



ENGINEERS  
AUSTRALIA

# Reducing government infrastructure emissions Discussion Paper

Engineers Australia submission

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This report has been developed through Engineers Australia's member delivered  
policy and advocacy initiative

## **Reducing government infrastructure emissions**

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# About Engineers Australia

Engineers Australia is the peak body of the engineering profession representing the collective voice of over 122,000 individual members nationally, including over 26,000 members in Queensland. Constituted by Royal Charter, our mission is to advance the science and practice of engineering for the benefit of all Australians.

Engineers and engineering are indispensable contributors to Australia's prosperity and lifestyles. Engineering services are embodied in almost every good or service consumed, used, or traded by Australians, now and in the future. Engineers are the enablers of productivity growth because they convert 'brilliant ideas' into new commercial products, processes, and services. Engineers also ensure society gets the most out of existing facilities by optimising their operations and maintenance.

Engineers are passionate participants in public discourse, contributing to meaningful community and policy discussions that impact the economy and society. Engineers Australia formulates its policy positions through engagement with members and non-member engineers, industry, educators, government officials, and other experts across Australia and internationally. By synthesising these diverse perspectives, we develop evidence-based policy aligned with the highest professional standards.

This submission has been developed by members through Engineers Australia's member-delivered policy and advocacy initiative.

## Executive Summary

Engineers Australia provides this submission compiling the thoughts of leaders in the engineering industry in response to the "Reducing government infrastructure emissions" Discussion Paper. Engineers Australia acknowledges that addressing embedded and active emissions in the infrastructure sector is a pressing global challenge that requires immediate attention from governments, industry, and the engineering profession. It is reported that infrastructure-related emissions account for around 70 per cent of Australia's total annual emissions.<sup>1</sup>

Engineers Australia advocates that consideration needs to be given to the social, economic and environment costs of climate change on infrastructure as part of managing current and future impacts. The State of the Climate Report (2022) by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the Bureau of Meteorology<sup>2</sup>, highlights change in both higher temperatures and weather patterns in Australia over the last century. Failure to reduce infrastructure exposures to these impacts and enhance adaptability and resilience could lead to future economic, social, and environmental vulnerabilities.

Sustainable infrastructure is an area of focus both for the private and government sector across Australia. Engineers Australia recommends the Department of State Development, Infrastructure, Local Government and Planning (DSDILGP) collaborate with other Infrastructure bodies (state and federal) to attain consistency. It is also recommended that DSDILGP Infrastructure Queensland review

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<sup>1</sup> 'Reshaping infrastructure for a net zero emissions future' Clean Energy Finance Corporation (March 2022) <https://www.cefc.com.au/media/402347/reshaping-infrastructure-to-lower-emissions-march-2020.pdf>

<sup>2</sup> The state of Climate (2022) [State of The Climate 2022 \(bom.gov.au\)](https://www.bom.gov.au/state-of-the-climate/)

Infrastructure Australia's 2022 Replacement Materials report which shines a light on opportunities to use recycled materials in road infrastructure and adopt key actions.

Key recommendations fall under three main categories:

- 1) **Regulatory** including Utilisation of design standards, Appointment of Chief Engineer, Australia working together rather than state wise,
- 2) **Financial** including government investing in area or initiatives that will promote or result in emission reductions, Government encouraging using local green products rather than focussing on costs,
- 3) **Capacity Building** including Inclusion of IS Ratings

Engineers Australia provides this submission to the Queensland Government which includes responses and recommendations by the leaders in the engineering industry for further consideration and development in response to the Reducing Government Infrastructure Emissions Discussion Paper. **In summary, Engineers Australia recognises the positive challenges ahead and is open to working with the State Government more broadly to achieve the best outcome for Queenslanders now and into the future.**

## 1. Embed emission reductions in infrastructure decision making

- *What is your organisation already doing that aligns with the strategic direction to embed emissions reductions in infrastructure decision making?*

Engineers Australia supports the need to embed emissions reductions in infrastructure decision making. Engineers Australia believes that infrastructure decision making is largely driven by clients who mainly comprise Consultants, Contractors, and the Government. The Consultants (mostly Engineers) and Contractors provide efficient engineering designs which result in less material consumption/ transport emissions while also providing continuous support and collaboration with Clients on emission reductions through the various project decisions.

- *What guidance, tools, data, or other support might be required to support embedding emissions reductions in infrastructure decision-making for your organisation and/or other stakeholders and decision-makers?*

Following are some of the guidance, tools, data, or support which Engineers Australia understand may be required to support embedding emissions reductions in infrastructure decision making for engineers or other stakeholders or decision makers:

- a) **Design Standards:** Use of the Standards assist in decision-making on emission reductions (and optimise energy use) in the infrastructure projects. While we recommend utilisation of the design standards, however, it is necessary to evolve and make recommendations or changes to them when necessary and not to get hindered by the design standards if the designs exceed them.
- b) **Responsible Steering Committee:** It is also important to have a steering committee on large infrastructure projects that can make decisions and integrate decisions to depart from design specifications into the overall project governance. Responsibility must include seeking Asset Owner acceptance as part of decision-making process to depart from specifications/standards. Changes and departures from the specifications can then undergo a more rigorous and focused due diligence process.

- c) **Engineers Australia’s Code of Ethics:** Incorporating the Engineers Australia’s Code of Ethics<sup>3</sup> promotes sustainability in engineering practice which provides engineering capability in lower emissions in the whole of the lifecycle of infrastructure.
  - d) **NABERS:** National Australian Built Environment Rating System (NABERS) provides a rating for building energy use. Having a higher rating also means lower emissions, especially with the current electricity grid being fossil-fuel intensive in Queensland. The utilisation of this tool will greatly facilitate the identification and analysis of the emission rate, thus offering valuable assistance in this regard.
  - e) **SDG 9:** Incorporation of the ideas identified in the United Nations, SDG 9 “Industry, Innovation, and Infrastructure” section 9.1 “Develop Sustainable, Resilient and Inclusive Infrastructures”<sup>4</sup> will prove to be helpful.
  - f) **Infrastructure Sustainability Council (ISC):** It is important to include the thoughts of qualified individuals from the Infrastructure Sustainability Council to develop these policies and incorporate the ideas for the betterment of society. It is believed that currently, the Government use Infrastructure Sustainability (IS) Design and As-Built Ratings to benchmark performance during delivery and this should continue as a mandatory requirement for all projects.
  - g) **Small and Medium-sized Enterprises (SMEs):** Engineers Australia believes it is imperative for the government to mandate to allow SMEs to compete more in this space by providing ‘guidance’ to organisations through either mandating or providing incentives via procurement etc that allow SMEs to be more competitive with their low emissions solutions.
  - h) **Interstate Initiatives:** Engineers Australia believes it will be more productive if various states work together towards these initiatives and can access trials and pilot programs happening in other states and identify where the lower emission materials and solutions can be implemented.
  - i) **Achieving Emissions Targets:** Whilst Queensland has made a good start on making the greenhouse gas emissions and targets documentation publicly available<sup>5</sup> since 2021, Engineers Australia recommends that the emissions and targets need to also show the reduction by the different infrastructure project types. This will help all stakeholders to understand the impact their project can make and will assist in creating a comprehensive analysis of achieved targets in the future.
  - j) **Access to data:** Making key product, materials, and emissions data readily available will significantly enhance a project’s ability to cater for scope 1, 2 and 3 emissions.
  - k) **Transparency:** Ensuring projects undertake Lifecycle Analysis and use products with Environmental Product Declarations will drive greater transparency along supply chains, allowing better decision making for low carbon alternatives.
- *What are your expectations regarding the type and application of standards, benchmarks, targets or other policy settings and frameworks in supporting infrastructure decision-making?*

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<sup>3</sup> Engineers Australia Code of Ethics (August 2022)

<https://www.engineersaustralia.org.au/publications/code-ethics>.

<sup>4</sup> [Goal 9: Industry, innovation and infrastructure - The Global Goals](#)

<sup>5</sup> <https://www.des.qld.gov.au/climateaction/emissions-targets>

Engineers Australia's expectations from the Government include:

- a) Assurance that emission requirements get captured and act as an input to the updates of the relevant Australian Standards and other compliance documents.
  - b) Provision of product, materials and scope 1, 2 and 3 emissions information to the key government authorities where a large component of the infrastructure construction budget is spent and where the largest impact can be more specifically achieved through major project delivery.
  - c) Utilisation of standards such as The Department of Transport and Main Roads (TMR) guidelines by many councils in the execution of their works, further ensuring that emission targets and requirements extend even further into the infrastructure construction space.
- *Can you provide any examples of where you have seen rating systems and standards etc applied to infrastructure decision-making that have reduced infrastructure emissions?*

#### a) Rating Systems

The Infrastructure Sustainability Rating Scheme<sup>6</sup> by Infrastructure Sustainability Council is a voluntary, third-party assured assessment that evaluates the overall sustainability performance of infrastructure assets across the quadruple bottom line (governance, economic, environmental, and social). Their Infrastructure Sustainability Ratings directory<sup>7</sup> has a list of various assets and projects registered with ISC for an IS rating.

Engineers Australia further believes that having a preliminary assessment during planning stages and ensuring the asset to be delivered is as sustainable as possible (environmentally, socially, and economically) and be industry best practice.

Currently in Australia and New Zealand, it is the only comprehensive rating system for infrastructure sustainability but clearly needs to be applied to not just government infrastructure projects but to industry projects where significant construction is undertaken.

Best practices for the IS Rating Scheme include the following:

- i. starting early at any stage of the infrastructure lifecycle,
- ii. engaging with all stakeholders in a collaborative process,
- iii. use of the IS Rating Scheme Tool, the IS Materials Calculator and the IS Technical Manual (latest),
- iv. getting an independent assurance from an accredited IS Assessor.

Engineers Australia further recommends that the best practice IS initiatives including (but not limited to) the following are promoted more widely:

- i. Using low-carbon materials and construction methods which is again largely driven by Contractors, and it is often seen that the Contractors having corporate responsibilities or targets, deliver better results, regardless of whether an IS Rating is to be delivered.
- ii. Designing for energy efficiency and renewable energy,
- iii. Using non-greenhouse gas equipment in power supply systems
- iv. Water conservation and rainwater harvesting,

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<sup>6</sup> IS Rating Scheme, <https://www.iscouncil.org/is-ratings/>

<sup>7</sup> [IS Ratings Directory \(iscouncil.org\)](https://www.iscouncil.org/is-ratings-directory/)

- v. Waste reduction and recycling,
- vi. Sustainable transport options,
- vii. Creating green spaces and biodiversity corridors, and
- viii. Community engagement and consultation.

Further, the NABERS rating scheme has been applied to a range of buildings. Of note is Midtown Centre, Brisbane where, in an architectural first, the façades of two 1980's buildings that stood 13 metres apart were removed and the building stripped back to a raw concrete shell. Each floor slab was stitched together. Extra storeys were added, bringing the height to 26 floors and yielding an additional 70% net lettable area.

In keeping the building's structure, the project saved about \$2 million in the social cost of carbon. The 11,000 tonnes of CO<sub>2</sub> saved is the equivalent to removing 2,500 cars from the road for a year or around four years of carbon neutrality. Key features:

- The two buildings at 155 Charlotte Street and 150 Mary Street in Brisbane's CBD are now one 44,000-square-metre, 26-storey vertical village.
- With 5 Star NABERS Energy and 4 Star NABERS Water ratings, Midtown Centre is 30% more energy efficient and 35% more water efficient than a conventional building.
- A 36% reduction in carbon emissions was achieved when compared to a new build, plus 90% of construction waste was recycled.
- A lifecycle analysis of the project's sustainability credentials found it was 246% more environmentally friendly than a demolition and new build scenario.
- A 49% saving on embodied carbon was achieved thanks to the innovative re-use and re-purpose strategies.

## b) Standards

Member feedback states that when client organisations allow flexibility in relation to the application of their own internal standards, consultants and contractors are able to respond with solutions that lower embodied carbon footprint, while still meeting the overall outcomes of the project. For example, performance, durability. The Department of Transport and Main Roads for example now provides guidance via it's [Waste 2 Resource Annual Status Report 2022-2023](#).

- *Are there additional opportunities and initiatives that should be considered in the roadmap?*

Addressing Scope 3 emissions in supply chains for all infrastructure projects, including the built environment is of paramount importance. Some commercial entities are leading this, however the government has a key leadership role in standardising the way Scope 3 emissions are accounted for.

Engineers Australia recognises **multi-use of space** as one of the opportunities and initiatives which if considered in the roadmap would be beneficial for the community. We have seen around the world in places such as Europe or Asia where space is the consideration, engineers often use innovative solutions. Solutions such as parts of the structures made in such a way to serve as multi-function spaces (dining space able to be converted to sitting space within a few minutes or, cinema space having the capability to be used for other functions) will be helpful. This not only reduces space and accompanying energy consumption but also the quantity of construction materials used.



## 2. Reduce embodied and operational infrastructure emissions

- *What is your organisation already doing that aligns with the strategic direction to reduce infrastructure embodied and operational emissions?*

At Engineers Australia, working on climate change solutions through our policy and advocacy work is core to our business. Our work on climate change is guided by our Climate Change Position Statement<sup>8</sup>. Our position statement supports rapid and wide-ranging action to reduce greenhouse gas emissions to net zero and adapt to the changing climate. It also recognises that practical, innovative engineering will be essential to achieving these goals.

We work closely with members and the wider profession to develop Engineers Australia's climate policy platform and drive the public conversation forward. We also engage regularly with government and parliamentary inquiries on climate-related issues.

We are focussed on contributing to standards and regular training and development for our members as well as the broader profession.

- *What are the top 3 infrastructure emissions reduction initiatives that you think government could progress over the short, medium, and longer term?*

The three most effective measures that will improve emissions in infrastructure construction are as follows:

1. Review Regulatory Processes
  - Develop regulatory requirements for Lifecycle Assessment (LCA), circular design criteria, disassembly, secondary material availability (valuing and certifying used materials), carbon per m<sup>2</sup>, and landfill bans for infrastructure projects.
  - Establish a new regulatory body aimed at implementing decarbonisation and materials circularity.
  - Introduce incentives and compliance measures to encourage decarbonisation and materials circularity, with a view to balancing State and Federal requirements.
  - Review measuring and reporting requirements, specifically, secondary materials use and availability, and scope 1, 2, 3 emissions (as part of LCAs),
2. Review Procurement Processes
  - Include circular economy criteria in funding arrangements.
  - Government investment with industry (PPP) as a means of reducing risk.
  - Government purchasing power across infrastructure assets.
  - Government can lead by example with government assets. Trickle-down effect to rest of sector.
  - Government investment in supply chains and innovative product commercialisation.
  - Valuing externalities – resources, carbon.
3. Foster Capacity Building
  - Develop world leading pilot projects.
  - Develop business cases demonstrating circularity.

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<sup>8</sup> [Our position on climate change \(engineersaustralia.org.au\)](https://engineersaustralia.org.au)

- Introduce targeted skills and information (training) for key roles in infrastructure development projects – carbon cost accounting, lifecycle assessment and material provenance, material composition, etc., for Project Directors, engineers, development managers, cost controllers, etc.
  - Manage the skills transition within the auspices of Australia’s national wellbeing framework, *Measuring What Matters*.
- *What specific initiatives could be considered for embodied and operational emissions?*

As a first step, government can lead by example by accounting for not just Scope 1 & 2 emissions across government assets, but also accounting for and understanding Scope 3 emissions as well. This will involve analysis of supply chains and the provision of materials data that can be further used by industry to account for their Scope 1, 2 & 3 emissions.

Government infrastructure projects can adopt the following principles to reduce embodied emissions:

- a) Mandatory **Lifecycle Analysis** for all government infrastructure projects.
- b) Use **low-carbon materials and optimise construction methods**, for a low embodied carbon footprint, such as recycled materials, renewable materials, and locally sourced materials, whilst minimising waste and energy consumption.
- c) **Design for durability and adaptability** i.e. extending the lifespan of the infrastructure and reduce the need for replacement.
- d) Promote circularity in the construction sector by designing for **disassembly, reusing materials, and recycling materials** at the end of their life.
- e) Use **digital tools** to optimise design and construction, thereby reducing waste and improving efficiency (which can lead to lower embodied emissions).

Similarly, government infrastructure projects can reduce operational emissions by adopting the following principles:

- a) **Design for energy efficiency** i.e. using energy-efficient appliances and equipment, LED light bulbs, optimizing building insulation, and using renewable energy sources.
- b) **Implement smart energy management systems** which can help to reduce energy consumption by optimizing heating, cooling, and lighting.
- c) **Promote sustainable transportation** options on new transport infrastructure projects, to include active and public transportation, and encouraging the use of electric vehicles.
- d) **Promote the use of durable materials and good engineering design** to reduce maintenance and replacement requirements.
- e) **Introduce effective integrated master planning facilitating the optimal selection of water sources**, treatment methods, and water transfer processes in a sustainable manner, leading to a significant reduction in emissions. By strategically aligning these elements, the environmental impact associated with water-related activities is minimised. Furthermore, embracing a total water management approach and adopting principles of the circular economy to address water needs will enhance sustainability. This involves comprehensive water resource management, recycling, and reuse, contributing to a more efficient and environmentally conscious water system. In essence, the combination of well-informed master planning, total water management, and a circular economy

approach synergistically work towards minimising emissions while addressing the critical demand for water. Specific examples include:

- i. reducing water consumption and waste production by installing water-efficient fixtures, recycling wastewater and composting organic waste,
- ii. augmenting potable water use with purified recycled water,
- iii. generating hydrogen with the use of recycled water, and
- iv. harvesting stormwater for potable use.

- *Describe what a 'coordinated energy and resource efficiency program' for infrastructure might look like?*

A coordinated energy and resource efficiency program for infrastructure would be a comprehensive and collaborative effort to reduce the energy and resource consumption of all types of infrastructure, including transportation, buildings, water and wastewater systems, and energy generation and distribution systems. The program should involve setting ambitious goals for energy and resource efficiency, developing and implementing a variety of strategies to achieve those goals, and tracking and reporting on progress over time. Specifically:

a) Setting and meeting ambitious energy reduction and material circularity targets:

- I. Drawing on targets as set out by the Qld Department of Environment and Science.<sup>9</sup>
- II. Mandating these targets be met in all government infrastructure projects.

b) **Developing and implementing a variety of strategies** to achieve the goals. The strategies could include:

- i. Lifecycle analysis (LCA) which would foster inclusion of Environmental Product Declarations and analysis of scope 3 emissions.
  - This will further promote a whole of asset life plan which details end of life reuse, disassembly or recycling options.
  - It is noted however that this is somewhat challenging in the built environment as there are various stakeholders across the value chain. LCA will aid increased awareness of end of life options however and generally improve circular outcomes.
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- ii. Building codes and standards that mandate circular construction and operation processes including emissions, materials, and waste reductions.
- iii. Procurement models to address circularity at the design stage so that all asset phases are captured (design, construction, operation and maintenance)
- iv. Incentives for businesses and homeowners to invest in energy efficiency measures, and
- v. investment in research and development of new energy-efficient technologies which are less resource intensive; as well as materials and products that are less resource and greenhouse gas intensive.;

c) **Tracking and reporting on progress** over time, to monitor progress towards the goals in order to identify areas where additional effort is needed, with annual publication for accountability.

d) In terms of infrastructure that are self-sufficient in energy consumption, emphasis should be placed on **Solar PV and other smart technologies** already mentioned above. A good idea would be for infrastructure to employ the LPS batteries ahead of the traditional batteries in terms of capacity and stability.

- *Are there additional opportunities and initiatives that should be considered in the roadmap?*

In addition to the above, Engineers Australia recognises a range of **Smart technologies that could be deployed in research and development efforts under the roadmap. For instance:**

- Use of smart paints that generate electricity
- Use of Smart HVAC which works only when there are people in the room and automatically turns off when there is no one in the room
- New infrastructure back-up power supplies which can utilise a solar PV and battery storage.

## 4. Grow a green supply chain for infrastructure

- *What is your organisation already doing to grow a green supply chain?*

Engineers Australia is at the forefront of education by engaging with schools and universities to ensure that students intending to enter the engineering workforce understand the key drivers for delivering engineering solutions that have a positive impact on climate change.

- *What could be done, both in general terms and specific initiatives, to help accelerate the research, development and adoption of low carbon products and services? What could be done to establish and mature an 'infrastructure innovation ecosystem' and green infrastructure supply chain in Queensland?*

The following can be done to help accelerate the research, development and adoption of low carbon products and services and to establish and mature an 'infrastructure innovation ecosystem' and green infrastructure supply chain in Queensland:

- Advocate for a national Carbon Tax:** Engineers Australia witnessed a greater uptake of renewables and low carbon technologies during the carbon tax regime in Australia. As all the UN low carbon initiatives are non-binding, a semi-carbon tax regime or generous government incentives would be very beneficial. This will encourage uptake of low carbon behaviours across the entire lifecycles for infrastructural developments from concept, design, construction, commissioning, operation/maintenance, and end of life phases.
- Creation of market for greener / recycled products:** This is required to ensure that the standards, specifications and other infrastructure design and construction documents all promote or require the use of materials and construction methods that minimise emissions. This will create a market for products manufactured from lower emissions or recycled materials allowing businesses to invest in research and equipment with confidence. Uncertainty will ensure that these products are not viable, and industry will continue to use historical approaches that manufacturing facilities are already set up for.
- Investment in the Battery storage technology:** Investing in improved battery storage technology will allow for enough energy to be stored to match energy demands of infrastructure. Infrastructure has the potential to utilise locally generated power (Solar PV), This combined with sufficient storage lowers the demand for energy from the grid thus lowering emissions.
- Smart Sensors:** Investing around the research of different smart sensors and the smart use of energy consuming devices with infrastructure can lower operational emissions. Digitalisation (e.g. Big Data,

IoT, GIS, AI) provides opportunities to optimise infrastructure. For example, The Edge Building – Amsterdam, this is a news story from 2015 about The Edge, which is the Greenest, Most Intelligent Building in the World (bloomberg.com)<sup>9</sup>.

- *What are effective procurement related demand signals that could support growing a green supply chain?*

The following demand signals could support growing a green supply chain:

- a) **Government's shift in culture/ design standards** can signal to the market to create a local green supply around major projects.
- b) **An indication in procurement documents that green supply is highly favoured/evaluated** will create a shift in the market, noting that procurement documents cannot impose supplier choice/ material selection (concrete mix for example). Government will need to indicate favouring green supply in a manner that does not lead to unfair competition.
- c) Governments can (and do) **include sustainability criteria** in awarding large contracts - these usually sit under environment workforce, and sustainability.
- d) Government needs to ensure that their procurement practices are not participating in green washing infrastructure projects.
- e) **Adding incentives for low emissions submissions** for projects or conversely penalties for higher emissions, thus creating the pathway to reach the desired target and ensuring there is a clear impact on the environment.
- f) **Asset management to cover any future upgrades** to the infrastructure and maintenance (predictive, planned and corrective) and these activities must be low or zero-carbon. As mentioned before the disposal (end of life) of an asset must be considered for emissions. The circular economy aspects too – end the life of an infrastructure asset can negate a replacement and thereby emissions to some extent.

- *Are there additional opportunities and initiatives that should be considered in this roadmap?*

There is a clear opportunity for the Government to demonstrate leadership by strengthening commercialisation pathways from research and development in universities to industry pilots. Focus needs to be on innovation in materials, processes, and equipment-that have low emissions, use less virgin materials, and are able to be recovered, reused, recycled at end of life.

## 5. Verify and promote outcomes

- *What is your organisation already doing to verify and promote infrastructure emissions outcomes?*

Engineers Australia actively contributes via various platforms such as its Create magazine, e-news, and social media along with the conferences and seminars to promote best practice case studies. The 2023 Climate Smart Engineering Conference is the best example to support this. There are also several volunteer members on many standards committees who involve themselves in contributing to different policies or government documents such as this one.

- *In your experience, what are successful ways to share best practice sustainability approaches to reduce emissions across organisations?*

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<sup>9</sup> [The Edge Is the Greenest, Most Intelligent Building in the World \(bloomberg.com\)](https://www.bloomberg.com/news/articles/2015-09-24/the-edge-is-the-greenest-most-intelligent-building-in-the-world)

Engineers Australia believes that following are some of the ways to share best practice sustainability approaches to reduce emissions across the organisations:

- a) Spreading knowledge via Engineers Australia's platforms like Create magazine etc.
  - b) Develop world leading pilot projects,
  - c) Showcase business cases demonstrating circularity,
  - d) Training on targeted skills and information for key roles in infrastructure development projects – carbon cost accounting, lifecycle assessment and material provenance, material composition, etc., for Project Directors, engineers, development managers, cost controllers, etc,
- *What actions or mechanisms that could be implemented to help verify sustainability outcomes with respect to emissions reductions?*

The various actions or mechanisms that could be implemented to help verify sustainability outcomes with respect to emissions reductions are as follows:

- a) **Use of various measurement instrumentation** that exist to measure consumption per day per hour of energy use including the type used e.g the Yokogawa's 'Renewable first' control & optimisation system. Thus, the outcome can be promptly confirmed, verified, and fine-tuned against global benchmarks as necessary. The benchmark has to be developed and captured in AS/NZS standards in line with the sister IEC standards.
  - b) **Thorough consideration is required to make the ISC process less administratively onerous** thereby more attractive for contractors to implement. At present large sums of money need to be spent on sustainability consultants to track site performance, audit scoring, and submit to ISC. Making the administration process more cost efficient would free up those funds for further sustainability initiatives that reduce emissions.
  - c) **Mandate Lifecycle Analysis** as identified earlier.
  - d) **Assessing the sustainability best practice process by interviewing stakeholders** (including ISC, as they play a major role on all infrastructure project types for a net zero<sup>10</sup> and have a net zero vision) and reviewing relevant documentation, such as project plans, design drawings, and sustainability reports, undertaking a risk assessment process to identify and manage sustainability risks, and finally by undertaking a performance monitoring and reporting process to track progress on sustainability goals and identify areas for improvement.
  - e) **Use of independent verification, rating schemes (depending on type of asset) and ISC** which are commonly used to verify outcomes. Promotion of outcomes is also done through Client's media, marketing, ISC partnerships, knowledge share sessions- as well as Engineers Australia.
- *How might government work with industry and the community to develop consistent approaches to carbon modelling, including for infrastructure projects?*

Engineers Australia suggests this can be done by:

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<sup>10</sup> <https://www.iscouncil.org/wp-content/uploads/2021/12/A-Net-Zero-Future-Delivered-Through-our-Infrastructure-Pipeline.pdf>

- a) **Implementing emissions management as part of sustainability in standards and specifications**, which will ensure a consistent implementation by industry and thus creating a market certainty enabling companies to invest in research and equipment to realise these targets.
- b) **Developing an approach to more accurate predictions/ identification of opportunities** to save on carbon emissions as Government has the unique position of being able to obtain large amounts of data from projects during different project stages. Government can potentially have visibility on how carbon modelling during planning relates to actual carbon emissions after construction is completed.
- *What other actions or initiatives to help verify and promote outcomes could be included in the roadmap?*

One of the challenges that needs to be addressed is the increased cost for projects that utilise low emissions materials. The Government is often in the public eye for costs associated with infrastructure projects however, the Government could publicly promote their drive toward low emissions solutions for long term benefits rather than using low-cost materials that do not yield long term benefits. Given the exposure to climate change and initiatives expected of industry it would show strong leadership for a government to promote their commitment by actions that benefit the general population in the long term.

## 6. Missing elements/additional comments

Engineers Australia would like to highlight elements as follows:

### a) **Need for positive outcomes**

Given the delayed actions to mitigate climate change, there is a pressing need to elevate the standards for reducing carbon emissions. Leading organisations are now aiming beyond merely meeting carbon-neutral targets; instead, they are actively striving to achieve positive environmental outcomes. This shift reflects a commitment to not only offsetting carbon emissions but also making substantial contributions towards environmental sustainability. As a response to the urgency of the climate crisis, organisations are focusing on innovative initiatives and impactful measures that go beyond conventional carbon neutrality, demonstrating a proactive and responsible approach to environmental stewardship.

Infrastructure projects should aspire to deliver diverse positive impacts across environmental, social, economic, and cultural dimensions.

The following are useful references that emphasize the need for positive impacts:

- The Institution of Civil Engineers - Presidential Address 2023 by Prof. Anusha Shah FICE: “The climate change and biodiversity crises are interlinked and need to be addressed in tandem. Nature-based solutions that safeguard nature whilst providing multiple benefits to people are key to solving the problem – we now need to deliver them at pace.”

Anusha Shah aims to shift focus to ensure that the civil and infrastructure engineering community work collaboratively across sectors, geographies, and generations to deliver sustainable, resilient solutions that **create a net positive for people and planet**.

- “Plan Beyond inspires us to make a **positive environmental, societal and economic difference** for businesses, governments and communities around the world – from the way we operate our business, to the work we perform with clients and other organisations.”<sup>11</sup>.

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<sup>11</sup> [Jacobs: a more sustainable future | Sustainability Magazine](#)

- Leading international consultants' state: "Helping communities thrive is at the heart of our approach to sustainability. We facilitate long-term business success by enabling economic, environmental, and social benefits that have a **positive impact on current and future generations.**"<sup>12</sup>

b) **Creating a "Chief Engineer" position within DSDILGP**

A Chief Engineer in the Queensland Government dedicated to promoting sustainability and reducing carbon emissions can have several benefits. Here are some arguments that other states have used in support of this initiative:

- **Expertise and Leadership:** A Chief Engineer championing a focus on sustainability can provide and engage the appropriate technical expertise and leadership needed to guide the state in adopting and implementing sustainable practices.
- **Comprehensive Planning:** The Chief Engineer can lead the development of a comprehensive sustainability plan, outlining specific goals and strategies for reducing carbon emissions across all sectors of engineering including, but not limited to, transport, energy, and infrastructure.
- **Innovation and Technology Integration:** Having a dedicated position can provide a focus on researching and integrating innovative technologies that can contribute to sustainability goals. This could include advancements in renewable energy, energy-efficient infrastructure, and smart city solutions.
- **Project Oversight:** The Chief Engineer can oversee and coordinate sustainability projects, ensuring that they align with the state's goals and are implemented effectively. This includes infrastructure projects, energy initiatives, and transport improvements.
- **Cost Savings in the Long Run:** While there may be initial costs associated with creating this position, the long-term benefits, such as the ability to provide authoritative knowledge on subjects such as reduced energy consumption and environmental impact, can result in significant cost savings and improvements in public knowledge for the state over time. Additionally, the Chief Engineer becomes the voice of industry to the public and able to speak from a position of knowledge and authority.
- **Regulatory Compliance:** The Chief Engineer can stay informed about environmental regulations and work to ensure that the state remains compliant. This proactive approach can prevent potential legal issues and promote a positive image for the state in terms of environmental stewardship.
- **Public Awareness and Engagement:** A Chief Engineer can play a crucial role in educating the public about the importance of sustainability and carbon reduction. They can develop outreach programs to engage communities and encourage environmentally friendly practices.
- **Job Creation:** Sustainability initiatives often lead to the creation of new jobs in areas such as renewable energy, energy efficiency, and green infrastructure. The Chief Engineer can work towards developing policies that support job growth in these and many other sectors.

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<sup>12</sup> [Sustainability | WSP](#)



- **Collaboration with Stakeholders:** The Chief Engineer can facilitate collaboration between government agencies, private businesses, universities, and non-profit organizations to leverage collective expertise and resources for sustainable initiatives.
- **Long-Term Vision:** Establishing a Chief Engineer position sends a clear message that the state is committed to a long-term vision of driving engineering solutions to sustainability. This commitment can attract investment, research, talent, and partnerships focused on sustainable development.
- **Commitment to Address Climate Change:** By creating a Chief Engineer position with a specific focus on sustainability, the state can demonstrate its commitment to addressing climate change, reducing carbon emissions, and building a more sustainable future.
- **Reference:** It is worth noting that ACT has a Chief Engineer, Adrian Piani, appointed in 2022 to safeguard an innovative and skilled engineering workforce in the ACT, as well as to ensure strategic infrastructure planning and processes are in place<sup>13</sup>.

**c) Support and Promote Australian Made:**

The COVID pandemic recently highlighted the level to which Australia relies on imported goods for its projects and how such events can adversely impact the time and cost to our major projects. By investing and supporting local engineering and manufacturing of new innovative products (as mentioned in this submission), the Government can help reduce that reliance on overseas companies. Further to this, it will support the creation of new jobs and industries that can become the hallmark of sustainable manufacturing that drives the lowering of emissions, reduces reliance on imported products and supports Australian companies in becoming more competitive on the world stage.

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<sup>13</sup> <https://www.engineersaustralia.org.au/news-and-media/2022/07/act-appoints-first-chief-engineer>