SUBMISSION

Submission to the ACT Government

Submission on developing the next ACT Climate Change Strategy

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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.

The Australian Capital Territory (ACT) Government has established strong foundations for climate change mitigation and resilience through the 2020–2025 Climate Change Strategy and associated net zero initiatives. These efforts support the ACT Government's ambitious vision for Canberra to become the first Australian city to achieve net zero emissions while maintaining a 100% renewable electricity supply. The ACT is already experiencing the impacts of climate change firsthand, with changes affecting water availability, energy demand, infrastructure resilience, and community wellbeing, highlighting the need for forward-looking, strategic climate action. Successfully reducing greenhouse gas emissions at the scale and pace required, while adapting to accelerating climate impacts, will require the coherent and integrated application of science, technology and engineering. Much of the technology needed has already been developed, and the ACT Government can implement the necessary policies to safely accelerate the transition and assist people in the ACT to access and use emission reduction technologies in their daily lives. Evidence-based policy supported by technical expertise will be essential to ensure that climate responses are effective, efficient and capable of addressing complex cross-sectoral challenges.

ATSE makes the following recommendations for the next ACT Climate Change Strategy:

Recommendation 1: Incorporate a systems-based approach in the ACT Climate Change Strategy to help address complex, cross-sectoral challenges and reduce the risk of siloed decision-making.

Recommendation 2: Strengthen monitoring, evaluation, and learning (MEL) for climate adaptation through increased use of data, modelling, and expert engagement to ensure policies remain responsive to evolving climate impacts.

Recommendation 3: Maintain and expand electric vehicle charging infrastructure, zero-emission technologies, and targeted financial incentives to accelerate uptake across the ACT, particularly among price-sensitive and low-income households.

Recommendation 4: Provide targeted incentives for landlords to install energy-efficient appliances, solar and battery systems, and virtual power plants in rental and multi-unit dwellings.

Recommendation 5: Develop the infrastructure and regulatory settings required to support emerging technologies such as vehicle-to-grid and vehicle-to-home systems, including in rental and multi-unit dwellings.

Recommendation 6: Accelerate the transition away from natural gas in the ACT by supporting the commercial and industrial sector to pilot electrification technologies, green hydrogen, and advanced biofuels.

Incorporating a strategic and integrated approach supported by robust evidence

The ACT is facing the effects of climate change first-hand, with a 1.5°C increase in the mean maximum temperature since records began in 1926 (ACT Commissioner for Sustainability and the Environment 2024). The ACT is experiencing warmer days, decreased rainfall and is at greater risk of extreme weather events, including bushfires. These impacts reflect climate change throughout Australia and internationally. For example, on the availability and quality of water resources, which have been deteriorating (ACT Commissioner for Sustainability and the Environment 2024). The ACT is seeing a reduction in average rainfall but an increase in short-term rainfall intensity, leading to the increased possibility of lower but more variable river flows (Office of the Commissioner for Sustainability and the Environment 2019). Uncertainty around water quality and availability is consequently leading to an increase in competition for water resources between sectors and across borders, leading to higher water costs (Green and Moggridge 2021).

Due to the cross-sectoral importance of water and the existing broad range of technical and policy options to manage these changes, the ACT Government has an opportunity to provide a more comprehensive and integrated coverage of water issues in its Climate Change Strategy. This includes engineering solutions such as stormwater harvesting, water-sensitive urban design, including total water cycle management, and

demand-management technologies such as artificial intelligence. Additionally, ATSE's explainer on Technologies for Water Management outlines existing technologies for data collection, management, transfer and use. While the sectoral approach used in the Strategy may help communicate the broad array of issues and options the ACT is facing, many issues do not fit neatly in these sectors, including water. Instead, an integrated systems approach to addressing climate change can ensure that the risks and barriers in the strategy are addressed adequately and the benefits are not underestimated.

The Climate Change Strategy can support balanced, evidence-based decision-making. When assessing a set of policy actions, an approach that includes the capital costs, operating costs, and the full range of benefits, co-benefits and disbenefits can overcome short-term limited framing and instead provide a holistic picture that is better aligned with public policy making. ATSE's Probabilistic Risk Assessment explainer outlines how technical expertise and data can be used to identify, categorise, evaluate and ultimately mitigate assessed risks, which can assist in expanding the framing of the Strategy's policies. Expanding this framing can also assist in creating more integrated, strategic approaches to climate adaptation. While it is important for the Strategy to consider the impacts of climate change and methods to improve disaster resilience and social recovery in the ACT, reducing the risks and impacts in the first instance via climate adaptation can ensure the need for repair and recovery is reduced. This change in focus is being implemented in many jurisdictions globally, and the ACT Government has an opportunity to take a lead role in this thinking (United Nations Office for Disaster Risk Reduction (UNDRR n.d.).

Climate change will continue to produce evolving and sometimes unexpected effects in the ACT. As such, detailed monitoring and ongoing data collection on climate trends will be essential for the ACT Government to identify, understand and respond to emerging risks and impacts over time. Continued use of nationally consistent modelling and projections will be important to support evidence-based decision-making and to track changing climate conditions in the region. This includes data collection and monitoring of the ACT's Scope 3 emissions, which made up 93.6% of the ACT's total carbon footprint in 2020 (ACT Commissioner for Sustainability and the Environment 2024). Increased Scope 3 monitoring can support the ACT Government to continue to implement existing policies, such as the Low Carbon Concrete policy, as well as new initiatives to target Scope 3 emissions. In addition, the ACT Government can continue to engage with experts in climate science and the energy transition to remain informed of contemporary developments and emerging priorities for future policy and action. ATSE's ACT Division comprises over 80 Fellows with expertise across science, technology and engineering, including energy and climate science, and can support the ACT Government in accessing this expertise. Beyond planning for impacts, it will also be important to design and implement a robust monitoring, evaluation and learning (MEL) system. While monitoring and evaluation are considered by the Strategy, the learning aspect is critical and not currently addressed. Embedding a strong learning component will help ensure that new evidence, data and insights are continuously incorporated into policy development and implementation as climate impacts evolve.

Implementing the Strategy will require clear policy direction, supportive regulations, and targeted infrastructure. Initiatives such as the ACT's Energy Innovation Fund have already stimulated innovation in the energy transition. Given the scale and urgency of climate adaptation challenges, a complementary Adaptation Innovation Fund, similarly structured and resourced, could support innovation in climate adaptation technologies where prior investment has been limited. This Fund could particularly help support engineering initiatives that underpin adaptation methods such as heat-resilient infrastructure and flood and bushfire resilience systems and complement Canberra's living infrastructure plan.

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Incentivising electric vehicle uptake through improved access and awareness

Transport is the largest source of greenhouse gas emissions in the ACT, accounting for over 60% of total emissions ACT Government 2022). Cars were used for around 75% of all trips in 2022, with commuting by public transport, cycling and walking making up a small proportion of total trips (ACT Commissioner for Sustainability and the Environment 2024). The ACT Government has committed to decarbonising transport, including transitioning to a fully net-zero government fleet and electrifying public transport such as buses and light rail. The ACT has the highest electric vehicle (EV) ownership per capita in the country, with over 14,000 EVs now registered in the Territory, with more than 1 in 5 of new cars sold monthly being EV models, well above the national average of roughly 1 in 10 (AEVA 2026). The ACT Government has adopted an ambitious target that 80-90% of new vehicle sales will be EVs by 2030 and is exploring pathways to phase out new internal combustion engine light vehicles (ACT Government 2022).

To support this transition, the ACT Government has expanded publicly accessible EV charging infrastructure, with the current network comprising nearly 250 charging bays across Canberra, and further investment is underway to add more fast and slow chargers to fill coverage gaps (ACT Government 2025). There is considerable focus on installing EV chargers in multi-story carparks; however, there is also an opportunity to accelerate the implementation of chargers in existing open-air carparks with shade structures equipped with solar panels to take advantage of renewable energy sources. The continuation of the broad implementation of public fast chargers located in major commuter hubs, such as shopping centres across the ACT, can support EV accessibility for residents. While investments help address barriers to EV adoption, private vehicles still predominantly run on non-renewable fuels, and EVs represent just over 10% of all vehicles registered in the ACT (AEVA 2026).

Assisting the broader community to access EVs is therefore critical to reducing transport emissions and meeting net zero targets. Existing incentives such as zero-interest loans, stamp duty exemptions and lower registration fees can lower upfront costs and improve affordability**,** while tools that help consumers compare the total cost of ownership may shift purchasing decisions by highlighting long-term savings. However, some incentives have been reduced, including changes to motor vehicle duty concessions in the ACT, which risks slowing uptake. Ensuring that supportive incentives remain in place and are targeted effectively will be essential to sustain momentum. In addition to financial incentives, public awareness and engagement campaigns that convey the long-term cost benefits and environmental advantages of EV ownership can help accelerate consumer preference for EVs. This is particularly important for young, low-income and price-sensitive buyers who may be deterred by upfront costs or uncertainty about charging infrastructure.

The transition to widespread EV adoption will also require careful planning of enabling infrastructure and energy system integration. A key consideration is the rollout of EV charging infrastructure at scale. Increased demand for charging will require upgrades to local distribution networks, smart charging management, and integration with broader energy system planning to avoid placing high strain on the electricity grid. Planning for this infrastructure will be particularly important in multi-unit dwellings, where residents often face significant barriers to accessing reliable and affordable charging (Consumer Policy Research Centre 2022). Renters and apartment dwellers may encounter challenges related to shared electrical infrastructure, building retrofits, and the installation of smart charging systems, highlighting the need for clear regulatory frameworks and technical guidance to support equitable access to charging. The ACT Government should continue to monitor and address emerging safety considerations associated with EV technologies. Charging infrastructure in enclosed environments, such as parking structures in apartment buildings and retrofitted dwellings, may introduce new risk considerations, including fire safety management and building design requirements (Navaratnam et al. 2025). Ensuring that building codes, fire safety standards, and charging infrastructure guidelines evolve alongside the growing EV fleet can help maintain public safety and support.

Recommendation 3: Maintain and expand electric vehicle charging infrastructure, zero-emission technologies, and targeted financial incentives to accelerate uptake across the ACT, particularly among price-sensitive and low-income households.

Reducing emissions from residential electricity and gas

The widespread adoption of renewable energy in residential infrastructure will be crucial for advancing the ACT's net-zero transition while helping to address rising cost-of-living pressures. While the ACT Government provides several incentives to support energy-efficient households, such as minimum energy efficiency standards for rental properties, significant gaps still remain for apartments, rented dwellings, and social housing (ACT Government 2026). These settings face structural and regulatory barriers, such as retrofitting challenges, that limit the uptake of renewable energy and energy management technologies, particularly for low to middle-income households, constraining their potential to reduce residential emissions.

ATSE's explainer on demand-side management, Power to the People, outlines emerging technology and policy solutions for empowering energy consumers to manage and shift their energy usage to reduce demand on the grid and electricity cost (ATSE 2025a). Of particular interest for the Strategy is the ability to use control systems to manage electric vehicle charging and virtual power plants (VPP) in apartments that enable optimal use of consumer energy resources. The ACT's relatively high urban density provides an advantage for the deployment of virtual power plants (VPPs), as aggregating and coordinating distributed energy resources across households in close proximity is more efficient. Successful VPPs are already operating in the ACT, including programs supporting social housing (DCCEEW 2025). Vehicle-to-grid and vehicle-to-home capabilities, identified as an emerging technology in the explainer, could also be of interest for rentals as they replace the need for a home battery system. However, the ACT Government would need to develop the infrastructure and policy settings to implement this.

Despite recent growth in residential energy generation, storage, and efficiency technologies, many renters and occupants of apartments and multi-unit dwellings still face substantial hurdles in accessing these solutions (ATSE 2026). These challenges could be addressed through mandating full electrification, generation, and storage technologies in new multi-unit dwellings, alongside targeted financial incentives for landlords to install these technologies in existing buildings. Financial support for alternative technologies can also support emissions reductions. For example, the uptake of alternative heating systems can reduce air pollution associated with traditional woodfires. With nearly one-third of ACT households being rented, encouraging uptake of consumer energy resources in these settings represents a substantial opportunity to reduce emissions from residential electricity consumption while supporting households in managing energy costs (Australian Bureau of Statistics 2020).

Recommendation 4: Provide targeted incentives for landlords to install energy-efficient appliances, solar and battery systems, and virtual power plants in rental and multi-unit dwellings.

Recommendation 5: Develop the infrastructure and regulatory settings required to support emerging technologies such as vehicle-to-grid and vehicle-to-home systems, including in rental and multi-unit dwellings.

Reducing industrial reliance on natural gas through electrification and alternative fuels

The ACT's reliance on natural gas represents a significant challenge for meeting its greenhouse gas reduction targets and achieving a 100% renewable energy future. While overall gas consumption in the ACT is relatively low, it is concentrated in certain sectors, making emissions reductions both critical and achievable with targeted interventions. The commercial and industrial sector provides a clear example of this challenge. Although it is small and specialised, it delivers substantial economic benefits while also accounting for a disproportionate share of gas usage. In 2022, large gas users in manufacturing (consuming more than 1 terajoule per year) represented less than 1% of total gas consumers but were responsible for 39% of total gas consumption (ACT Government, 2024). This concentration highlights both the scale of emissions associated with gas use and the potential impact of targeted interventions in this sector.

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A combination of technological and fuel-based solutions can support the transition away from natural gas. Electrification of gas-dependent processes can significantly reduce consumption, and the ACT has laid strong foundations to assist in this transition. Electrification technologies have been assessed as the technically viable pathway to decarbonisation for 93% of the commercial and industrial gas appliance types in the ACT (GPA Engineering 2024). For the limited number of appliances where electrification is not viable or practical, such as where combustion or flame is required, fuel solutions can assist in emission reductions. Green hydrogen, which is produced through electrolysis powered by renewable electricity, is currently at early stages of development and adoption in Australia and could provide a solution to gas usage that cannot be replaced by electrification (Hossain Bhuiyan and Siddique 2025). Advanced biofuels, such as bio-gasoline derived from non-food feedstocks like woody biomass or waste materials (e.g., cooking oils or animal tallow), also present opportunities to reduce gas use. ATSE's report Decarbonising Diesel Industries demonstrates potential applications of advanced biofuels in mining, freight, agriculture, fisheries, and forestry, with similar uptake feasible in the ACT's commercial and industrial sectors (ATSE 2025b). Financial assistance, such as a grants program led by the ACT government, could assist manufacturers to implement and pilot these technologies, ultimately leading to further emissions reductions in the ACT's commercial and industrial sectors.

Recommendation 6: Accelerate the transition away from natural gas in the ACT by supporting the commercial and industrial sector to pilot electrification technologies, green hydrogen, and advanced biofuels.

ATSE thanks the ACT Government for the opportunity to respond to Developing the next ACT Climate Change Strategy. For further information, please contact academypolicyteam@atse.org.au.

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