NABERS

Embodied Carbon

Consultation Response

NABERS is administered by the NSW Office of Energy and Climate Change

Published October 2023

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1 INTRODUCTION

Recap: Why a NABERS Embodied Carbon tool

The world's buildings are responsible for around 38% of global emissions. Operational emissions account for 29%, while the remaining 11% are estimated to be embodied emissions.[1] But as Australia's electricity grid decarbonises and more buildings are powered by renewable electricity, the proportion of emissions generated upfront is expected to rise drastically. The Green Building Council of Australia's (GBCA's) 2021 report, *Embodied Carbon and Embodied Energy in Australia's Buildings*, estimates that embodied emissions could represent up to 85% of Australia's built environment emissions by 2050 – rising from 16% in 2019.[2]

Further, the impact of decisions made during the design and planning phases of buildings now, are locked in for years to come.

Australia currently has no consistent method of measurement for embodied carbon. **Developing a consistent method for measuring, benchmarking and verifying embodied carbon is a critical step towards enabling Australia to achieve its net zero emissions target by 2050.**

Since June 2021, NABERS has worked in partnership with the GBCA, and collaborated with industry and governments across Australia.

First, we conducted a feasibility investigation, which led to the following conclusions:

- There is an urgent need for a national standard to measure, compare and set reduction targets for embodied emissions in buildings.
- Industry would like a government organisation to create, maintain and improve the standard over time, and believe NABERS is best placed to do this due to its technical and administrative capabilities.

Then, we carried out 12 months of technical consultation, working with the GBCA, industry and governments to design a national standard that will:

- Enable building owners to set robust and measurable targets for reducing embodied emissions in buildings, enhancing transparency and reporting to investors, and allow organisations of all kinds to set embodied carbon targets for the buildings they will occupy.
- Have the potential to harness the collective power of the building sector, to significantly increase demand for low-carbon design practices and construction materials. It would also help create a common language for embodied carbon emissions in Australia.

1 World Green Building Council, Bringing Embodied Carbon Upfront, 2019
https://worldgbc.org/article/bringing-embodied-carbon-upfront/
2 Green Building Council of Australia, Embodied Carbon & Embodied Energy in Australia's Buildings, 2021
https://new.gbca.org.au/news/gbca-news/gbca-and-thinkstep-release-embodied-carbon-report/

Consultation process overview

Creating a national standard for measuring embodied carbon is a large and complex challenge that requires input from building designers, construction specialists, owners and managers, product manufacturers, lifecycle analysts and more.

To gather as many perspectives as possible, we ran an extensive consultation process, summarised in *Figure 1 - Process to develop NABERS Embodied Carbon tool* below.

We would like to acknowledge the generosity of the many people and organisations who freely gave their time and expertise, to help us to shape a tool that is impactful, trusted and based on market needs.

What you will find in this paper

This paper contains a summary of the considerations that were raised by stakeholders in response to the NABERS Embodied Emissions consultation paper, and NABERS' response to these.

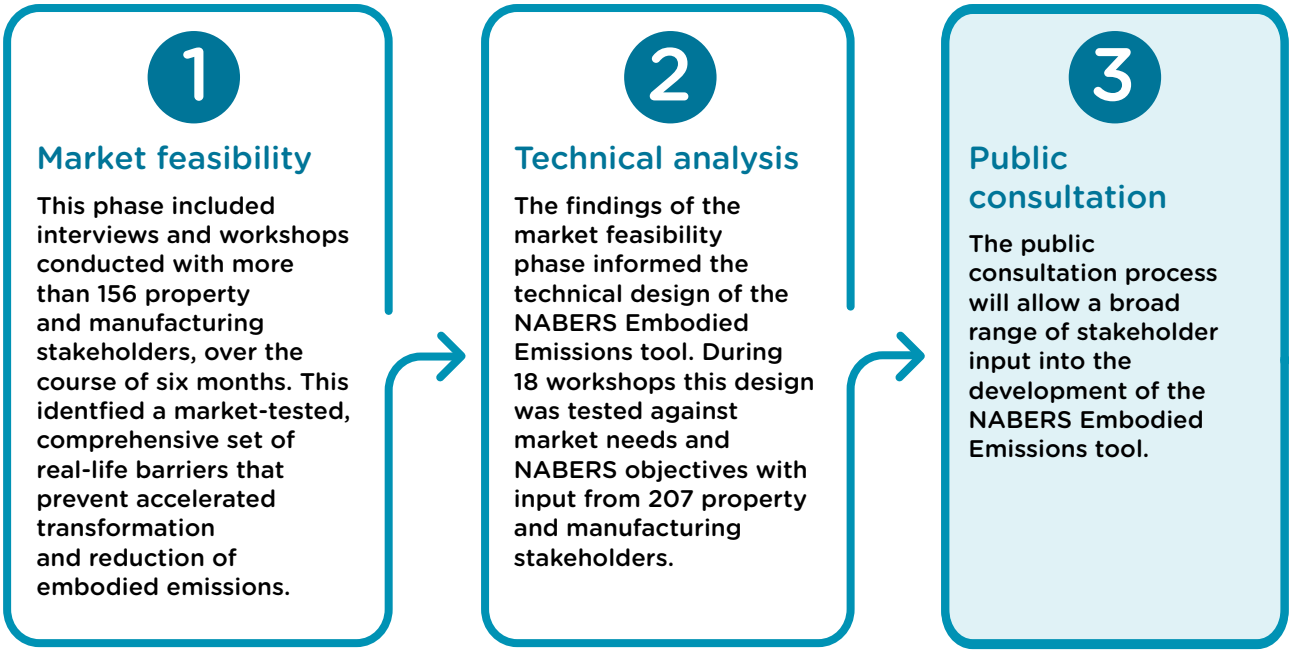


Figure 1 - Process to develop NABERS Embodied Carbon tool

Public consultation overview

NABERS published an Embodied Emissions consultation paper in December 2022. It contained 10 foundational proposals for how we could develop an Embodied Carbon tool that would measure, verify and compare embodied carbon in new buildings and major refurbishments. The proposals were based on what we learned from industry during the technical analysis carried out in 2022.

In the paper, we asked industry for their feedback on the proposed scope of the tool, what data should be used to calculate embodied carbon and how benchmarking and certification would be carried out.

The public consultation closed in February 2023. We received 78 responses from a broad variety of stakeholders, including building product manufacturers, building owners and developers, engineering and sustainability consultants, quantity surveyors, architects, life cycle assessment experts, government policy makers and academics. Several of these responses were from industry bodies, representing broad sectors of the built environment.

This paper is designed to sit alongside, rather than replicate the detail contained in, the NABERS Embodied Emissions consultation paper.

Next steps

NABERS has started developing the Embodied Carbon tool, in line with the principles discussed in this paper. This includes developing comparison benchmarks, certification rules, and training for NABERS Assessors, among other major deliverables. We aim to launch the Embodied Carbon tool in mid 2024.

Throughout this process we will continue to work closely with our partners at the GBCA. Green Star Buildings will accept NABERS upfront carbon calculations as a pathway in the relevant credits, once the NABERS tool has been released.

We will also continue to engage with industry on all aspects of tool development, to gather the insights and expertise needed to make this national standard robust, useful and usable across industry.

2 CONSULTATION RESPONSE: OVERVIEW

We are delighted to report that overall support for the tool and its underlying proposals is strong.

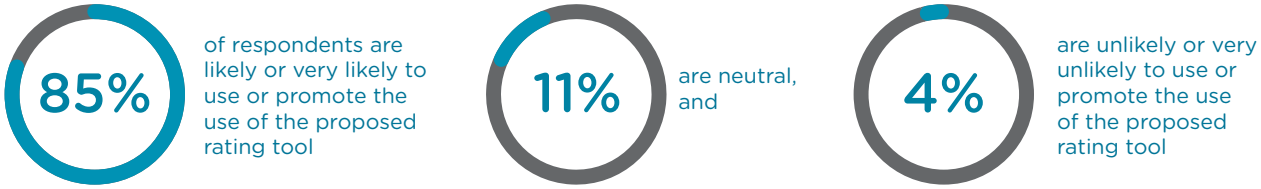
Many feel the rationale supporting the tool was well considered and communicated in the consultation paper.

There is strong support in industry for a nationally consistent tool. There is also general agreement that there is merit in starting with something simple and robust. A meaningful portion of respondents believe the scope of the national standard should be expanded, but agree that this can be done over time.

Many respondents provided additional ideas, which have helped us refine the proposals we put forward. These are outlined in the rest of this report.

Finally, many stakeholders acknowledged their appreciation of the consultation process, and feel their needs and concerns have been heard.

Of the 78 responses received:



The overwhelmingly positive response to what is proposed is a significant milestone, given the large and complex challenge and the range of stakeholder interests represented.

We have arrived at this point because of the help many industry experts provided us with through this process.

There's much to be done, and we are excited about continuing to collaborate with industry, to create a tool that is impactful, trusted and based on market needs.

3 SCOPE OF THE NABERS EMBODIED CARBON TOOL

Proposal 1: Eligible projects

Proposal 1 – Only new buildings and major refurbishments will be eligible to certify

In the first release of the tool, only new buildings and major refurbishments will be eligible to certify. A major refurbishment involves a major change to at least one element of the cold shell (e.g. replacement of the curtain wall), where cold shell is defined in 4.3.4 The included elements of the building construction in the NABERS Embodied Emissions consultation paper.

Overall sentiment

Overall support for certifying new buildings and major refurbishments, with a suggestion to extend use of the tool to existing buildings where data is available.

Considerations

Include buildings that were recently completed

Stakeholders suggest extending the tool to buildings that reach practical completion prior to the release of the NABERS Embodied Carbon tool.

NABERS response

Thank you for your suggestion.

We will extend the tool to buildings that reached practical completion prior to the tool being released, as long as these buildings have the required data.

This will apply to recently constructed buildings only, for example, within the last 2 to 5 years. Further work is required to determine how far back we should go.

Define the term 'major refurbishment'

- Stakeholders would like to see a clear definition of the term 'major refurbishment'. Ideally, this definition will:
- Align with definitions that are accepted in built environment circles.
- Provide consistency across buildings.
- Ensure developers can't make relatively minor adjustments and label the work as a 'major refurbishment', to achieve a high NABERS rating.

NABERS response

We will collaborate with the Property Council of Australia (PCA), the Australian Building Codes Board, and the GBCA to provide a definition of 'major refurbishment' that aligns with commonly accepted definitions.

Rate within 2 years

Stakeholders suggest new buildings receive certification within two years of achieving practical completion.

NABERS response

We agree with this suggestion and will confirm as we progress the development of the tool.

Proposal 2: Life cycle stages included

Proposal 2 – Only upfront emissions will be included (A1-A5)

Only upfront emissions will be included in the emissions calculations. This includes modules A1 to A5 from Figure 2, below.

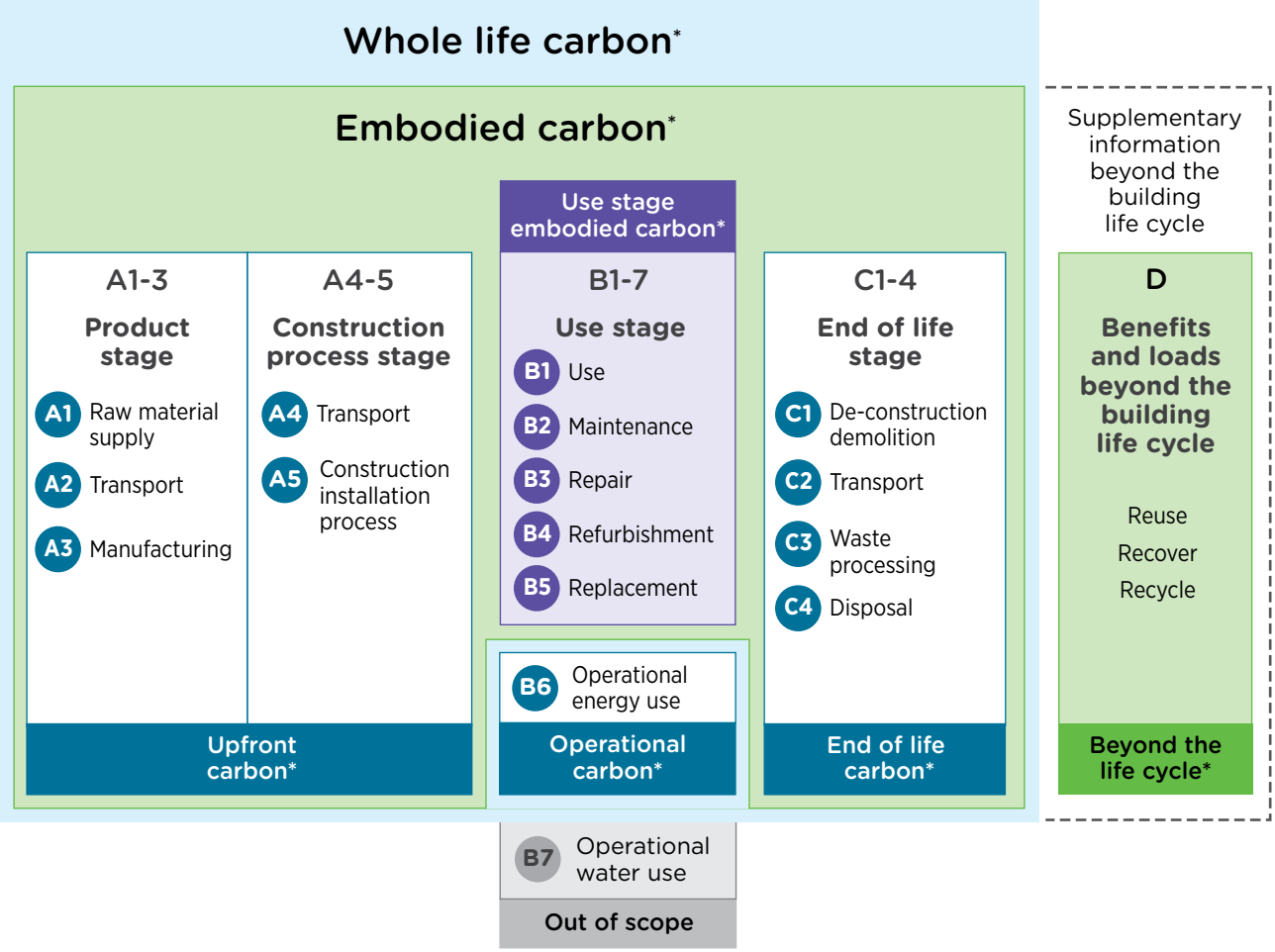


Figure 2 - Terminology and related life cycle stages. Reproduced from WorldGBC, 2019

Overall sentiment

Most support the focus on upfront carbon initially and evolving the tool over time to consider whole-of-life impacts.

Considerations

The case for whole-of-life carbon

Most stakeholders support NABERS starting with a simple, cost-effective tool that can be broadened in the future. However, a few feel strongly that the first iteration of the tool should cover whole-of-life carbon because:

- This will increase the amount of carbon measured.
- They worry that focusing on upfront carbon may lead to undesirable tradeoffs. For example, some expressed concerns that buildings might preference reducing embodied carbon at the expense of greater operational energy use and emissions. Others expressed concerns that building durability or adaptability will be sacrificed in order to reduce upfront embodied carbon.

NABERS response

NABERS will focus on upfront carbon for the first release of this standard, as supported by most respondents. This will provide a robust metric that can be used to tackle the largest sources of embodied carbon in construction projects.

The full rationale for the proposal to focus on upfront carbon can be found on pages 14 and 15 of the NABERS Embodied Emissions consultation paper.

Regarding concerns about undesirable trade-offs, conversations between NABERS and owners, engineers, architects and builders — in addition to regulations and standards that are in place to govern building practices — suggest that many of the worrying tradeoffs mentioned are unlikely to come to fruition. We will provide a way to estimate whole-of-life carbon, for those that choose to use it. These calculations will help project teams make sound decisions while allowing NABERS to monitor for undesirable tradeoffs.

This will apply to recently constructed buildings only, for example, within the last 2 to 5 years. Further work is required to determine how far back we should go.

Split A1-A3 from A4-A5

A small number of stakeholders suggest NABERS splits A1-A3 from A4-A5 calculations. They argue that A4 and A5 are not derived from Environmental Product Declarations (EPDs) so are less reliable and might cloud more 'accurate' rating results.

NABERS response

Emissions relating to A4 (transport of materials to site) and A5 (emissions from the construction process) are not included in the EPD of a given product. This is because they are different depending on where that building is located and how it is constructed. However, because these emissions occur during the construction phase of a project, they can be measured and verified, and there are robust methods to do so which many project teams in Australia are already using.

A4 and A5 emissions are important information for design and construction teams, which complement the information in EPDs. This includes considering the impact of transport emissions when selecting building products, as well as encouraging less carbon intensive construction methods. For this reason, A4 and A5 emissions will be included in the framework.

Proposal 3: Treatment of demolitions

Proposal 3 – Emissions from demolitions are excluded

Emissions associated with demolitions from previous structures will be excluded from the calculation. The system boundary between an old structure and the new building will be drawn at the point after the previous building (or parts of it) has been demolished and all rubble has been cleared. The new building is responsible for any earthworks and all construction from this point forward. Buildings that re-use and do not demolish existing structures will be rewarded under Proposal 6, where re-used materials are assigned zero emissions.

Overall sentiment

Most agree the rationale for the exclusion of emissions from demolition is sound.

Considerations

Reward avoided demolitions

We heard from a few stakeholders that excluding demolition emissions might encourage demolition and rebuilds over refurbishment, as there is no penalty for demolition.

NABERS response

Some of this feedback was driven by confusion from the title of this proposal, which led some stakeholders to believe this framework would not discourage demolition. However, the framework is being designed to reward sites that avoid demolition, by recognising all retained building elements and materials that are re-used without modification as having zero carbon emissions. This is consistent with NABERS preference for incentivising reuse and is in alignment with international standards.

Alignment with Green Star Buildings

Some stakeholders noted that they'd like to see alignment between NABERS and Green Star Buildings.

NABERS response

The boundary for calculating upfront carbon is aligned in NABERS and Green Star Buildings. The NABERS upfront carbon tool will be a pathway for targeting the Upfront Carbon credit as part of the Green Star Buildings rating tool. When using NABERS to target the Upfront Carbon credit in Green Star Buildings, it will be important to note that in addition to reducing upfront carbon, the credit also requires the purchase of offsets when demolishing a building that is less than 50 years old to incentivise avoiding demolition. The purchase of offsets is required to acknowledge that the decision to demolish has a strong impact.

Proposal 4: Included elements of building construction

Proposal 4 – Cold shell is the default building scope

For each benchmarked building type, a single minimum scope will be specified: a. Cold shell is the default option for most building types. b. Warm shell or other building scope will only be considered for a building type where cold shell cannot be applied meaningfully. Car parks are expected to be included in addition to cold shell (or warm shell) as the default, whether internal or external to the building. However, this will need to be resolved when benchmarks are created.

Overall sentiment

There is an **almost even split between preference for cold shell and warm shell**, with a slight edge going to warm shell.

Considerations

Clarity around definitions

A range of arguments were provided on the merits of cold versus warm shell.

Those who were supportive of cold shell coverage feel it is a practical starting point for capturing a large amount of carbon emissions, and will enable the framework to be released sooner. However, other stakeholders raised a number of concerns, such as that 'cold shell' is useful for building types with a tenant-owner split (such as offices or shopping centres), and less practical for others which tend to be occupied by a single organisation.

NABERS response

The concepts of cold and warm shell proved difficult to communicate in the consultation process, and don't apply equally to all building types.

Rather than sticking with these definitions, we will clearly communicate which building elements are in and out of scope for each building type.

Generally speaking, for any building type, the NABERS framework is expected to cover around 80% of the embodied carbon of a building project, focusing on elements that are in the control of

the developer.

Mechanical services emission challenges

Some stakeholders raised concerns about a lack of emissions data for mechanical services equipment, such as heating, ventilation and air conditioning systems and on-site power generation.

NABERS response

Building services related to the core of the building will be in scope for all building types. This includes major mechanical services such as HVAC, primary equipment associated with fire systems, vertical transport systems, and ducting and equipment associated with the core of a building. Some aspects of the building like minor ducting and cabling out to the floor level won't be included, as they are difficult to measure and represent a relatively small proportion of emissions.

We are currently conducting emission factors consultation with industry, to determine appropriate data sources. Mechanical equipment in particular has a lack of data availability through EPDs, so we will investigate whether it's possible to use TM65 measurement results.

Including emissions from fitouts

Some stakeholders are concerned that the first iteration of the tool will exclude large amounts of upfront carbon relating to tenancy fitouts and churn.

NABERS response

We acknowledge that fitouts contribute to building emissions, and that many stakeholders would like to see this framework expanded to cover this in the future.

There are several challenges with including fitouts in the first release of this framework. One of them is the hugely diverse range of materials and equipment that can form part of a fitout, for much of which there is limited data, or no quality data. A further challenge is that in tenanted buildings (such as offices or retail), many fitout decisions are made by different organisations at different times, making gathering data even more challenging. For this reason, the initial launch of the tool will be streamlined, to start solving the biggest portion of the problem now.

However, we acknowledge that fitouts are a meaningful driver of embodied carbon emissions. We have included fitouts on the roadmap for future expansion of this framework, to be considered after the initial release. We are also committed to partnering with the GBCA, who are piloting how the principles in this framework can be applied for fitouts through the Green Star Fitouts rating tool. The scope of the Green Star Fitouts rating tool is currently open for consultation. For further information on the proposed scope of the Green Star Fitouts rating tool, refer to https://new.gbca.org.au/green-star/evolution/fitouts-consultation/

Proposal 5: Environmental indicators included

Proposal 5 – Only carbon emissions will be included

Only carbon emissions will be included in the emissions calculations. For the purposes of this report, the term "carbon emissions" refers to greenhouse gas emissions, as defined by the Greenhouse Gas Protocol.

Overall sentiment

Most support focusing on carbon emissions for the first release of the tool, noting that:

- It would be desirable for subsequent releases to consider other areas of environmental impact, such as water.
- Other tools, such as the Green Star Buildings rating tool, address additional environmental impacts.

Considerations

Naming the tool

Stakeholders suggest a few options for changing the name of the tool, seeing as it is focused on carbon emissions.

NABERS response

We will rename the tool "NABERS Embodied Carbon tool" to acknowledge its focus on embodied carbon. "Carbon" is the industry term representing GHG emissions, both in Australia and internationally.

Clarification around metrics

A request was made to confirm that what is being measured is carbon dioxide equivalent (CO2-eq), where emission sources with different global-warming potential (GWP) are brought into a comparable metric.

We were also asked to confirm the context that CO2-eq would be measured in, e.g. per square meter.

NABERS response

Yes, the tool will include the greenhouse gases that are covered by the UNFCCC / Kyoto Protocol, as referenced in the GHG Protocol amendment 1a: https://ghgprotocol.org/sites/default/files/2022-12/Required gases and GWP values.pdf

That includes measuring carbon emissions in CO2-eq, where different greenhouse gases are adjusted by their global-warming potential (GWP).

The tool will report on CO2-eq per square meter.

4 CALCULATION METHOD

Proposal 6: The allowable emissions data

Proposal 6 – NABERS will encourage verified product-specific emissions data and will apply conservative defaults where no emissions data is available

A select number of emissions data sources will be allowed. Where product-specific emissions data exists (i.e. process life cycle assessment data), it should be used in preference to other emissions data. As we move down the order of material preference, emissions are likely to increase, creating an incentive to use higher-order data where this is available. During the tool development phase NABERS will investigate rules which could enforce this order of preference.

The allowable data sources include, in order of preference:

a. Third party verified product-specific process life cycle assessment data, such as from Environmental Product Declarations and carbon footprint declarations, which comply with internationally accepted standards.

b. Published emissions data from Climate Active Product Disclosure Statements associated with product Carbon Neutral certification.

c. The NABERS table of emissions data, which is based on a conservative estimate from a review of available data. This will be set to ensure product manufacturers are generally better off verifying their product's carbon footprint through one of the above methods. It will preference process life cycle assessment data from EPDs where this is available (e.g. timber, concrete, steel). Hybrid data will only be considered where there is a lack of suitable process life cycle assessment data (e.g. façade assemblies, building services and some construction activities). In these cases, emissions data may be per square metre or dollar spent.

Additional data sources may be considered during tool development where they align with the intended objectives of this proposal. For example, this may include the worst-in-average calculation from industry-average EPDs.
All retained building elements and other re-used products will be assigned zero emissions in their original state. They will be entered into the calculator as zero embodied carbon, plus the emissions generated in repurposing these elements for re-use. This applies regardless of the age or source of the building element. This means buildings that avoid demolition will be rewarded with a better rating, as the reused elements of the structure will be considered emissions-free.

* Complying standards: for EPDs – ISO 14025 and either EN 15804 or ISO 21930; for carbon footprints – ISO 14067 or PAS 2050, preferably aligned with the system boundary from EN 15804 or ISO 21930.

Overall sentiment

The vast majority support the proposed hierarchy of allowable emissions data sources.

Please note: NABERS is currently consulting with stakeholders on emission factor calculations, including the methodology for developing conservative defaults.

Considerations

Rationale for support

There is overwhelming support for a hierarchical emissions data source table including third-party verified process-based LCA data (such as EPDs) and conservative defaults. This was very well received by most stakeholders.

People feel this will encourage:

- Manufacturers to disclose their product-related emissions, and
- The manufacture and uptake of low-emissions building materials, as product suppliers and construction companies work together to improve NABERS Embodied Carbon and Green Star Buildings ratings.

Most feel that encouraging EPD use is in line with industry practice and international standards, that it enables transparency, and that it allows better product-to-product comparisons and drives innovation for low-carbon products from manufacturers.

Opposition to the proposal

The vast majority of stakeholders strongly support the proposal. However, one submission advocated for hybrid life cycle assessments and data, on the grounds that they capture a broader set of emissions sources. For example, the emissions associated with the equipment used to manufacture a product is often not included in an EPD, and should be captured in hybrid life cycle assessment.

NABERS response

A key reason why we proposed standardised, product-specific EPD data is that it allows projects to choose lower-emission products and be rewarded with a better rating. Third party verified, product-specific data also allows product manufacturers who are reducing their carbon emissions to make credible claims, and be recognised and rewarded by the market for their efforts. These are key reasons why most stakeholders were supportive of this proposal, and why many equivalent frameworks internationally also encourage EPD certification.

Hybrid life cycle methods have the potential to be more comprehensive in emissions capture than EPDs, which is positive. However, currently these methodologies are not sufficiently standardised to make adequate comparisons between products, nor is product-specific data available. This framework can be adapted in the future to recognise widely used, standardised and product-specific hybrid methods when they emerge, and when suitable data is available.

Conservative emission factors considerations

Disclosing the percentage of verified data

Some feel it would be helpful to see what proportion of the emissions data for a project was sourced from verified data sources, and what proportion of the data is NABERS conservative defaults.

This information will provide clarity and transparency around the type of data used for ratings.

NABERS response

We appreciate these suggestions. We also appreciate that showing what proportion of the data is verified product-specific data, and which is based on conservative defaults might encourage the use of more verified data. NABERS will conduct tests with users on where and how to best display this information, so the information is visible to project teams and encourages them to seek more verified data.

Provide product average data, as well as conservative defaults

Most stakeholders supported the use of conservative defaults where product-specific data is not available, as it encourages products to seek a certified EPD. However, some stakeholders also suggested that there were instances where more detailed sub-metrics that are based on average (rather than conservative) emissions would be helpful.

NABERS response

NABERS appreciates this suggestion. While the NABERS rating calculation will use conservative emission factors for products with no verified process data, we will also provide average data for products available in Australia.

Average data will help project teams during concept design, to understand what is possible with good product and design choices.

Further, providing some secondary metrics (such as CO2-eq/m2) using average emission factors may be helpful for aligning with international ESG and sustainable finance reporting.

Modifiers to encourage better quality data

Some suggest that instead of using conservative default emission factors, we could apply a modifier to ratings that do not use high-quality data, reducing their overall score to encourage better data quality.

NABERS Response

Thank you for this suggestion. Applying a modifier to buildings with low-quality data sources would have a similar effect to the proposal in the consultation paper in one regard: it would reduce a building's rating and encourage the use of products with better data sources.

However, using conservative defaults has a few advantages over a modifier. Above all, the conservative default emission factors will be tailored to each product type, reflecting the product options that available on the market. Whereas a modifier would be a more arbitrary factor.

Keeping the default data up-to-date

Some raised the importance of keeping default data up-to-date.

NABERS response

We agree this is important and are committed to keeping the data up-to-date. This was a key consideration on the decision for NABERS to be the organisation to build this standard, as a program in a position to maintain and improve this framework over time.

Mechanical services emission challenges

Some stakeholders suggest looking accepting CIBSE TM65 calculations. TM65 is a calculation methodology for measuring embodied carbon in building services. Stakeholders suggested this because of the current lack of EPDs for building services. The TM65 methodology outlines how to use other means to estimate embodied carbon, where EPDs do not exist.

NABERS response

Thank you for your suggestion. We are currently exploring this possibility. We've reached out to respondents who suggested this, to invite them to take part in our emission factors consultation.

Transport emissions calculations

We have been asked whether the transport emissions and calculation method will match what is in the GBCA upfront carbon emissions calculation guide.

NABERS response

Yes, it will.

Environmental Product Declaration considerations

EPD register

Some have assumed or requested that NABERS will produce a library of EPD data.

NABERS Response

As mentioned earlier, NABERS will collect EPD data as part of the internal process to produce conservative default and average emission factors. NABERS will publish and maintain the default conservative emission factors to be used in the NABERS rating, and the average emission factors.

However, NABERS is not currently creating a library or database to find specific EPD-certified products, as this is already available from several providers in the market. Instead, the NABERS Assessor doing the rating will be responsible for finding and sourcing valid EPD documentation, to prove the emission factors they used in the rating are correct.

Availability of EPDs

It was noted that a lack of EPDs for certain product types could raise issues, including:

- The difficulty of knowing which product to use in a certain category, if there aren't many EPDs.
- The potential to bias ratings if product categories (e.g. mechanical services, assemblies, complex elements) predominantly use conservative defaults.

NABERS Response

The lack of EPDs in some product categories is a real challenge, which will take time to solve. However, we have designed the framework to help tackle this issue, by rewarding products that seek EPD certification.

Applying conservative emission factors to products in a category where few EPDs exist will not skew NABERS ratings, because the factors will be based on the reality of what's available on the market. It's unlikely that products without verified data will have better than average emissions.

We will test this during the benchmarking phase, to to make sure it doesn't result in buildings being unfairly penalised.

Supporting small and medium players

Some have noted that the cost of EPDs could be prohibitive for small and medium-sized manufacturers. This could result in their products not being chosen.

NABERS response

We are actively advocating for ways to help solve this problem.

In addition, it should be noted that small and medium-sized manufacturers could solve for this by contributing their data to industry-average EPDs which are less expensive than producing product-specific EPDs.

Proposal 7: Treatment of building products with stored carbon or carbon neutral certification

Proposal 7 – Stored carbon and carbon neutral products will be disclosed on NABERS Rating Certificates via a Carbon Removal Indicator; they will not be recognised within the star rating on the certificate

NABERS Rating Certificates will report on building products with stored carbon and carbon neutral certification via a Carbon Removal Indicator. This indicator will sit alongside the NABERS Embodied Carbon tool's star rating.

The amount of stored carbon in products and from carbon offsets within carbon neutral certified products will be disclosed separately to the NABERS Embodied Carbon tool star rating. The star rating will include the greenhouse gas emissions from all products used but will exclude any stored carbon or carbon offsets.

An example of what the Carbon Removal Indicator could look like is illustrated below. Note

that the Carbon Removal Indicator is currently an early concept, and its design, including its name, calculation methodology and visual representation of results, will be finalised later in the rating tool development phase.

The stored carbon reported via the Carbon Removal Indicator will relate to a project's materials in relation to scope of works covered by the NABERS Embodied Carbon tool. This means that stored carbon occurring in A1–A5 is included at this time, and this includes stored biogenic carbon from timber. Cement re-carbonation is excluded from the calculation as it is outside the scope of life cycle stages considered in this tool. This will be reconsidered in conjunction with a review of life cycle stages as part of the NABERS Roadmap for Future Consideration. Stored carbon emissions reported in the Carbon Removal Indicator will be based on EPD data.
Carbon neutral products reported via the Carbon Reduction Indicator will relate to building products with carbon neutral certification, such as Climate Active Carbon Neutral. Only product level Carbon Neutral certifications are proposed to be recognised in this indicator.

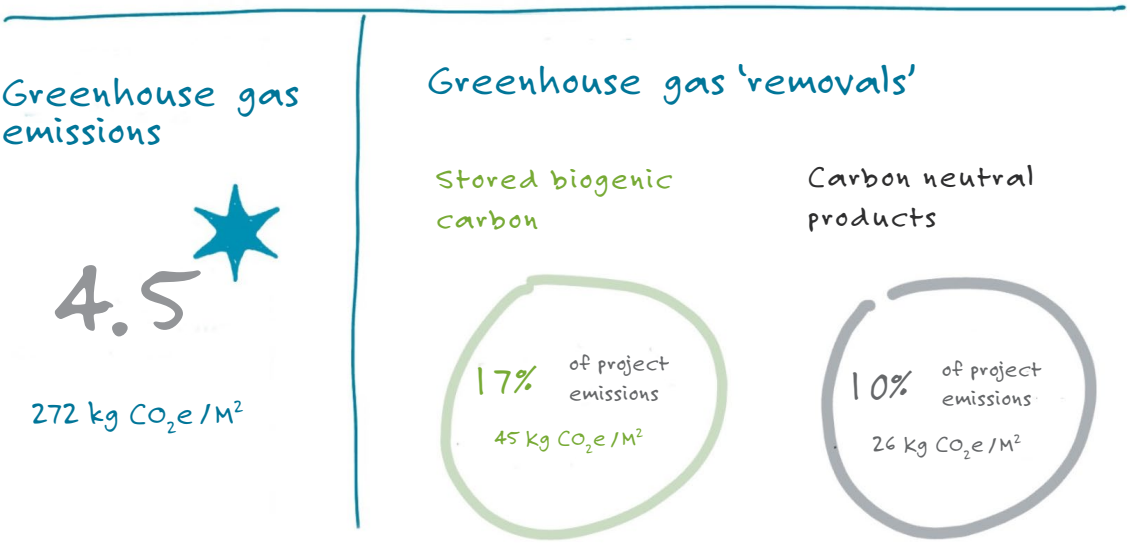


Figure 3: Example of how a Carbon Removal Indicator could look, based on NABERS Renewable Energy Indicator

Overall sentiment

Strong support for disclosing stored carbon and carbon neutral certification separately and the transparency this will bring, including among manufacturers across product sectors.

Stakeholders emphasise the importance of focusing on driving down fossil carbon in ratings as a priority.

They also note that providing separate information on biogenic carbon and carbon neutral products is also important, because these are valued strategies for managing the carbon footprint of buildings.

Considerations

Impact on timber

A few stakeholders feel that leaving stored carbon out of the star rating will not drive the uptake of wood-based products.

NABERS response

Based on extensive consultation, including with the wood industry, there is overwhelming support for star ratings that focus on carbon from fossil fuels, with a separate way of disclosing stored biogenic carbon from responsibly sourced timber.

Advantages of this that were noted by stakeholders, include:

- It provides information to help people consider the use and impact of wood-based products.
- It aligns with the NABERS principle of showing what has been measured and not giving a preference to particular strategies.
- It eliminates the need to predict how wood-based products will be treated at end of life.

Offset considerations

Some raised the issue of greenwashing in relation to offsets.

NABERS response

As per the proposal, NABERS will allow products certified as carbon neutral by Climate Active. No other means of using offsets have been approved for the Embodied Carbon tool at this stage.

Interpretation considerations

Some are concerned that the proposed way of disclosing stored biogenic carbon and carbon neutral products implies that offsets are given the same level of importance as sequestered carbon, even though offsets fall outside the project boundary.

NABERS response

The intent of this is to provide transparency about the treatment of stored biogenic carbon and carbon neutral products. It is not intended to provide a judgment on the value of these strategies. This level of transparency allows asset owners and project teams to make their own value judgements based on credible, measured data.

We will provide guidance to ensure stakeholders can interpret the information provided.

Alignment with Green Star Buildings

There is a preference for the GBCA and NABERS to align. Currently, in Green Star Buildings ratings, Carbon Neutral products, and products that have stored biogenic carbon, can be counted as being burden free, having zero emissions.

NABERS response

NABERS and the GBCA will continue to work together to maximise alignment on this and other areas of the standard.

Recarbonation of cement

A suggestion was made to include recarbonation of cement in the indicator.

NABERS response

Recarbonation will be considered alongside a future whole-of-life tool, as it sits outside the scope of upfront carbon LCAs.

5 BENCHMARKING

Proposal 8: Benchmarking methodology

Proposal 8 – A statistical analysis of Bill of Quantities data is the preferred approach to creating whole-of-building benchmarks.

Overall sentiment

The proposal to use Bill of Quantities (BoQ) data was supported. However, many technical considerations were noted.

Considerations

Availability of BoQ data

Some suggest NABERS consider using data from additional sources: cost estimates and cost plans. These are more readily available than BoQs.

NABERS response

Thank you for this suggestion. It is something we will investigate, particularly as many projects currently use cost plans, rather than BoQs.

BoQ data accuracy

Issues were raised around the accuracy of BOQ data. We heard that BoQs can both over and under-estimate material use.

NABERS response

To investigate the differences between BoQ figures and as-built amounts, we will collect as-built data for a collection of projects. The main thing we need to know is whether there's a trend of over-estimating or under-estimating, so that we can correct for that. If there isn't a clear trend one way or the other, small inconsistencies in reported data tend to be smoothed out when dealing with large data sets. This is why we aim to collect data for around 1000 buildings, for benchmarking.

Please note that while BoQ data will be used for benchmarking, as-built data may be more appropriate for certifying a rating. We will continue to investigate and test this.

Normalisation considerations

Some were concerned about how complicated it might be to make fair comparisons between buildings. They noted that normalisation factors for benchmark data are important and could include location, aspect ratio, car parks and space utilisation.

NABERS response

We agree.

Decisions on these types of issues will be part of the benchmarking work. As we collect data for benchmarking, we will gather the information required to understand issues such as soil conditions, weather considerations, and the purpose of the building. We will organise workshops with stakeholders to discuss the benchmarking process and our findings, to agree on a way forward.

Impact of conservative defaults on benchmarks over time

A few people were concerned that, if the emissions data for our benchmarks will come from

conservative emission factors, ratings will change quite a lot when verified data (with lower emissions) is available.

NABERS response

To create the benchmarks, we will use weighted average emission figures where available, or median values. Not the default conservative emission factors.

6 CERTIFICATION PROCESS

Proposal 9: How projects progress to certification

Proposal 9 – Projects receive certification following practical completion, with some options to review progress along the way

Projects will progress to certification through the following stages:

1. Set carbon emissions target
NABERS calculation tools for embodied carbon will be available to everyone, regardless of their intention to certify with NABERS. These tools will help projects set embodied carbon targets and will provide data to inform decisions through to practical completion.

2. At design stage
When projects choose to sign a NABERS Commitment Agreement, an Independent Design Review will be conducted. This allows the project to advertise their intention to obtain a particular NABERS Embodied Carbon target.
For projects that choose not to sign a Commitment Agreement, an Independent Design Review will also be available, but not mandatory. These projects could use their review to understand how they are tracking in respect to their target ratings.
The Independent Design Review process will adapt the existing process used for design reviews with other NABERS tools.

3. At practical completion
After practical completion of the building, data is entered into the NABERS rating input form. NABERS Assessors for embodied carbon ratings will be responsible for submitting the rating and ensuring it is consistent with the NABERS Rules. The NABERS Assessor will be a qualified professional with training in the NABERS Embodied Carbon tool. This could be embodied carbon experts, quantity surveyors, building sustainability professionals or other suitably-qualified individuals who have completed the NABERS Assessor training and certification process for the NABERS Embodied Carbon tool.
Ratings will be based on the materials and quantities in the actual building. All claims need to be verifiable via documentation such as schedules, invoices and EPDs. Evidence will be required for project elements which have a significant impact on embodied carbon.

4. Certification of the rating
There will be an early certifications verification process. Following the launch of the tool, submissions will have data entry and source data checked, including invoices, Bills of Quantities and product disclosure statements. This will continue as a short-term measure until sufficiently low errors in data are detected. The process will then transition to the existing NABERS Level 1 and Level 2 audit processes, as outlined:

a. NABERS Level 1 Audit: will be conducted by NABERS technical officers on 100% of NABERS rating applications. This is a quality assurance process undertaken to ensure that an Assessor has correctly completed the rating application, made no obvious errors in data entry, and correctly applied the NABERS Rules to the rating.
b. NABERS Level 2 Audit: will be conducted by a panel of external auditors on 5% of NABERS rating applications initially. The Level 2 audit process involves re-rating the premises, using documentation provided by the Assessor who conducted the original rating. From time to

time, this can lead to a NABERS rating being revised or withdrawn. Assessors can receive sanctions for unsatisfactory performance as identified through the audit process

Overall sentiment

Overall support for the proposed certification process.

Considerations

Developing adequate capacity and capability

A concerted effort will be required to attract and build expertise in those conducting Independent Design Reviews, as well as those involved in submitting and auditing ratings.

This could be an issue, given the limited number of LCA professionals in the market.

NABERS response

We agree.

NABERS training will equip Assessors with all the knowledge they need to carry out ratings. Assessors won't need to be LCA professionals - they can be professionals from related fields who are interested in upskilling in this area.

NABERS understands the tool will increase the need for LCA professionals. While attracting and retaining these individuals is a whole of industry issue, our work will indirectly contribute to these efforts. This includes our advocacy work to streamline the creation of EPDs.

Timing of design reviews

A good time for design reviews is post-tender award. This enables data on actual products to be included in calculations.

NABERS response

Thank you for this suggestion.

Project teams can choose the timing of their Independent Design Reviews (IDRs). We anticipate most will undertake these towards the end of the design phase of their project, once tendering is underway, as you have suggested.

Ability to meet Commitment Agreements

Respondents recognise that Commitment Agreements will support marketing efforts prior to practical completion. However, concerns about the repercussions of not meeting Commitment Agreements were raised.

NABERS response

The NABERS embodied carbon calculator will help teams set targets. Teams are encouraged to generate a range of embodied emission reduction scenarios, where each scenario includes contingencies to ensure the project can meet the desired target even if risks are encountered.

Also, please note that while we strongly encourage project teams to set embodied carbon targets at the start of their projects, these can be set without entering into a Commitment Agreement.

Rating shelf life

Clarification is sought around the expiration of ratings.

NABERS response

We will work to clarify the shelf life of ratings, including circumstances under which ratings might expire. Over the coming months, we will engage with industry on this question.

7 FUTURE DEVELOPMENT

Proposal 10: A roadmap for future development

Proposal 10: A review of the proposals in this consultation paper will be carried out at approximately 18-24 months following launch

The following proposals will be reviewed as shown below, in alignment with the objectives and market needs:

Proposal 2 – Only upfront emissions will be included (A1-A5) For review: expanding life cycle stages included beyond upfront emissions.

Proposal 4 – Cold shell is the default building scope For review: expanding the building scope beyond cold shell.

Proposal 5 – Only carbon emissions will be included For review: expanding environmental indicators considered beyond carbon emissions.

Proposal 7 – Stored carbon and carbon neutral products will be disclosed on NABERS Rating Certificates via a Carbon Removal Indicator; they will not be recognised within the star rating on the certificate. For review: treatment of carbon neutral products to consider any changes to their contribution to urgent emissions reduction. For review: consideration of the treatment of stored carbon to align with outcomes of review of life cycle stages.

Proposal 8 – A statistical analysis of Bill of Quantities data is the preferred approach to creating whole-of-building benchmarks For review: consideration of timelines to regularly update benchmarking, taking into account data availability.

Overall sentiment

There is **overall support** for reviewing key proposals 18 - 24 months after launch.

Many appreciate the inclusion of the roadmap because it helps stakeholders see that their concerns with current proposals have been heard and may be considered in future.

Considerations

Priorities

Many stakeholders suggested that fitouts should be prioritised as the next step, after the first tool launch.

NABERS response

After the initial launch, we will work with industry to define the next priority. Fitouts will be one of the main considerations.

Link with other NABERS tools

Some are keen for NABERS to consider how this tool will link with other NABERS tools.

NABERS response

We expect buildings will engage with a range of NABERS tools. Each of our NABERS tools can be used alone or in concert with our other tools.

We've heard from many stakeholders that they will routinely check NABERS operational energy ratings against embodied carbon results. We will continue to explore the interaction between an

upfront carbon rating and operational NABERS Energy ratings.

Link with other LCA tools

Some are keen to understand whether project-specific LCAs that are done through a third-party might feed into NABERS ratings.

NABERS response

NABERS will provide a way of calculating **estimated** ratings, using the NABERS emission factors, that can be done in third-party tools. For other NABERS rating tools, such as NABERS Energy, it is common for project teams to estimate their rating, and track progress against that estimate over time, using third-party tools. We anticipate doing the same for embodied carbon.

We will engage with tool providers to determine how to do this. We will also work with tool providers on how they can output data in a way that aligns with NABERS input requirements, to make the work of getting a rating smoother.

To **certify** a rating, projects will need to enter data into the NABERS rating calculator, because that is where error detection, checks against the rules, and auditing take place.

Contact us

NABERS is administered by the NSW Office of Energy and Climate Change

4 Parramatta Square
12 Darcy Street
Parramatta NSW 2150

T (02) 9995 5000
E nabers@environment.nsw.gov.au

nabers.gov.au