence and policy development needs being explored in Farming Innovation Programme - Gene editing/modern breeding techniques are in scope of all competitions in the FIP.

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			<p>this information to help with breeding goal development (the goals include lower methane emissions). Competitions in Defra's Farming Innovation Programme (FIP) are developing this measure ahead of further refinement of policy measures. NB. This measure shows carbon savings starting before the start date. While Government action or support to deliver implementation at pace may not yet be in place, there is existing, market led, uptake across sectors to deliver emission reductions. Additionally due to the significant lead in time for the projected savings to start, and the modelling system used, there may be minor emissions savings before the anticipated start year, e.g. due to proactive and engaged farmers and land managers taking steps themselves, ahead of policy.</p>					a shift away from economic breeding indices.	
159	Agriculture and LULUCF	Covering slurry tanks with a retrofitted, permeable cover.	<p>Regulations to mandate retrofitting slurry tanks with a permeable cover will reduce both methane and ammonia emissions, subject to consultation. In the short term, focus is on improving compliance and supporting take up through e.g., Countryside Stewardship slurry grants. NB. This measure shows carbon savings starting before the start date. While Government action or support to deliver implementation at pace may not yet be in place, there is existing, market led, uptake across sectors to deliver emission reductions. Additionally due to the significant lead in time for the projected savings to start, and the modelling system used, there may be minor emissions savings before the anticipated start year, e.g.</p>	0.00003	0.00015	0.00043	2027	<p>We have high certainty in the delivery of this policy and its enabling impacts on other policies. A small retrofitting offer is currently available under the Countryside Stewardship Capital Grants. Projected uptake for the scheme (heavily caveated that this requires quality assurance and as such is subject to change) suggests in excess of 50% of specialised pig and dairy holdings in England (based off 2021 farming stats data) having upgraded slurry storage and covers by 2029.</p>	<p>Next steps are to confirm whether this will be included in the Farming Innovation Fund. Expected to be fully covered in future years when rollout is expanded. Uptake is not required to start until 2027. Will track uptake.</p>

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			due to proactive and engaged farmers and land managers taking steps themselves, ahead of policy.						
160	Agriculture and LULUCF	Covering slurry tanks with a retrofitted, impermeable cover.	Regulations to mandate retrofitting slurry tanks with an impermeable cover to reduce both methane and ammonia emissions. . In the short term, focus is on improving compliance and supporting take up through e.g. grants provided through Farming Investment Fund Slurry Infrastructure Grant and Countryside Stewardship capital grants for slurry stores. NB. This measure provides shows carbon savings starting before the start date. While Government action or support to deliver implementation at pace may not yet be in place, there is existing, market led, uptake across sectors to deliver emission reductions. Additionally due to the significant lead in time for the projected savings to start, and the modelling system used, there may be minor emissions savings before the anticipated start year, e.g., due to proactive and engaged farmers and land managers taking steps themselves, ahead of policy.	0.00991	0.05521	0.2	2023	We have high certainty in the delivery of this policy and its enabling impacts on other policies. Projected uptake for the scheme (heavily caveated that this requires quality assurance and as such is subject to change) suggests in excess of 50% of specialised pig and dairy holdings in England (based off 2021 farming stats data) having upgraded slurry storage and covers by 2029.	Next steps are to track uptake.
161	Agriculture and LULUCF	Analyse manure prior to application to match crop requirements.	Analysing the nitrogen content of slurry, prior to application on crops and grassland, can improve nutrient management, ensuring nitrogen applications do not exceed crop requirements to minimise emissions of nitrous oxide (N2O). Increasing industry adoption is expected as part of a market-led take up of precision farming that is already occurring. Government will work with industry to identify the most appropriate	0.00008	0.00032	0.00096	2022	Delivery risk uncertain. Requires further analysis of actions under SFI to help deliver this.	Identify whether the actions encouraged under the SFI (particularly advisor visits) will partly mitigate delivery risks.

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			mechanisms for change. We expect the Sustainable Farming Incentive (nutrient management standard) to contribute indirectly to this outcome.						
162	Agriculture and LULUCF	Integrating grass/herbal leys in rotation in arable systems.	Leys are temporary grasslands made up of legume, grass and herb species. Diversification of arable cropping systems with grass/herbal leys can increase the positive effects of rotation practices. This measure reduces greenhouse gas emissions and emissions intensity by improving soil organic matter leading to positive impacts on crop yield, soil structure, resistance to erosion losses and could reduce nitrogen fertilizer application. Grass leys are also likely to reduce nitrogen leaching from the soil. This is included in the Sustainable Farming Incentive SFI (soils standards for SFI 2022). Once land is entered into the standard, the Government will pay for the integration of multi-species cover crops including a mix of legume, grass and herb species. NB. This measure shows carbon savings starting before the start date. While Government action or support to deliver implementation at pace may not yet be in place, there is existing, market led, uptake across sectors to deliver emission reductions. Additionally due to the significant lead in time for the projected savings to start, and the modelling system used, there may be minor emissions savings before the anticipated start year, e.g. due to proactive and engaged farmers and land managers taking steps themselves, ahead of policy.	0.00306	0.01310	0.04779	2024	We have high certainty in the delivery of this policy and its enabling impacts on other policies. Already incorporated into ELM.	Track uptake to confirm whether we have sufficient numbers to achieve savings.

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163	Agriculture and LULUCF	Avoiding use of Nitrogen in excess through the development of an agronomist led nutrient management plan.	Support the use of nutrient management plans and manure management plans across the farming sector. To optimise the use of nitrogen and avoid excess application. Positive impacts include reduced Greenhouse Gas emissions from synthetic fertilisers and reduced energy use and leaching of nitrogen from the soil. This is included in the Sustainable Farming Incentive SFI (soils standards for SFI 2022, nutrients standard for 2023, and low/no input grassland standard for 2023) and is also partially covered by the Farming Rules for Water and Nitrate Vulnerable Zones regulations.	0.00144	0.00779	0.02102	2022	We have high certainty in the delivery of this policy and its enabling impacts on other policies.	SFI 23 could partially help minimise the risk of excess nitrogen application through greater awareness and education via the annual FACTS qualified adviser visit. We are also looking at rewarding grassland farmers to use more natural nitrogen fixing crops to reduce the demand for nitrogen fertiliser inputs. We have commissioned a project to develop a new online, free to user, nutrient management planning tool (to be launched 2025) which also aims to improve uptake of nutrient management planning. Market forces (i.e. current price of nitrogen fertiliser) will impact applications of N fertilizers and potentially drive increased efficient use of nitrogen.
164	Agriculture and LULUCF	Improved crop health through improved pest and disease control practices.	Support improve crop health to increase yield quality and reduce yield losses, through the Sustainable Farming Incentive SFI Integrated Pest Management actions and the Farming Innovation Programme. This reduces emissions through a reduced need for control agents, such as pesticides, and activities such as fuel used during pesticide application.	0.00035	0.00140	0.00433	2022	We have high certainty in the delivery of this policy and its enabling impacts on other policies.	We need to confirm the extent to which we expect the savings total to be covered by SFI Integrated Pest Management actions.
165	Agriculture and LULUCF	Improved farm fuel and energy efficiency.	Support reductions in farm non-traded carbon dioxide (CO2) emissions from motive power, pumps and drives. Actions include, amongst others, the use of minimum till, which can cultivate the land using mechanical measures other than ploughing to reduce soil disturbance, and the use of no till, which uses direct drilling methods instead of cultivation machinery, thereby reducing fuel emissions.	0.1	0.3	0.6	2022	Uncertain delivery risk. The policy requires further appraisal of options. Future work needed to consider existing roll out of technologies and the steps required to deliver additional savings in this area.	Competitions in FIP are developing this technology and equipment. Next steps will involve monitoring what is coming out of FIP, and what is being paid for under FIF, and also to build a more detailed picture with a view to developing a list of specific measures (e.g., efficiency in fuel use and farm buildings energy efficiency, energy saving technologies), and consider future delivery vehicles. A DESNZ led call for evidence on Non-Road

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			Currently competitions in the Farming Innovation Programme (FIP) are developing this technology and equipment (for example electrified tractors and utility vehicles, the use of robots and low energy motors) and the Farming Investment Fund (FIF) is providing grants towards the purchase of relevant equipment.					Mobile Machinery (NRMM) is currently planned for 2023. This would aim to identify possible savings opportunities for agricultural machinery for through fuel switching and technological improvement.	
166	Agriculture and LULUCF	Biological fixation of nitrogen on grassland using grass-legume mixtures.	Increasing the inclusion of clover into pasture areas and ensuring the proportion of clover in the mixed grassland to at least 20%. Clover captures atmospheric nitrogen which is made available to pasture, reducing mineral fertiliser requirements and associated nitrous oxide (N2O) emissions. We are already seeing farmer led movement to more biological and on farm solutions to nutrients. Government will accelerate wider adoption t by funding these actions through the Sustainable Farming Incentive (soils standards for SFI 2022 nutrients standard for SFI 2023) and Countryside Stewardship (GS4 Legume and herb-rich swards). We have conducted done co-design pilots, tests and trials with more than 5,000 farmers and other people, plus several stakeholder organisations since 2019. We plan to continue this in 2023. We've also created a single landing page on GOV.UK on funding for farmers.	0.02198	0.1	0.3	2022	We have high certainty in the delivery of this policy and its enabling impacts on other policies. This will be delivered by Countryside Stewardship and ELM: CS GS4 – Legume and herb-rich swards; SFI23 nutrients standard.	Next steps are to review the role of ELM and wider levers necessary to achieve desired levels of uptake (e.g. regulation). We will continue to develop options to consider how to maximise uptake/ carbon savings. This will involve reviewing Defra land use surveys, census and farm practice surveys to establish the baseline and working with British Grassland Society to understand what is realistic.
167	Agriculture and LULUCF	Reseeding temporary pasture/forage crops with high sugar grass varieties.	Reseeding temporary pasture/forage crops with high sugar grass varieties. High sugar grasses have the potential to increase livestock's nitrogen usage efficiency. This reduces nitrogen lost through livestock urine and subsequent	0.00337	0.01856	0.05139	2022	Uncertain delivery risk. The policy requires further appraisal of options. While it is not possible to monitor/verify whether these are being used (they do not look different from	Next steps are to explore options for paying for higher sugar grasses and establish what we would/could pay for.

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			emissions to the environment. Government is considering the role in, and options for encouraging the reseeded of temporary pasture/ forage crops with high sugar grass varieties.					other varieties), it is possible that we could pay towards the cost of seed and that advice provided under SFI may encourage farmers to take up this measure.	
169	Agriculture and LULUCF	Use of plant biostimulants to promote growth and reduce emissions.	Use of plant biostimulants to promote growth and reduce emissions. Plant biostimulants are plant or soil additives that contain substances (microbial and non-microbial) that stimulate natural plant processes and can reduce greenhouse gas emissions intensity by increasing yield. Biostimulants may offer these productivity and resilience gains by enhancing nutrient uptake, nutrient efficiency, tolerance to environmental stress and crop quality. Regulation is in development to set consistent products standards. The evidence on the efficacy of Biostimulants is mixed, and so further research is required to allow for it to be integrated into the Sustainable Farming Incentive. Defra's Farming Innovation Programme (FIP) and agri-food evidence programme are developing evidence on novel fertilising products. NB. This measure shows carbon savings starting before the start date. While Government action or support to deliver implementation at pace may not yet be in place, there is existing, market led, uptake across sectors to deliver emission reductions. Additionally due to the significant lead in time for the projected savings to start, and the modelling system used, there may be minor emissions savings before the anticipated start year, e.g. due to proactive and engaged farmers and	0.00008	0.00037	0.00152	2030	We need to understand more on the impact on soil biology. Due to the need for further research and development of biostimulants it is assumed they would not see uptake until 2030 (10 year lead in time from 2020). This further development is needed as there is limited evidence on their effects, and this drives the lack of uptake. These risks require attention, however appear resolvable based on the actions already underway.	Call for Evidence being launched this year. At a later stage, the Future Farming and Countryside Programme (FFCP) would look at potential use and any farm specific advice required. Fertiliser regulatory reform from 2023 will also include scope to include more novel products such as biostimulants from later in 2020s. Defra has commissioned evidence to look at inhibitors/biostimulants as we currently lack evidence on impacts to soil.

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			land managers taking steps themselves, ahead of policy.						
170	Agriculture and LULUCF	Use of nitrification Inhibitors (chemical additives to fertilisers) to reduce nitrous oxide emissions.	Nitrification inhibitors are chemical additives that inhibit or delay biochemical processes that give rise to Greenhouse Gas emissions from fertiliser breakdown. Evidence is not yet robust enough on the case for direct Government intervention. While nitrification inhibitors are currently available on the market, further research and evidence is needed for example on impacts and application rates. Defra's Farming Innovation Programme (FIP) and agri-food evidence programme are developing evidence on novel fertilising products to inform future policy and regulation development.	0.00646	0.02564	0.07833	2022	We have high certainty in the delivery of this policy and its enabling impacts on other policies. Further research needed.	Defra are planning to commission a research project to develop the evidence base.
171	Agriculture and LULUCF	Reversing, reducing and preventing surface and subsoil soil compaction.	Promote reducing and remediating surface and subsoil compaction through the Sustainable Farming Initiative SFI and soil health measures in the Environmental Improvement Plan, alongside regulatory impacts from initiatives such as Farming Rules for Water. Compaction compromises the movement of the movement of air, water and nutrients within soil which can reduce crop yields and increase emissions.	0.02238	0.09603	0.2	2022	No incentives could mean cost may become limiting, and farmers may not see as necessary or feasible. These risks require attention, however appear resolvable based on the actions already underway.	SFI actions and soil health measures in the EIP may make some contribution, we need to explore the possible savings impacts from these measures and from Farming Rules for Water.
172	Agriculture and LULUCF	Improving/renovating land drainage on mineral soils (where drainage is poor).	Produce guidance on improving and renovating current land drainage (where drainage is poor) to improve crop yield and reduce Nitrous oxide (N2O) emissions.	0.00108	0.00447	0.01473	2022	Uncertain delivery risk. The policy relies on further appraisal of options.	We need to confirm the extent to which we expect the small total savings of this measure to be covered by other ELM actions helping with soil drainage. We need to explore how industry/market may encourage this.

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173	Agriculture and LULUCF	Precision Farming (arable/grassland) using machine guidance and other technologies to control and adjust fertiliser application.	Support and accelerate the use of machine guidance (MG) and variable rate nitrogen application technologies (VRNT) in arable and temporary grassland field operations to help farmers reduce overlaps/avoids gaps and adjust the application rate of fertiliser to match need better in that precise location within the field in order to reduce Nitrous oxide (N2O) emissions. Funding is available for technology and equipment to facilitate this measure through the Farming Investment Fund and new innovations are being supported through the Farming Innovation Programme.	0.00559	0.02102	0.06084	2022	We have high certainty in the delivery of this policy and its enabling impacts on other policies. Delivery vehicle not yet confirmed.	Under consideration for inclusion in ELM as a revenue offer to complement capital offers for related technologies that already exist. We need to confirm whether we intend to offer precision farming revenue payments through ELM. (We expect to make a provisional decision on this in the next month).
174	Agriculture and LULUCF	Maintain a soil pH that is optimum for crop or grass growth (e.g., liming).	Support and accelerate adoption of soil analysis for pH and carrying out soil liming (application of magnesium or calcium rich materials to soils) on arable grassland. The application of lime improves the soil pH on land which is below the optimal pH for crop or grass growth. This allows more carbon to be captured below ground through improved productivity and efficient use of nutrients from the soil. This is included in SFI soils standards for 2022, moorland standard for 2022, and nutrients standard for 2023.	0.02316	0.1	0.3	2022	We have high certainty in the delivery of this policy and its enabling impacts on other policies. Several relevant actions in ELM but not direct.	There are several relevant actions in ELM (e.g., nutrients advice and soil assessments) although we are not directly paying people to keep soil at optimum pH level as this would be hard to track. Under the Farming Rules for Water, farmers are required to plan their nutrient applications according to crop need, and one step in this process is checking the soil pH. We also expect discussion around checking soil pH levels and checks on soil analysis to take place as part of the SFI funded FACTS annual adviser visit. We are investigating the impact of this on this measure's emission saving.
175	Agriculture and LULUCF	Cultivating common crop varieties that have better nutrient uptake.	Support and accelerate the adoption of the cultivation of varieties of already common crops in the UK which use nitrogen more efficiently, reducing Nitrous oxide (N2O) emissions. Competitions in Farming Innovation Programme (FIP) are developing this technology and	0.00001	0.00007	0.00039	2034	We have high certainty in the delivery of this policy and its enabling impacts on other policies.	A longer lead in time (10-15 years) is assumed for this measure to allow for R&D of improved crop varieties through a crop breeding programme. We are exploring it in FIP, which is industry led, so we don't have control over what technologies are explored explicitly. We have

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			equipment. In addition, Defra's Genetic Improvement Networks (GINs) aim to improve the main UK crops by identifying genetic traits to improve their productivity, sustainability and resilience. Ongoing work in the Wheat GIN, including annual nitrogen diversity trials, is exploring nitrogen use efficiencies in different wheat varieties. NB. This measure shows carbon savings starting before the start date. While Government action or support to deliver implementation at pace may not yet be in place, there is existing, market led, uptake across sectors to deliver emission reductions. Additionally due to the significant lead in time for the projected savings to start, and the modelling system used, there may be minor emissions savings before the anticipated start year, e.g., due to proactive and engaged farmers and land managers taking steps themselves, ahead of policy.						worked with the FIP team to ensure that we have opportunities to feed in, for example in the 'Sustainable Proteins' theme. In particular, the focus is on improving the efficiency of crops to utilise the N fertiliser. This would mitigate emissions as well as reduce the economic loss of unrecovered nitrogen. We will look to utilise FIF or ELM to support the wider roll out of these improved crop varieties, and the associated procedures, once they have been successfully developed and safely demonstrated.
176	Agriculture and LULUCF	Growing cover crops within a rotation to maintain soil cover during fallow periods.	Support and accelerate adoption of such cover crops to ensure co-benefits (e.g. for nature and water quality, from the capture of carbon and the retention of nutrients) are realised. This is included in Sustainable Farming Incentive arable and horticultural soils standard for SFI 2022 and through Countryside Stewardship (SW6 Winter cover crops).	0.01021	0.05504	0.1	2022	We have high certainty in the delivery of this policy and its enabling impacts on other policies. This measure is already being taken up (based on SFI pilot data).	Track uptake to confirm whether we have sufficient numbers to achieve savings.
177	Agriculture and LULUCF	Hedgerows.	Support farmers to create or restore at least 30,000 miles of managed hedgerows by 2037, increasing to a total of at least 45,000 miles of additional managed hedgerows by 2050 returning hedgerow lengths in England to 10% above the 1984 peak (360,000 miles).. We will also support	0.01800	0.05000	0.09200	2022	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development. We will closely monitor the uptake of ELM schemes to ensure there is enough uptake for delivery..	Defra will encourage and support increased hedgerows through our ELM schemes. We are working with Sustainable Farming Incentive pilot participants to gather learning from the pilots and are incorporating this feedback into the development of the live version of the Hedgerow

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			them to additionally restore degraded hedges across the country. These measures will increase carbon storage and sequestration. We have announced the inclusion of a hedgerow standard in the Sustainable Farming Incentive, expected to roll out in 2023.					Standard and its supporting capital items, which are due to be rolled out into the scheme in 2023.SFI is unlikely to deliver the savings alone but together with CS options it is likely to (for example BN11: planting new hedge, BN5: Hedgerow laying, BN7: hedgerow gapping up).	
178	Agriculture and LULUCF	Agroforestry. A combination of levers aiming to increase silvo-arable agroforestry to 10% of all arable land by 2050.	Agroforestry will be delivered through environmental land management schemes. Indicative launch date for agroforestry standard in Sustainable Farming Incentive is 2024, although this will not be confirmed until nearer the date. These measures will increase carbon storage and sequestration.	0.0000 0	0.01400	0.08800	2029	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development. Agroforestry will mainly be delivered through ELM and is dependent on voluntary uptake of schemes. Data will be limited until the rollout of the agroforestry standard.	Develop strong comms and guidance services on agroforestry systems. Closely monitor uptake of ELM schemes.
179	Agriculture and LULUCF	Increase tree canopy and woodland cover to 16.5% of total land area in England by 2050.	Through the England Trees Action Plan, supported by the Nature for Climate Fund (NCF), we have launched new grants and initiatives to support increased tree planting in England. These include the England Woodland Creation Offer, the Community Forests Trees for Climate Programme and the establishment of Woodland Creation Partnerships in Cornwall and Northumberland. Tree planting and woodland creation was increased in England to c.2,700 hectares in 2021/22. The new environmental land management (ELM) schemes will deliver a large proportion of tree planting funding from 2025, when the NCF is due to end. Future woodland creation grants in ELM will mirror the EWCO. Landscape Recovery will support major landscape-scale afforestation projects where these deliver a wide range of environmental	- 0.0078 0	0.05240	0.3	2028	There are delivery risks with tree planting because our trajectory is ambitious; these include sector capacity, supply keeping up with planting rates and landowners buy-in to make permanent change.	We have recently legislated a statutory tree target. We are making good progress. For example, in 2021/22 2,300 ha of woodland creation took place in England, representing a 10% increase in woodland creation compared to the previous year and an additional 400 ha of tree planting outside of woodland. Interim (non-binding) target to increase tree and canopy cover by 0.26% of land area in England by 31 January 2028, (equivalent to tree and woodland cover of 34,000 ha). Initial delivery pathway was set out in the Environmental Improvement Plan. To increase operational capacity government launched the Tree Production Capital Grant, which will provide funding support to nurseries and seed suppliers to invest in facilities and equipment to increase

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				CB4	CB5	CB6			
			outcomes. . NB. This measure has small negative carbon savings over CB4. This is due to operational emissions created during the creation of woodlands, for example from the machinery used and soil disturbance. Our tree-planting goals have a large impact on the longer term goals, as they will sequester more carbon the more they grow.						the quantity, quality, diversity and biosecurity of tree, seed, and sapling supply.
180	Agriculture and LULUCF	Domestic planting of Perennial Energy crops (PECs) and Short Rotations Forestry. Increase planting of PECs (miscanthus and Short Rotation Coppice) and Short Rotation Forestry (SRF).	Increase land planted with perennial energy crops and short rotation forestry, ensuring above- and below-ground carbon sequestered by fast-growing species through the Biomass Strategy. We will also be further exploring how this will be driven by market demand, what the appropriate sustainable business models might be and whether other support might be needed from government to enable this planting.	0.00812	0.3	1.0	2026	Uncertain delivery risk. The policy requires further appraisal of options. Other: Underpinning this measure is confidence in the end market for these products and need to maximise proportion of feedstock destined for technologies with CCUS. Decision needed on vehicle for incentivising uptake.	To increase delivery confidence, we need to: Facilitate ministerial decisions on the specific elements within this pathway, including integration with wider land use requirements, species mix, cultivation standards. Continue working closely across government and with key stakeholders to understand the viable and sustainable business models and end market for biomass crops, maximising the proportion destined for technologies with CCUS. Alongside this end market economic modelling, rapid work to understand barriers to land use and behaviour change, what further delivery mechanisms may be needed to support or incentivise growers. The Skidmore review called for the publication of a Biomass Strategy, and government has committed to do this.
181	Agriculture and LULUCF	Peat Restoration (Blended Finance - 2022-2050).	Restore approximately 280,000 ha of peatland by 2050 (inclusive of the Nature for Climate Fund (NCF) funded restoration). The NCF is providing over £33 million to restore 20,000 hectares of peatlands, with a further bidding round in 2023. Beyond 2025, the main delivery vehicles will be incentives through the new environmental land	0.2	0.8	1.4	2025	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development. Restoration delivered via ELM schemes post 2025 will require landowners to voluntarily put land forward for restoration.	We are exploring different options for private finance, including the peatland carbon code. We will develop understanding of the feasibility of changes to landscape-scale water level management, which will enable more expansive lowland restoration, through a large-scale R&D programme rolling out of water

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			management (ELM) schemes: Countryside Stewardship will provide a key funding stream for wetter modes of farming; Landscape Recovery will provide long-term funding to support large-scale peatland restoration projects; and the Farming Innovation Programme supports applications for research and development in paludiculture. Private investment will be mobilised by developing the Peatland Code further, including by expanding the Code to cover lowland peat and exploring further carbon pricing opportunities for the sector. Informed by data from the England Peat Map and findings of the Lowland Agricultural Peat Task Force, a Peatland Restoration Roadmap will be developed to set out a detailed trajectory for restoration to 2050.						landscape infrastructure (water storage and water level management) awaiting procurement. The sector capacity and skills work mentioned in the cell above will be important for long term delivery, as well as the development and publication of our Peatland Restoration Roadmap (2024).
182	Agriculture and LULUCF	Increasing responsible management of lowland agricultural peatlands .	Promote more responsible agricultural management of peatlands, through raising water tables and wetter modes of farming (e.g. Paludiculture).	0.03600	0.2	0.2	2025	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development. Technical feasibility of restoration and sustainable management activities is unclear.	The updated Peatland Restoration Roadmap (2024) and other R&D projects will develop a foundation for next steps in policy development. .
183	Agriculture and LULUCF	End the sale of peat in horticulture.	End the sale of peat in horticultural growing media, in the amateur sector and in the professional sector by 2026, with limited exemptions.	0.00000	0.01000	0.04000	2031	We have high certainty in the delivery of this policy and its enabling impacts on other policies. There has been positive progress with the outcome of the public consultation being published announcing the ban in amateur sector. There is a risk as we need to identify appropriate legislative Bill and to progress with pursuing a ban in the profession sector.	The sector team are currently looking to identify a legislative vehicle for this bill.

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184	Agriculture and LULUCF	UK-level estimates of future carbon savings - Agriculture and LULUCF	Modelling for UK-wide consistency for the agriculture and LULUCF sectors	2.1	4.2	6.9	CB4	These sectors are devolved and therefore delivery risks are uncertain.	In preparing this report, the DAs have provided information on the policies and proposals they expect to implement to reduce emissions in these sectors. These include tree planting, peatland restoration and various agriculture measures. Information is published in Net Zero Wales, the Green Growth Strategy for Northern Ireland and Scotland's Climate Change Plan update. These sectors are largely devolved and also given the UK's land use profile, a significant proportion of UK-wide emissions reductions savings will be delivered by Devolved Administrations (DAs). Whilst DAs have been consulted on this Carbon Budget Delivery Plan, as required by section 14(5) of the Climate Change Act 2008, DESNZ's understanding of DA-specific risks is limited. However, we understand that many of the risks to delivery of emissions savings will be common across all four Nations and, in DESNZ's experience, policies for these sectors may be subject to risks such as the need to manage competing demands on land, dependencies on stakeholders, the appropriate infrastructure being in place, evidence gaps and dependencies on early stage technologies. In DESNZ's experience the approach for typically mitigating these risks may be for the relevant administration to set a vision for managing competing priorities, engagement with stakeholders, investment in infrastructure, and research and development. UK Government will continue to work with DAs on net zero policy and analysis to support UK-wide delivery, addressing common challenges and sharing best practice to mitigate delivery risks, recognising devolved competence.

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185	Waste and F-gases	Near elimination of biodegradable municipal waste to landfill - Collection and packaging reforms.	The majority of emissions from the waste sector are attributable to methane produced by biodegradable waste breaking down in landfill. Collection and packaging reforms will support the reduction of biodegradable municipal waste going to landfill. Collection and Packaging reforms are made up of the consistent collection of household and business recycling, the introduction of packaging Extended Producer Responsibility (pEPR) and a Deposit Return Scheme (DRS) for plastic and metal drinks containers. We have brought forward £295 million of capital funding which will allow local authorities in England to prepare to implement free separate food waste collections for all households from 2025. Consistent collection of recycling is the primary driver reducing biodegradable waste going to landfill. DRS and pEPR will reduce the total amount of waste and therefore create space for more biodegradable waste to be processed in waste processing facilities which are not landfill.	0.4	2.0	3.0	2023-2028	Uncertain delivery risk. Many actions are dependent on external stakeholders. For example, waste policies such as the consistent collections of recycling are dependent upon successful, timely implementation of the reforms by businesses and local authorities and response from households.	Distribute the £295m capital funding in 23/24 and £60mil of resource transition funding in 23/24 for weekly household separate food waste collections, and maintain wider waste budgets for collection, packaging, and recycling reforms. Work with local authorities and the non-household municipal sector to ensure that they can achieve compliance by the implementation dates as agreed with Defra Secretary of State. These dates will be included within legislation. NB some local authorities may need transitional arrangements past the legislative implementation date due to being tied into long-term contracts. Defra are exploring potential transitional arrangements and the latest analysis suggests the impact on carbon savings would be within the uncertainty bounds of the modelling regardless. [
186	Waste and F-gases	Near elimination of biodegradable municipal waste from landfill - additional policies towards near elimination of this waste to landfill from 2028.	This is an early-stage proposal which will consist of further measures to divert biodegradable municipal waste from landfill from 2028. We will launch a call for evidence to support development of a plan to achieve this shortly.	0.4	0.5	0.7	2023-2028	Uncertain delivery risk. We know that the near elimination of biodegradable waste to landfill is a desirable environmental outcome and will develop policy in this vein. At this time however we do not have confidence in the data and numbers to quantify the proportion of material in mixed wastes that is biodegradable. As a result we do not yet have detailed policies to take forwards that will achieve the near	Enhanced waste composition data will allow us to both model potential savings and take a targeted approach to deliver on the near elimination of biodegradable waste to landfill. We aim to begin addressing this through launching a call for evidence (intended to launch March 2023 subject to Ministerial approval). We have policy ideas that can work on, but these will be enhanced and we will have greater confidence in their likely success

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								elimination of biodegradable waste, although are exploring options and intend to implement policies in advance of 2028 so as to meet the commitment for near elimination from 2028 – and sooner if possible. We are delivering research which supports this aim.	following the call for evidence. Ministers will also soon be deciding next steps for textiles.
187	Waste and F-gases	Monitoring emissions from wastewater treatment and subsequent optimisation of existing operations to minimise process and other emissions.	Work with water compaies to encourage the widespread deployment of new sensors for the detection of emissions from a full range of sites, treatment stages and environmental conditions to enable optimisation of current processes to reduce greenhouse gas leakage and minimise production.	0.01680	0.1	0.3	2026	Uncertain delivery risks. Delivery is dependent on water company action. Water companies will need to invest in new wastewater treatment processes, which would require pilots and investment by water companies to upgrade treatment facilities and processes. investment would be contingent on price review outcomes.	To do this we need further research and the development of techniques to monitor GHG emissions. The Water Industry holds responsibility to drive this through existing industry tools and processes such the WINEP, UKWIR and opportunities from regulator driven funding mechanisms such as the Ofwat Innovation Fund and progress is being made in this area. In addition, the PR24 guidance contains Water Companies Performance Commitments and a Net Zero Challenge fund to support and incentivise delivery.
188	Waste and F-gases	Data improvement for industrial wastewater treatment.	Promote further improvements in modelling and data collection to improve reporting and reduce uncertainty. Government will publish a rapid evidence assessments setting out options to improve estimates of greenhouse gas emissions from industrial wastewater treatment.	0.06720	0.06720	0.06720	2037	We have high certainty in the delivery of this policy. This work is currently underway but the level of reduction that will be delivered is less certain.	We have high delivery confidence in this policy and the programme of work is currently underway.
189	Waste and F-gases	High proportion of conventionally digested sludge from wastewater treatment is upgraded to Advanced Anaerobic Digestion (AAD).	Work with water companies to upgrade existing treatments which use anaerobic digesters to Advanced Anaerobic Digestion, which emit less greenhouse gas and capture waste energy as heat and natural gas.	0.01344	0.05376	0.08400	2025	This is dependent the water industry investing in the processes. It is market driven as there are no legislative requirements driving this.	This could be achieved through the Ofwat Open Access Fund in development for spring 2023.

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190	Waste and F-gases	Alternative treatment processes for wastewater - e.g., anaerobic treatment/Membrane Aerated Biofilm Reactor (MABR)/alternative ammonia removal processes.	Work with the water industry to expand into more sustainable wastewater treatment techniques and encourage the development and adoption of new wastewater treatment processes which will improve the efficiency of wastewater treatment and reduce greenhouse gas production and contribute to the circular economy by allowing resources to be reused.	0.0000 0	0.02520	0.08400	2030	This is dependent on the water industry investing in the processes. It is market driven as there are no legislative requirements driving this.	BEIS have set up a Regulators Pioneer Fund (closed September 2022) for projects starting and finishing between January 2023-March 2025.
191	Waste and F-gases	Additional HFC phasedown step(s) to secure 85% cut.	Implementation of additional phasedown step(s) to meet the Kigali Amendment requirement to reduce HFC consumption by 85% by 2036. This will follow the same process laid out for the existing phasedown step(s) in the F-gas regulation.( Timescales for this measure assume that legislation is secured.	0.0000 0	0.00000	0.05627	2035	. A primary legislative vehicle would need to be secured. Additionally, in order to undertake their review, the F-Gas team will need to prioritise net zero action in addition to their ongoing work on the REUL Bill and NIP Bill.	We are continuing to explore legislative options.
193	Waste and F-gases	Metered-dose inhalers (MDIs) F-gas Phasedown.	Prescribing incentives introduced by the NHS to reduce the use of HFCs in inhalers and industry commitments to introduce lower GWP propellants in MDIs.	0.0273 8	0.2	0.5	2025	We have high certainty in the delivery of this policy and its enabling impacts on other policies. The NHS would need to prioritise training for clinicians on how to use and prescribe alternatives, and patients would need to be supported to switch. Need MHRA to approve MDIs using alternative propellants. Slight risk relating to MHRA backlog as there is no unmet clinical need to prioritise it over other approvals work.	We are continuing to engage with the NHS and health boards.
194	Waste and F-gases	UK-level estimates of future carbon savings – waste, wastewater, and F-gases	Modelling for UK-wide consistency for the waste, wastewater and F-gas sectors	0.1	0.6	0.9	CB4	These sectors are devolved and therefore delivery risks are uncertain.	In preparing this report, the DAs have provided information on the policies and proposals they expect to implement to reduce emissions in these sectors. These include various waste measures, including decreasing waste and increasing recycling. Information is published in Net Zero Wales, the Green Growth Strategy for Northern Ireland

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				CB4	CB5	CB6			
								and Scotland's Climate Change Plan update. These sectors are largely devolved and a significant proportion of UK-wide emissions reductions savings will be delivered by Devolved Administrations (DAs). Whilst DAs have been consulted on this Carbon Budget Delivery Plan, as required by section 14(5) of the Climate Change Act 2008, DESNZ's understanding of DA-specific risks is limited. However, we understand that many of the risks to delivery of emissions savings will be common across all four Nations and, in DESNZ's experience, policies for these sectors may be subject to risks such as dependencies on stakeholders, the appropriate infrastructure being in place, evidence gaps and dependencies on early stage technologies. In DESNZ's experience the approach for typically mitigating these risks may be for the relevant administration to engage with stakeholders, investment in infrastructure, and research and development. UK Government will continue to work with DAs on net zero policy and analysis to support UK-wide delivery, addressing common challenges and sharing best practice to mitigate delivery risks, recognising devolved competence.	
195	Engineered Removals	Business Models to support Greenhouse Gas Removal Technologies	Develop and implement business models to support the overarching policy ambition to deploy at least 5 MtCO <sub>2</sub> /year of engineered Greenhouse Gas Removals (GGRs) by 2030 and further future development. After 2030 we expect the volume of engineered removals to increase to 23 MtCO <sub>2</sub> /year by 2035 and 75-81Mt CO <sub>2</sub> /year by 2050. Our aim is to enable a diverse portfolio of engineered GGRs.	0.054	6.4	23.4	2027	<p>Uncertain delivery risk-</p> <ul style="list-style-type: none"> <li>- Funding for the power BECCS and the GGR business model is subject to a future spending review round and therefore cannot be confirmed now, creating inevitable uncertainty.</li> <li>- Greenhouse removals technologies have never been deployed at scale, creating inherent uncertainties and risk</li> <li>- The policy relies on CCS policy for Track 1 expansion and Track 2</li> </ul>	<p>There are outstanding decisions around GGRs business model and CCUS cluster funding which when made will substantially reduce delivery risk.</p> <ul style="list-style-type: none"> <li>- March 2023: Public announcement on access CCUS Track 1 expansion and Track-2</li> <li>- DESNZ Engagement with HMT on power BECCS and GGR business model design and opportunities, and managing the interdependencies</li> </ul>

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			The main business models are the GGR Business Model and the Power BECCS (Bio-energy Carbon Capture and Storage) Business Model. The Industrial Carbon Capture (ICC) and Hydrogen Business Models are additional policy instruments that could enable some GGR deployment. The actual split of GGR technology will depend on the scope for business models and commercial negotiations, but likely include Power BECCS, H2 BECCS, Industry BECCS and Direct Air Capture and Storage (DACCS) technologies.					that is also not completed - The policy requires additional research and innovation in GGR technologies to provide greater clarity on savings potential and to inform further policy development.	between CCUS programme timings and funding - Legislation to enable both the power BECCS and GGR business models is required in the Energy Bill - DESNZ to reduce uncertainty on GGR technologies through innovation funding pilot programme. Further research underway to explore potential around non-CCUS related technologies for 2030 and beyond

**Table 3 – Unquantified proposals and policies**

Note: Proposals and policies that we expect will or could deliver further carbon emissions savings, in addition to the savings identified in Table 2, are marked with an asterisk (\*). These are proposals and policies for which we cannot currently quantify associated emissions savings, for example in relation to some early-stage proposals, where we are still assessing the available evidence.

No.	NZS Sector	Policy name and description	Timescale from which the policy takes effect	How the policy supports delivery/meeting of carbon budgets	Delivery risk(s) description (section 13)	Risk mitigation (section 13)
1	Cross cutting	<b>Emissions trading- UK ETS cap:</b> To incentivise cost-effective abatement across traded sectors at the pace and scale required to deliver net zero, we have consulted (in partnership with the Devolved Administrations) on a net zero consistent UK ETS cap for 2024-2030. The range of options put forward in the consultation remains compatible with achieving carbon budgets. In due course, the Authority will communicate its decision on the UK ETS cap in its response to the consultation along with an assessment of any impacts on carbon budget delivery.	CB4	The UK Emissions Trading Scheme (ETS) puts a price on the 'carbon externality' that greenhouse gas emissions represent. This is the most cost-efficient way to support the transition to net zero. It is a necessary condition for enabling the market to deliver that transition, and provides a long-term price signal that, when supported by complementary mechanisms and policies, can deliver a stable investment case for decarbonisation. The ETS emissions cap also provides a strong guarantee that the traded sector's emissions will not exceed its decarbonisation pathway.	We have reasonable confidence that we will get the required policy agreement across the UK ETS Authority to reach a position on a Net Zero-compliant cap trajectory in time for legislation to be put in place before 2024. (This is a commitment we have made publicly in the Net Zero Strategy and other publications.)	We are working closely with the UK ETS Authority to reach a consensus on policy decisions. Compromise positions have been drawn up to aid progress and to keep timelines on track for delivering legislation by the end of 2023.

2*	Cross cutting	<p><b>Setting out a long-term pathway for emissions trading:</b> We will work within the ETS Authority to publish a long term pathway for the ETS this year. Subject to agreement within the Authority, this pathway will set out our intention to legislate to continue the ETS beyond 2030 until at least 2050. It will remain aligned with our net zero target, so giving businesses the certainty they need to invest in decarbonisation. We will explore expanding the scheme to more sectors of the economy, including high emitting sectors.</p>	CB4	<p>We will explore expanding the scheme to more sectors of the economy, including high emitting sectors. We consulted last year on expanding the scheme to cover energy from waste/waste incineration and domestic maritime emissions and on incorporating greenhouse gas removals. We will explore the potential role of emissions trading in decarbonising heat, alongside possible options for rebalancing energy costs away from electricity. We will work to develop a harmonised approach for measuring carbon emissions from farms.</p> <p>The ETS emissions cap provides a strong guarantee that the traded sector's emissions will not exceed its decarbonisation pathway. Depending on future decisions regarding the ETS, including future levels of the cap and expansion to other sectors, this could therefore provide additional savings beyond those which are currently quantified.</p>	Expanding the UK ETS to new sectors of the economy could involve political challenges for HM Government and the Devolved Administrations. We will also need to consider the risk of carbon leakage.	Further in-depth work will be undertaken within HMG and with the Devolved Administrations as part of the UK ETS Authority to develop a shared vision for how to overcome political and economic challenges. We will undertake full consultation on our proposals. We will ensure effective carbon leakage mitigations are in place.
3*	Innovation	<p><b>Government portfolio of net zero research and innovation programmes for the Spending Review period 2022-2025,</b> amounts to approximately £4.2 billion of public investment. This includes £1.5 billion specifically allocated to net zero innovation announced in the Net Zero Strategy (including the £1 billion Net Zero Innovation Portfolio), as well as further research and innovation delivered through other departmental programmes and through UKRI.</p>	Ongoing - policy in effect. Start of emissions savings will depend on the specific innovations, technologies, and sub-technologies being considered, as well as the speed at which they can be scaled up.	<p>This policy provides R&amp;I funding to support the development of new technologies to decarbonise sectors such as power, buildings, industry, transport and agriculture. Continued investment in cutting-edge research, development and demonstration will be integral to achieving the transition. This cross-government portfolio of net zero research and innovation support will help develop technologies critical for decarbonising all relevant sectors of the economy.</p> <p>There is potential for this policy to generate carbon savings beyond those already quantified by increasing the effectiveness of new technologies, reducing costs so that technologies can be deployed at greater scale sooner or from technologies currently at early technology readiness levels which are not yet mature enough to have quantified deployment plans. Additional policies to deploy new technologies at scale will be needed to realise any additional savings from innovation.</p>	We have high certainty in the delivery of this policy and its enabling impacts on other policies. Funding has been agreed and allocated against key R&I priorities outlined in the Net Zero R&I Framework.	Mitigating actions are not currently required for this policy.

4	Innovation	<b>Implementing measures to make it easier for pension schemes to unlock investment in illiquid assets</b> , including innovative companies, green projects, and infrastructure. The government's response to the October 2022 consultation, published on 30 January 2023, outlined the final regulatory changes.	Subject to Parliamentary approval, regulations to come into force by Spring 2023. Start of emissions savings will depend on the specific innovations, technologies, and sub-technologies being considered, as well as the speed at which they can be scaled up.	This policy aims to open up more financing options for innovative companies, including those focused on net zero.	We have high certainty in the delivery of this policy and its enabling impacts on other policies. Reforms have been consulted on and proposed changes have received broad support.	Mitigating actions are not currently required for this policy.
5	Innovation	<b>Driving innovation in key low-carbon sectors by taking leadership role in Mission Innovation 2.0.</b> Through our leadership of Mission Innovation (MI) and the Secretariat, we have cemented Mission Innovation as the leading forum for international clean energy innovation and global collaboration. The UK co-leads the Green Powered Future Mission and the Clean Hydrogen Mission, as well as the Heating and Cooling Innovation Community. The UK also participates in four other Missions: Net-Zero Industries, Integrated Biorefineries, Carbon Dioxide Removal and Zero-Emission Shipping.	Ongoing - policy in effect. Start of emissions savings will depend on the specific innovations, technologies, and sub-technologies being considered, as well as the speed at which they can be scaled up.	This policy aims to drive enhanced international action and investment in research and innovation for clean energy solutions.	We have high certainty in the delivery of this policy and its enabling impacts on other policies'. The policy is already being delivered and the UK has cemented itself as a leader in Mission Innovation.	Mitigating actions are not currently required for this policy.
6	Innovation	<b>Missions:</b> As one of the first major investments following the creation of the Department of Science, Innovation and Technology (DSIT), it dedicates £250m over three years to exploiting the UK's global leadership in three of the five technologies that will be the focus of the Department's work: Artificial Intelligence, Quantum Technologies and Engineering Biology. Developed with delivery partners, the new programme delivers against the Innovation Strategy commitments for new "innovation missions" and to support the 7 technology families. The development of these technologies will help tackle major challenges faced by the UK and the world such as climate change and energy security. The missions may include interventions directly supportive of Net Zero activity, or through spill over benefits in the realisation of technology outcomes.	The programme dedicates £250m over the next three years, but the impacts of the interventions will take place over a longer timeframe.	This policy aims to build on UK strengths and opportunities to catalyse industry, research and public sector actors in developing key transformational technologies which could support the net zero transition.	We have high certainty in the delivery of this policy and its enabling impacts on other policies'. This was publicly announced before the publication of the Net Zero Growth Plan	Mitigating actions are not currently required for this policy.

7	Innovation	<b>The Net Zero Research and Innovation Framework</b> , which set out the key research and innovation challenges for the next 5-10 years and a roadmap to 2050. Alongside the Net Zero Growth Plan, we've published a follow-up Delivery Plan which outlines the Government's investment of £4.2 billion towards net zero research and innovation programmes for the current Spending Review 2022-25, aligned to the priorities in the Framework.	Ongoing - policy in effect. Start of emissions savings will depend on the specific innovations, technologies, and sub-technologies being considered, as well as the speed at which they can be scaled up.	This policy aims to set out the government's key priorities for net zero R&DI and clearly articulate government support against those priorities.	We have high certainty in the delivery of this policy and its enabling impacts on other policies'. The R&I Framework has already been published, and the Delivery Plan is due to be published in March 2023.	Mitigating actions are not currently required for this policy.
8	Innovation	<b>Provision of advice, networking opportunities, skills development and testing facilities, including an online innovation hub from Innovate UK</b>	Ongoing - policy in effect. Start of emissions savings will depend on specific innovations, technologies, and sub-technologies being considered, as well as the speed at which they can be scaled up.	Innovate UK, together with the British Business Bank, is developing an online Innovation Hub for businesses to easily access all funding and support opportunities that are relevant for them with three clicks. This is in response to an action in the Innovation Strategy to provide a dedicated platform for opportunities, making it easier and simpler for innovative businesses to access government backed funding and support. This also includes options specifically for net zero businesses to grow and scale as fast as possible.	We have high certainty in the delivery of this policy and its enabling impacts on other policies'. There are no significant barriers and progress has already been made in terms of delivery.	Mitigating actions are not currently required for this policy.
9	Innovation	<b>UK participation in Horizon Europe</b> either as an associated country or a third country, the world's largest collaborative research programme worth around €95 billion over the next decade, will help us reach our net zero goals. With a minimum of 35% of funding earmarked for climate change projects, this collaboration with other world leaders in net zero research will drive further progress. DSIT continues to develop its alternative to Horizon Europe in case it is needed which is designed to significantly increase the scale, pace and impact of our international leadership on Net Zero. This funding will support international research collaboration with the EU and others to drive progress on net zero.	Start of emissions savings will depend on the specific innovations, technologies, and sub-technologies being considered, as well as the speed at which they can be scaled up.	In all circumstances, there will be funding that will support collaboration with EU partners in order to progress net zero research.	In all circumstances, we are confident we can provide a strong offer for international S&T collaboration to progress net zero research.	The Government has launched, and extended, a funding guarantee for successful Horizon Europe applicants. This is expected to last until 31st June 2023.
10	Innovation	We will continue to invest in R&D through the <b>Advanced Propulsion Centre (APC) competition</b> .	CB4	Support the transition to zero emission vehicles by accelerating technology development. Since 2013, Government and industry have jointly committed more than £1.3 billion in the design and development of new vehicle technologies, with 188 zero emission and low carbon projects supported across a range of R&D competitions. These projects are	Further funding is needed to ensure the UK automotive sector remains competitive as global investment in light vehicle technologies and heavy freight decarbonisation increases.	We are prioritising our approach to implementing auto innovation programmes and are preparing to consult industry as we explore new options for intervention.

				estimated to support over 56,000 jobs and save over 370MtCO <sub>2</sub> e.		
11	Innovation	<b>We will coordinate transport's investment in R&amp;D, collaborating with key stakeholders through our Transport Research and Innovation Board (TRIB).</b>	2025	TRIB could accelerate R&D to reduce transport emissions, including transport infrastructure.	Ability and willingness of Members to support research programmes, with money and resources.	Close collaboration with TRIB members to ensure sharing of knowledge and best practice.
12	Investment	<b>Introduce mandatory climate-related financial disclosure requirements across the economy:</b> These requirements were aligned to the recommendations of the Taskforce on Climate-related Financial Disclosures (TCFD). To achieve economy-wide reporting, requirements were introduced by the Financial Conduct Authority via listings rules and the Department for Work and Pensions and the Department for Business, Energy and Industrial Strategy via regulation. Regulations came into force through 2021 and 2022, with the final BEIS (now DESNZ) policy coming into effect 6th April 2022.	Requirements in place from 6th April 2022	Significant flows of private finance will be needed to meet our carbon budgets. The right mix and quantum of public and private capital will be a pre-requisite for delivery of most deployment targets, and thus most associated carbon savings. For financial institutions to effectively allocate their capital, they must have access to the right information and data to price and manage risks, identify opportunities and get comfortable with building exposure to new sectors and technologies. The UK's climate-related financial disclosure requirements will help ensure the right capital is available at the right time, reducing the delivery risk of other carbon savings.	Requirements in place - no delivery risk.	We will monitor impacts of this policy.
13	Investment	<b>Transition planning</b> Currently the Financial Conduct Authority (FCA) requires listed companies, as well as large asset owners and managers to disclose transition plans on a 'comply or explain' basis. The Government commits to consulting on the introduction of requirements for the UK's largest companies to disclose their transition plans if they have them. To ensure parity between listed and private companies, as well as to ensure requirements are consistent and comparable across the economy, we expect to consult on the basis that these requirements could align closely with those of the FCA, including the 'comply or explain' basis. The government will also work with the FCA to ensure transition plan requirements are delivered across the financial services sector alongside requirements for listed and private companies.	Forthcoming - subject to consultation	Transition planning is a useful tool for companies to communicate to investors how they will be managing risks and securing opportunities associated with our transition to net zero. They allow investors to more effectively allocate capital.	Subject to Ministerial approval. If agreed and announced in Green Finance Strategy 2, subject to consultation.	We will work closely with users and preparers of transition plans to ensure our proposals have the desired impact.

14	Investment	<p><b>UK Green Taxonomy</b>  We will deliver a UK Green Taxonomy – a tool to provide investors with definitions of which economic activities should be labelled as green. This will support the quality of standards, labels and disclosures used in the industry for green finance activity. We expect to consult in Autumn 2023. The Government proposes that nuclear - as a key technology within our pathways to reach net zero - will be included within the UK's Green Taxonomy, subject to consultation. After the Taxonomy has been finalised, we will initially expect companies to report voluntarily against it for a period of at least two reporting years after which we will explore mandating disclosures. Government does not wish to place undue burdens onto companies whose size or scale makes the disclosure of taxonomy-related information unreasonable. Therefore, we will develop proposals with proportionality in mind. We are considering whether it is appropriate to pursue a 'Transition Taxonomy', which was a recommendation of the Net Zero Review, or include certain transitional activities within one Taxonomy.</p>	Forthcoming - subject to consultation	<p>Significant flows of private finance will be needed to meet our carbon budgets. The right mix and quantum of public and private capital will be a pre-requisite for delivery of most deployment targets, and thus most associated carbon savings. For financial institutions to effectively allocate their capital, they must have access to the right information and data to price and manage risks, identify opportunities and get comfortable with building exposure to new sectors and technologies. Ad such, the UK's Green Taxonomy will help ensure the right capital is available at the right time, reducing the delivery risk of other carbon savings.</p>	<p>There are some risks to obtaining agreement on the taxonomy, including proposed disclosure frameworks, which could in turn reduce the overall impact of the policy.</p>	<p>Continued engagement across Whitehall to agree positions at official level, and use of multiple channels of Ministerial engagement to address any concerns.</p>
15*	Investment	<p><b>Use the new UK Infrastructure Bank to co-invest alongside private sector investors for infrastructure projects.</b> The Bank will support projects in England, Scotland, Wales and Northern Ireland and is available to local and mayoral authorities for key infrastructure projects and will provide advice on developing and financing infrastructure. The Bank will 'crowd-in' in private investment to support economic growth, accelerate our progress to net zero, and help level up the UK. The Bank will invest in public and private projects, as well as providing world-class advisory services. Initially, the government will provide the Bank with £5bn of equity and allow it to borrow a further £7bn on top, with a review point in three years to assess whether that is sufficient funding. In addition to this £12bn of capital it will be able to deploy £10bn of government guarantees. We expect it to use this to crowd in private investment to support more than £40bn of infrastructure investment overall. £4bn of capital is set aside for local authority lending. On the £8bn for private projects, based on evidence from the UK and internationally, we would expect it to crowd in private investment at a ratio of 2.5:1, supporting £20bn of private investment.</p>	Ongoing - policy in effect	<p>For many of the sectors and technologies we are reliant upon for meeting our carbon budgets, access to the right forms of public funding and co-investment will be critical. This is due to the sectors and technologies in question being too nascent to attract the deepest pools of private capital. Although the capital deployed by the UK Infrastructure Bank cannot be quantified into specific carbon savings, as the capital will be deployed across sectors and across time horizons, the scale and the reach of the capital available means the UKIB's interventions should provide additional carbon savings.</p>	<p>UKIB is operational and making investments. No risks to delivery</p>	<p>We will monitor impacts of this policy.</p>

16*	Investment	<b>Adopt a new Net Zero objective and integrate Net Zero into the operations of the British Business Bank (BBB).</b> BBB is a government-owned economic development bank established by the UK government. BBB supports access to finance for smaller businesses to drive sustainable growth and prosperity across the UK, and also to enable the transition to a net zero economy. Between 2014 and end of August 2022, BBB supported £505 million of equity investment in clean technology companies.	Ongoing - policy in effect	For many of the sectors and technologies we are reliant upon for meeting our carbon budgets, access to the right forms of public funding and co-investment will be critical. This is due to the sectors and technologies in question being too nascent to attract the deepest pools of private capital. Although the capital deployed by the British Business Bank cannot be quantified into specific carbon savings, as the capital will be deployed across sectors and across time horizons, the scale and the reach of the capital available means we expect the BBB's interventions to provide additional carbon savings.	BBB is operational and making investments. No risks to delivery	We will monitor impacts of this policy.
17*	Investment	<b>The Clean Growth Fund (CGF):</b> launched in 2020, with an ambition to use its £101 million in venture-stage funding to accelerate the deployment of innovative clean technologies that reduce greenhouse gas emissions, while catalysing the UK clean growth venture capital market and leveraging private sector funding into early stage clean tech start-ups.	Ongoing - policy in effect	For many of the sectors and technologies we are reliant upon for meeting our carbon budgets, access to the right forms of public funding and co-investment will be critical. This is due to the sectors and technologies in question being too nascent to attract the deepest pools of private capital. Although the capital deployed by the Clean Growth Fund cannot be quantified into specific carbon savings, as the capital will be deployed across sectors and across time horizons, the scale and the reach of the capital available means we would expect the CGF's interventions could provide additional carbon savings.	CGF is operational and making investments. No risks to delivery	We will monitor impacts of this policy.
18	Investment	<b>Green Financing Framework:</b> published in June 2021, sets out six categories of green expenditure that are eligible to be financed under the programme ( <a href="http://www.gov.uk/government/publications/uk-government-green-financing">www.gov.uk/government/publications/uk-government-green-financing</a> ). A total of £16.3 billion has been raised by the sale of green gilts and retail green savings bonds for the financial year 2020-21. The Green Financing Programme will continue into the next financial year, with further issuances totalling £10 billion. These proceeds are held in HM Treasury's general account, and the equivalent amount will be allocated to fund environmental and climate-related expenditures as classified in the Framework.	Ongoing - policy in effect	The capital raised through the green gilt helps to fund multiple net zero programmes. As such, the associated carbon savings are already accounted for. The policy does however reduce the delivery risk of the programmes it helps to fund.	The UK's green gilt framework is operational and raising capital. No risks to delivery.	We will monitor impacts of this policy.
19	Investment	<b>Green finance education charter:</b> In 2019, we partnered with the Green Finance Institute and leading UK-based finance professional bodies to launch the first-ever Green Finance Education Charter which commits signatories to integrating green finance and sustainability into their core curricula, new qualifications and	Ongoing - policy in effect	For our green finance policy framework to be effective, and as such for it to reduce overall delivery risk for our carbon budgets, we need the right skills and expertise to be available within our financial and professional services sector. This policy helps deliver that and therefore de-risks the delivery of carbon budgets.	GFI is operational and delivering positive outcomes. No risk to delivery.	We will continue to work closely with the GFI to align their outputs with our priorities.

		the continued professional development of members.				
20*	Domestic transport	<b>Promote use of higher biocontent low carbon fuels in compatible heavy-duty vehicles (HDVs)</b> as an interim measure to reduce emissions from internal combustion engine vehicles as the fleets transition to Zero Emission Vehicles (ZEV). Fuels could include B20, B30 and B100, where figures represent the fraction of biodiesel blended (i.e., B20 = up to 20% biodiesel blended).	CB4	In 2021 the Zemo Partnership published a report which modelled potential emission savings from deploying higher biocontent transport fuels blends. The modelling suggested the potential to contribute up to 44-47 MtCO <sub>2</sub> e cumulative emission savings from 2020 to 2030. Higher biocontent fuels would help achieve further GHG savings from existing internal combustion engine (ICE) HDVs, as the fleet transitions to zero emission vehicles.	Depending on the speed of ZEV adoption, and interdependencies with the SAF mandate and feedstock availability, there is a risk that this could require additional biofuel production, creating a pressure on sustainable feedstock supply. Whilst this could support domestic production industry and secure road transport GHG savings, sustainable feedstock is limited and therefore this policy may impact other decarbonisation policies dependent on the same feedstock.  Higher biocontent fuels are costlier. The effective delivery of this package of measures, and potential to plug carbon budget gaps, is contingent on HMT support for a fiscal incentive to off-set higher costs related to the use of higher bio content fuel.	The higher biocontent low carbon fuels policy package would focus on compatible HDVs and buses with the potential to secure appropriate warranties, and would likely utilise biofuels already in the market (that will no longer be required in the light road vehicle sector due to increasing ZEV adoption).  The proposed LCF Strategy is conducting supply and demand analysis, which will inform the policy package ambition to limit negative impacts on other decarbonisation policies.  DfT / HMT working group set up to explore options on incentives.
21*	Domestic transport	Identify specific opportunities for transport decarbonisation in rural areas through <b>transport innovation in the upcoming Future of Transport: Rural Strategy.</b>	CB4	The strategy will enable local areas to identify potential solutions for decarbonising rural areas, as well as the risks of not planning for these changes. Alongside decarbonisation a key aim for the strategy is on improving transport for the user.	There is a risk that publication of the Rural Strategy will be delayed due to limited resource and/or alignment to wider policy.	DfT is progressing policy work and expects the Rural Strategy to be published in early 2023.
22*	Domestic Transport	Drive decarbonisation and transport improvements at a local level by <b>making quantifiable carbon reductions a fundamental part of local transport planning and funding.</b>	CB4	Updated Local Transport Plan (LTP) and Quantifiable Carbon Reductions (QCR) guidance will support local transport authorities to drive transport decarbonisation at the local level. This will enable a better understanding of the potential carbon impact of local transport interventions, which will support local authorities to deliver quantifiable carbon reductions and contribute to national decarbonisation.	New guidance has been developed but has not yet been finalised or received sign-off to go to public consultation.  DfT is also seeking advice from King's Counsel (KC) to explore further if there are possible legal risks that the QCR guidance will present for the development of national, or large local transport infrastructure schemes.  While the commitment and updated guidance may lead local authorities to	DfT will continue to work with other Departments to develop the guidance. The public consultation on the final guidance is expected to progress soon.  KC advice will be fully considered, with any necessary amendments made to the guidance to mitigate potential risks to

					create plans to decarbonise local transport, these plans delivering on their decarbonisation potential depends on future funding made available for local transport and could be impacted by other Government funding priorities.	scheme development, if advice suggests that these are material.  In terms of future funding, updated LTPs will enable the Department to build its business case for local transport funding to deliver LTP interventions, including those that can deliver transport decarbonisation at a local level.
23	Domestic transport	Allocating further funding to support the electrification of UK vehicles and their supply chains through the <b>Automotive Transformation Fund</b> .	CB4	Support the transition to zero emission vehicles and roll-out of supporting infrastructure.	Further funding will be necessary to deliver a fully-fledged supply chain and anchor global investment from car manufacturers to the UK, protecting jobs and growth.	We are prioritising our approach to implementing auto innovation programmes and are preparing to consult industry as we explore new options for intervention.
24	Domestic transport	<b>Build a globally competitive zero emission vehicle supply chain</b> and ensure our automotive sector is at the forefront of the transition to net zero.	CB4	Support the transition to zero emission vehicles and roll-out of supporting infrastructure.	Further funding is needed to ensure the UK automotive sector remains competitive as global investment in light vehicle technologies and heavy freight decarbonisation increases.	We are prioritising our approach to implementing auto innovation programmes and are preparing to consult industry as we explore new options for intervention.
25	Domestic transport	<b>Ensure the UK's charging infrastructure network is reliable, accessible, and meets the demands of all motorists.</b>	CB4	Support the transition to zero emission vehicles and roll-out of supporting infrastructure. The UK now has over 37,000 electric vehicle charging points.	The main risk is that the speed of chargepoint delivery does not remain sufficient to support the transition to zero emission vehicles.	DfT published the EV Infrastructure in 2022. The Department constantly reviews its EV Infrastructure Strategy commitments to ensure it remains on track to meet targets.  We are working with external stakeholders to identify common barriers and solutions.
26	Domestic transport	<b>Launch Local Electric Vehicle Infrastructure (LEVI) Fund</b> to support Local Authorities to deliver charging infrastructure for drivers without off street parking.	CB4	Support the transition to zero emission vehicles and roll-out of supporting infrastructure.	We have good certainty regarding delivery of the fund, following the pilot schemes in 2022.	The programme business case for the LEVI fund has been approved and, in March 2023, we announced a further £343m in capital funding being made available through it. We have also launched the

						LEVI Capability Fund, making available £45.8m resource funding to support local authorities to implement local charging strategies.
27	Domestic transport	<b>The Rapid Charging Fund</b> will support the upgrade of electricity capacity on the strategic road network, enabling the roll-out of ultra-rapid electric vehicle chargepoints.	CB4	Support the transition to zero emission vehicles and roll-out of supporting infrastructure.	The electricity capacity upgrades which will be funded by the RCF could take 1- 4 years to deliver and could impact the current agreed spend profile.	We are providing additional resource to progress work and engaging with DESNZ and connection providers (including Distribution Network Operators) to identify how delivery of connections can be accelerated.
28	Domestic transport	<b>Deliver the first All-Electric Bus Town or City.</b>	CB4	Supports bus, coach, and minibus decarbonisation.	The first All Electric Bus city, Coventry, has already been announced and the Government is contributing £50m towards the £150m project.  Up to 300 zero emission buses will be supported through the All Electric Bus City. The first order for 130 electric buses was placed in 2021, and around 50 of these buses are now in service.	We are continuing to work closely with Transport for the West Midlands and are being kept updated.
29	Domestic transport	<b>UK Shipping Office for Reducing Emissions (UK SHORE)</b>	CB4	Supports the decarbonisation of domestic maritime across vessels and ports. UK SHORE will deliver £206m of R&D funding to accelerate the development of zero emission technologies. Demonstration projects will directly reduce emissions in both the short and long term.	As part of UK SHORE, the second and third Clean Maritime Demonstration competitions are underway, and the Zero Emission Vessels Infrastructure competition launched in February.  However, timescales for large scale industry demonstrations are a risk to delivery of UK SHORE funding. This is due to global supply chain issues, which may prevent construction of these projects within the current Spending Review period.	UK SHORE aims to release the main funding streams in the programme as early as possible to allow competition winners the maximum time possible to deliver projects. Clear direction on when the end date of UK SHORE funding is has been provided to delivery partners.  UK SHORE programme management will continue to track current project timelines and understand the impact of any delays.
30	Domestic transport	<b>Publish the Low Carbon Fuels Strategy</b> and further develop policy on potential SAF support for scaling up a UK SAF industry	Ongoing - policy in effect	These policy mechanisms support the effective use and deployment of low carbon fuels. This will deliver emissions savings, particularly in the transition period to zero emission vehicles.	Publication of a proposed Low Carbon Fuels Strategy is planned for summer 2023 but, whilst work is advanced, timings are dependent on cross-Government collaboration and agreement (including on availability of biomass and principles for	We are working closely with DfT teams and OGDs to inform the proposed Low Carbon Fuels strategy, including

					<p>priority use of that biomass, being developed as part of the DESNZ Biomass Strategy).</p> <p>Limited availability of sustainable feedstock may present a delivery risk for policies such as the SAF mandate and the RTFO, and will be considered as part of the proposed Low Carbon Fuels Strategy (as well as interactions with zero emission vehicle policy).</p> <p>Publication of SAF mandate second consultation and the Government response to Philip New's report will provide some certainty to SAF investors; but any delays to a Government decision on the final outputs of the mandate consultation or decisions on which additional measures to pursue to provide SAF revenue certainty could mean the UK falls behind and does not secure meaningful investment that will help meet the required mandate volumes.</p>	<p>on assumptions of feedstock availability.</p> <p>We are working at pace with industry, and in collaboration with colleagues in HMT, to develop and assess options for revenue certainty that could help secure additional investment in UK SAF production.</p>
31*	Domestic Transport	<b>Embed transport decarbonisation principles in spatial planning and across transport policy making.</b>	Ongoing - policy in effect	Increased spatial consideration of transport schemes will lead to more potential for walking, wheeling, cycling and public transport uptake, leading to additional carbon savings.	<p>The central risk for delivery is around cross-Government collaboration, as spatial planning and spatial funds are owned by DLUHC, a large proportion of delivery requires collaboration with DLUHC and leveraging of its policy areas.</p>	<p>DfT is regularly engaging with DLUHC to shape spatial policies and funds.</p> <p>We have also secured the inclusion of a new legislative requirement for Infrastructure Delivery Strategies in the Levelling Up and Regeneration Bill, with significant potential for better join up of transport issues in local plans.</p> <p>With DLUHC we are jointly developing recommendations for how the two Departments can strengthen governance, appraisal and funding processes. This comes in response to an internal HMT report, in March 2022.</p>

32*	Domestic Transport	<b>Tees Valley Hydrogen Hub intervention.</b> Investment of up to £20m until March 2025 to establish the UK's first multi-modal hydrogen transport hub in Tees Valley.	CB4	The Tees Valley Hydrogen Transport Hub is delivering hydrogen vehicles and refuelling infrastructure which will lead to a direct reduction in carbon emissions in the Tees Valley in Carbon Budget 4 although the full quantification can only be completed once bids have been properly assessed. DfT will sign grant offer letters with winning projects from the competition, which will ensure continuing activity after March 2025.	The competition may fail to catalyse wider sustainable hydrogen transport activity in the region, or not generate learning to support future decisions on hydrogen.  More practically, there are risks that vehicles and refuelling infrastructure are not strategically deployed to enable effective operation or that there is an inability to source sufficient green or low-carbon hydrogen for demonstration activity.	Identified delivery risks are being addressed at the bid assessment stage and factored into grant offer letters.  Mitigating measures have been developed for each delivery risk.
33	Domestic Transport	<b>Support the development of commercial-scale Sustainable Aviation Fuels (SAF) plants</b> in the UK through the £165m Advanced Fuels Fund.	CB4 (funding runs to 2025)	Supports delivery of our commitment to SAF deployment, delivering significant emissions savings from aviation.	Risks include those associated with emerging technologies such as technology failure or inability to attract or hold onto significant private investment.  Transitioning from lab to commercial scale is difficult as small demonstration facilities are capital intensive and typically unprofitable at the scale involved. Commercial plants typically cost £600-£1bn to reach economies of scales in production and will often need to run at a loss during their first years of deployment.	A programme and project risk management process are in place to monitor selected projects. Projects must submit monthly progress reports which are independently verified by our monitoring officers. Any risks are escalated through the programme's governance framework to take mitigated action promptly. Progress reports include updated finance reports and risk registers.  Regular engagement across government where we are supporting the same projects to share intelligence and take holistic decisions. This includes GGR and CCS programmes.
34*	Green Choices	<b>Launch the Commute Zero Programme.</b> Commute Zero will be a programme that works with leading companies and large employers to research, support and encourage long-term changes to employee travel habits and support the take-up of lower carbon commuting.	CB4	Carbon reductions could be achieved through a combination of encouraging sustainable transport modes, increases in vehicle occupancy, and uptake of zero emission vehicles.	There is a risk around delivery certainty due to changes in grant funding. Furthermore, Ministers have not agreed to the strategic outline of the scheme.	A project team is in place and our delivery partner is working on designing the programme. We are working on alternative funding streams for the initial scheme development.  We are also exploring long term options which could secure the financial sustainability of the Commute Zero

						Portal in different scenarios.
35*	Green Choices	<b>Work with the Civil Aviation Authority to provide consumers with environmental information at the time of searching for and booking flights.</b>	CB4	This policy is aimed at individual consumer choices and therefore it is not possible to quantify its impact on emissions reductions. However, once implemented, additional emissions savings are expected from individuals and businesses making greener choices.	The main risk is around delivery certainty as the approach to providing information to consumers is still to be determined. There are also some resourcing constraints around supporting this work.	We published a Call for Evidence on 11 January 2023, which will go towards gathering key information and will pave the way for a consultation on this to follow in late 2023.  We have allocated specific resource in the Civil Aviation Authority to this work and a recruit campaign is ongoing to progress this work within the Department.
36	Green choices	<b>We are supporting motorists through Plug-In Vehicle Grants</b> , which provide support towards the upfront purchase of new zero emission vans, motorcycles, wheelchair accessible vehicles and trucks, which are eligible.	CB4	Support the transition to zero emission vehicles.	Additional funding may be required in future years to continue supporting the uptake of certain zero emission vehicles, particularly vans.	We are considering additional tax incentives to further incentivise uptake of electric vehicles. We are also continuously reviewing grants to ensure they are operating effectively and making the best use of taxpayer money.
37	Fuel Supply	<b>Downstream oil &amp; gas:</b> Downstream, UK refineries already underpin major CCUS and hydrogen projects in key industrial clusters. We have also published the draft Downstream Oil Resilience Bill which will give the government the powers it needs to ensure secure fuel supplies are maintained during the transition to net zero.	Energy Bill expected to receive Royal Assent 2023	This policy is not designed to reduce carbon emissions itself, however it will support progress to reduce emissions by enabling CCUS and hydrogen projects which themselves will lead to carbon savings.	Oil refineries are already part of established projects for CCUS/H2. Measures in the Bill are relatively uncontroversial.	Mitigating actions are not currently required for this policy.
38	Fuel Supply	<b>Low Carbon Hydrogen Standard and Certification Scheme:</b> Set up a hydrogen certification scheme by 2025. We envisage the certification scheme will use the methodology set out in the Low Carbon Hydrogen Standard, which sets a maximum threshold for the amount of greenhouse gas emissions allowed in the production process for hydrogen to be considered 'low carbon hydrogen'.  Certification scheme - this is a proposal to set up a hydrogen certification scheme by 2025, as committed to in the British Energy Security Strategy. We envisage the certification	CB4 Low Carbon Hydrogen Standard published in April 2022. Hydrogen Certification Scheme to be set up from 2025.	Creating a trusted, transparent certification scheme will help producers and consumers to demonstrate the environmental credentials of the hydrogen they create and use.  It will also help to deliver carbon savings in end use sectors by boosting the growth of the low carbon hydrogen market and helping consumers choose low carbon hydrogen. Hydrogen production and certification alone will not generate carbon savings, but we expect it to enable carbon savings in several sectors including industry, power, transport and potentially	The Low Carbon Hydrogen Standard was published in April 2022 and is being used as eligibility criteria for government funding. We indicated that we would review the standard by early 2023 and are on track to do so.  We have recruited a new team to support us to meet the British Energy Security Strategy commitment of developing a certification scheme by 2025. We published a consultation on high level design features of the certification scheme in February 2023. Risk that delivery partner not secured for certification scheme which could delay	We have recruited a new team to support us to meet the British Energy Security Strategy commitment of developing a certification scheme by 2025. We published a consultation on high level design features of the certification scheme in February 2023. Work to agree a delivery partner is progressing well.

		scheme will use the methodology set out in the Low Carbon Hydrogen Standard, which sets a maximum threshold for the amount of greenhouse gas emissions allowed in the production process for hydrogen to be considered 'low carbon hydrogen'.		buildings, by replacing high-carbon fuels used today.	launch in 2025. We will rely on a clause in the Energy Bill for our spending power.	
39	Fuel Supply	<b>Net Zero Hydrogen Fund:</b> The £240m Net Zero Hydrogen Fund (NZHF) aims to support the commercial deployment of new low carbon hydrogen production projects during the 2020s. The NZHF will provide capital grant co-funding to give projects a financial boost for construction to begin. It will also provide development support to stimulate a diverse pipeline of projects.	CB4 Net Zero Hydrogen Fund opened for applications in April 2022.	This funding will kickstart the production of low carbon hydrogen during the 2020s, which is crucial in displacing fossil fuels and meeting our ambitions for hydrogen production.  It will also help to deliver carbon savings in end use sectors by boosting the growth of the low carbon hydrogen market. Hydrogen production alone will not generate carbon savings, but we expect it to enable carbon savings in several sectors including industry, power, transport and potentially buildings, by replacing high-carbon fuels used today.	We have announced successful applicants of the first competition window for Strands 1 and 2 of the Net Zero Hydrogen Fund (as of 30/03/23). We intend to launch a second competition window for Strands 1 & 2 of the NZHF in the spring. We expect to award contracts totalling up to 250MW of capacity from HAR1, subject to affordability and value for money. We aim for contracts to be awarded in Q4 2023, with first projects operational in 2025.	N/A
40	Fuel Supply	<b>Hydrogen Production Business Model:</b> A government subsidy which provides revenue support to hydrogen producers to overcome the operating cost gap between low carbon hydrogen and high carbon counterfactual fuels.	CB4 We aim to award contracts for HAR1 (joint NZHF and HPBM support) in Q4 2023, with first projects operational in 2025 (subject to affordability and value for money).	The intervention will support the deployment of low carbon hydrogen projects that will support government's ambition of reaching up to 10GW of hydrogen production capacity by 2030, with at least half of this from electrolytic hydrogen.  It will also help to deliver carbon savings in end use sectors by boosting the growth of the low carbon hydrogen market. Hydrogen production alone will not generate carbon savings, but we expect it to enable carbon savings in several sectors including industry, power, transport and potentially buildings, by replacing high-carbon fuels used today.	The Low Carbon Hydrogen Agreement Heads of Terms were published in December 2022 and we aim to publish the full contract in July 2023. The Heads of Terms sets out the government's proposal for the final hydrogen production business model design. It will form the basis of the Low Carbon Hydrogen Agreement, the business model contract between the government appointed counterparty and a low carbon hydrogen producer. Risk that delays to secondary legislation and/or delays to counterparty set up impact ability to award contracts under Electrolytic Hydrogen Allocation Round 1 in 2023. The CCUS cluster schedule, electrolytic and legislative timelines remain challenging.	We continue to work with devolved administrations and with the Low Carbon Contracts Company (as the anticipated government counterparty) to keep on track for the challenging timelines. We aim to publish a consultation on the design of the regulations in March.
41	Fuel Supply	<b>Industrial Decarbonisation and Hydrogen Revenue Support (IDHRS) scheme and Hydrogen Production Levy:</b> . Through the Energy Bill, we have introduced hydrogen spending powers and provisions for a hydrogen levy which is intended to fund revenue support payments made through the HPBM. Government will provide funding for successful projects from the first electrolytic hydrogen allocation round until the hydrogen levy is in place.	CB4 We aim to award contracts for HAR1 (joint NZHF and HPBM support) in Q4 2023, with first projects operational in 2025 (subject to affordability and value for money).	It is intended to give long term certainty to investors and projects and enable the first commercial scale deployment of low carbon hydrogen production.  It will also help to deliver carbon savings in end use sectors by boosting the growth of the low carbon hydrogen market. Hydrogen production alone will not generate carbon savings, but we expect it to enable carbon savings in several sectors including industry, power, transport and potentially buildings, by replacing high-carbon fuels used today.	Increasing public scrutiny of hydrogen levy could delay or prevent implementation of HPBM & hydrogen levy in planned form.	Developing parliamentary handling / concessions strategy for levy provisions in the Energy Bill. There are provisions in the Energy Bill that allow for the Hydrogen Production Business Model payments to be funded from the Exchequer, which will be used for initial exchequer-funded payments before the levy is operationalised.

						Those provisions could also be used in future if the government position on the approach to funding changed - i.e. if a future decision were taken to fund the Hydrogen Production Business Model from the exchequer on an enduring basis, though this is not HMG policy.
42	Fuel Supply	<b>Hydrogen Transport and Storage Business Models:</b> This is a proposal to design new business models for hydrogen transport and storage infrastructure by 2025. A consultation closed in November 2022 and a Government response is expected in Q2 2023. Legislative measures will be crucial to delivering these new business models.	CB4 We aim to design new business models for hydrogen transport and storage infrastructure by 2025.	The business models will support hydrogen transport and storage infrastructure which is needed to enable our 10GW production capacity ambition and lead to potential carbon savings.  It will also help to deliver carbon savings in end use sectors by boosting the growth of the low carbon hydrogen market. Hydrogen production alone will not generate carbon savings, but we expect it to enable carbon savings in several sectors including industry, power, transport and potentially buildings, by replacing high-carbon fuels used today.	Designing two business models by 2025 is challenging given design complexity. Primary powers are required to enable the business models to be implemented (i.e. spending powers, ability to appoint counterparties and powers which enable HMG to lead the detailed design and allocation of a RAB-style price control framework as part of the hydrogen transport business model).	To bring forward hydrogen transport and storage business models, we are aiming to introduce legislative measures shortly, which will be crucial to designing these new business models by 2025.
43	Fuel Supply	<b>Reducing Methane Leakage through the Distribution Network (Ofgem)</b> The Gas Distribution Networks have been given a financial incentive in the RIIO-2 price control to reduce leakage levels by means of lowering system pressures and improved gas conditioning levels. Reducing methane leakage means lower greenhouse gas emissions	Ongoing - policy is in effect	The Gas Distribution Networks have been given a financial incentive in the RIIO-2 price control to reduce leakage levels by means of lowering system pressures and improved gas conditioning levels. Reducing methane leakage means lower greenhouse gas emissions	As of March 2022, Ofgem informed BEIS that GDNs (according to their 2021 annual report), are on track to completing the replacements of iron mains with plastic pipes up to the end of the current price control - 2026. HSE is to undertake a review of the Iron Main Replacement Programme this year. We were informed that this would provide more information on the safety case and determine whether the scope of the programme would remain. The findings of this review may be a barrier to continuing with the replacement of iron mains but other factors, including the progression of low carbon alternatives would also be considered.	Mitigating actions are not currently required for this policy.
44	Industry	<b>Climate Change Agreements (existing scheme):</b> The Climate Change Agreements scheme exists to ensure that the businesses, for whom energy makes up a larger proportion of their operating costs, are supported to make changes to their processes to increase their energy efficiency. Support through Climate Change Agreements is available to 2,600 eligible businesses in over 50 industrial sectors who meet negotiated energy efficiency or carbon reduction targets. The current	CB 4	Climate Change agreements support energy efficiency improvements and associated carbon savings for eligible industrial operators	We have high certainty in the delivery of this policy and its associated carbon savings due to the mature stage of policy development and implementation.	Mitigating actions are not currently required for this policy.

		scheme began in 2013 and will run until the 31 March 2025.				
45	Industry	<b>Climate Change Agreements (from 2025):</b> The Government is extending the Climate Change Agreements (CCA) scheme by two years to cover 2025-26 and 2026-27 as announced in the March 2023 Budget. This will allow continued support to energy-intensive businesses across the UK in return for them meeting energy efficiency targets. The terms of the extended scheme are set out in a consultation document published by the Department for Energy Security and Net Zero, published alongside the Budget. The Government is considering proposals for a potential future CCA scheme with potential targets from 2025 and the role it could play in supporting energy efficiency aims.	CB 4	Climate Change agreements support energy efficiency improvements and associated carbon savings for eligible industrial operators	We only have confidence in the delivery of this policy and its associated carbon savings up to 2024 due to no decisions having been made yet on the future CCA scheme beyond the 2 year extension that was announced in the March 2023 Budget. CCAs are also included as part of the EEP baseline through their linkage to the Climate Change Levy.	Mitigating actions are not currently required for this policy.
46	Industry	<b>IETF Phase 3 Extension:</b> Phase 3 of the Industrial Energy Transformation Fund will launch in 2024, subject to business case approval. The additional £185m budget will support energy intensive industries across the UK to save energy and decarbonise whilst maintaining competitiveness.	CB 4	The Industrial Energy Transformation Fund (IETF) supports industrial sites with high energy use to transition to a low carbon future. The fund targets existing industrial processes, helping industry to cut energy bills by investing in more efficient technologies; and reduce emissions by bringing down the costs and risks associated with investing in deep decarbonisation technologies.	We have medium certainty in the delivery of this policy and its associated carbon savings. The policy is at a mature stage of development following successful funding allocations for Phases 1 and 2, with Phase 3 subject to business case approval before this can begin to allocate funding. As the IETF is a competitive, demand led scheme, there is some uncertainty as to level of carbon savings that will be delivered, particularly as we expect Phase 3 to continue supporting more novel deep decarbonisation technologies.	Mitigating actions are not currently required for this policy.
47*	Industry	<b>International efforts to increase the transparency of embodied emissions and boost demand for low carbon products:</b> The UK championed a number of key initiatives in this area at COP26 and beyond. This includes the Clean Energy Ministerial's Industrial Deep Decarbonisation Initiative, which the UK co-leads with India. This focuses on aligning approaches to data measurement, standards and procurement, to ensure there is a coordinated approach to market creation across borders. We are also supporting the Net Zero Industry Mission, under Mission Innovation, which aims to foster deeper collaboration on industry decarbonisation.	CB 4	Work to support demand for low carbon products and carbon leakage mitigation starts with an internationally agreed methodology to monitor and report on the embodied emissions of products. This information allows us to enact policies based on data, including private and public procurement, product labelling, product standards and CBAMs. More broadly, mitigating carbon leakage risk is essential to enable domestic businesses to make investments required for decarbonisation and to reach net zero.	Potential delivery risks include delays to the delivery of the carbon leakage consultation and internal feasibility assessments.	We will be undertaking a feasibility assessment as well as consultation on the pledge itself through the Carbon Leakage Consultation. Mitigation is in place which includes delivery key milestones to ensure the consultation goes ahead as planned.

48	Industry	<b>Resource efficiency:</b> The approach in driving the transition to a more resource efficient economy is set out for England in the Government's 2018 Resources and Waste Strategy, to be supplemented by a new Waste Prevention Programme, which outlines how we will maximise the value of our resources and minimise waste to increase the circularity of our economy. We will formalise joint working arrangements across government departments to promote collaboration on resource efficiency approaches, ensuring we are using all the policy tools available in working towards shared emissions and environmental targets.	CB 5	Delivering carbon savings through resource efficiency requires collaboration across multiple sectors and departments. This policy will help to unlock the savings attributed to quantified Industrial Resource Efficiency policies by enabling joint working across government.	Delivery of this policy will not be possible at current resourcing levels. Across wider government, resource to work on circular economy is highly constrained and risks being de-prioritised. A taskforce model would require strong support from Ministers across government.	We are seeking additional resource and budget to ensure we can carry out this policy. We will also be seeking Ministerial support on the nature of the joint working arrangements.
49	Industry	<b>Resource efficiency:</b> Government has supported the Green Construction Board to produce a Routemap to Zero Avoidable Waste, published in July 2021. We will continue to promote the adoption of resource efficient practices across the sector through close collaboration with the Green Construction Board, and wider industry engagement.	CB 5	This policy will help to unlock savings under the quantified Industrial Resource Efficiency package of policies, which includes carbon savings from resource efficiency in construction.	There are multiple financial, regulatory, resourcing, technical and political challenges that could prevent the full emissions saving potential by the publication of the strategy alone.	Work is underway to identify the barriers to implementing resource efficiency policies in the construction sector. The results of this joint BEIS/Defra research project will be available from April 2023.
50*	Industry	<b>Demand-side measures/ Carbon Leakage mitigation measures:</b> Published a call for evidence on demand-side policy in Spring 2022, to investigate how we can define low carbon products and the emissions reporting that will be required to support those definitions. It also explored the design of demand-side policy levers, with a view to the potential introduction of voluntary standards and labelling as early as 2025, and regulatory standards being introduced in the late 2020s. The eventual policy package could include CBAMs, product standards and other demand-side policies to grow the market for low carbon industrial products.	CB 5	The aim of demand-side policies is to increase demand for low carbon products, supporting the business case for companies to decarbonise and helping to mitigate carbon leakage. This will enable industry to make the large investments required to decarbonise highly emitting industrial processes. The group of policies described would support significant carbon savings both domestically and internationally.	The requirements for international co-operation, WTO compliance and the intricacy of the policies mean that they will be complex to deliver.	HMT/DESNZ are about to publish a consultation exploring the feasibility of these policies. Lawyers will also be required to look into the legality of any trade related measure, such as mandatory product standards or carbon border adjustment mechanisms.
51	Industry	<b>Resource efficiency:</b> We are supporting inter-disciplinary approaches and strengthening the evidence base on resource efficiency initiatives by collaborating with the UKRI funded National Interdisciplinary Circular Economy Research (NICER) programme. The Department for Energy Security and Net Zero and Defra are also conducting a research project to investigate resource efficiency opportunities across 11 sectors.	CB4	This policy will help to build the evidence base and enable effective decision making to unlock savings associated with the quantified Industrial Resource Efficiency package of policies.	There are several notable evidence gaps related to resource efficiency. These currently limit our ability to develop evidence based RE policy and introduce uncertainty around our estimates about the potential impacts.	We anticipate ongoing research will tackle evidence gaps, thus reducing uncertainties about the extent to which RE policy can contribute to the Net Zero target.

52	CCUS Programme	<p><b>Track 1 of the Cluster Sequencing Programme</b> The cluster sequencing process was established to identify and sequence carbon capture, usage and storage (CCUS) clusters, with Track-1 identifying clusters suitable for deployment in the mid-2020s. Following the announcement of HyNet and East Coast Cluster as Track-1 clusters, we invited applications for capture projects to connect to the clusters. We have announced the Track-1 Project Negotiations List alongside the Net Zero Growth Plan and Energy Security Plan and negotiations with those projects will now commence. We will also set out a process this year for the expanded deployment of projects in the T-1 clusters and their associated stores.</p>	late CB4	<p>The projects included on the Track-1 negotiating list could deliver emissions savings by capturing CO2 emissions, and transporting that CO2 to permanent geological storage. The final realised emissions savings enabled by Track 1 of the Cluster Sequencing Programme will be subject to negotiations successfully concluding and projects demonstrating deliverability, affordability and value for money. We have also confirmed we will launch a process to expand the Track-1 clusters.</p>	<p>Timely delivery is dependent on the progress of negotiations, planning and consenting decisions for individual projects, and the finalisation of the policy framework including the passing of the relevant legislation and development of a CCS Network Code.</p>	<p>We have announced the Track-1 Project Negotiations List to enable negotiations to commence. We are internally prioritising activity, resource levels as needed to ensure negotiations are completed in a timely manner. We will launch the Track-1 expansion process by the end of 2023 so further capture projects can contribute to our capture ambitions as soon as possible.</p> <p>We continue to support the passage of the Energy Bill through Parliament, which provides the legislative basis for the economic licensing framework for CO2 transport and storage, and we are running extensive stakeholder engagement on CCS Network Code and will publicly consult in summer 2023.</p>
53	CCUS Programme	<p><b>Track 2 of the Cluster Sequencing Programme</b> - The cluster sequencing process was established to identify and sequence carbon capture, usage and storage (CCUS) clusters, with Track-2 seeking clusters suitable for deployment by 2030. We have launched further details alongside the Net Zero Growth Plan and Energy Security Plan.</p>	late CB4	<p>We will be launching Track-2 of the CCUS Programme to select two new transport and storage systems, and associated capture projects to deliver government's ambition of deploying CCUS in four clusters by 2030, with Track-2 clusters to be operational by 2030. Any projects delivered through Track-2 will enable emissions savings by capturing CO2 emissions, and transporting that CO2 to permanent geological storage.</p>	<p>Delivery is dependent on the finalisation of the policy framework including the passing of the relevant legislation and development of a CCS Network Code. There remains uncertainty surrounding the amount of projects which will come forward through the Track-2 process and the timeframe over which those projects are delivered. Once projects are selected, delivery will be dependent on the progress of negotiations, planning and consenting decisions for these.</p>	<p>We have launched the Track-2 process with the aim of ensuring Track-2 clusters are operational and contribute to our ambition of capturing 20-30Mt CO2 by 2030.</p>
54	CCUS Programme	<p><b>CCUS Deployment Post-2030:</b> In response to the Independent Review of Net Zero, we have confirmed we will set out a vision on how the CCUS sector will support our net zero ambitions.</p>	late CB4	<p>Policies to support the delivery of CO2 capture projects and the delivery of further CO2 transport and storage infrastructure are essential for enabling the sectoral capture policies, across power, industry, low-C hydrogen production, waste, and GGRs.</p>	<p>Although there is sufficient time to develop the policies needed to enable further CCUS delivery, potential risks to delivery include the level of appraised CO2 storage capacity within the UK, and the lack of a clear route to deployment for projects beyond Track-2.</p>	<p>We will set out a clear vision for delivery of CCUS beyond Track 2, setting out how CCUS will support our net zero ambitions. We are working with the North Sea Transition Authority to further our understanding of</p>

						geological CO2 storage potential and to ensure sufficient CO2 stores are available to deliver Net Zero.
55	CCUS Programme	<b>Business Model for Transport and Storage (T&amp;S) of CO2, including associated economic regulatory framework and legislation</b> to support the development of T&S networks for the deployment of CCUS clusters using a regulated asset base model. The economic licence and supporting network code will be overseen by an economic regulator, (OFGEM).	late CB4	The delivery of the CO2 transport and storage infrastructure is essential for enabling the sectoral capture policies, across power, industry, low-C hydrogen production, waste, and GGRs.	The key risks to delivery are ensuring the economic licence and supporting contracts along with the codes for the CO2 network and the legislation to underpin the business model that will support the transport and storage of CO2 are delivered in a timely manner.	We are engaging with shortlisted T&S Cos on the development of the licence and associated contracts and will consult on those documents in the summer 2023. Similarly, we are working with the sector on the CCS Network Code and will publicly consult in summer 2023. We continue to support the passage of the Energy Bill through Parliament, which provides the legislative basis for the economic licensing framework for CO2 transport and storage.
56	Engineered Removals	<b>Delivery of £100 million innovation funding</b> (a subset of the £1bn innovation funding set out in the innovation policy section)	CB4	The Innovation funding supports the development of GGR technologies to help them achieve commercialisation. This includes the Direct Air Capture and GGR Innovation Competition. Phase 2 of the competition was announced in July 2022, with over £54m of government funding awarded across 15 of the most promising demonstration projects. This will support our ambition of at least 5MtCO2/yr of engineered removals by 2030 (see quantified list).	We have high certainty in the delivery of this policy and its enabling impacts on our ambition to reach 5MtCO2/yr of engineered removals by 2030. The demonstration projects are well on the way to successfully capture up to 1000 tCO2/yr by 2025 and with scale up to reach in excess of 50,000 t/CO2/yr by 2030. Policy support during the commercialisation of these technologies will provide potential investors with confidence in investing in this new industry.	Mitigating actions are not currently required for this policy.
57	Engineered Removals	<b>Respond to, and take action following, the call for evidence exploring the role of the UK ETS as a potential long-term market for GGRs.</b>	CB5	The call for evidence explored whether GGRs could be incentivised further if they were integrated into the UK Emissions Trading Scheme. Inclusion of engineered GGRs in the ETS could further support the growth and deployment of GGRs, which will be important in achieving our ambition to deploy at least 5MtCO2/yr of engineered removals by 2030.	We have high certainty in the delivery of the government response. The call for evidence closed in June 2022, responses have been analysed and a Government Response will be published in due course.	Mitigating actions are not currently required for this policy.

58	Engineered Removals	<b>Explore options for regulatory oversight to provide robust monitoring, reporting and verification (MRV) of GGRs</b> , following the recommendations of the BEIS-led MRV Task & Finish Group involving experts from industry and academia.	CB4	This policy supports carbon budget delivery by designing policy to address critical barriers to the deployment of engineered GGRs through the establishment of reliable MRV standards to underpin business model support and a future negative emissions markets. It plays a critical role in balancing residual emissions from the hardest to decarbonise sectors by setting out accounting and sustainability frameworks to ensure that GGR projects deliver verifiable, permanent and sustainable removals of CO2 from the atmosphere.	Development of MRV for GGRs is inherently complex given the interlinkages with other MRV regimes already in place or being developed for other technologies or in other countries, which brings some delivery risks. We are looking at phasing the development of MRV so that the critical elements are ready first to support roll out of GGRs. Therefore whilst these risks require attention, they are resolvable based on the actions already underway.	Further mitigating actions are not currently required for this policy.
61	Buildings	<b>Additional measures to support the Heat Networks Programme:</b> Heat Network enabling measures aim to ensure that future heat network policies are delivered at the pace and scale needed to meet our net zero targets. The programme ensures that policies are delivered in a programmatic and systematic way and encompasses a range of supporting activity which de-risks delivery. This includes the development of procurement models to leverage private sector investment, technical standards, developing skills and supply chain capacity.	CB64	Supports savings associated with the Heat Networks Transformation Programme	Delivery is subject to future funding decisions.	Subject to future spending decisions.
62	Buildings	<b>Boiler Upgrade Scheme - Extension:</b> The current Boiler Upgrade Scheme can be extended. This would be a part of a number of measures to reach the ambition for 600,000 heat pump installations p.a. by 2028.	CB46	Heat Pump uptake could be accelerated to deliver up to ~15Mt/year of emission savings <sup>2</sup> (on average over CB6 period). This depends on wider commercial factors such as the cost of heat pumps (both their upfront costs and running costs). Any future Government support would be dependent on future Spending Review outcomes.	This scheme can be extended, however this has not yet been allocated funding at SR.	Subject to future spending decisions.
63	Buildings	<b>Green Gas Levy:</b> The Green Gas Levy will raise the capital required to fund the Green Gas Support Scheme by placing a levy on all licensed fossil fuel gas suppliers.	CB4	The Green Gas Levy (GGL) applies to licensed fossil fuel gas suppliers in Great Britain from 30 November 2021, and funds the Green Gas Support Scheme (GGSS) (supporting associated savings).	We have high certainty in the delivery of this policy. The levy is working effectively and is funding the Green Gas Support Scheme (see separate Green Gas Support Scheme entry).	Mitigating actions are not currently required for this policy.
64	Buildings	<b>Energy Technology List - Annual Review:</b> A government list of energy efficient products that meet the robust energy saving criteria. HMG annually reviews the technologies and products that qualify for inclusion. This can be found at <a href="https://www.gov.uk/guidance/energy-technology-list">https://www.gov.uk/guidance/energy-technology-list</a>	CB4	The list functions as an easy-to-use procurement tool for energy managers, procurement professionals, facilities managers and a wide variety of other professions and organisations. The ETL gives the added reassurance to purchasers of measured and verified energy performance	We have high certainty in the delivery of this policy and its associated carbon savings. Policy is in delivery and does not deliver direct savings	Mitigating actions are not currently required for this policy.

65	Buildings	<b>EPC Action Plan:</b> The EPC Action Plan, published in Summer 2020, is intended to improve the accuracy and reliability of EPCs, their usefulness to users, and to improve access to EPC data. The EPC Register was launched in September 2020 and has been redesigned to provide a more user-friendly experience to help people improve the energy performance of their homes.	CB4	Better reflecting the benefits of heat pump installation in buildings assessments could incentivise greater deployment of low carbon technologies. Making EPCs more robust could strengthen retrofitting of homes and the incentives for consumers to value low-carbon homes	We have high certainty in the delivery of this policy and its associated carbon savings. Policy is in delivery and does not deliver direct savings.	Mitigating actions are not currently required for this policy.
66	Buildings	<b>Consumer Information &amp; Advice (former Simple Energy Advice) - Enhancement:</b> A one-stop shop where you can connect your EPC to your home and get bespoke advice on energy efficiency. The next stage will be to connect that advice to the government-funded schemes such as the Home Upgrade Grant and ECO.	CB4	This service is an enabler and will support homeowners make information green choices. Actions to improve their home efficiency will lead to reductions in energy waste.	We have high certainty in the delivery of this policy and its associated carbon savings. Policy is in delivery and does not deliver direct savings.	Mitigating actions are not currently required for this policy.
67	Buildings	<b>Trustmark &amp; PAS 2035:</b> The Each Home Counts review, published in 2016 recommended the development of an overarching standards framework for end to end delivery of retrofit and the establishment of a government endorsed quality mark to ensure consumer protection and redress. HMG sponsors the PAS standards and they, with TrustMark registration, are key requirement for installers working in government funded decarbonisation schemes. We are working with TrustMark to encourage more installers to sign up to the standards and/or TrustMark as appropriate.	CB4	TrustMark delivers consumer confidence through its expert network of Scheme Providers and their Registered Businesses when undertaking building retrofit work	This policy does not deliver carbon savings.	Mitigating actions are not currently required for this policy.
68	Buildings	<b>Home Retrofit Skills and Capacity Building:</b> Proposal supporting upskilling through the £9.2m Home Decarbonisation Skills Fund, which builds on £6m spent in 2020 and 2021, and will continue to work with the industry to remove barriers to growth, including the uptake of training. We are currently developing plans for a further £15m package of skills support that will launch in 2023	CB4	This proposal supports skills training and capacity building in the home retrofit supply chain, which needs to grow and upskill to meet our fuel poverty and net zero commitments	This policy does not deliver carbon savings.	Mitigating actions are not currently required for this policy.
69*	Buildings	<b>Future Buildings Standard:</b> The Future Buildings Standard will produce extremely efficient non-domestic buildings which use low-carbon heat complemented by high fabric standards. Buildings built to the Future Buildings Standard will be zero carbon ready, meaning that no retrofit work will be necessary to ensure they have zero carbon emissions as the electricity grid continues to decarbonise. These changes will be delivered through amendments to the Building Regulations and publication of a new Approved Document (statutory guidance) subject to consultation.	CB4	The Future Buildings Standard will produce extremely efficient non-domestic buildings which use low-carbon heat complemented by high fabric standards. Buildings built to the Future Buildings Standard will be zero carbon ready, meaning that no retrofit work will be necessary to ensure they have zero carbon emissions as the electricity grid continues to decarbonise.	DLUHC led FBS consultation on track but timescales challenging. These risks require attention, however appear resolvable based on the actions already underway.	DESNZ working closely with DLUHC to ensure the delivery of the FBS stays on track.

70	Buildings	<b>New Buildings:</b> We will consult on whether to end all new gas grid connections, or whether to remove the duty to connect from the Gas Distribution Networks.	CB4	Regulating on new connections to the Gas Grid would act as a backstop to the Future Homes Standards and the Future Buildings Standard to ensure our expected timetable for new builds to be built using low carbon heat from 2025 is met.	To enact the consultation's proposals would require primary powers. Not included in the Energy Bill.	Working with legal to explore any possible options not needing primary powers to enact.
71	Buildings	<b>Public Sector:</b> We have initiated the Public Sector Low Carbon Skills Fund which provides complementary funding alongside the Public Sector Decarbonisation Scheme to enable public sector organisations to acquire expert skills in order to unlock decarbonisation projects.	CB4	As an enabler, the Low Carbon Skills Fund provides public sector organisations with the resources to draw together their heat decarbonisation plans. To realise the carbon savings identified in the heat decarbonisation plans, grant recipients are then required to identify funding for and sources of investment in the recommended carbon reduction measures.	The LCSF is an enabler programme. It is delivering carbon savings because the heat decarbonisation plans produced under LCSF are leading to successful PSDS grant applications. Grant recipients can use a variety of funding and investment sources in addition to PSDS to take the next step of converting the recommendations in the heat decarbonisation plans to installed measures.	Ongoing research into and evaluation of the LCSF programme. This is to improve the programme design and increase its effectiveness and also to understand the barriers to decarbonisation and develop further policy to overcome these.
72	Buildings	<b>Enablers:</b> We will enhance our gov.uk service to provide homeowners with personal, tailored advice for retrofitting their homes and links to local, accredited, trusted installers. We will launch regionally-led in-person pilots in 2023 and are expanding the telephone helpline will also support users.	Delivery over the next 3 years	This service is an enabler and will support homeowners make information green choices. Actions to improve their home efficiency will lead to reductions in energy waste.	Agreed a contractor/supplier for phoneline service and exploring contract extensions for digital service to deliver referral and eligibility checker for ECO4 and ECO+. Finalising final business case for in-person regional-led F2F pilots.	Mitigating actions are not currently required for this policy.
73*	Buildings	<b>Products standards:</b> Progress consultations on additional proposals to raise products standards between 2022 and 2023 ahead of implementing measures from 2025.	CB4	Current savings are based on proposals to raise minimum energy efficiency standards for a limited group of high priority products. Additional savings would be possible if we set stronger efficiency product standards than is currently planned and/or raised/introduced energy efficiency standards for additional products. Barriers to this would include cost and consumer/business impact of explore going beyond our current proposals.	Evidence gaps and industry and consumer stakeholder reaction are potential risks to delivery. No formal consultation has yet been done on some of the products.	This workstream covers multiple different policies some of which are more advanced than others. Policies are still considered deliverable but savings may be impacted if there are delays in consultation and implementation.
74*	Buildings	<b>Additional owner occupier energy efficiency improvement.</b> This is an early-stage proposal to explore how to upgrade homes in the owner-occupied sector to ensure as many homes as possible meet EPC Band C by 2035 where cost-effective, practical and affordable. We are planning to consult by the end of this year on how to improve the energy efficiency of owner-occupied homes.	The consultation will explore implementation trajectories. Policy start and end date to be determined.	Further improvements to the energy performance of owner occupied homes would deliver additional carbon savings towards the carbon budgets.	New policy in this area may require new primary powers, in addition a reasonable lead in time will be needed once final policy decisions have been made to enable the market, and supply chain, to prepare.	Consultation on options by end of 2023 would keep open the option of delivering an ambitious policy that could be implemented in early CB5. A consultation in 2024 may allow for policies to be in place at the start of CB5 - but would significantly reduce the amount of time for markets to prepare once final policy decisions have been made, and/or require a less ambitious initial

						requirement (delivering lower savings for CB5).
75	Buildings	<b>The Heat Pump Investment Accelerator Competition (HPIAC).</b> The Accelerator will provide non-refundable grant funding of up to £30m towards building and fitting out new, or re-purposing existing, factories to manufacture heat pumps and/or components. The accelerator expects to support up to £270m in private sector investment, supporting the UK supply chain for heat pumps and components by supporting up to 270,000 heat pumps and components being manufactured in the UK (which is half the 2028 installation target). The accelerator could support up to 3,000 low carbon jobs, either new or safeguarding those currently working in the UK fossil fuel boiler manufacturing sector.	Delivery over 2023 to 2026.	The competition is intended to support the delivery of CB5 and 6 through improving supply chain security of heat pumps, by increasing domestic manufacturing rather than relying upon importing heat pumps, which as global demand continues to increase, demand is outstripping supply.	Main risks are focussed on benefits realisation, that manufacturers may not deliver the full benefits of the projects that have been awarded funding, either through having overstated the outputs of the project or due to external economic impacts, such as high inflation	Accepting the Skidmore recommendation to proceed with this policy mitigates risk around uncertainty. The outstanding risks are being mitigated through robust assessment of applications using a range of expert input on the viability and appropriateness of applications. Successful applicants will also be monitored throughout the delivery of the facilities and for up to 7 years after construction has completed to monitor the benefits delivery, with the option of grant clawback where there is significant discrepancies identified.
76	Buildings	<b>Incentivising low-carbon technologies:</b> The Government has committed to outlining a clear approach to gas vs. electricity price 'rebalancing' by the end of 2023/4. Rebalancing will generate the clear short-term price signal necessary to shift households and businesses to lower-carbon, more energy efficient technologies such as heatpumps.	CB 4	This policy is intended to support delivery from CB4 onwards by ensuring consumers are not penalised for making green choices through reducing running costs of low carbon heating, relative to fossil fuel alternatives.	Risk relates to the further policy development needed and engagement with stakeholders on any proposals.	New Commitments published in the Energy Security Plan
XX	Buildings	<b>Phasing out of new and replacement gas boilers.</b> The Government stated an ambition in the Heat & Buildings Strategy to phase out new and replacement gas boilers by 2035 at the latest.	CB6	The emission savings for the 2035 ambition are embedded within the quantified pathways. Bringing forward the ambition to 2033 would increase savings by c.2MtCO <sub>2</sub> pa in a high electrification pathway.	TBC	TBC

77*	Agriculture and LULUCF	<b>Better health through disease reduction in pigs.</b> Endemic production-limiting disease is a major constraint on efficient livestock production and will have an impact on the carbon footprint of livestock farming. Improving health status would be expected to lead to reductions in emissions intensity. The Animal Health and Welfare Pathway aims to improve farm animal health and welfare across our national herds and flocks, including an in-development Porcine Reproductive and Respiratory Syndrome virus control programme for pigs.	Subject to the results of further development, this proposal could produce carbon savings within the next 3 years.	Improving the health status of pigs would be expected to lead to reductions in the emissions intensity of pork production. This is emerging work and the potential emissions reductions are contingent on research. Defra is currently undertaking research to quantify the emissions savings associated with improved pig health but this has not been completed.	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development.	Further R&D is required to establish risk mitigation.
78*	Agriculture and LULUCF	<b>Development of more sustainable protein sources for human diets.</b> Alternative proteins could offer environmental benefits. However, the sector is diverse and at different stages of readiness and investment, and so further research is needed to overcome technological barriers, increase understand consumer acceptance preferences and accomplish an optimal regulatory alignment that meets the needs of the sector and consumer safety.	Subject to future market development, and the results of further research and policy development, some technologies could produce carbon savings within the next 10 years. Other technologies face technical barriers that mean they will take longer than a decade to deliver savings.	Within a broad and varied market, some alternative proteins may offer environmental benefits through low emissions intensity associated with production. Emissions savings towards the carbon budgets could be delivered via a shift in the agricultural sector in response to market drivers. This is emerging work and the potential emissions reductions are contingent on research and market drivers.	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development. Some technologies face technical barriers that mean they will take longer than a decade to deliver savings.	Further R&D is required to establish risk mitigation.
79*	Agriculture and LULUCF	<b>Developing the evidence base on controlled environment agriculture (CEA) systems/vertical agriculture.</b> These systems make it possible to consistently and reliably control and/or manipulate the growing environment. This effectively controls crop nutrition and growth along with potential pathogens (pests and diseases) on the crop, and increases the potential to reduce transport/import emissions and improve yields.	This proposal could produce carbon savings within the next 10 - 20 years. In particular, the significant energy requirements of CEA systems will require an integrated approach to developing renewable energy supply for such projects.	CEA/vertical farming could improve the energy efficiency of production (including reducing transport emissions). This could lead to reductions in the emissions intensity of the arable/horticulture sector. This is emerging work and the potential emissions reductions are contingent on research. These systems are likely to increase greenhouse gas emissions until renewable energy sources become more widely available. We continue to undertake research and monitor the evidence base in this area.	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development.	Further R&D is required to establish risk mitigation.
80*	Agriculture and LULUCF	<b>Methanisation, methane capture and combustion.</b> Additional mitigation intervention whereby the methane generated during storage of liquid manure is collected and burnt, converting it to carbon dioxide, a less potent GHG. There may also be potential to	Subject to the results of further research and policy development, this proposal could	Methane, generated during storage of liquid manure, is collected and burnt. This converts the methane to carbon dioxide, a less potent greenhouse gas, which may deliver carbon savings. There may also be potential to utilise the heat and energy	Uncertain delivery risk. The policy uses a technology that is nascent, creating inherent uncertainties and risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development.	Further R&D is required to establish risk mitigation.

		utilise heat or energy produced on combustion within the farm business.	produce carbon savings within the next 10 – 20 years.	produced. This is emerging work and the potential emissions reductions are contingent on research. Although initial quantification has been attempted, significant uncertainty remains and further work is needed, and further work is needed.		
81*	Agriculture and LULUCF	<b>Biorefinery as nutrient recovery.</b> We continue to support research and development in this area such as through the Farming Innovation Programme. The Programme funds industry-led research and development to drive innovation that will enhance the productivity and profitability of England's farming sectors, whilst enhancing the environment and reducing greenhouse gas emissions. It has already supported a range of projects, including ones which focus on biorefinery as nutrient recovery. For instance, the 'Bringing H2OPE to Agriculture' project looks at on-site transformation of dairy cow slurry into valuable byproducts including fertiliser and growth substrate.	Subject to the results of further research and policy development, this proposal could produce carbon savings within the next 5 years.	Producing high-value products, such as livestock feed or fertilisers from waste could support a more circular economy in which emissions are avoided or reduced from feed or fertiliser production. This is emerging work and the potential emissions reductions are contingent on research. Although initial quantification has been attempted, significant uncertainty remains, and further work is needed.	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development.	Further R&D is required to establish risk mitigation.
82*	Agriculture and LULUCF	<b>Using insect protein as animal feed.</b> Feeding insect protein to animals has the potential to reduce overall global emissions from feed production (in comparison to conventional protein production e.g. soya grown overseas) and support a circular economy (e.g. if insects are raised on waste). There is ongoing research to determine the potential of these measures and the sector is at an early stage of development. This measure is unlikely to have significant UK GHG or land use impacts. It could, however, reduce supply chain emissions from feed supply occurring outside the scope of UK carbon budgets.	Subject to the results of further research and policy development, this proposal could produce carbon savings within the next 5 - 10 years. Whilst this may be an important technology to reduce emissions across the livestock supply chain, it may have limited impact on UK emissions. Further work is required to understand the impacts on UK territorial emissions within scope of the Climate Change Act versus wider international emissions reductions.	Feeding insect protein to animals may reduce overall global emissions from feed production by displacing soya grown in deforested areas and support a more circular economy.  Whilst this may be an important technology to reduce emissions across the livestock supply chain, it may have limited impacts on UK emissions. Further work is required to understand the impacts on UK territorial emissions within scope of the Climate Change Act versus wider international emissions reductions  This is emerging work and the potential emissions reductions are contingent on research (including an assessment of any potential impacts on animal and public health).'	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development.	Further R&D is required to establish risk mitigation. Defra is working with devolved administrations and Food Standards Agency on review of the Transmissible Spongiform Encephalopathy (TSE)-related livestock feed controls, which includes considering allowing the use of processed insect protein in pig and poultry feed. Defra and FSA are currently completing an assessment of the animal and public health risks of the changes considered.

83*	Agriculture and LULUCF	<b>Policy roadmap for the safe use of timber in construction.</b> Increasing the safe use of timber in construction was a commitment in the England Trees Action Plan and the Net Zero Strategy, as it can support storing carbon safely, for example through using timber to build houses. This work will be taken forward in particular through the cross-government and industry timber in construction working group, which will design a policy roadmap identifying key actions for government and industry to safely increase timber use in construction.	Government is planning to publish a Timber in Construction Road Map by the end of 2023 which will lay out the next steps in more detail.	Harvesting timber to be stored in buildings and replanting the woodland creates a 'conveyor belt of carbon' from woodlands into storage in buildings. Increased demand for timber means higher timber prices and therefore more investment in woodland creation, which means we're more likely to meet our tree planting target. Higher timber prices drive increased management of existing woodlands. This makes woodlands more resilient to risks such as wildfire and disease and reduces the risk of reversals which cause emissions. More wood products going into structural use means that the carbon is stored over a longer time horizon than when used for e.g. MDF or pallets. Substitution of carbon-intensive materials such as cement, steel and brick for wood reduces emissions	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development. Ensuring cross government collaboration is vital to enabling progress with this policy.	Defra plan to take to the April Climate Change Sub-Irig Board to discuss across government. Defra and DLUHC are working on publishing Timber in Construction roadmap to lay out the next steps publicly. Defra analysts are working across government to investigate the potential of extra savings.
84*	Agriculture and LULUCF	<b>Increase ambition for planting perennial energy crops and short rotation forestry.</b> This may be achieved either through: increasing land planted, or relaxing expected standards about stocking density or use of exotic species.	Subject to the results of further policy development, this proposal could produce carbon savings in Carbon Budget 6.	Increasing land planted with perennial energy crops and short rotation forestry, would ensure above- and below-ground carbon sequestered by fast-growing species.	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development.	Further R&D is required to establish risk mitigation. The Skidmore review called for the publication of a Biomass Strategy, and government has committed to do this.
85*	Agriculture and LULUCF	<b>Paradigm shift in water management on lowland peatlands.</b> Major investment in water storage and water level management infrastructure is required to transform the management of water to rewet lowland peatlands. This would enable us to raise water levels safely in a controlled way to an appropriate depth that would lead to lower GHG emissions.	Long term (10+ years)	Rewetting by raising and maintaining higher water levels in peat soil reduces emissions and offers opportunities for continued productive agriculture and growing new crops suited to wetter soils, as well as supporting lowland peat restoration activities. This is because peat restoration is sensitive to water table depth, so managing this is integral to meeting our peatland targets. Further R&D needs to be completed before we can accurately quantify the carbon savings.	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development. Further R&D needs to be completed to establish risks. Developing the infrastructure is a major investment. Further R&D is about to commence to improve our understanding of the costs associated with the infrastructure that might be required.	Further R&D is required to establish risk mitigation. Defra is currently working on modelling different water level scenarios to inform the level of risk as an interim approach. Using the outcomes of this R&D, Defra will submit a SR bid to try and acquire the appropriate funding.
86*	Agriculture and LULUCF	<b>Regulatory approaches to activities on lowland peat soils.</b> Following the provision of necessary water management infrastructure, explore how we can go beyond our farming scheme incentives to achieve rewetting of lowland peat soils. Agree	Long term (10 years)	Peatland is privately owned and incentive schemes are demand led, therefore, rewetting peat soils will be the prerogative of landowners once the water infrastructure is in place. This measure would achieve greater rates of rewetting, reducing the GHG emissions.	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development.	Further R&D is required to establish risk mitigation.
87*	Agriculture and LULUCF	<b>Paludiculture.</b> Implementation of a roadmap towards commercially viable paludiculture. This includes building on the work of the Lowland Agricultural Task Force and delivery of the Paludiculture Exploration Fund (2022-2025), which comprises a community	Long term (10+ years)	Raising and maintaining water levels just below the surface of peat soil, as required for paludiculture, reduces emissions and offers opportunities for continued productive agriculture and growing new crops suited to wetter soils.	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development.	Further R&D is required to establish risk mitigation.

		engagement project and a competitive grant scheme.				
88*	Agriculture and LULUCF	<b>R&amp;D:</b> Improving peat emissions data. Ongoing Research & Development will improve the quantification of peat emissions data and removals.	Mid term (2-5 years) and ongoing	Improving the available evidence base on our peatlands will enable the baseline estimate of emissions from peat to be revised. Areas of improvement have been identified. It would also support government and industry to implement more effective policy and guidance, supporting reducing our emissions.	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development. We are expecting the updated mapping to show some loss of peatland, meaning that in some locations it will not be possible to achieve the abatement that has been quantified, however, emissions from these areas will no longer be included in the baseline.	Further R&D is required to establish risk mitigation, although it is anticipated that the removal of emissions from the baseline could offset the reduced abatement.
89*	Agriculture and LULUCF	<b>Saltmarsh restoration and creation.</b> Explore the potential for carbon sequestration through the restoration and creation of saltmarsh habitats around the UK.	Subject to the Roadmap recommendations on inclusion in the UKGHGI this proposal could produce carbon savings in Carbon Budget 6.	Saltmarshes may contribute to climate change mitigation. While we are already working to protect and restore these habitats, we are not yet in a position to accurately quantify the extent of that contribution. There are significant data gaps surrounding emissions from coastal wetlands, activity data regarding extraction activities, and habitat extent. This information must be collected before a decision on inclusion in the GHGI can be made.	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development.	Further R&D is required to establish risk mitigation.
90*	Agriculture and LULUCF	<b>Seagrass restoration and creation.</b> Explore the potential for carbon sequestration through the restoration and creation of seagrass habitats around the UK.	Subject to the Roadmap recommendations on inclusion in the UKGHGI this proposal could produce carbon savings in the next 12-20 years.	Seagrass may contribute to climate change mitigation. While we are already working to protect and restore these habitats, there are significant uncertainties over the extent of that contribution. Work continues to improve the evidence base.	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development.	Further R&D is required to establish mitigation for any potential risks which may emerge.
91*	Agriculture and LULUCF	<b>Explore the potential for carbon dioxide removal through the application of ground silicate rocks to land.</b>	Unknown Provided R&D results are positive and subject to further policy development this proposal could produce carbon savings in the next 10 to 20 years.	This is emerging work and contingent on research, but could provide additional support to meeting carbon budgets through providing a further mechanism for carbon dioxide removal from the atmosphere.	Uncertain delivery risk. The policy requires additional research to provide greater clarity on systems impacts and the resulting savings potential and to inform further policy development.	Further R&D is required to establish risk mitigation.
92*	Agriculture and LULUCF	<b>Explore the potential to deploy biochar for carbon sequestration through application to land.</b>	Provided R&D results are positive and subject to further policy development this proposal could	This is emerging work and contingent on research, but could support carbon budgets through providing an additional mechanism for carbon dioxide removals from the atmosphere.	Uncertain delivery risk. The policy requires additional research to provide greater clarity on savings potential and to inform further policy development.	Further R&D is required to establish mitigation for any potential risks which may emerge.

			produce carbon savings in the next 10-20 years.			
93*	Agriculture and LULUCF	<b>Explore the potential to cultivate microalgae to fix carbon dioxide into biomass.</b>	Provided R&D results are positive and subject to further policy development and inclusion in the UKGHGI this proposal could produce carbon savings in the next 15-20 years.	This is emerging work and is contingent on research, but could support carbon budgets through providing an additional mechanism for carbon dioxide removal.	Uncertain delivery risk. The policy requires additional research to provide greater clarity on systems impacts and the resulting savings potential and to inform further policy development.	Further R&D is required to establish mitigation for any potential risks which may emerge.
94*	Agriculture and LULUCF	<b>Explore the potential to cultivate macroalgae (such as seaweed or kelp) to fix carbon dioxide into biomass.</b>	Provided R&D results are positive and subject to further policy development and inclusion in the UKGHGI this proposal could produce carbon savings the next 15-20 years.	This is emerging work and contingent on research, but could support carbon budgets through providing an additional mechanism for carbon dioxide removals from the atmosphere.	Uncertain delivery risk. The policy requires additional research to provide greater clarity on systems impacts and the resulting savings potential and to inform further policy development.	Further R&D is required to establish mitigation for any potential risks which may emerge.
95	Agriculture and LULUCF	<b>Agriculture, Forestry and Other Land Use (AFOLU): Nature for Climate Fund.</b> We will boost the existing £640 million Nature for Climate Fund with a further £124 million of new money, ensuring total spend of more than £750 million by 2025 on peat restoration, woodland creation and management.	By the end of 2025	NCF supports delivery for both forestry and peat restoration.	This is dependent on the relevant sectors having the capacity for delivery trajectories.	R&D is being done in both sectors to improve sector capacity.
96	Agriculture and LULUCF	<b>Rewetting lowland peat.</b> Rewetting lowland peat necessitates investment in (i) water storage capacity (e.g., reservoirs), and (ii) water level management capabilities (e.g., telemetry, mechanised pumps, Archimedes screws). This infrastructure would facilitate rewetting and address drought and flood risks. Design and cost of interventions will be context-specific, and will require close working with the EA, NE and water management authorities, e.g. around regulatory challenges. We are developing projects to facilitate a better understanding of the costs, barriers, and emissions impact of this work.	Long-term (10+ years)	Rewetting by raising and maintaining higher water levels in peat soil reduces emissions and offers opportunities for continued productive agriculture and growing new crops suited to wetter soil, as well as supporting lowland peat restoration activities. This is because peat restoration is sensitive to water table depth, so managing this is integral to meeting our peatland targets.	Further R&D needs to be completed to establish risks. Developing the infrastructure is a major investment and there is a risk we will not receive appropriate funding. Further R&D is about to commence to improve our understanding of the costs associated with the infrastructure that might be required.	Further R&D is required to establish risk mitigation. Defra is currently working on modelling different water level scenarios to inform the level of risk as an interim approach. We have a strong trajectory for tree planting and are making good progress. For example, in 2021/22 2,300 ha of woodland creation took place in England, representing a 10% increase in woodland creation compared to the previous year and an

						additional 400 ha of tree planting outside of woodland. The Nature for Climate Peatland Capital Grant Scheme launched last year and funds peatland restoration at landscape scale. At least 35,000 ha of peatlands in England will be restored by 2025 via the Nature for Climate Fund.
97	Waste and F-gases	<b>Product Labelling and company reporting.</b> Explore the use of product labelling to show the durability, repairability and recyclability of products, as well as their environmental footprint, with a view to stimulating demand for better quality items. We have committed to developing a mandatory methodology for the voluntary eco-labelling of food and drink products. This will be for participating companies to consistently follow, providing a common standard where eco-information is voluntarily used should they choose to include such information on their products. Through the Food Data Transparency Partnership, Defra will also develop defined and consistent methodologies for the food and drink sector to consistently measure and report scope 3 GHG emissions.	Exploration has started and will be ongoing. We expect activity to increase.	Environmental labelling and eco-labelling can be used to indicate products and services with lower embodied carbon emissions, enabling more informed choices. Company reporting will incentivise companies to improve the environmental performance of their products and drive increased traceability in supply chains.	Success will depend on level of level of adoption by industry, the extent to which consumers act upon the eco-labels and the extent to which industry make supply chain changes in response to consumer choices.	Eco-labelling: We are in the process of launching an industry engagement group to work through the approach with a view to consulting by end of 2023.
98	Agriculture and LULUCF	<b>Green Jobs and Skills:</b> New professional body for the farming industry. Between 2021 and 2027, Defra will gradually reduce and then stop untargeted Direct Payments. Farmers will instead, receive public money for improving the environment, improving animal health and welfare and reducing carbon emissions. To achieve this, farmers will need new skillsets. The Government is contributing towards the establishment of a new professional body for the farming industry; The Institute for Agriculture and Horticulture (TIAH). TIAH is aimed at removing the fragmentation that exists within current learning and skills landscape for farming businesses. TIAH will drive improvements in industry capability – which will cover the skillsets required to deliver future Environmental Land Management objectives; including water and air quality, soil husbandry, woodland restoration and management, agroforestry and biodiversity. Alongside TIAH's work, we are also looking at the new skills and knowledge advisers may need to	TIAH is expected to formally launch in 2023 and their existence will then be ongoing.	This is in an industry initiative that won't directly deliver any additional carbon savings but will enable the delivery of agricultural transition policies that aim to deliver net zero.	We have high certainty in the delivery of this policy and its enabling impacts on other policies. TIAH are meeting all the deliverables of their grant agreement and are project to launch later this year as part of their 2023/24 funding agreement.	Green RAG rating Defra's grant manager is working closely with the TIAH team to ensure any issues are raised early and appropriate mitigation undertaken.

		support farmers and land managers towards these goals. Action is already being taken by the sector. For example, the Chartered Institute for Ecology and Environmental Management (CIEEM) has developed a competency framework and BASIS has recently launched an environmental adviser training module and register.				
99	Agriculture and LULUCF	<b>Green Jobs and Skills: Forestry Training Fund.</b> To meet afforestation targets, the Forestry Training Fund launched in February 2023 to provide practical training courses for new entrants and upskilling the existing workforce. With Forestry England, we are increasing the number of available apprenticeships including the launch of the Level 6 Professional Forester.	Started and ongoing.	The initiatives won't directly deliver any additional carbon savings but will enable the delivery of forestry policies that aim to deliver net zero, such as the afforestation targets	We have high certainty in the delivery of this policy and its enabling impacts on other policies - the Forestry Training Fund has opened for applications in February. Level 6 apprenticeships are already being delivered and provisions for Level 3 apprenticeships are on the way, though recruitment of technical trainers is proving challenging.	Mitigating actions are not currently required for this policy.
100	Agriculture and LULUCF	<b>Agriculture:</b> Consider the role of emissions targets to drive decarbonisation. Assess the role and efficacy of introducing agriculture specific emissions targets, such as targets split between individual greenhouse gases to drive decarbonisation across the agriculture and land use sectors.	We will consider whether an emissions target for agriculture would help to drive down emissions and will keep this under review.	Emissions targets, or targets split between individual greenhouse gases, could help us reduce emissions in the agricultural sector. This is an early-stage proposal and next steps have not yet been determined. The potential emissions reductions are contingent on further research.	Uncertain delivery risk The policy requires additional research to provide greater clarity on savings potential and to inform further policy development.	Further R&D is required to establish risk mitigation.
101	Agriculture and LULUCF	<b>Develop the evidence on agroecological farming systems and the potential of regenerative systems.</b> We are seeing farmers undertake such practices and are monitoring efficacy across farming. Defra's evidence programme encompasses R&D on the productivity, sustainability and wider trade-offs of agroecological farming systems including extensive livestock systems, which will inform future development. Many of the pathway measures delivered through the Environmental Land Management schemes align with agroecological practices, for example introducing cover crop.	R&D is ongoing as part of a long-term programme of work developing evidence to feed into policy on an ongoing basis.	This is an early-stage proposal, with next steps yet to be determined. Agroecological farming systems may promote farming practices that reduce Greenhouse Gas (GHG) emissions, such as reducing Nitrogen application and introducing clover into pasture, supporting delivery of the pathway. Although regenerative measures are considered within the pathway and delivered through the Environmental Land Management Schemes, there is scope for additional emissions reductions from farming practices promoted under agroecological farming systems once they are better understood.	Uncertain delivery risk The policy requires additional research to provide greater clarity on savings potential and to inform further policy development.	Further R&D is required to establish risk.

102	Agriculture and LULUCF	<b>Increase the use of robust Monitoring, Reporting and Verification of GHG emissions (MRV).</b> We will explore policies to increase the use of MRV across farm businesses as a mechanism to support improved understanding and behaviour change for decarbonisation. This will build on the recent UK ETS consultation call for evidence chapter which explored the use and application of MRV for the agriculture sector and ongoing research projects to examine opportunities to better harmonise and improve the robustness of emission reporting across farm, food, and drink businesses. We will develop a harmonised approach for measuring carbon emissions from farms and by 2024 will set out how farmers will be supported to understand their emission sources through carbon audits and take further actions to decarbonise their businesses.	We will develop a harmonised approach for measuring carbon emissions from farms by 2024.	This is an enabling policy that could support the delivery of carbon savings within existing net zero agriculture measures by improving sector level understanding of the source and scale of emissions on farms, and empowering farmers to deliver existing measures in order to decarbonise. This is an early-stage proposal and next steps have not yet been determined. The potential emissions reductions are contingent on further research.	Uncertain delivery risk: The policy requires further appraisal of options Other: Political risk	Further R&D is required to establish risk mitigation.
103	Agriculture and LULUCF	<b>Further incentives to encourage nutrient use efficiency.</b> Continue to monitor the effectiveness of current nutrient efficiency measures and market forces and consider development of policy levers to further enhance or strengthen delivery if needed e.g., through regulation.	We will continue to keep this enabler under review and implement if required.	This is an enabling policy which could support emissions reductions by encouraging a more efficient use of nutrients. This is an early-stage proposal and next steps have not yet been determined. The potential emissions reductions are contingent on further research.	Uncertain delivery risk: The policy requires further appraisal of options	Further R&D is required to establish risk mitigation.
104	Agriculture and LULUCF; Waste and F-gases	<b>Explore the role of carbon pricing strategies and trading markets as a mechanism to drive decarbonisation.</b> We will continue to review potential carbon pricing strategies for the agriculture and land use and waste sectors, including the potential role for voluntary or compliance carbon markets to support cost effective decarbonisation in these sectors.	We will continue to review whether carbon pricing will support cost effective decarbonisation. In 2022, we consulted on proposals to expand and improve the UK ETS. Details of next steps will be published in the Government Response.	This is an enabling policy that could support emissions reductions by encouraging uptake of net zero measures and practices. This is an early-stage proposal and next steps have not yet been determined. The potential emissions reductions are contingent on further research.	Uncertain delivery risk: The policy requires further appraisal of options	This is an early-stage proposal. Further policy development is required to properly assess and mitigate risks.

105*	Waste and F-gases	<b>R&amp;D to refine emissions estimates and explore further methane gas capture from landfill.</b> Landfill gas is collected and is used to generate electricity, oxidised through flaring or natural processes. Whilst current practices capture some landfill gas, there is room for improvement. Previous research has indicated that most methane is lost at operational sites through uncapped waste and around infrastructure, such as gas wells. Industry practise could reduce this leakage. There are also other smaller opportunities for improvements at closed but permitted sites.	This is ongoing early stage research at present, but with appropriate resource and progress we could expect activity in this area to increase and therefore, provided R&D results support the further development of this trajectory of travel, timeframes for carbon savings could be possible in the range 5-15 years.	This is emerging work and contingent on research but could support the more accurate measurement of landfill gas and enable exploration of opportunities to improve methane gas capture from landfill.	<p>Uncertain delivery risk At present we do not have a robust evidence base and adequate measurement of these emissions.</p> <p>Ensuring human resource availability and funding allocation going forwards will be critical to building this evidence base. As will collaborative working with DESNZ, and with regulators, to ensure evidence provides underpinning for future policy development.</p> <p>The measurement of methane emissions from landfill sites is not a current regulatory requirement and there is not a proven methodology as to how this can be achieved. There is therefore no current means of quantifying the issue or measuring the success of any intervention.</p> <p>We are currently developing methods of measuring methane at whole landfill level (for historic, recently closed and ultimately open landfill sites) moving us beyond modelled emissions to measurement.</p>	The EA and Defra have a number of pieces of work underway to identify monitoring techniques and requirements to support this work. The Environmental Services Association (whose members include the largest waste companies in the UK) are committed to capturing at least 85% of methane emitted from landfill by 2030 so our work will support industry's ambition.
106	Waste and F-gases	<b>Waste water: Research and Investment.</b> Water company research and investment into reducing process emissions from wastewater treatment plants, e.g. anaerobic treatment, membrane activated biofilm reactors, alternative ammonia removal processes and nature-based solutions.	This is ongoing but we expect activity to increase.	Improving the available evidence base on process emissions will enable government and industry to implement more effective policy and guidance, supporting reducing our emissions.	This is dependent on the water industry investing in the processes. It is market driven as there are no legislative requirements driving this.	Working closely with stakeholders to facilitate delivery. Water Companies also need to deliver on their public Net Zero commitment by 2030 Ofwat NZ position statement also makes clear to the industry what is expected of them.
107*	Waste and F-gases	<b>Raising ambition through additional actions identified by the review of F-gas legislation.</b> We are undertaking a review of F-gas policy in 2023 and will identify action to deliver additional emissions savings which we will then take forward as appropriate.	Providing legislation is secured, savings could begin in 5-10 years	Subject to passing suitable primary legislation, measures identified through the review of F-gas policy are likely to allow us to deliver greater emissions savings than our current projections although the extent of additional savings cannot at present be determined	<p>Uncertain delivery risk At present we do not have a robust evidence base and adequate measurement of these emissions. Ensuring human resource availability and funding allocation going forwards will be critical to building this evidence base. As will collaborative working with DESNZ, and with regulators, to ensure evidence provides underpinning for future policy development. The measurement of methane emissions from landfill sites is not a current regulatory requirement and there is not a proven methodology as to how this can be achieved. There is therefore no current means of quantifying the issue or measuring the success of any intervention. We are currently developing methods of</p>	The EA and Defra have a number of pieces of work underway to identify monitoring techniques and requirements to support this work. The Environmental Services Association (whose members include the largest waste companies in the UK) are committed to capturing at least 85% of methane emitted from landfill by 2030 so our work will

					measuring methane at whole landfill level (for historic, recently closed and ultimately open landfill sites) moving us beyond modelled emissions to measurement.	support industry's ambition.
108	Green Jobs and Skills	<b>We have established an Expert Committee on Critical Minerals to advise government and have published an updated list of these minerals to guide investment decisions.</b> A Critical Minerals Intelligence Centre has also been launched that will provide robust, dynamic analysis on stocks and flows to guide our decision-making. The Government has published a Critical Minerals Strategy on 22nd July setting out our approach to securing the technology-critical minerals and metals.	Ongoing - policy in effect	Increasing the resilience of global critical mineral supply chains supports the manufacturing of clean technologies globally. Securing the supplies of critical minerals can support the UK to play its part in manufacturing the technologies required for the NZ transition.	All deliverables completed on time. Critical Minerals Expert Committee has been established and continues to meet regularly; Critical Minerals Intelligence Centre launched on 4th July; Critical Minerals Strategy published on 22nd July	Mitigating actions are not currently required for this policy.
109	Green Jobs and Skills	<b>The Green Jobs Delivery Group (GJDG) -</b> A cross-cutting delivery group to include representatives from industry, the skills sector and other key stakeholders to oversee the development and delivery of the Government's plans for green jobs and skills. This group will drive action across the green skills agenda. We will set out further details on the membership and mandate of the cross-cutting delivery group later this year.  We will continue to encourage industry to ensure there is equal opportunity for all to work in the green economy, building on our existing support for industry initiatives. Through the cross-cutting delivery group we will explore what actions can be taken across industry to improve diversity in the green economy, including improving data collection and transparency.	Policy in effect	The Green Jobs Delivery Group is supporting the delivery of policies which help to deliver net zero and reduces risks to delivering our Carbon Budgets. For example, it can accelerate or extend the savings achieved across its work plan.	We have high certainty in the delivery of this policy and its enabling impacts on other policies. We have also established three task and finish groups on Power and Networks, Local Capacity, and Nature Skills.	Mitigating actions are not currently required for this policy.

110	Green Jobs and Skills	<b>The Skills for Life campaigns</b> - raises awareness of education, training and skills options, including those that can lead to green careers, inspiring young people (14-19) and adults (primary audience is adults aged 25 to 44 years old, C2DE, secondary audience is working age population, C2DE, in England) to work in the green economy. This campaign supports Net Zero by promoting green careers in its images, content and case studies - along with other shortage and priority sectors.	2023	<p>The user journey for people exploring, applying for and taking up skills offers is not linear and delivered across multiple partners.</p> <p>Government cannot track a customer journey from initial interaction with the campaign to take up of skills offers, completion and employment. We are exploring whether it is possible to track awareness and consideration of qualifications and jobs that would contribute to net zero although this may not be possible to effectively track qualitatively due to the complexity of the 'green' sector and the numbers of jobs that could contribute to net zero.</p> <p>We are exploring how to gather demand-led data which could be fed into an assessment of campaign effectiveness. While this data will shed light on what is happening on the ground, we would not be able to directly link the campaign to any of this data due to the incomplete customer journey and the fact it is impossible to demonstrate the additionality of comms vs other interventions.</p>	<p>The joined up campaigns need to deliver multiple priorities which can cause some conflict with message hierarchy and affect our ability to focus on core messages that will cut through in order to have an impact.</p> <p>If too many messages are prioritised then it is more challenging to have an impact due to the funding/time restrictions and the bandwidth of our audiences to engage.</p>	We will work closely with industry and education providers to ensure campaign messaging is effective and reflects priorities.
111	Green Jobs and Skills	<b>Delivery of Sustainability Strategy by Department of Education (published April 2022)</b>	2021 (to2030)	<p>The strategy will support meeting of carbon budgets in the following ways:</p> <ol style="list-style-type: none"> <li>1. Enabling cross government net zero policy by providing a pipeline of learners prepared for the net zero economy.</li> <li>2. Stimulating behaviour change in learners and thus the local communities via initiatives such as the Climate Action Award, Climate Action Plans and the National Education Nature Park.</li> <li>3. Reducing the carbon emissions from the operations of the education system (36% of total public sector emissions).</li> </ol>	Risks to the delivery of the strategy include the capacity of the education sector to engage with net zero initiatives; the limited funding available to go beyond the immediate condition needs of schools, and resource pressures/reductions within the Department's Sustainability and Climate Change Unit.	Prioritisation of key projects to ensure the delivery of headline projects (Nature Park, Climate Action Plans and Reporting and Decarbonisation work)
112	Green Jobs and Skills	<b>Introduce a national education nature park and award scheme</b>	Moving into national rollout from September 2023	Enables children and young people to develop skills needed for their future studies and careers and to ensure that they factor in climate change and sustainability in their work going forward. By studying for the Climate Action Award, children and young people will be developing new skills needed in Net Zero industries.	We have high certainty in delivery as the supporting contracts with the providers have been let and they are high profile and experienced e.g. Natural History Museum.	If there are delays, we can adopt a phased approach to roll out, targeting only sectors or regions of the education estate first.

113	Green Jobs and Skills	<p><b>Employer-led Local Skills Improvement Plans (LSIPs)</b> are bringing together employers and providers (e.g., further education colleges) to identify skills priorities. The Skills and Post-16 Education Act 2022 places LSIPs on a statutory footing and the Secretary of State for Education may only approve a LSIP if satisfied that the skills, capabilities, or expertise required in relation to jobs that contribute to or support Net Zero targets, adaptation to climate change and other environmental goals, have been considered in the development of the plans. We have now designated employer representative bodies (ERBs) to lead on the development of LSIPs in all 38 areas of England.</p> <p>The Strategic Development Fund (SDF) provides capital and programme funding to enable FE providers in an area to support changes in local facilities and provision so as to better meet the needs of employers, as set out in LSIPs.</p>	<p>LSIP Trailblazers took place during 2021-22 FY. National rollout of LSIP programme began September 2022 with LSIPs to be signed off by SoS by summer 2023. Once rolled out, policies are ongoing, with plans drawn up over 3 year cycles.</p>	<p>This will support more people to retrain, develop skills, grow an interest in and gain qualifications in jobs that are directly or indirectly linked to the NZ transition (e.g. Wind Turbine Maintenance, Electrical Install, bio science). This will help limit supply chain constraints thereby de-risking delivery of existing policies.</p>	<p>We have high certainty in delivery of the policy. Employer representative bodies (ERBs) have been designated to lead on the development of LSIPs in all 38 areas of England and are engaging and working with employers, providers and other stakeholders to develop LSIPs. The 18 SDF pilot areas have now completed their projects and the 41 SDF2 projects across all LSIP areas of England will complete by the end of March 2023.</p>	<p>We are working to ensure that LSIPs are finalised over the summer, and are investigating ways to deliver the Local Skills Improvement Fund (LSIF), which will build on the Skills Development Fund.</p>
114	Green Jobs and Skills	<p><b>Careers</b> - we will continue to build an integrated careers information, advice and guidance offer to raise awareness of different career pathways in low-carbon sectors</p>	<p>Ongoing - policy in effect</p>	<p>Awareness raising of opportunities in green jobs and skills through the provision of careers information, advice and guidance, supports uptake of new and growing opportunities within the green skills economy. By creating a more informed workforce in this area, it will help limit supply chain constraints thereby de-risking delivery of existing policies.</p>	<p>This offer will incorporate schools, colleges, universities, employers, the National Careers Service, DWP employment support and local government. Careers advisers provide independent, professional advice on careers, skills and the labour market, and can play an important role in alerting customers, including workers in the high-carbon sector, to the range of green jobs available locally. The risk would be that careers advisers and careers leaders in schools would not be aware of the roles within the high-carbon sector and green jobs. We are also reliant on employers or sector bodies providing information on what roles might entail.</p>	<p>Continue to make careers advisers and careers leaders aware of the opportunities available within these sectors to enable them to share information.</p>
115	Green Jobs and Skills	<p><b>Further education teaching</b> - we have worked with employers to <b>develop a refreshed occupational standard for Further Education teaching</b> (included in the Level 5 Learning and Skills Teacher Apprenticeship), which came into effect in September 2021.</p> <p>This occupational standard will form the basis of future FE teaching qualifications, confirming that from 2024 all FE trainee teachers, not just apprentices, will embed and promote these issues across their teaching, in all subject areas.</p>	<p>The revised Learning and Skills Teacher Apprenticeship Standard was made available for delivery in September 2021.</p>	<p>Future skills supply will be supported as all new FE teachers will have a good level of understanding of sustainability in relation to their technical and vocational subject. Future FE teachers will be able to ensure that sustainable knowledge and practices underpin their teaching and they will be well positioned to support emerging skills.</p>	<p>We have high certainty in the delivery of this policy. The Occupational Standard was published in autumn 2021 and will be the basis of future FE teaching qualifications.</p>	<p>Mitigating actions are not currently required for this policy.</p>

		This means that future learners in FE will receive training relevant to new developing growth sectors. This will support future skills supply by ensuring that all new FE teachers have a good level of skill and understanding in relation to teaching on sustainability.				
116	Green Jobs and Skills	<b>Green Apprenticeships and Technical Education Advisory Panel</b> - The Institute for Apprenticeships and Technical Education (IfATE) has convened a Green Apprenticeships and Technical Education Advisory Panel (GATE-AP) to work with employers to align occupational standards to net zero and wider sustainability objectives.	CB4 Target to have greened all in scope occupational standards by March 2024. Processes are being updated to ensure environment and climate change Knowledge, Skills and Behaviourss are considered as business as usual.	By updating occupational standards to include environment and climate change , people undertaking apprenticeships and other technical education qualifications will be able to apply their learning to work in sectors which contribute to delivery of the carbon budget and help to make sectors which are les directly linked to carbon budgets function more sustainably.	We have high certainty in the delivery of this policy and its enabling impacts on other policies as IFATE has already greened 50% of the standards in sectors prioritised by the Green Jobs Taskforce.	Mitigating actions are not currently required for this policy.
117	Green Jobs and Skills	<b>Continue to roll out T levels which support green careers</b> - there are three Construction, and three Engineering, Manufacturing T Levels now in live delivery and Agriculture is in development for September 2023.	There are three Construction, and three Engineering and Manufacturing T Levels now in live delivery and Agriculture is in development for September 2023.	This policy will contribute to meeting the latest environmental and climate change skills needs. Increasing quantity and quality of green careers will help limit supply chain constraints thereby de-risking delivery of existing policies.	Funding remains the key risk for any future Green/sustainability related T Levels which are identified as required but are in addition to those already budgeted for.	Continued engagement across Whitehall to shape T level design and funding.
118	Green Jobs and Skills	<b>Higher Technical Qualifications (HTQs)</b> - started rollout from September 2022. These are existing and new level 4/5 qualifications approved and quality marked by IfATE as aligning to the skills demanded in the workplace by employers, including for green occupations. Digital HTQs are available for teaching this academic year with additional occupational routes coming on stream up to 2025.	Cycle 2 of rollout which also covers Construction and Health & Science (in addition to Digital) will begin teaching in September 2023.  Qualifications approved in cycle 3 will be available for teaching from	HTQs are important to meeting carbon budgets as roll-out up to 2025/26 will continue to broadly align with government priorities, supporting the development of level 4/5 skills aligned with the transition to net zero.	There has been significant progress across the programme. This is, however, a long-term reform programme (over the course of roughly 10 years), and delivery is still at an early stage. Reversing the long-term decline in level 4/5 learner numbers remains challenging.	Stakeholder engagement with awarding bodies continues and new HEIs/FECs are coming forward in each cycle. Funding from the Growth Fund, Skills Injection Fund, Strategic Priorities Grant and other funding pots are building capacity and capability among

			September 2024, covering an additional 4 occupational routes (7 in total).  Qualifications approved in cycle 4, will be available for teaching from September 2025, covering an additional 6 occupational routes (13 in total).			providers. HTQs feature in cross-Government campaigns to drive up demand among learners and employers. These measures, along with the rest of our reform programme, give us confidence that HTQ rollout will be delivered successfully.
119	Green Jobs and Skills	<b>Institutes of Technology</b> - the Network of 21 Institutes of Technology (IoTs) across England are working alongside industry leading employers to deliver higher level technical provision in key STEM subjects such as manufacturing and engineering, construction and digital.  The extent to which each IoT delivers green skills provision as part of their curriculum is determined by the IoT itself and is dependent on the skills needs of employers in the area they serve.	Wave 1 IoTs are already in delivery, 7/9 wave 2 lots are expected to commence delivery from September 2023.	The provision delivered by IoTs links to employment in green jobs across a wide range of sectors, supporting the transition to net zero and the wider net zero system.	We have high certainty in the delivery of this policy and its enabling impacts on other policies, the unique nature of IoTs working with local employers to meet local need, including delivering green skills, and net zero.	IoT continue to work closely with local employers to understand and react/ respond to local skills to develop a workforce to support the UK's journey to net zero. We also continue to work with employer stakeholder bodies, OGDs and organisation to increase awareness of the IoT programme.
120	Green Jobs and Skills	<b>Skills Bootcamps</b> - providing free, flexible courses of up to 16 weeks for people to retrain and upskill at Levels 2-5 in skills supporting the green economy, including building retrofit, solar and wind, heat pump installation, forestry and arboriculture, electric vehicle maintenance and repair, and charge point installation.	The policy is ongoing, however its next iteration is under review.	Skills Bootcamps support Carbon Budget delivery through the provision of training, and employment, in green sectors and roles that support the reduction of emissions and the transition to net zero. Examples include upskilling workers into job roles that support greater energy efficiency in domestic and commercial buildings, and to work with green technologies that contribute to the lowering of carbon emissions.	There is a risk that learners and employers will be unable or unwilling to engage with Skills Bootcamps in Green Skills.	Building on insights from previous delivery, enhanced employer engagement strategy, and delivering an offer that has the flexibility to address challenges and to be applicable to a range of learners.
121	Green Jobs and Skills	Through the NSF we are <b>funding an Emerging Skills Project in electrification and battery technology</b> , which commenced in June 2021. We are exploring options to develop the Emerging Skills Programme further, to stimulate the provision and demand for cutting-edge skills in key technologies and sectors such as green construction.	The policy is in current delivery (started April 2021) and has funding cover within the current SR period .	The policy supports green jobs across a wide range of sectors, supporting the transition to net zero and the wider net zero system.	As there will be no more end to end pilots being undertaken by the ESP team, there is a need to collaborate and work alongside other teams in the DFE and OGD's, this is likely to have an impact on the overall outcomes due to differing priorities for the relevant teams/departments.	Emerging Skills Programme Team is currently reviewing its options in relation to emerging technologies and thereby emerging skills.

122	Green Jobs and Skills	<p><b>Free Courses for Jobs</b> - provides adults without an existing full level 3 the opportunity to gain one by studying one of over 400 high value qualifications.</p> <p>In addition, adults who meet the definition of being unemployed or the low wage criteria can also access these qualifications for free, regardless of their prior qualification level.</p> <p>Some qualifications are available to study online or part-time and those eligible may be able to get support to pay for childcare, travel, and other costs.</p> <p>Free Courses for Jobs includes various qualifications supportive of the green economy; a list was published in 2021 alongside the Green Jobs Taskforce report.</p>	The policy is in current delivery (started 2021) and has funding cover within the current SR period.	Whilst FCFJs is not primarily a net zero focused delivery policy, it will support more people to retrain, develop skills and gain qualifications in jobs that are directly or indirectly linked to the NZ transition (e.g. Wind Turbine Maintenance, Electrical Installation).	<p>We have high certainty in the delivery of this policy and its enabling impacts on other policies. FCFJs has seen over 35,000 enrolments on L3 courses since it began and there is a high possibility some of these enrolments may have been to pursue qualifications that led to employment or progression in green sectors and roles.</p> <p>We may consider making more qualifications and sector subject areas relating to Green Skills/Jobs eligible in this offer if there is a local/national need in future.</p>	Mitigating actions are not currently required for this policy.
1234	Green Jobs and Skills	<p><b>STEM subjects</b> - we are encouraging more students into STEM subjects throughout primary and secondary education. To do this, we are funding several initiatives to support STEM teaching and uptake, such as support for teaching about climate change as part of the curriculum. We are encouraging a diverse range of students to take up STEM subjects through programmes such as Tomorrow's Engineers Code which showcase the diversity of roles and people that make up the STEM sector.</p>	This policy covers a range of short, medium, and long-term interventions which feed into the National Science and Technology Council's aim of making the UK a 'science superpower' by 2030.	Increasing the uptake of STEM skills throughout primary and secondary education will impact the supply of skills relevant to green jobs in STEM sectors, indirectly supporting the transition to net zero and the wider net zero system.	The supply of skills is a critical enabler of the UK's science and technology ecosystem. Failure to develop a workforce with the right skills - including STEM skills linked to green jobs and net zero - will jeopardise our ability to make the UK a science superpower by 2030. The main risks to this enabling policy are an insufficient supply of STEM teachers and a lack of diversity within the range of students taking up STEM opportunities. These risks require attention; however, they appear resolvable based on the actions already underway.	Actions already underway to mitigate these risks include: funding bursaries and scholarships to encourage potential teachers to train to teach STEM subjects; providing a 'levelling up premium' for STEM teachers in eligible secondary schools to support retention; encouraging a diverse range of students to take up STEM subjects through programmes such as Tomorrow's Engineers Code.
124	Green Jobs and Skills	The Department for Work & Pensions are considering <b>how government can work more closely with sectors in the future to support them in the green transition</b> , and we are identifying where we can adapt and enhance our support for people at risk of redundancy to support a transition to green jobs.	2018-2022	Improvements in DWP's ability to support people into green jobs will help to ensure recruitment demand in green industries is met as these sectors grow to help deliver the net zero transition. Providing support for workers in at-risk jobs to move into new roles will also mitigate against the risks of Carbon Budget delivery, as high emission sectors decline.	There is not an agreed universal approach to defining and measuring green jobs which limits the data available to inform policy and operational delivery.	<p>The Green Jobs Delivery Group has recognised this risk, including in its Terms of Reference the objective to 'build on the work of the Green Jobs Taskforce to develop a clearer understanding of the green economy and how to define and measure it.'</p> <p>We have also been supporting ONS who have been funded by HM Treasury's Economy</p>

						Data Innovation Fund to undertake a dedicated project on defining green jobs and producing statistical and analytical outputs.
126	Green Jobs and Skills	<b>Defra are in the process of commissioning an R&amp;D project to assess the size of the wider restoration sector</b> and the level of growth it needs to undergo in order to meet our restoration targets. This will include looking at green skills routes into the sector.	CB4	The jobs and skills initiatives will enable the delivery of peat restoration targets as part of the delivery of net zero.	Uncertain delivery risk: The policy requires additional research to provide greater clarity on the scale of workforce required to deliver.	Government is in the process of commissioning an R&D project to assess the size of the wider restoration sector and the level of growth it needs to undergo in order to meet our restoration targets. This will include looking at green skills routes into the sector. In the short term currently scoping options for restoration training sites on public land. We are also looking to move peat restoration to ELM so we have longer time frame funding commitments to provide confidence to the sector to invest in equipment and training.
128*	Local NZ	<b>Local Net Zero Hubs Programme:</b> supports all areas of England to reach net zero by promoting best practice and supporting local authorities to develop net zero projects and attract commercial investment.	Ongoing - policy in effect	Local authorities play an essential role in driving and accelerating action to tackle climate change with significant influence in energy, housing, and transport. Local authorities are directly responsible for only 2-5% of local emissions through their own estates and operations, but they have potential to influence up to around 80% of all UK emissions. Local authorities can also attract private sector net zero investment that wouldn't otherwise be obtained, supporting local supply chains with new and upskilled local jobs. Local authorities can therefore play a key role in supporting the delivery of our national net zero targets across a number of sectors.  The Local Net Zero Hubs Programme supports all areas of England with their capacity and capability to reach net zero	We have high certainty in the delivery of this policy as the Hubs are well established.	We will continue to monitor the programme on an ongoing basis.

				by supporting local authorities to develop net zero projects and attract commercial investment to accelerate net zero delivery.		
129	International	The UK has responded to the Glasgow Climate Pact by <b>revisiting its 2030 Nationally Determined Contribution (NDC) and strengthening it with information on delivery</b> of our target to reduce all greenhouse gas emissions by at least 68% by 2030 on 1990 levels.	Present - 2030	"The 2030 NDC is more ambitious than Carbon Budget 5 and in response to the Glasgow Climate Pact, was strengthened by making the following updates: <ul style="list-style-type: none"> <li>• clarified how the target aligns with the Paris Agreement temperature goal;</li> <li>• explained more fully how the UK will deliver the NDC by 2030;</li> <li>• updated on the progress made in expanding the territorial scope of the NDC to include the UK's Crown Dependencies and Overseas Territories; and</li> <li>• included more detail on the UK's approach to levelling up, gender, green skills, public engagement, Just Transition and how the UK is supporting other countries with delivery of their NDCs. "</li> </ul>	Outcome completed - communicated our revisited NDC on 23 September 2022 to the UNFCCC	Mitigating actions are not currently required for this policy.
130	International	Build on our G7 and COP26 Presidencies and COP campaigns to <b>strengthen collaboration in key sectors</b> . Utilise bilateral relationships (and extensive climate attaché network) and multilateral fora to <b>develop strategic partnerships on climate action</b> , including through G20.	This is an ongoing commitment with much of the work driven by regular multilateral and bilateral governance (eg annual COPs underpinned by intercessionals throughout the year). The effects of this work will last indefinitely but we are focusing particularly on driving action this decade to keep 1.5 degrees within reach	Promoting greater international ambition and coordination across climate and energy policy supports our Net Zero Strategy by addressing multiple issues and making decarbonisation faster and cheaper for all, offering opportunities for growth and trade. As the impacts of UK action on international decarbonisation are not possible to quantify, it is not possible to quantify the potential impact o UK emissions.	Most risks to UK international action reflect the fact that the impact of our initiatives will depend on decisions made by other governments and entities so are not within our control. With the passing of our COP26 Presidency domestic leadership and progress will remain important for our international influence.	Regarding our ability to influence others, we use all UK levers at our disposal e.g. climate finance, diplomacy etc.

131	International	<p><b>Published a refreshed Export Strategy</b> to outline how we are advocating for extended export support to green energy initiatives and more green innovation in the export market for the period 2021-2024.</p> <p>In the first year of the strategic period, UK Export Finance (UKEF) has: introduced variants of its existing products which offer low carbon exporters access to increased lending capacity, with extended repayment terms; estimated its financed emissions across its full portfolio and set ambitious 2030 decarbonisation targets for the oil and gas, and power sectors, which will guide UKEF on its pathway to net zero by 2050; and continued to demonstrate international leadership on climate change, such as by supporting peers in their implementation of the COP26 statement to end public support for the fossil fuel energy sector overseas (the government's fossil fuel policy), and by becoming the first export credit agency in the world to offer Climate Resilient Debt Clauses (CRDCs) in its direct sovereign lending.</p>	2021 - 2024	UKEF support can unlock finance for green exports and investment. This supports HMG's net zero by 2050 ambitions, by growing industrial capacity in new technologies, and the Export Strategy ambition to increase exports to £1 trillion by 2030.	We have high certainty in the delivery of this policy and its enabling impacts on other policies. There are two small external risks that the policy is dependent on wider government work (UKEF support is demand-led, and therefore depends fundamentally on the shape of the UK supply chain, which in turn is affected by wider government priorities and policies/strategies, as well as the economic environment more broadly), and any reductions in global or domestic climate ambition could limit how much finance is unlocked.	Mitigating actions are not currently required for this policy.
132	International	<p><b>Champion UK priorities for integrated international climate and nature action</b> over the coming decade in a cross-governmental strategic framework (anticipated Q1 2023).</p>	Present - 2030	The Strategic Framework for International Climate and Nature Action sets out how Government will continue to drive forward ambitious international climate and nature action to 2030. It brings together existing Government international policy on climate and nature for the first time. As this is an internationally focused framework the main impacts are expected to be on emissions in other countries. However, supporting faster international action - for instance in innovation, research and deployment - could potentially have positive spill overs globally and in the UK e.g. helping to reduce costs and speed up low carbon deployment.	Most risks to UK international action reflect that the impact of initiatives will to a large extent depend on decisions made by other governments and entities. Domestic leadership and progress will remain important for the UK's international influence.	We use all UK levers to influence e.g. climate finance, diplomacy, international initiatives etc.
133	International	<p>The UK will seek to <b>increase and facilitate trade in green goods and services through our trade policy, our pipeline of free trade agreements (FTAs) and our seat at the World Trade Organization (WTO).</b></p> <p>We will seek to reaffirm our commitment to the Paris Agreement in all UK trade agreements, and will ensure that they preserve our regulatory autonomy to pursue our climate targets.</p> <p>We will use our multilateral fora to galvanise</p>	Ongoing - policy in effect	<p>Trade can help support the growth of the global market for priority sectors identified in the Net Zero Strategy - zero emission vehicles and renewables are particularly trade-exposed sectors with global supply chains.</p> <p>While the UK enjoys regulatory sovereignty, agreeing clarificatory text under FTAs offers some additional protections for measures required to meet net zero targets, in the event of a trade dispute.</p>	<p>We have high certainty in the delivery of this policy and its enabling impacts on other policies. The UK has an active trade policy programme that seeks to remove barriers to trade in low carbon sectors and stimulate UK exports, and to advocate to address climate change within the multilateral trading system.</p> <p>We have protected our right to regulate and reaffirmed our MEA commitments in FTAs with Australia and New Zealand, and have a mandate to do the same in upcoming</p>	We are working with all negotiating partners to demonstrate the mutual benefits of removing barriers to green trade, and engaging multilaterally across developed and developing countries, including those who have not previously engaged in multilateral discussions.

		international partners to adopt climate-ambitious trade policy, and to promote global trade rules that are aligned to net zero and the Paris Agreement.		Trade is an important enabler across priority net zero sectors. Changing trade patterns will also play an important role in reducing deforestation and preventing carbon leakage.	trade agreements with India, Canada, Mexico, the Gulf Cooperation Council and Israel.	
134	International	<b>Publication of the UK International Climate Finance Strategy</b> brings together the collective ambitions for ICF of DESNZ, FCDO and DEFRA, and reaffirms our international commitment to double ICF spend on 2019 levels, to £11.6bn in the period from 2021/22 to 2025/26. The strategy also shows how we are delivering on the ICF sub-targets which we have announced publicly, on nature adaptation, and innovation.	FY21/22-25/26 - Strategy speaks to how it contributes to 2030 UK objectives and 2030 UN Sustainable Development Goals	This investment will support low and lower-middle income countries to increase their level of ambition in their NDCs, including by investing more in the protection and restoration of critical ecosystems, such as forests, peatland and marine habitats which are major carbon sinks. A more ambitious global effort could reduce the cost of certain low carbon technologies more quickly, catalysing and de-risking our own transition.	We have legally committed to ICF spend under Paris Agreement. However, reduction of ODA to 0.5% of GNI coupled with pressures on ODA budget from Ukraine refugee costs present material risks to meeting the £11.6bn commitment	We are currently reviewing ODA spend to ensure optionality on ultimate solution.
135	International	Following the adoption of the Just Transition Declaration at COP26, the UK will focus on the <b>implementation of this framework</b> to support developing countries and emerging economies to accelerate climate ambition and enable a global green recovery	International declaration that has taken effect indefinitely. We intend to include information on Just Transition efforts, where relevant, in our national Biennial Transparency Reports in the context of reporting on our policies and measures to achieve our Nationally Determined Contributions	Just Energy transitions supports the greening of the economy in a way that is fair and inclusive.	The UK authored International Just Transition Declaration was signed by key donor countries, covering a large proportion of global international public financing, to support the conditions for a just transition internationally. We will work with our international partners to embed these principles in our international climate and broader funding streams, recognising our role in supporting a just transition internationally and its ability to be a key driver to enable faster action.	Through our various engagement channels we continue to highlight the importance of international collaboration on just transition and implementation of the just transition declaration. This includes championing through the Breakthrough Agenda.
136	International	<b>Commitment to monitoring the impacts of our climate and clean energy policies</b> to assess the need for targeted support for disproportionately impacted groups. This will include working to advance gender equality and diversity in the clean energy sector, for example through our commitments under the 'Equal by 30' Campaign to work towards equal pay, equal leadership and equal opportunities for women in the clean energy sector by 2030.	By 2030	A gender diverse energy sector is vital for driving energy transition	The UK is working to meet the commitments under Equal by 30, for example by tracking gender distribution of employees in BEIS and in Government, publishing data on representation, taking a mainstreaming approach to gender in energy policy-making, taking action to reduce the gender pay gap.	The UK is working with international organisations like the International Energy Agency to strengthen work on gender equality and diversity in the energy sector. The UK supports the POWERful Women initiative and other energy sector

						groups in their work towards increasing gender equality in the clean energy sector.
137	International	We will <b>support increased climate finance flows to developing and emerging markets to finance the transition to net zero</b> , this includes delivering on our commitment to provide £11.6 billion International Climate Finance. As part of this HMG is increasing investment to £3 billion in nature-based climate solutions which offer co-benefits for biodiversity and so support delivery of the Global Biodiversity Framework.	Total ICF spend of 11.6Bn is committed to the period 2021/22-2025/26. DESNZ has approx 20% share of this budget.	This investment will support low and lower-middle income countries to increase their level of ambition in their NDCs, including by investing more in the protection and restoration of critical ecosystems, such as forests, peatland and marine habitats which are major carbon sinks. A more ambitious global effort could reduce the cost of certain low carbon technologies more quickly, catalysing and de-risking our own transition.	Greater global public finance is needed to meet mitigation and adaptation finance needs and the private sector is often reluctant to invest in climate solutions which haven't yet reached full market maturity, and this is particularly the case in EMDE's where a whole host of other investment barriers persist, such as: challenging planning, policy, regulatory, and institutional environments; limited investment opportunities; lack of scale; unclear ESG, SDGs, and Paris alignment; and Limited standardisation of infrastructure transactions.	We are working across HMG to develop a Delivery Plan for the £11.6bn to ensure the commitment remains within reach, despite ODA pressures.  At COP26 the UK announced a £576m ICF funding package to mobilise private climate finance to EMDEs. The UK is also playing a leading role in the South Africa Just Energy Transition Partnership and further partnerships to be announced at CO27.
138*	International	Following ICAO's adoption of Net Zero by 2050 as its long-term aspirational goal, continue to <b>use UK influence through the forum to push for the strengthening of existing measures</b> such as CORSIA and agree further measures, such as a global target for sustainable aviation fuels.	2022	This policy would support reductions to UK aviation emissions (both domestic and international), e.g., through increased use of SAF. It cannot be quantified at present as it is not known what can be achieved through international agreements, but further developments are likely.	The UK is among the most ambitious states in aviation decarbonisation, therefore agreeing global measures that will enable global sector to decarbonise will come with trade-offs. It also requires broad global consensus which the UK cannot achieve alone.	The UK's international influence will be applied through all available channels to secure the most ambitious possible agreements through ICAO and, where helpful, other fora.  We will engage bilaterally with other states to assist in implementing aviation decarbonisation policies to demonstrate that they are feasible and maximise both environmental impact and benefit to the UK.
139	Embedding	<b>Lay legislation on 'Improving Consumer Experience of Public Charging'</b>	CB4	Support the transition to zero emission vehicles and roll-out of supporting infrastructure.	The main risk is that regulations will not be approved by Parliament through the affirmative laying process.	We are continuing to work with other Departments, communicating with stakeholders and updating Ministers on progress. It is highly likely regulations will be

						approved in the as-is state of the draft.
140	Embedding	We have <b>established the Domestic Economic Affairs (Energy, Climate and Net Zero) Cabinet Committee</b> - DEA(ECNZ) which places net zero and climate more broadly at the heart of government decision-making.	CB4	The Cabinet Committee sits at the apex of internal Government governance structures. As such it indirectly supports all quantified policies - it does this through progress monitoring, direction setting and decision-making.	We have high certainty on the delivery of this policy and the enabling impacts it has on other policies. We work closely with CO colleagues to ensure that the Committee has the information it needs and is discussing the most pertinent issues.	Mitigating actions are not currently required for this policy.
141	Embedding	<b>Revision to HMT Green Book Guidance</b> , including on transformational change and upcoming changes to carbon valuation in policy appraisal.	CB4	This policy supports the delivery of Carbon Budgets by giving policy officials the tools to fully consider and appraise climate change and emissions when creating policy. Proper appraisal and evaluation of emissions will ensure ministers have high quality advice on costs and benefits when deciding between policy options, increasing the quality of decision making and - ultimately - policy outcomes for the UK.	In January 2023, the Department for Business, Energy and Industrial Strategy, published updated Supplementary Guidance to the Green Book to reflect the latest evidence and the UK's net zero target. This provides practical information on embedding carbon methodologies and on the effectiveness of climate change policy.  We have high certainty in the enabling impacts of this mechanism on other policies and continue to reinforce its effectiveness by holding teach-ins and training sessions to equip policy officials with the skills and knowledge to undertake evaluations and appraisals.	Mitigating actions are not currently required for this policy.
142	Embedding	HMT <b>set requirements at Spending Review 2021 for major bids to be assessed according to their climate and environmental impact</b> , and has published data on the environmental impacts of SR21. HMT continues to improve this methodology and to work with departments to build capacity and capability. HMT also now requires all measures at budgets to have climate impact assessments.	CB4	This policy supports the delivery of Carbon Budgets by ensuring that the climate impacts of spending bids are considered as part of the Spending Review process led by HMT. This ensures that net zero is embedded into fiscal decision-making processes.	This was delivered as part of Spending Review 21, therefore, we have high certainty in the enabling impacts of this mechanism on other policies. HMT continues to work with departments across government to ensure that the methodology and capability to carry these assessments is as robust as possible, and to improve the quality and coverage of their emissions impact data.	Mitigating actions are not currently required for this policy.
143	Embedding	<b>Greening Government Commitments</b> to reduce emissions from the estates and operations of central Government and their partner organisations	The current set of GGC targets cover the period 2021-25, and so fall into CB3 (2018-2022) and CB4 (2023-2027)	This policy provides government departments and their partner organisations with targets to reduce their emissions. This will help these organisations to decarbonise and ultimately helping to meet Carbon Budgets.	These risks require attention, however appear resolvable based on the actions already underway. The commitment encourages central government organisations and partner organisations to decarbonise more quickly than would otherwise be the case.	Emissions reduction targets provide government departments and their partner organisations with a clear goal for decarbonisation. We are confident that these targets will engender greater action to support decarbonisation progress.
144	Embedding	<b>National Procurement Policy Statement</b> sets out clear principles that contracting authorities should be following organisationally, with net zero being one of the key considerations.	CB4	This policy encourages the consideration of net zero in public procurement, aiming to ensure that contracting authorities factor in net zero as they undertake procurement activities. This policy ensures net zero is embedded into the wider public	We have a high certainty on the delivery of this policy and the enabling impact it has on other policies. This Policy Statement should become a statutory requirement in the near future.	Mitigating actions are not currently required for this policy.

				procurement ecosystem, working in tandem with other policies to leverage public procurement spending in support of net zero.		
145	Embedding	<b>Carbon Exclusion Measure Procurement Policy Note</b> requires suppliers bidding for major government contracts (>£5m) to commit to net zero and publish a 'Carbon Reduction Plan'.	CB4	This policy ensures that suppliers bidding for major government contracts commit to net zero and publish a carbon reduction strategy. This helps to ensure that the government is procuring with suppliers committed to net zero.	We have a high certainty on the delivery of this policy and the enabling impacts it has on other policies. It has already helped to ensure £187.5bn of procurement contracts have gone to suppliers committed to net zero between September 2021 and February 2023.	Mitigating actions are not currently required for this policy.
146	Embedding	<b>Environmental principles policy statement:</b> impact on net zero. The Environment Act 2021 makes sure that environmental considerations are at the heart of government policy making, by creating a legal duty on Ministers of the Crown to have due regard to the environmental principles policy statement when making policy. The five internationally recognised principles are: integration, prevention, rectification at source, polluter pays, and the precautionary principle. The policy statement is designed to set out how the principles should be interpreted and proportionately applied. The final environmental principles policy statement was published on 31 Jan 2023. Following an implementation period, the duty will come into force on 01 Nov 2023.	The final Environmental Principles Policy Statement was laid before Parliament on 31 January 2023. The duty to give due regard to the statement will commence on 01 Nov 2023.	The Environment Act 2021 places a legal duty on Ministers of the Crown to have 'due regard' to the environmental principles policy statement (EPPS) when making policy. We published the final EPPS in Jan 2023. The EPPS explains how Ministers of the Crown should interpret and proportionately apply the five environmental principles when making new or revised policy. Its publication will help to further embed net zero (as it is a core component of the overall EPPS framework) into government policymaking. It will come into force on 1 November 2023. This will help support the transition to net zero and delivery of Carbon Budgets.	We have high certainty in the enabling impacts of this mechanism on other policies. The duty will legally come into force on 1 November 2023. Policy made on and after this date will be in scope of the new duty.	Defra is working across government to help policy makers to consider the policy statement during relevant policy development, before the duty comes into force.

