



Department for
Energy Security
& Net Zero

Energy and emissions projections 2022-2040

Summary of update

October 2023



© Crown copyright 2023

This publication is licensed under the terms of the Open Government Licence v3.0 except where otherwise stated. To view this licence, visit nationalarchives.gov.uk/doc/open-government-licence/version/3 or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or email: psi@nationalarchives.gsi.gov.uk.

Where we have identified any third-party copyright information you will need to obtain permission from the copyright holders concerned.

Any enquiries regarding this publication should be sent to us at: emissionsprojections@energysecurity.gov.uk

Contents

1	Executive summary	4
2	Introduction	5
3	Updates to the projections	6
4	Changes to the projections	7
5	Energy and emissions projections and the Carbon Budget Delivery Plan Baseline	8
6	List of supporting material	10

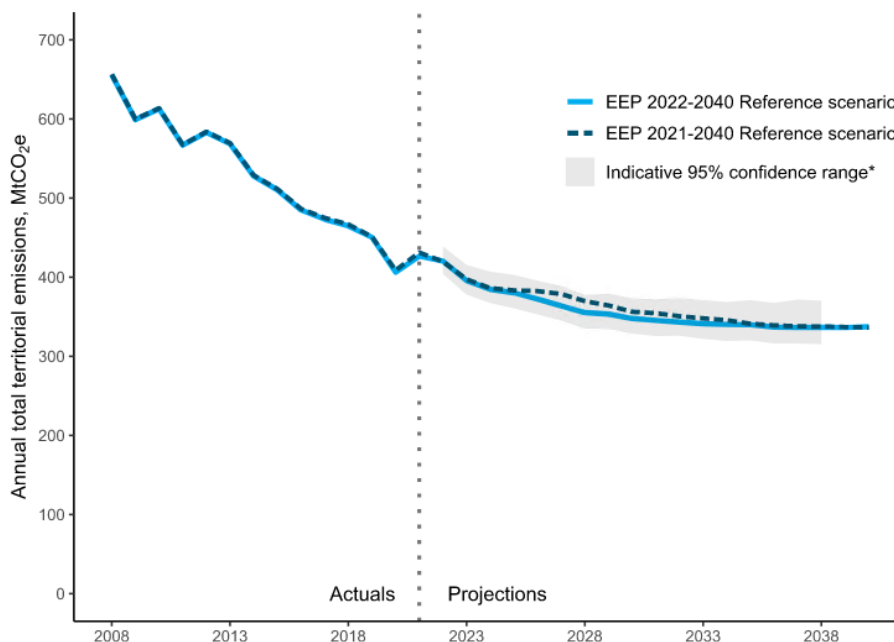
1 Executive summary

This briefing provides a summary of the Department for Energy Security and Net Zero (DESNZ) latest updated projections of greenhouse gas emissions and the main drivers of changes since the last update published in October 2022¹ (EEP 2021-2040). We will publish a more detailed report next month, with additional breakdowns and scenarios.

The DESNZ Energy and Emissions Projections (EEP) provides projections of greenhouse gas emissions, under policies that have already been implemented and planned policies where funding has been agreed and the policy design is near final. These are referred to as EEP-ready policies. Policies at an earlier stage of delivery are not included. Therefore EEP 2022-2040 does not contain the full list of policies and proposals set out in the Carbon Budget Development Plan (CBDP) published in March 2023². Annex D contains a list of quantified policies included in EEP 2022-2040.

As shown in Figure 1 below, our latest projections (EEP 2022-2040) show slightly lower emissions for almost all projected years compared to the previous edition (EEP 2021-2040).

Figure 1: Projected UK emissions EEP 2022-2040 compared to EEP 2021-2040, Territorial emissions, excluding International Aviation and Shipping (MtCO₂e)



Projected emissions are lower for each of the five-year periods for which the UK has set internal interim greenhouse gas reduction targets. We project that the UK will meet its

¹ EEP 2021-2040 was published in October 2022. A revision to projected emissions (of less than 1 MtCO₂e per year) was published in the Annex tables in March 2023. All comparisons against last year's edition are against the March 2023 revision to EEP 2021-2040, which was published on 10th March 2023:

<https://www.gov.uk/government/publications/energy-and-emissions-projections-2021-to-2040>

² <https://www.gov.uk/government/publications/carbon-budget-delivery-plan>

next legislated interim greenhouse gas reduction target (carbon budget 4 2023-2027). Under EEP-ready policies, compared to EEP 2021-2040, the latest projections show a smaller gap between projected performance and targets for carbon budgets 5 and 6 (2028-2032 and 2033-2037 respectively).

Projected emissions are lower than EEP 2021-2040 for most Net Zero Strategy sectors (See Annex A: Net Zero Strategy categories). However, projected emissions from domestic transport are higher across the projection period. This is mainly due to updated assumptions on use of Plug-in-Hybrid Electric Vehicles (PHEVs). Updated evidence suggests PHEVs are driven in electric mode for a smaller proportion of kilometres travelled and are less efficient than previously assumed. Projections of Non-CO₂ emissions from Agriculture are also slightly higher due to the use of a different economic model, Defra's UK Agricultural Market Model (UKAMM)³, to project agricultural activity. UKAMM projects a larger UK sheep herd during the projection period than the previously used model, FAPRI⁴.

There are several drivers of lower projected emissions. The largest of these is updates to scientific evidence on emissions from Land Use, Land Use Change and Forestry (LULUCF). Other factors also contribute to lower projected emissions, including methodology improvements and the impact of new policies. These are explained in more detail below.

EEP 2022-2040 is also lower than the Carbon Budget Delivery Plan (CBDP)⁵ baseline which was based on EEP 2021-2040. The CBDP baseline was already adjusted upwards for updated evidence on PHEVs. See Section 5 for details.

2 Introduction

This briefing has been prepared to align with good practice in the publication of statistics and analysis according to the Office for Statistics Regulation (OSR) Regulatory Guidance on Intelligent Transparency⁶. It provides information to help individuals and organisations understand the baseline projections of emissions we have included in the Government's response to the Climate Change Committee. We will publish a full update and additional tables next month.

DESNZ EEP provides projections of energy consumption, emissions, and electricity generation. The projections include the impact of policies that have been implemented and planned policies where funding has been agreed and the policy design is near final. These are referred to as EEP-ready policies. Policies at an earlier stage of delivery are

³ <https://www.gov.uk/government/publications/uk-agricultural-market-model-ukamm>

⁴ <https://www.afbini.gov.uk/fapri-publications>

⁵ <https://www.gov.uk/government/publications/carbon-budget-delivery-plan>

⁶ <https://osr.statisticsauthority.gov.uk/publication/regulatory-guidance-on-intelligent-transparency/>

not included. The projections provide the baseline against which the impact of new and early-stage net zero policies are assessed.

We produce projections with and without International Aviation and Shipping (IAS). All references to projections and comparisons in this report exclude IAS. The accompanying Annex tables contain projections with and without IAS.

3 Updates to the projections

We update the projections each year to incorporate a range of updated scientific evidence, statistics, and projections of economic and demographic drivers. We also update estimates of policy impacts, incorporate new EEP-ready policy impacts, and improve overall projections methodology and modelling.

The main economic and demographic updates included in the latest projections include updated Office for Budgetary Responsibility (OBR) short and long-term economic growth projections⁷, updated price assumptions and updated population and household growth assumptions. Annex M contains details of the main assumptions.

The projections have also been updated to incorporate actual data on past energy consumption and emissions (DUKES 2022⁸ and Greenhouse Gas Inventory 1990 to 2021⁹). The latest estimates of energy consumption, as published in DUKES 2023, are not included¹⁰. Therefore, the first projected year for both energy consumption and emissions is 2022.

Several new policies reached the stage of development required for inclusion in this year's update¹¹. The new policy with the largest impact is Building Regulations 2021 Part L which sets energy efficiency standards for new homes. Other new policies included for the first time in these projections are: the Clean Heat Market Mechanism, Heat Network Efficiency Scheme (HNES), Social Housing Decarbonisation Fund (Wave 1), Social Housing Decarbonisation Fund (Wave 2), Sustainable Warmth (Local Authority Delivery 3 and Home Upgrade Grant 1), Home Upgrade Grant 2, Great British Insulation Scheme. See Annex D for a list of quantified policies included in EEP 2022-2040 and their expected impacts on emissions.

⁷ <https://obr.uk/efo/economic-and-fiscal-outlook-march-2023/>

⁸ <https://www.gov.uk/government/statistics/digest-of-uk-energy-statistics-dukes-2022>

⁹ <https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2021>

¹⁰ DUKES 2023 was published 27 July 2023, which was too late to incorporate into our modelling.

4 Changes to the projections

Table 1 below provides a breakdown of the main drivers of changes in projected UK territorial greenhouse gas emissions between our last published projections (EEP 2021-2040 published October 2022)¹² and our latest projections (EEP 2022-2040). We have summarised these by the 5-year carbon budget periods¹³.

Table 1: Changes which affect total territorial emissions projections, excluding IAS (in comparison with EEP 2021-2040), MtCO₂e

Type of change since EEP 2021-2040	Carbon budget period			
	CB3 (2018-22)	CB4 (2023-27)	CB5 (2028-32)	CB6 (2033-37)
Policy savings updates (DESNZ and DLUHC)	1	2	-7	-9
Policy savings updates (Defra)	-2	-3	-2	-2
Transport assumptions and policy updates	7	21	33	43
Inventory, Non-CO ₂ and LULUCF updates	-17	-26	-21	-21
Power sector updates and other model inputs	8	-3	-32	-6
Modelling and assumption changes	-5	-22	-22	-23
Total change since EEP 2021-2040	-9	-31	-50	-17

As shown in Table 1, compared to the previous projections, emissions are lower for each of the five-year periods for which the UK has legislated interim emissions targets. Several drivers contribute to this, the largest of which is updated scientific evidence on emissions from Land Use Land Use Change and Forestry (LULUCF) suggesting there are fewer emissions from peat in certain land types than previously thought.

The difference between the updated and previous projections narrows towards the end of the projection period. The largest driver of this is higher projections of oil consumption

¹² Comparisons are against the March 2023 revised EEP 2021-2040 projections. The difference in UK territorial emissions due to the revision is less than 1 MtCO₂e in any single year.

¹³ Carbon Budgets are the legally binding five-year interim emissions reduction targets set under the UK Climate Change Act 2008.

from plug-in hybrid vehicles. This is due to updated evidence on the performance and use of Plug-in Hybrid Electric Vehicles (PHEVs) which suggests that they use electricity for a smaller proportion of kilometres travelled and are less efficient than previously assumed. This has led to a downward revision in the estimated emissions reductions from PHEVs throughout the projection period. Although road transport emissions are higher throughout the whole projection period, the impact becomes larger over time as PHEVs make up a larger proportion of road vehicles.

The Vehicle Emissions Trading Schemes Order 2023 – the legal name for the Zero Emissions Vehicle (ZEV) mandate (covering the period 2024-2030), confirmed on 28 September 2023, is also not included because it reached the required stage of development too late for inclusion.

The largest change under ‘Modelling and assumptions changes’ is an adjustment to projections of residential gas demand. During testing of the accuracy of our projections, we found that we were overestimating residential gas consumption compared to outturn figures and have adjusted our projections downwards to correct for this.

We will publish a more detailed explanation of these changes next month.

5 Energy and emissions projections and the Carbon Budget Delivery Plan Baseline

The Carbon Budget Delivery Plan (CBDP)¹⁴, published on 30 March 2023, set out a package of quantified and unquantified proposals and policies, to enable Carbon Budgets 4-6 to be met. The CBDP contains additional policies and proposals that had not yet reached the stage of development required for EEP. The impact of these additional policies and proposals is assessed against a baseline (the ‘CBDP emissions baseline’) which was derived from the previous edition of EEP (EEP 2021-2040). The adjustments made to the EEP 2021-2040 projections were to incorporate updated evidence and ensure it was suitable for the CBDP. These adjustments are explained in the CBDP technical annex: Net Zero Growth Plan and Carbon Budget Delivery Plan: analysis methodology¹⁵. The CBDP emissions baseline is available in the technical annex tables (Powering up Britain: charts and tables).

¹⁴

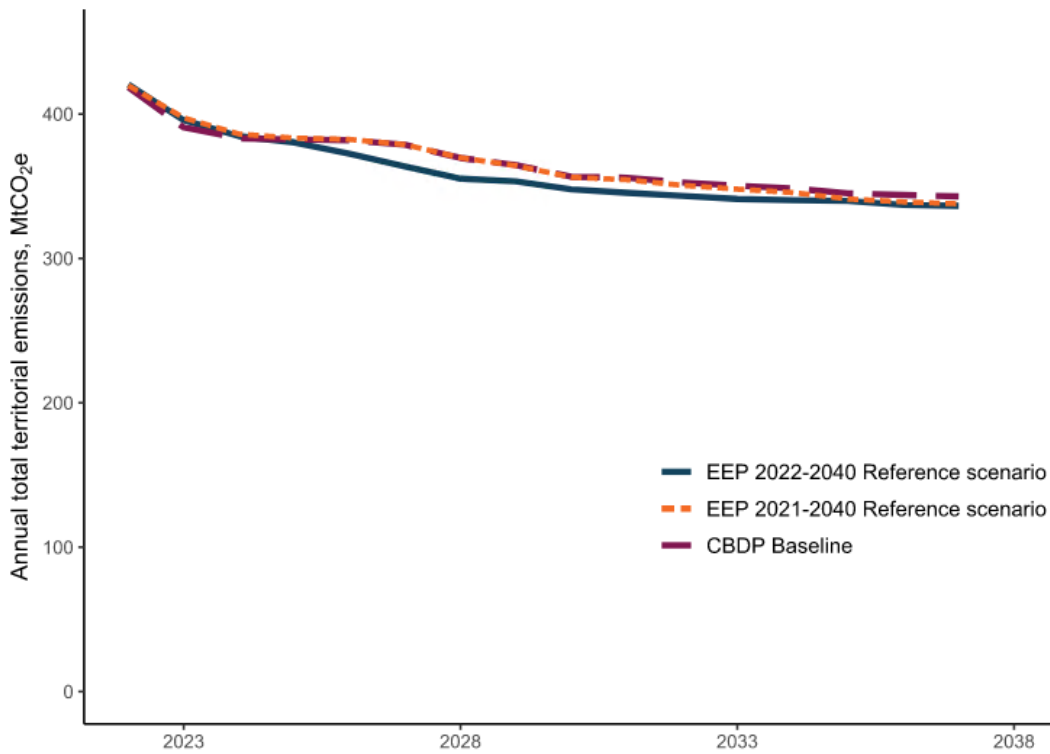
<https://www.gov.uk/government/publications/carbon-budget-delivery-plan>

¹⁵

<https://www.gov.uk/government/publications/net-zero-growth-plan-and-carbon-budget-delivery-plan-analysis-methodology>

The resulting CBDP emissions baseline was slightly higher than the EEP 2021-2040 emissions projections. This is mainly because the CBDP was adjusted up for the expected impact of changes to assumptions for Plug-in Hybrid Electric Vehicles. Projected emissions for the Carbon Budgets 4, 5 and 6 are respectively 20 MtCO₂e, 54MtCO₂e and 36 MtCO₂e lower than the CBDP baseline (excluding IAS). (Figure 2 below shows the CBDP baseline compared to both EEP 2021-2040 and EEP 2022-2040).

Figure 2: Carbon Budget Delivery Plan Baseline (March 2023) compared to EEP 2022-2040 and EEP 2021-2040. Territorial emissions, excluding International Aviation and Shipping (MtCO₂e)



6 List of supporting material

Annex A: Greenhouse gas emissions by source

Annex A NZS Categories: Greenhouse gas emissions by source

Annex B: Carbon dioxide emissions by source

Annex C CO₂: Carbon dioxide emissions by IPCC category

Annex C Non-CO₂: Non-CO₂ greenhouse gas emissions by IPCC category

Annex D: Policy savings in the projections

Annex E: Primary energy demand

Annex F: Final energy demand

Annex G: Major power producers' generation by source

Annex H: Major power producers' cumulative new electricity generating capacity

Annex I: Major power producers' total electricity generating capacity

Annex J: Total electricity generation by source

Annex K: Total cumulative new electricity generating capacity

Annex L: Total electricity generating capacity

Annex M: Growth assumptions and prices

This publication is available from: <https://www.gov.uk/government/collections/energy-and-emissions-projections>

If you need a version of this document in a more accessible format, please email alt.formats@energysecurity.gov.uk. Please tell us what format you need. It will help us if you say what assistive technology you use.