SUBMISSION

Submission to the Climate Change Authority

# 2026 Evidence Platform Issues Paper

30 April 2026

**The Australian Academy of Technological Sciences and Engineering (ATSE) is a Learned Academy of independent, non-political experts helping Australians understand and use technology to solve complex problems. Bringing together Australia's leading thinkers in applied science, technology and engineering, ATSE provides impartial, practical and evidence-based advice on how to achieve sustainable solutions and advance prosperity.**

Measuring Australia's progress towards meeting our obligations under the Paris Agreement is essential to ensuring we have the capacity to adjust policy settings appropriately to meet Australia's emissions reduction ambitions. Keeping long-term global temperature rises well below 2°C, in line with the Paris Agreement, will help to avoid extreme and prolonged cyclones, more regular heat waves, ecosystem damage and reduce primary industries production (Australian Academy of Science, 2021). The Learned Academies, including ATSE, stand ready to support the Climate Change Authority in their important work by providing evidence and expert advice from our Fellowships. ATSE supports the work of the Climate Change Authority in developing an evidence platform and welcomes opportunities to provide advice as the evidence platform is developed and implemented. ATSE has previously produced reports on decarbonising diesel industries, water management in the Murray-Darling Basin, the state of low emissions technologies and soil carbon opportunities to support the evidence base for Australia's emissions reduction efforts.

ATSE generally supports the proposed outcomes and metrics within the Issues Paper. There are, however, a few areas where important metrics of emissions reduction could be better captured or reflected in the evidence platform. This submission is focused on the emission reduction metrics, but ATSE welcomes the Climate Change Authority's planned focus on green growth, adaptation and critical enablers. ATSE would welcome the opportunity to provide further advice on these domains or connect the Climate Change Authority with our expert Fellows.

To improve the efficacy of the evidence platform, ATSE makes the following recommendations:

**Recommendation 1:** Include measures of lead indicators for the renewable energy roll out, including measures of mean renewable project approval times and mean time from financial close to grid connection.

**Recommendation 2:** Include measures of relevant R&D intensity as a lead indicator of future emissions reduction.

**Recommendation 3:** Develop metrics for the decarbonisation of heavy vehicles through electrification or use of low carbon liquid fuels.

**Recommendation 4:** Include metrics tracking the availability of vehicle to home and vehicle to grid charging, either by tracking the proportion of the population able to access bi-directional charging or by the number of EVs and charges sold that support bidirectional charging.

**Recommendation 5:** Ensure metrics fully account for embedded emissions in infrastructure.

**Recommendation 6:** Investigate the feasibility of developing a measure of expected methane emission change from agriculture based on uptake of technologies to reduce methane from ruminant livestock.

**Recommendation 7:** Bring forward the inclusion of skills and workforce within the critical enablers domain for development in 2026.

## Leveraging lead time indicators technology adoption

The Issues Paper proposes several measures to monitor the success of the rollout of renewable energy. These metrics – annual rates of additional capacity and project approvals – are supported by ATSE. One of the largest barriers to increasing rates of capacity connection and approvals has been slow approvals processes (Clapin & Longden, 2024). Almost three-quarters of renewable energy capacity in the development pipeline is yet to receive planning approval (Johnston, 2025), and projects can take years to receive the required approvals, with a quarter of all projects taking between 3.9 and 7.8 years to receive federal approval (Climate Change Authority, 2025). The urgency of this situation is indicated in the latest AEMO Connections Scorecard which shows that the number of proposed new generation and battery storage projects seeking to connect to the National Energy Market is nearly as big as the entire existing installed base of generation.

Recent legislative changes have been enacted to attempt to speed up approvals of this critical infrastructure, and tracking the success of these changes will be important for ensuring a smooth roll out of renewables. Other measures of the speed of the roll out could include the mean time from financial closure to grid connection, which would help to consider construction delays. Including these leading indicators would strengthen the Outcome 3 metrics by improving the ability to identify risks and the causes of delays in the green energy rollout.

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While the technologies to meet Australia's 2030 and 2035 emissions reductions targets already exist, the development of new innovations and technologies to support eliminating the hard to abate emissions will be needed to reach Australia's net zero by 2050 goal. While technological advancements have been made that offer new emissions reduction options for hard to abate sectors, eliminating the final 10% of emissions is expected to be the most challenging (Mai et al., 2022). Despite this need for R&D investment, Australia's R&D expenditure in emissions reduction related fields is below global averages. For example, public R&D expenditure within energy has decreased in both absolute terms and relative to other countries since 2004, with Australia now spending a half to a third of what comparable countries do on energy R&D (as a proportion of GDP; ACOLA, 2022). Investments in research and development of emissions reductions technologies can act as a leading indicator of how Australia is progressing in developing and commercialising these technologies. Including the R&D expenditure on emissions reduction technologies or projects within the evidence platform would therefore help to reflect Australia's future readiness for emissions reduction in hard to abate areas. This data could be obtained from government funding agencies (such as the Australian Research Council) for public funding and through the Australian Bureau of Statistics data collection of business expenditure on R&D by field of research.

**Recommendation 1:** Include measures of lead indicators for the renewable energy roll out, including measures of mean renewable project approval times and mean time from financial close to grid connection.

**Recommendation 2:** Include measures of relevant R&D intensity as a lead indicator of future emissions reduction.

## Measuring effective vehicle electrification

Reducing transport sector emissions, as presented in the proposed Outcome 4, is an important step in overall emissions reduction. The sector accounts for nearly one-fifth of Australia's greenhouse gas emissions (Cheung et al., 2023) and is likely to become Australia's largest source of emissions as emissions from electricity and agriculture fall (DCCEEW, 2022). The Issues Paper outlines three metrics to measure success in reducing transport sector emissions, all focus on the uptake of light electric vehicles. However, the heavy vehicle sector is missing from these tracking metrics. Decarbonising heavy transport is more challenging than for light vehicles due to higher energy density requirements, long operating ranges, and limited charging infrastructure in regional/remote areas. As outlined in ATSE's Decarbonising Diesel Industries report, reducing the use of diesel can help a range of sectors reduce their emissions profiles. Progress on reducing heavy transport emissions can be measured through the volume of low carbon liquid fuels[1] sold in Australia, electric or other low emission heavy vehicle sales, or the number of projects reaching a final investment decision.

Beyond reducing emissions on the road, electric vehicles can help reduce emissions for homes and businesses. Bidirectional charging[2] allows electric vehicles to act as batteries for homes and businesses, as well as support grid supply and stability. Bidirectional charging is in its infancy in Australia, with only three energy providers nationwide allowing customers to install bidirectional chargers and feed energy back into the grid (Fisk, 2025). ATSE has previously called for more energy companies to support bidirectional charging to allow energy consumers more control over their energy use and the better support grid demand (ATSE, 2025). This can help reduce the need for energy generation and grid level storage, easing the energy transition. Monitoring the state of bidirectional charging, either through examining the proportion of Australian consumers allowed to access bidirectional charging, or through sales of bidirectional charging enables vehicles or chargers would be a useful inclusion in the evidence platform.

[1] For example, sustainable aviation fuels or biodiesel.
[2] For more information on bi-directional charging and demand side management please see ATSE's Power to the people: Smarter energy use through demand side management explained.

**Recommendation 3:** Develop metrics for the decarbonisation of heavy vehicles through electrification or use of low carbon liquid fuels.

**Recommendation 4:** Include metrics tracking the availability of vehicle to home and vehicle to grid charging, either by tracking the proportion of the population able to access bi-directional charging or by the number of EVs and charges sold that support bidirectional charging.

## Embodied emissions

Infrastructure Australia estimates that buildings and infrastructure are indirectly responsible for half of all emissions in Australia, with 10% of all emissions embodied in infrastructure (Infrastructure Australia, 2024b). These emissions are primarily generated in the manufacture and deployment of this infrastructure, as well as during use and in end-of-life decommissioning (Infrastructure Australia, 2024b). Building Australia's essential infrastructure will generate significant embodied emissions. These emissions are often underrepresented in emissions tracking frameworks, which tend to prioritise operational emissions rather than whole of life emissions. Fully accounting for these in the Climate Change Authority's evidence platform will enable a more accurate reflections of Australia's true emissions profile. The National Greenhouse Gas Inventory currently includes a production boundary that excludes many embodied emissions from inclusion in emissions accounting. However, other government bodies have developed guidelines for measuring embodied emissions that could be adapted to inform the development of relevant metrics. For example, Infrastructure NSW has released technical guidance for measuring embodied carbon in infrastructure (Infrastructure NSW, 2025), while similar guidance has been released by the Federal Government (Infrastructure Australia, 2024a). Utilising these measurement guidelines and collaborating with infrastructure bodies could allow the Climate Change Authority to accurately profile embodied emissions and ensure they are fully accounted for within the evidence platform.

**Recommendation 5:** Ensure metrics fully account for embedded emissions in infrastructure.

## Measuring agricultural emissions from livestock

Methane emissions from ruminant livestock are a major contributor to Australia's emissions profile, with 42% of agricultural emissions coming from ruminant methane (Climate Council, 2021). One tonne of methane is also equivalent to 28 tonnes of carbon dioxide in the atmosphere, make reducing methane emissions particularly important (IPCC, 2014). The Issues Paper proposes a metric on reducing methane intensity in cattle, but this would fail to account for the approximately 70 million sheep who contribute to methane emissions (Meat and Livestock Australia, 2023). As such, this measure would be a more accurate reflection of Australia's progress towards emissions reduction if it measured technology uptake across all ruminant livestock.

Measuring the flat rate of technology adoption does not consider the varying efficacies of different technologies in reducing methane emissions under a range of conditions. For example, *Asparagopsis* (red seaweed) additives have been found to reduce methane emissions by 98% in feedlot cattle and 30% in grazing dairy cows, while other feed additives have reduced methane by 10-34% (DCCEEW, 2025). By utilising the known efficacy of these emerging technologies[3], combined with the uptake of these technologies, the Climate Change Authority could potentially develop a measure of predicted emissions reduction from ruminant livestock. This kind of measure, while methodologically ambitious, could provide a more accurate picture of the agricultural sector's emissions reductions than a simple technological adoption percentage.

[3] Based on high-quality, peer-reviewed, research.

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**Recommendation 6:** Investigate the feasibility of developing a measure of expected methane emission change from agriculture based on uptake of technologies to reduce methane from ruminant livestock.

## Preparing a climate ready workforce

Progress towards emissions reduction will require a highly skilled workforce with a range of technical and engineering experience, particularly in areas critical to the energy transition such as renewable generation, electrification, and grid infrastructure. ATSE is encouraged by the Climate Change Authority's plans to include skills and workforce within the critical enablers domain. However, developing these skills often involves long lead times (International Energy Agency, 2025). Building a future workforce depends on encouraging students to pursue relevant career pathways and supporting them through further education and training that can take many years before they are work ready. ATSE contributes directly to this process through our range of educational programs that span primary schools, higher education and into the workforce[4]. However, programs established now are unlikely to make a material impact on the workforce for several years – in some cases, this can be decades. As such, it is important that leading metrics of progress on skills and workforce are included in the Climate Change Authority's evidence platform as soon as possible. Possible leading metrics could include enrolments in relevant high school, vocational and university courses, as well as course completion rates. This will ensure that that any necessary changes to workforce/skills programs and policies can be made early, giving time for students to choose new career pathways and develop new skills.

**Recommendation 7:** Bring forward the inclusion of skills and workforce within the critical enablers domain for development in 2026.

*ATSE thanks the Climate Change Authority for the opportunity respond to the 2026 Evidence Platform Issues Paper. ATSE's Fellowship stands ready to support the Climate Change Authority as this work is progressed. If you would like any additional information on the content of this submission or would like further advice as the evidence platform is developed, please contact academypolicyteam@atse.org.au.*

[4] Our STELR program build fundamental science, technology, engineering and mathematics (STEM) knowledge and engagement in primary and secondary schools, our Elevate and Propel programs support undergraduate students to pursue and succeed in STEM degrees, our IMNIS program supports postgraduate students to engage with industry and our Emerging Leaders Network helps to support early and mid-career experts to become leaders in their fields.

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