ESA

The Economic Society of Australia

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National emissions values

Jennifer Jenkins, Infrastructure Australia

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National emissions values

Presentation

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Role of Infrastructure Australia

- Established in 2008 as Australian Government’s independent adviser on nationally significant infrastructure investment planning and project prioritisation.
- Includes : transport, water, energy, communication and social infrastructure
- Infrastructure Australia undertakes the following activities:
  - **Evaluate infrastructure proposals** that are nationally significant or seeking more than $250 million in Australian Government funding
  - Identify nationally significant investment opportunities through the **Infrastructure Priority List**
  - Identify the challenges and opportunities facing the infrastructure sector through the **Australian Infrastructure Audit**
  - Examine the reform and policy opportunities through the **Australian Infrastructure Plan**

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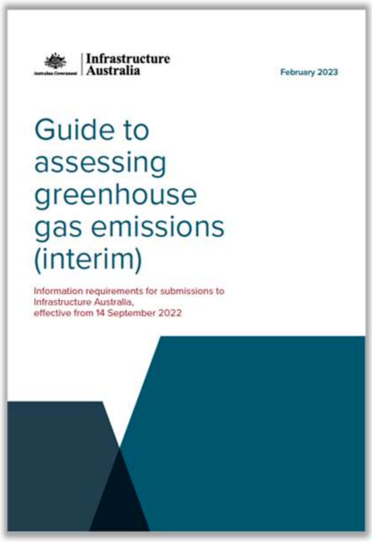
How did we get here?

- In September 2022, the Climate Change Act (Consequential amendments) enacted
- Infrastructure Australia to take into account Australia’s greenhouse gas (GHG) emissions reduction targets in our project evaluations and advice to government.
- Jurisdictions need to provide information on GHG emissions as part of their submissions to us.
- Published the Guide to Assessing GHG emissions (interim) in February 2023 to help proponents understand new requirements
- The Guide identified need for consistent emissions values and methods to measure
- December 2023 amendments to IA Act strengthen provisions to consider GHG emissions and introduce new requirements to consider the climate change policy implications in our evaluations.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February 2023

Guide to assessing greenhouse gas emissions (interim)

Information requirements for submissions to Infrastructure Australia, effective from 14 September 2022

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Case for national emissions values

- A consistent value was needed for decision making.
- Transport is the third largest contributor of CO_2 emissions in Australia and is on track to be the largest by 2030.
- Cost benefit analysis is intended to measure all social costs and benefits related to a proposal.
- The social impact of emissions are an externality that can be measured and valued.
- Emissions values are not an actual price that is included in financial appraisal or an offset that has to be paid.

Range of values used nationally $20 - $123

Multiple valuation methods

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Infrastructure and Transport Ministers

ITMM

ITMM June 2023 meeting - Infrastructure and Transport Ministers agreed to developing a nationally consistent approach for valuing greenhouse gas emissions.

Infrastructure Decarbonisation Working Group

Carbon Valuation Sub-Group

ITMM established the Infrastructure Decarbonisation Working Group (IDWG), chaired by DITRDCA.

Carbon Valuation Sub-Group (CVSG), led by Infrastructure Australia to develop national emissions value.

Technical advisors - Frank Jotzo (ANU), Australian Treasury, CSIRO Climate Modelling, ClimateWorks (Monash University), technical advisors from all jurisdictions.

Consultants: CIE and WSP

Values were unanimously endorsed at ITMM in December 2023

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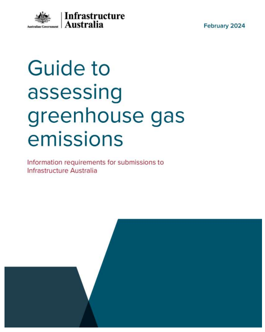
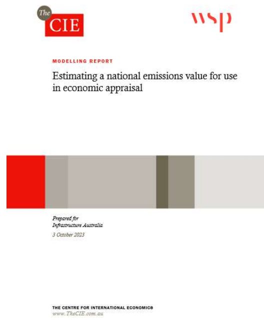
Release of Guide to assessing GHG emissions

The *Guide to assessing GHG emissions*, including national emission values for use in economic analysis, was released on 12 March 2024.



This document outlines requirements for proponents making submissions to IA

This document is a guide for application of the values in economic analysis



This document details the method used to develop the emissions values

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Application of the values

When to apply values

National values are to be used as minimum value in infrastructure proposals submitted for projects seeking more than $250 million in Australian Government funding.

What to measure and value

Proposals are required to quantify and report on emissions from materials, the construction process, and the asset's operation. This includes:

- embodied emissions of purchased materials
- emissions from the transportation of purchased materials
- emissions from net vegetation loss/gain
- emissions from combustion of fuel in third party vehicles using the infrastructure asset.

Quantified emissions must be monetised using the emissions values and included in the cost benefit analysis (CBA).

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Subsequent related updates

- **Australian Transport and Planning Guidance (ATAP)**
  - Environmental Parameter Values (PV5) was updated in May 2024 to reflect the new national values and remove reference to the previous $60 per tonne CO2-e
- **Infrastructure and Transport Ministers Meeting June 2024**
  - In principle support for use of national emissions values in jurisdictional transport infrastructure business cases over $100 million, commencing 1 January 2025.
  - Supported *Embodied Carbon Measurement for Infrastructure: Technical Guidance*, which provides a nationally consistent approach to measuring embodied emissions in infrastructure projects.

National emissions values

Methodology

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Methodology: Target consistent approach

To calculate a target-consistent carbon value in any year, we needed to know:

1. The proportion of Australia's emissions that need to be abated in that year
    - For this, we needed assumptions about Australia's emissions reduction pathway from 2023-2050
    - Our modelling used 5 different potential emissions reduction pathways that align with Australia's emissions reduction targets
2. The cost of abatement for the required proportion of emissions
    - For this, we needed assumptions on the marginal cost of abatement
    - Our modelling used 7 sets of abatement cost data

This produces 35 unique estimates of carbon values from 2023-2050. An average of these 35 estimates provides the 'expected' carbon values, and upper and lower bound estimates can be calculated with a specified confidence interval.

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Constraints to determine emissions reduction pathway

We can either select a single emissions pathway OR model a range of reasonable pathways that reflect our targets.

- Australia emissions reduction targets
    - 43% reduction in emissions by 2030, relative to 2005 levels (interim)
    - Net zero by 2050
- Australia also committed to:
    - holding the increase in the global average temperature to well below 2°C above pre-industrial levels; and
    - pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels.
- IPCC estimated a global emissions budgets:
    - 1200 Gt from 2020 to 2050 for 2°C temperature increase
    - 500 Gt from 2020 to 2050 for 1.5°C temperature increase

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Range of emissions pathways

The emissions pathways are based on Australia's emissions budgets, aligned with global temperature increase limits from legislated commitments:

- 1.7°C represents a 'well-below' 2°C upper bound.
- 1.5°C corresponds to Australia's 1.5°C aspiration.
- 1.6°C scenario accounts for potential budget variations.

Policy alignment	Global temperature outcome (50% probability)[1]	Global climate budget as at start 2020[1]	Australia's share (~1% as per CCA)	Australia's emissions 2020–2022[2]	Australia's remaining budget 2023-2050
Well-below 2°C	1.7°C	850 $GtCO_2$	8.2 $GtCO_2$	1.5 $GtCO_2$	6.7 $GtCO_2$
	1.6°C	650 $GtCO_2$	6.3 $GtCO_2$	1.5 $GtCO_2$	4.8 $GtCO_2$
Pursuing 1.5°C	1.5°C	500 $GtCO_2$	4.9 $GtCO_2$	1.5 $GtCO_2$	3.5 $GtCO_2$

1. Based on IPCC 6th AR, WG1 Full Report, Table TS.3

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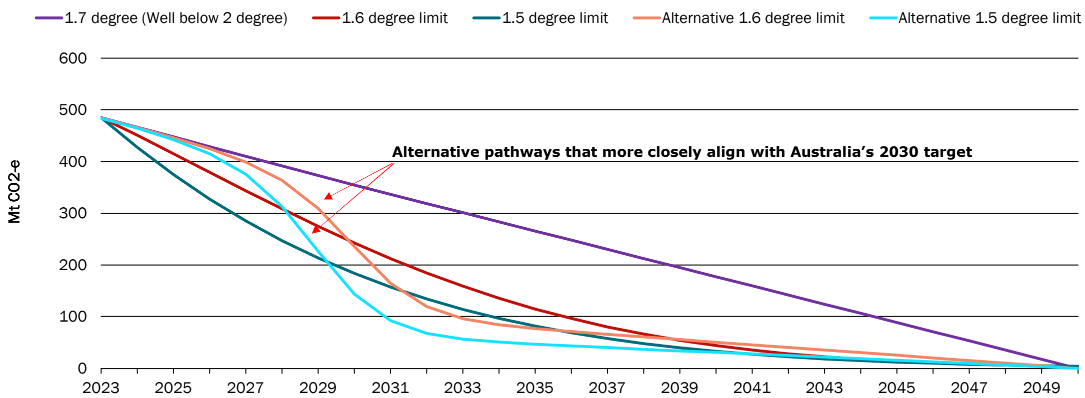
Emissions reduction pathways modelled



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How were the studies selected to inform abatement costs?

Studies selected based on:

- Ready availability of underlying data in the public domain
- Suitability of data in terms of identifying reference case, policy case and marginal abatement costs
- Robustness and ongoing use of underlying models (have they been widely used)
- Time constraints

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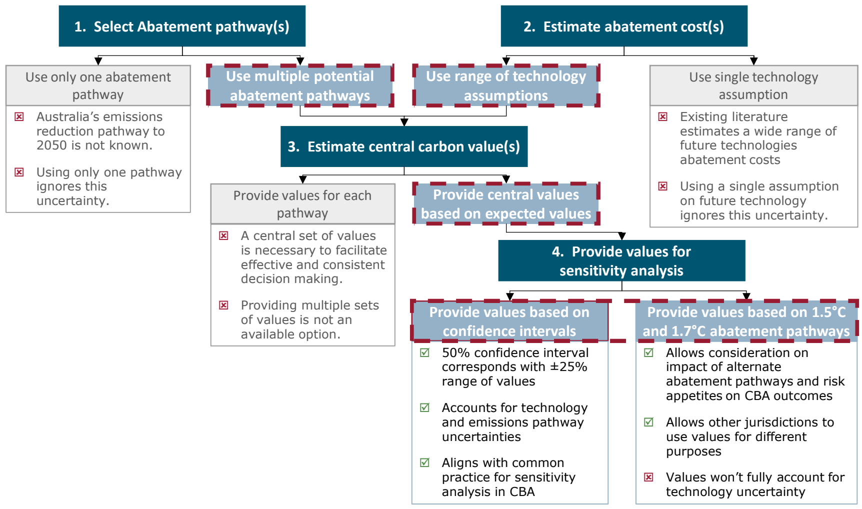
Map of methodological approach

Outline of approach:

- ☑ Use multiple abatement pathways and range of abatement cost assumptions to account for uncertainty in both.
- ☑ Provide central values based on expected values
- ☑ Provide values based on 50% confidence intervals for sensitivity analysis
- ☑ Provide 1.5°C and 1.7°C (well below 2°C) abatement pathways for supplementary consideration.



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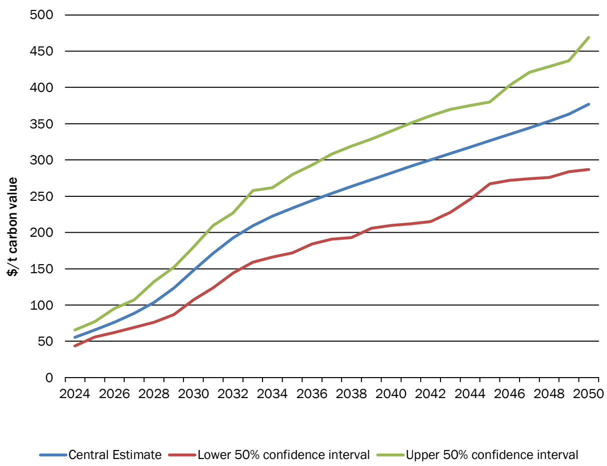
National emissions values



	Central Estimate	Sensitivity Testing	
Year (FY)	Expected value	**Low** 50% confidence	**High** 50% confidence
2024	56	44	66
2025	66	56	77
2026	76	62	95
2027	88	69	107
2028	104	76	132
2029	123	87	152
2030	148	107	180
2031	171	124	210
2032	192	144	227
2033	209	159	258
2034	222	166	262
2035	234	172	280
2036	244	184	293
2037	254	191	308
2038	264	193	319
2039	273	206	329
2040	282	210	340
2041	291	212	351
2042	300	215	361
2043	309	228	370
2044	318	246	375
2045	326	267	380
2046	335	272	403
2047	344	274	421
2048	354	276	429
2049	363	284	437
2050	377	287	469

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Estimating sensitivity parameters

- A 50% confidence interval (CI) for sensitivity parameters was chosen because:
  - A 50% CI effectively captures values ~25% either side of the central estimate, aligning with typical +/- sensitivity tests in a CBA.
  - Using maximum and minimum values could include outliers from the ~30 studies reviewed. This might diminish its utility for decision-makers and lead to questions on the credibility of the results
  - Testing an 80% and 90% confidence interval found the spread of results was significant, impacting usefulness of results.
  - Values corresponding to 1.5°C and well below 2°C also published in the guidance.

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Why are the values so low/high? Why do values increase slowly/rapidly?

Different valuation approaches, targets and economies yield different values:

- Target Consistent Approach vs European market price
- Bottom-up MAC vs economywide MCA data
- Least cost abatement assumes market will abate using lowest cost technology
- More opportunities in Australia for low-cost abatement relative to Europe/UK
- Values should incentivise change and be aligned to broader measures to decarbonise infrastructure and transport e.g. procurement, low carbon materials

Our values are consistent with and reflective of Australia's targets which are:

- Increasingly ambitious after 2030 to achieve global temperature targets and net zero.

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Model updates

Periodic Update:

- **Frequency:** At least every 5 years.
- **Purpose:** This update will consider updates to technologies and pricing of abatement measures in the modelling and an assessment of the underlying modelling methodology.

Annual Reviews:

- **Frequency:** Annually.
- **Purpose:** Review and consider updates to modelling assumptions based on changes to national emissions targets and government policies. This review is expected to involve less significant structural changes to the modelling approach. An out-of-cycle update will only be undertaken if a significant change is identified.

IA will be responsible for managing reviews, updates and publishing revisions to the recommended values.

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Questions?

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P 0409 986 008
E Jennifer.Jenkins@infrastructureaustralia.gov.au

www.infrastructureaustralia.gov.au