



**ACT**  
Government

2024-2030

# The Integrated Energy Plan

OUR PATHWAY TO ELECTRIFICATION



## **Acknowledgment to Country**

*Yuma*

*Dhawura nguna ngurumbangu gunangu Ngunnawal. Nginggada dindi dhawura  
Ngunnawalbun yindjumaraldjinyin. Mura bidji mulanggaridjindjula.  
Naraganawaliyiri yarabindjula.*

*Hello*

*This country is Ngunnawal (ancestral/spiritual) homeland. We all always respect elders, male  
and female, as well as Ngunnawal country itself.  
They always keep the pathways of their ancestors alive. They walk together as one.*

We acknowledge the Ngunnawal people as traditional custodians of the ACT and recognise any other people or families with connection to the lands of the ACT and region. We acknowledge and respect their continuing culture and the contribution they make to the life of this city and this region.

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Telephone: 02 6207 1923

Website: <https://www.environment.act.gov.au>

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# Foreword

Yuma

I am pleased to release The Integrated Energy Plan 2024–2030, which will guide our Territory’s path to achieving net zero emissions by 2045. This plan builds on our previous success of securing 100% renewable electricity in 2020, making electrification our easiest, lowest cost pathway to net zero emissions.

The Integrated Energy Plan 2024–2030 focusses on establishing conditions that allow ACT households and businesses to capture the benefits of electrification.

We want to enable ACT energy consumers to save money by transitioning to electricity at a time that is right for them by providing early, long-term certainty around our net zero emissions energy pathway. Ensuring energy is affordable and people can make the best energy choices remains a key goal of this government.

We must take some actions now. Other actions are better phased later as technological solutions mature and become suitable for implementation in the ACT. We will work collaboratively with businesses over the long term to find solutions and alternatives to fossil fuel gas where they don’t already exist.

It has always been this government’s priority to support those most in need. This approach was endorsed through our public consultation. In this plan we commit to prioritising support for those who cannot transition to electricity themselves. This includes looking after our social and public housing tenants and supporting those most in need.

We also heard that some building types would be more difficult to transition than others, so we will investigate solutions for these complex buildings, which can include apartments and multi-unit developments.



**Andrew Barr MLA**  
Chief Minister and Minister for  
Climate Action

The challenges ahead are also opportunities for the Territory to attract innovative new enterprises and to create high-value jobs to deliver our all-electric city. Having the right skills to support the transition to 2045 is key to success.

I am extremely proud of the ACT for its nation-leading commitments and achievements on climate action. This plan sets the foundations for further success to 2030 and beyond.

# Foreword

Yuma

Climate change is one of the biggest challenges we face. The ACT is proud to lead on meaningful climate change action and reducing greenhouse gas emissions.

In 2020 we were the first Australian jurisdiction to shift to 100% renewable electricity and we have legislated this in perpetuity. Transport and gas emissions are now the largest contributors to the ACT's greenhouse gas emissions.

We are continuing our journey for Canberra to meet its goal of net zero emissions by 2045 while ensuring we remain a sustainable and liveable city. In 2022 the ACT Government announced another nation-leading policy approach; to use our 100% renewable electricity supply to power our city and transition off fossil fuel gas.

The energy transition will occur over the next 21 years. This gives us time to act and make early choices. The decision to decarbonise our homes, businesses and the way we move around has significant implications for how we design, build and upgrade our city infrastructure and energy networks over the next two decades and beyond. The government will lead the way and work with business, industry and households to remove technical and regulatory barriers and to provide support for those who need it most to transition. Our fossil fuel industry workers will be reskilled to take advantage of new employment opportunities. The renewable energy transition will be facilitated by the right skills and jobs in renewable energy industries in Canberra.

The ACT community, business and industry are leaders in demonstrating how to reap the benefits of affordable renewable energy. Many Canberrans have already made the switch away from gas to energy efficient electric options. About a third of Canberra households are already experiencing the benefits of an all-electric home, and more are embracing sustainable technologies such as solar panels and home battery systems, increasing the energy efficiency of their properties.



**Shane Rattenbury MLA**  
Minister for Water, Energy and  
Emissions Reduction

The Integrated Energy Plan provides the certainty Canberrans need to start planning their switch over the next 20 years. It builds on our achievements to date. It sets our pathway for continuing to lead the transition.

It invites businesses and the community to help deliver a zero emissions future for our city. I look forward to working with the whole community as we implement this plan and continue our journey to be a city powered by renewable energy.



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MELBOURNE BUILDING

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# Executive Summary

By 2045, the ACT's energy will be 100% renewable. Renewable electricity will make up the bulk of our energy use, with renewable gas used for some niche applications. Canberra will be the first Australian jurisdiction to reach net zero emissions, also known as net zero. Reaching net zero brings economic opportunities and savings to households and businesses as they swap from fossil fuel cars and appliances to zero emissions.

The Integrated Energy Plan provides the long-term pathway for the transformation of the ACT's energy system to achieve net zero emissions by 2045, building on our existing success in securing 100% renewable electricity in 2020. This first Integrated Energy Plan (IEP1), for 2024–2030, lays the foundations to allow ACT's households and businesses to capture the benefits of electrification out to 2045 and beyond.

Transitioning our city to renewable energy will require a flexible and collaborative approach from the whole community. We aren't starting from scratch. Under this plan we will build on existing programs and policies to transition and help adapt our city to a changing climate. The government will also take steps to support the critical enablers that underpin the transition of our households, businesses, industry and fleet. Our actions under this plan include the following:

- > For all households, we will provide information, tools and programs to support transition and motivate those who can do it themselves. We will start to look at regulatory options to support electrification.
- > We will prioritise support for those who need it most with new commitments to electrify public and community housing by 2030: and pilot upfront support for low-income households. We will also look at other measures to provide support for private households out to 2030. This is key because those who aren't in a position to transition can feel costs the most.
- > We will reduce barriers for transitions that are more difficult, such as complex buildings, and for business and industry. This will include further work on green gas needs, demand and the best way to deliver it.
- > We will continue working to achieve our goals in transport, such as achieving the target of 80–90% of new light vehicle sales being zero emissions vehicles (ZEVs) by 2030.
- > We will also focus on key enablers to underpin the transition. These include: supporting the development of a skilled workforce to undertake the necessary work to transition appliances, buildings and our energy infrastructure; ensuring we have ongoing 100% renewable electricity that is affordable and secure; and ensuring electricity and gas networks are fit-for-purpose throughout the transition.

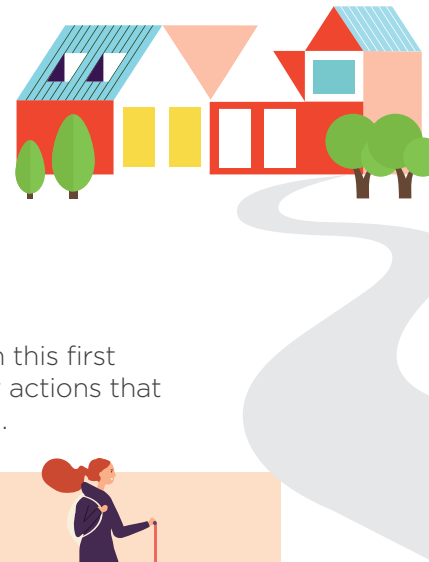
The ACT Government undertook public consultation to seek detailed feedback on the proposed policy directions and key focus areas of The Integrated Energy Plan. More than 440 engagements were recorded during consultation. Feedback informed the guiding principles for decision making and the actions we have committed to.

In 2027, the ACT Government will undertake a mid-point review of The Integrated Energy Plan 1 to assess progress and update the community.





# Continuing the ACT's Pathway to Electrification



The ACT's energy transition to net zero emissions is well underway. Through this first Integrated Energy Plan, the ACT Government commits to the following new actions that build on our existing achievements and complement other steps in this plan.

## Summary of new actions



Explore potential regulatory interventions to support electrification.

Undertake an independent review of the Energy Efficiency Improvement Scheme (EEIS) to inform its long-term direction.

Electrify all feasible public and community housing by 2030.

Provide \$5.2 million for a pilot to identify a pathway to electrification for private households that most need support.

Provide interest free loans to support multi-unit buildings to become electric vehicle ready.

Deliver a Retrofit Readiness Program for apartment and unit owners to develop a plan to electrify their buildings.

Commence a review of the unit titles management legislation to ensure it is fit-for-purpose to support electrification of multi-unit buildings.

Support the installation of fast electric vehicle (DC) charging hubs.

Provide rebates of up to \$3000 for fleet operators to install electric vehicle chargers.

Target training subsidies to priority trades that support the energy transition.

Undertake a scoping study for the design of a Future Energy Skills Hub at Canberra Institute of Technology.

Develop policy and regulatory frameworks to support safe, efficient and equitable decommissioning of the gas network.

Electrify all ACT Government owned and operated buildings where possible by 2040.

Transition ACT Government fleet vehicles to zero emissions vehicles and install chargers at ACT Government sites.





# Introduction

The ACT already meets its current electricity needs with 100% renewable electricity. By 2045, all the ACT's energy needs will be 100% renewable, with renewable electricity making up the bulk of our energy use for households and businesses and renewable gas used for niche applications. Fossil fuels will be phased out. Canberra will be the first Australian city to reach net zero and 100% renewable energy, bringing economic opportunities and savings to households and businesses as they swap from fossil fuel cars and appliances to zero emission options. More of our energy will be generated within the ACT as households and businesses embrace solar and battery technology.

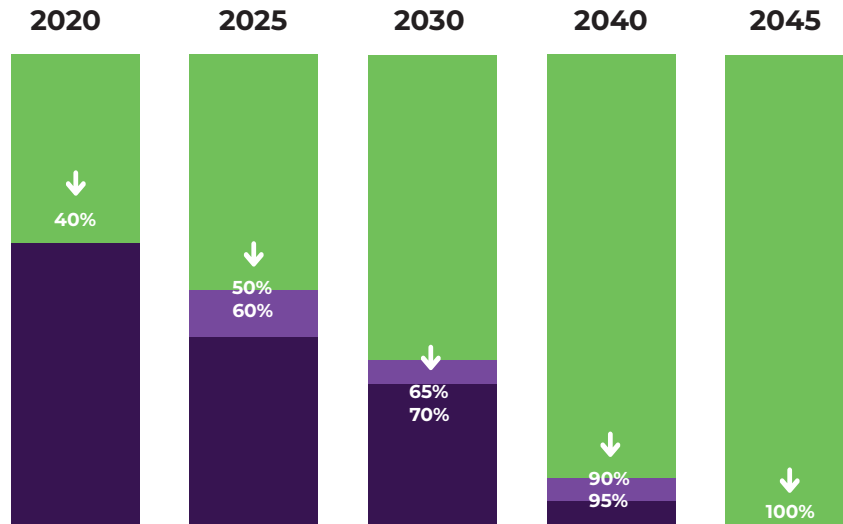
## The case for electrification and transition to renewable energy

Fossil fuels, including fossil fuel gas, petrol and diesel, have been an important part of the ACT's energy mix, helping power our homes, businesses, transport systems and city infrastructure. However, to reach net zero we must now accelerate the transition from fossil fuels to renewable energy. Electrification is getting cheaper and, in many cases, fossil fuels are already a more expensive alternative for consumers. Furthermore, fossil fuels are the largest contributor to climate change, are a finite resource and negatively impact community health and wellbeing. To play its part in the global effort to decarbonise, the ACT Government has committed to phasing out fossil gas by 2045 and powering the Territory with 100% renewable energy instead. We are doing this for the environment and the cost savings.

**The environment:  
Renewable energy will help us meet our emissions reduction**

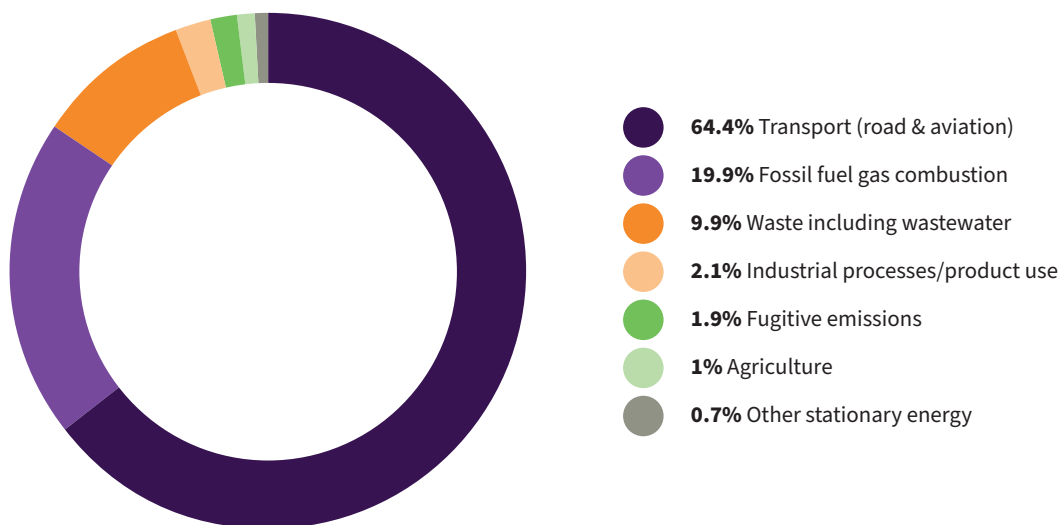
The ACT Government has legislated a nation-leading target of achieving net zero greenhouse gas (GHG) emissions by 2045 at the latest. To keep the ACT on track, interim targets were legislated to guide the ACT’s emissions reductions.

**ACT Emissions Targets 2020-2045**



We are making progress. Total emissions were 47% below 1989–90 levels in 2022–23.<sup>1</sup> This is primarily because we secured a nation-leading 100% renewable electricity target from 2020, which was a significant step for the Territory and a strong foundation to help us reach our goal of being a net zero city.

**ACT Emissions (excluding those from land use, land use change & forestry)**



<sup>1</sup> ACT Greenhouse gas Inventory for 2022-23, Point Advisory, 30 September 2023 <[https://www.climatechoices.act.gov.au/data/assets/pdf\\_file/0003/2329824/ACT-Greenhouse-Gas-Inventory-Report-2022-23.pdf](https://www.climatechoices.act.gov.au/data/assets/pdf_file/0003/2329824/ACT-Greenhouse-Gas-Inventory-Report-2022-23.pdf)>

The ACT will now focus on reducing emissions from our two most significant sources: fossil fuel gas use and transport. More than 84% of the ACT's current emissions come from a combination of transport (64.6%) and fossil fuel gas combustion (19.9%).

The good news is that we can power most fossil fuel uses with renewable electricity, including heating and cooling systems, hot water, cooking, vehicles and much of our transport network. Electrification is the cheapest pathway to net zero and delivers the greatest benefits to households and businesses.

This decision has been informed by significant research and analysis, including technical modelling and consumer research.

## **The savings:**

### **Electrification will drive cost-of-living relief for energy consumers**

Fossil fuel gas has historically been a relatively inexpensive form of energy. However, the days of cheap gas are over, with retail gas prices expected to increase by around 19% from 2022 to 2029.<sup>2</sup>

This will add approximately \$220 to the annual gas bill for the average household by 2029. Gas price increases over this period will be driven by the international price of gas (wholesale costs) and the cost of maintaining and moving gas through the ACT gas network (distribution cost). In response to these increased costs and to take action against climate change, many Canberrans are already transitioning away from fossil fuels.

Transitioning to an all-electric energy supply is going to help many households save money in coming years, particularly when combined with rooftop solar photovoltaic (PV) and battery storage. Electric alternatives to fossil fuels are typically more efficient, reducing energy usage and providing opportunities for energy bill savings. Average stand-alone households are estimated to save between \$735 to \$960 each year in energy bills if they electrify all their water, heating and cooking appliances. This includes savings from not paying a gas connection fee.<sup>3</sup> The higher saving value reflects the inclusion of a solar PV system.

The ACT Government offers incentives to switch from fossil fuel gas to electricity, including no-interest loans, rebates and other incentives.

#### **What is fossil fuel gas?**

The ACT Government prefers the term 'fossil fuel gas' to 'natural gas' as it clearly identifies that we are discussing non-renewable gases. Fossil fuel gas is found in the Earth's crust. It predominantly consists of methane, a powerful greenhouse gas; once extracted and burned, it cannot be renewed.

#### **What is green gas?**

The term green gas refers to zero emissions hydrogen (or its derivatives) and biogas.

Hydrogen produced using renewable electricity can be zero emissions. Biogas is a renewable fuel as it is produced when organic matter, such as food or biodegradable waste products, are broken down by micro-organisms in the absence of oxygen.

<sup>2</sup> Retail price impacts of the gas transition, GDH Advisory, <[https://www.climatechoices.act.gov.au/\\_data/assets/pdf\\_file/0005/2052482/Retail-price-impacts-of-the-gas-transition-ACT-Government-fact-sheet.pdf](https://www.climatechoices.act.gov.au/_data/assets/pdf_file/0005/2052482/Retail-price-impacts-of-the-gas-transition-ACT-Government-fact-sheet.pdf)>

<sup>3</sup> Energy Equity in Electrifying ACT Households, Common Capital, 2023



# An Integrated Plan for the Energy Transition

The Integrated Energy Plan (IEP) provides the long-term pathway for the transformation of the ACT's energy system to achieve net zero emissions by 2045, focussing on reducing emissions from fossil fuel gas use and vehicles and maintaining a secure, efficient supply of renewable energy for the ACT.

The IEP is aligned with government priorities and goals in other sectors including planning, building, transport and waste. Together, these strategies and plans provide a comprehensive approach to building a resilient and sustainable Canberra.

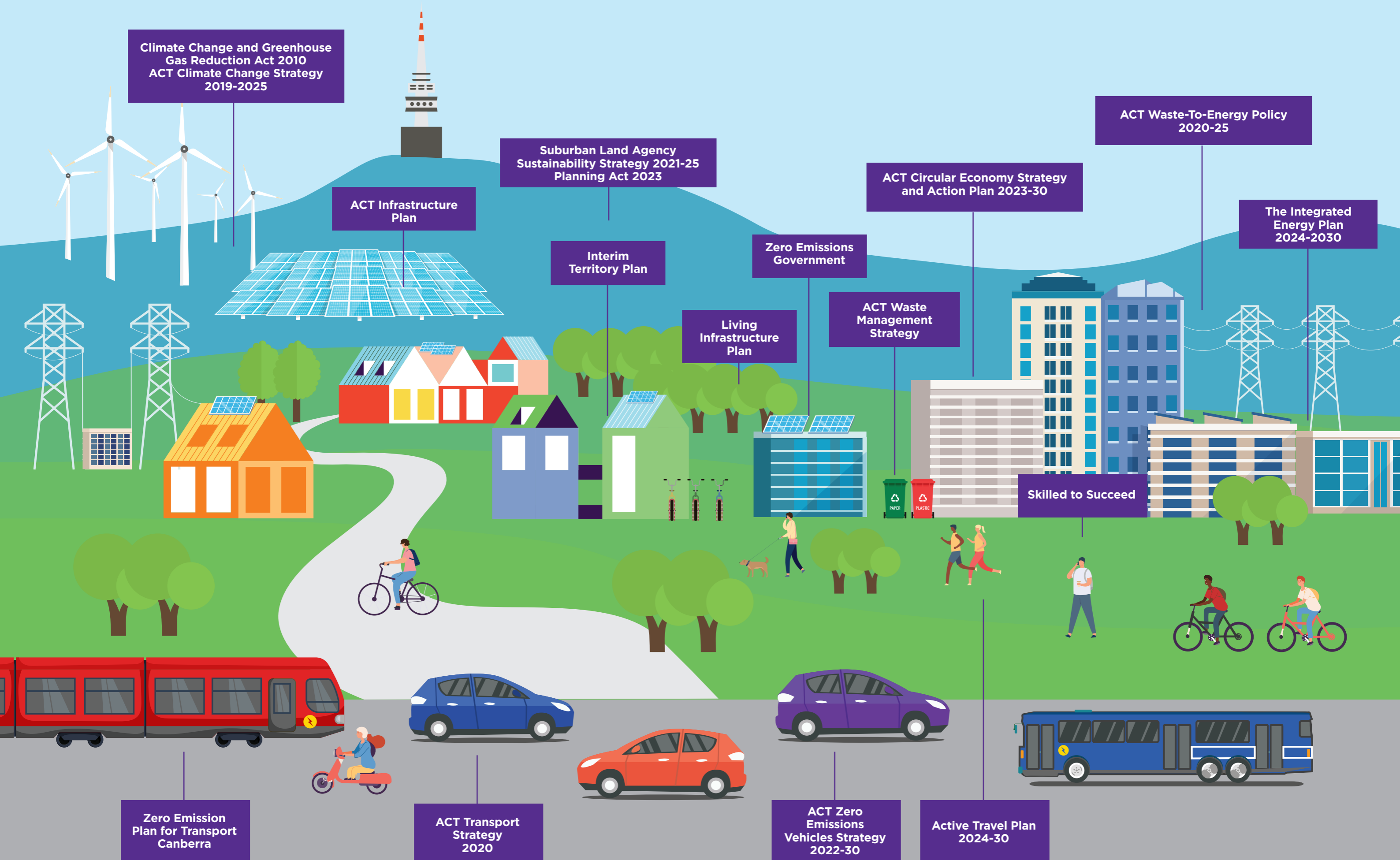
## A staged approach for the ACT's energy transition

The IEP will be delivered in three stages out to 2040. This first IEP (IEP1) covers 2024–2030, the next will cover 2030–2035 and the last 2035–2040. This staged approach aligns with the interim emissions reduction targets in 2030 and 2040.

During the first IEP, the ACT will report on its legislated interim emissions reduction target of 50–60% (based on 1990 levels) in 2025. In 2027, the ACT Government will undertake a mid-point review of IEP1 to assess progress and update the community.

IEP1 builds on existing programs and efforts. It sets out the new actions and next steps we will take to help community, business and industry transition. Transitioning our city will rely on the combined efforts of the entire ACT community over the coming decades. We recognise that we will need to evolve our approach to take account of improvements in technology and the community's needs and expectations. The different IEP stages allow for this evolution while providing certainty on long-term direction for key stakeholders like Evoenergy (which runs the gas and electricity networks of the ACT), electricity retailers, households, businesses and tradespeople.

# Our strategies to transition the city



# Navigating the transition

| Challenges   | Next steps  | Outcomes for 2030   |
|--|---|---|
| <p><b>Households</b><br/>The energy transition requires full electrification of households including installing electric cooktops, hot water, heat pumps and space heating.</p>                            | <ul style="list-style-type: none"> <li>&gt; Provide a one-stop-shop for households to help consumers who are able to improve energy efficiency and electrify, to do so.</li> <li>&gt; Explore potential regulatory interventions to support electrification.</li> <li>&gt; Undertake a review of the EEIS to inform its long-term direction.</li> </ul> | <p>More all-electric energy efficient homes, powered by 100% renewable electricity, that have reduced energy demand, are comfortable in all seasons as our climate changes and are saving on energy bills.</p>                                |
| <p><b>Priority households</b><br/>Some members of our community will need more support than others to electrify their home.</p>  | <ul style="list-style-type: none"> <li>&gt; Electrify all feasible public and community housing by 2030.</li> <li>&gt; Provide \$5.2 million for a pilot to cover the upfront costs of electrification for private households that most need support.</li> </ul>  | <p>Those who need the most help to transition are benefitting from all-electric energy efficient homes, powered by 100% renewable electricity, that are more comfortable in our changing climate.</p>   |
| <p><b>Complex buildings</b><br/>Many multi-use buildings face unique technical, engineering, regulatory and financial barriers to electrification and installation of vehicle charging infrastructure.</p> | <ul style="list-style-type: none"> <li>&gt; Support multi-unit developments to become EV ready.</li> <li>&gt; Deliver a Retrofit Readiness Program to provide example pathways.</li> <li>&gt; Commence a review of the legislation and regulatory systems to facilitate the energy transition for complex buildings.</li> </ul>                         | <p>Success stories demonstrating complex building electrification are being shared and showcased between industry, government and the community to enable more complex buildings to transition.</p>   |
| <p><b>Business and industry</b><br/>For a few niche industrial applications, electrification won't be feasible, so green gas alternatives may need to be found.</p>  | <ul style="list-style-type: none"> <li>&gt; Continue to support businesses to electrify.</li> <li>&gt; Continue to explore the appropriate role for green gas for those applications where electrification isn't feasible.</li> </ul>   | <p>Businesses in the ACT are innovating with the latest technology and benefitting from being more energy efficient. Industrial users of gas have certainty around the role of green gas for applications that cannot feasibly electrify.</p> |
| <p><b>Transport</b><br/>Current petrol and diesel vehicles need to be replaced by ZEVs.</p>  | <ul style="list-style-type: none"> <li>&gt; Support the installation of reliable charging infrastructure.</li> </ul>  | <p>ZEVs powered by renewable electricity make up 80–90% of new car sales. All sectors of the community have access to new and used ZEVs and charging facilities, supporting people with different lifestyles.</p>                             |

# Enabling the transition

| Challenges  | Next steps   | Outcomes for 2030  |
|---|--|--|
| <p><b>Skills</b><br/>Many skills required for the transition are in short supply. Some workers will gradually experience less demand for their skills, such as gas fitters.</p>   | <ul style="list-style-type: none"> <li>&gt; Target training subsidies to priority trades that support the energy transition</li> <li>&gt; Scope the design of a Future Energy Skills Hub at the Canberra Institute of Technology.</li> </ul>   | <p>Skills crucial to the transition, such as electrical trades, construction workers and engineers are available to homes and businesses when they are needed. Workers experiencing disruption have pathways for diversifying their skills.</p>                          |
| <p><b>ACT's 100% renewable electricity</b><br/>Maintaining energy affordability will be critical to managing cost-of-living pressures.</p>  | <ul style="list-style-type: none"> <li>&gt; Continue monitoring of the ACT Government scheme to ensure 100% renewable electricity.</li> <li>&gt; Work in partnership with the Australian Government and other jurisdictions to decarbonise the National Electricity Market.</li> </ul> | <p>Ongoing secure, reliable and affordable energy continues to be delivered for the ACT and 100% renewable electricity maintained.</p>   |
| <p><b>The ACT's local electricity network</b><br/>The network will need to accommodate a growing population and more Consumer Energy Resources (CER).</p>   | <ul style="list-style-type: none"> <li>&gt; Examine regulatory measures to facilitate a fit-for-purpose electricity network.</li> <li>&gt; Continue collaboration on national reforms.</li> </ul>  | <p>There is widespread uptake of CER, with all consumers having access to a smart meter. Consumers are benefitting from reduced costs as a result of their market participation through solar, batteries and electric vehicles.</p>                                      |
| <p><b>Gas use</b><br/>The ACT Government has banned new connections to the gas network in most land-use zones. Over the next few decades, the gas network will need to be decommissioned as gas use diminishes. Early and prudent planning is required.</p> | <ul style="list-style-type: none"> <li>&gt; Develop policy and regulatory frameworks to support safe, efficient and equitable decommissioning of the gas network.</li> </ul>   | <p>The gas distributor is providing visibility and early signals to the community of expected timing and phasing of gas network decommissioning. By 2030, no new connections to the fossil gas network are occurring in most areas, unless approved by the Minister.</p> |



# Our Journey to 2045



# Guiding Priorities



## Clear and implementable pathway

- > Government will provide long-term clarity and a stable policy environment to support and incentivise the transition away from fossil fuels.



## Enabling Canberrans to act

- > Government will ensure information, education and resources are available for all parts of the community to enable them to make informed choices and enjoy the benefits of transition.



## Prioritising those most in need

- > Government will prioritise support for those who need it most and cannot transition themselves.



## Secure and reliable energy systems

- > Government will work to maintain the security and reliability of the energy system as the population grows, consumer energy resources increase, fossil fuel gas is phased out and zero emission vehicles become the norm.



## Removing barriers to the energy transition

- > Government will collaborate to remove technical, regulatory and workforce barriers to transition.





## What we heard from the community

The development of this plan has been informed by consultation with the community, industry and subject matter experts via two position papers: [Powering Canberra: Our Pathway to Electrification](#) and [Canberra is electrifying: Towards a net zero emissions city](#).

From 1 August to 12 September 2023, the ACT Government consulted on Canberra is Electrifying: Towards a net zero emissions city. The majority of community workshop and focus group participants were very supportive of the transition to an all-electric city.

Those in support of the IEP found the timeline for the transition to be realistic and agreed with the importance of an equitable and fair transition. Organisations that provided submissions were generally supportive of the IEP, highlighting the benefits of transitioning to renewable electricity. Stakeholders recognised that the position paper was thorough in outlining many of the key challenges of implementation including reliability of the electricity network (or electricity infrastructure), complex buildings, workforce, upfront costs for community and business and equity through the transition. Key concerns included whether the electricity network has the capacity to support the increased demand, complexity and costs associated with upgrading existing infrastructure, the upfront costs to households and small businesses, and equity and accessibility for priority households. The transition was viewed by many as a significant economic opportunity, including in relation to creating new jobs, especially in the renewable energy sector. There was strong support for the role of information and education to help drive the consumer-led transition. Further insights from the consultation are noted through this document. Detailed reports are available at [Your Say](#).

The ACT Government engaged with the Dhawura Ngunnawal Caring for Country Committee on the IEP as part of its commitment to continuing engagement with First Nations. The government also established the Energy Transition Technical Advisory Group (TAG) with representatives from industry and professional bodies including ActewAGL Retail, Evoenergy, Master Builders Association, Master Plumbers Association, National Electrical Communications Association, Housing Industry Association, Green Building Code of Australia, ACT branch of the Property Council of Australia, Australian Sustainable Built Environment Council, Energy Networks Australia and the Australian National University's Energy Change Institute and the School of Regulation and Global Governance. The TAG provided strategic, policy and technical comment on the development of The IEP and associated initiatives.

The ACT Government will continue to engage with community, industry and subject matter experts throughout the duration of the IEP.





# Navigating the Energy Transition

## Addressing barriers to help our community electrify

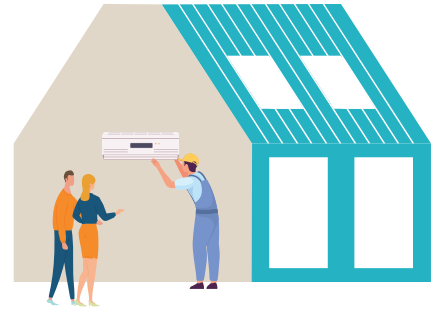
Transitioning our city will require a flexible and collaborative approach from the whole ACT community. Many of the actions underpinning this plan rely on community, business and industry making choices to electrify. While some will face additional barriers as part of the transition, many households and businesses will also be motivated by the cost benefits of phasing out fossil fuels. Net zero is possible with the participation of the whole community, through consistent effort and a clear vision.

**To navigate what the transition means for different areas of our community, we have divided actions into five areas:**





## Households



**Going all-electric and improving energy efficiency helps households save money and energy**

Households are at the heart of the transition. In the ACT, the majority of gas users are households and small businesses.<sup>4</sup> Reducing fossil fuel gas consumption offers opportunities for households to reduce energy bills, reduce emissions and improve health outcomes. The technology to electrify is already available and widely used. Household electrification, coupled with energy efficiency, is the best choice for lower energy bills and emissions while improving the thermal comfort of a house to help adapt to a changing environment.<sup>5</sup> In the near future smart electric technologies could be orchestrated to deliver even more benefits for households. Energy efficient appliances connected to a smart grid could run while solar is being produced and energy is cheap. Space heating or cooling is retained in houses that are draught-proof and well insulated. In the evenings, households could run off power saved in batteries during the day, and even make money by selling excess energy back to the grid when demand for energy and prices are high.



<sup>4</sup> Getting off gas: why, how and who should pay? Grattan Institute, June 2023, <<https://grattan.edu.au/wp-content/uploads/2023/06/Getting-off-gas-why-how-and-who-should-pay.pdf>>

<sup>5</sup> Switching on: Benefits of household electrification in Australia, Monash University, October 2023 <[https://www.monash.edu/data/assets/pdf\\_file/0005/3433550/Switching-On\\_Benefits-of-household-electrification-in-Australia\\_report.pdf](https://www.monash.edu/data/assets/pdf_file/0005/3433550/Switching-On_Benefits-of-household-electrification-in-Australia_report.pdf)>

# Start your home energy transition journey

## Key steps are recommended for households:

**Draught-proof:** sealing gaps is a simple way to improve energy efficiency, keeping the warm air in during winter and out during summer.

**Insulate:** good insulation can help keep homes comfortable all year round and reduce the amount of energy used.

**Go electric:** swap out old gas cooking, heating and hot water appliances for energy efficient electric alternatives.

**Shop around for the best energy retail plan.** This is simple to do by calling your energy retailer or visit [energymadeeasy.gov.au](http://energymadeeasy.gov.au)

A rooftop solar PV system can help your home produce its own renewable electricity.



You can lose up to 40% of the heat in your home through the roof. Good insulation in your home saves you money on your energy bills and also improves the comfort of your house.

Heating makes up 60-70% of an average Canberra household's energy use.

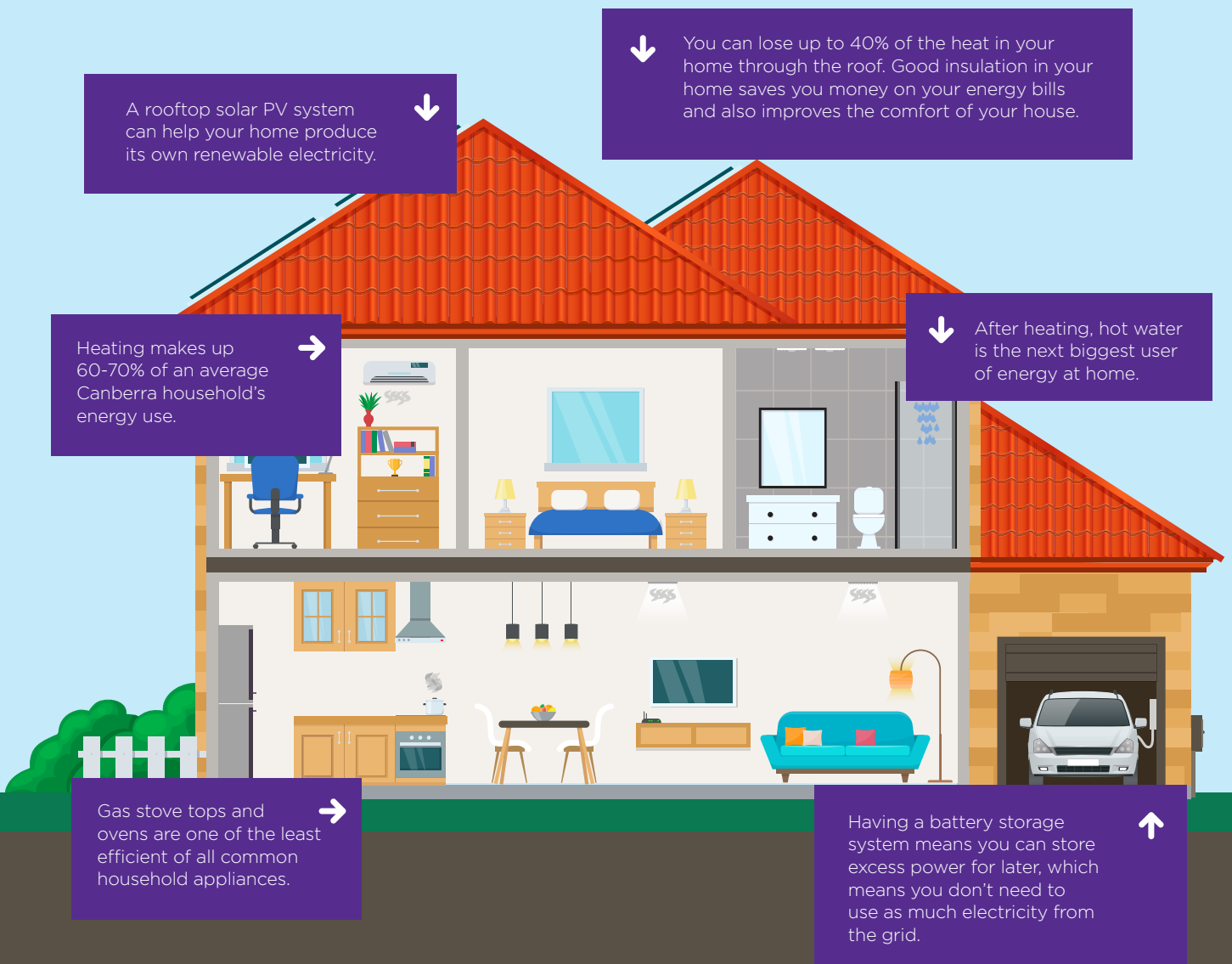


After heating, hot water is the next biggest user of energy at home.

Gas stove tops and ovens are one of the least efficient of all common household appliances.



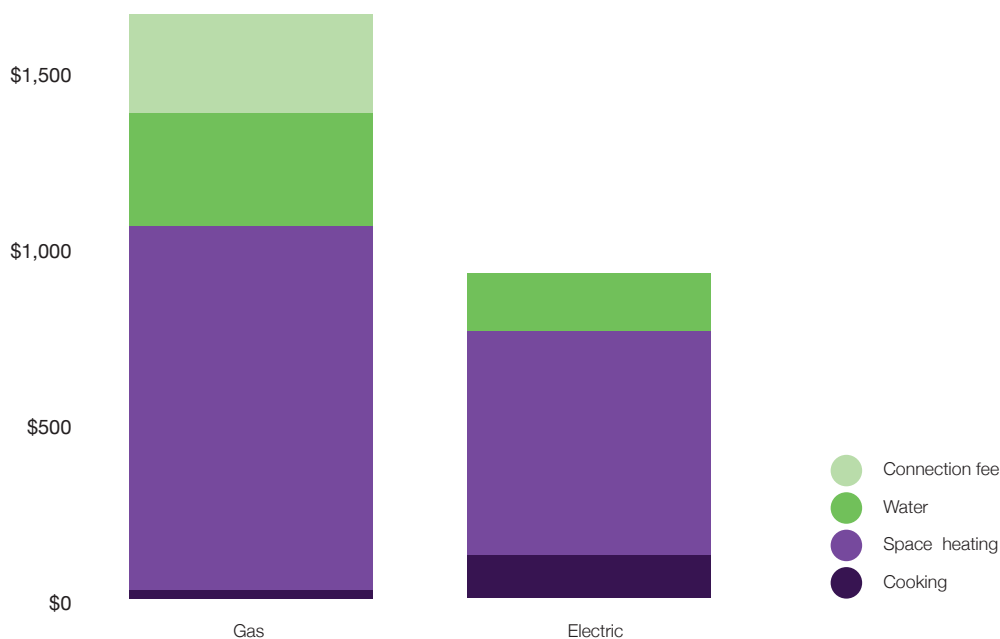
Having a battery storage system means you can store excess power for later, which means you don't need to use as much electricity from the grid.



Energy efficiency is often the quickest and most cost-effective emissions mitigation option to implement. Draught proofing, good insulation and small behaviour changes at home can make a large difference, easing cost-of-living pressures and making homes more comfortable in our changing climate. When these actions are coupled with efficient electric appliance upgrades, households can improve thermal comfort while reducing energy costs. For example, in winter, a typical Canberra house can lose 10–20% of heating through windows and gaps or cracks around doors and window frames.<sup>6</sup>

Canberra households have already started the energy transition by upgrading gas appliances to efficient electric appliances, installing rooftop solar and battery systems and purchasing electric vehicles. In 2023, 30% of Canberra households had rooftop solar systems<sup>7</sup> and more than a third of Canberra households were already all electric.<sup>8</sup> The ACT has the highest uptake of electric vehicles in the country per capita, with around 1 in 5 new cars purchased in 2023 being an electric vehicle.<sup>9</sup>

Australian households are increasingly worried about their energy bills, with a 2023 survey showing 52% of households were more concerned about paying their electricity bills than they were the previous year.<sup>10</sup> Households that electrify experience net bill savings. The electrification benefits vary based on the type of appliance that is upgraded, however the average household could save about \$735 a year in energy bills if they electrify all their gas water, heating and cooking appliances. This includes a saving of the gas connection fee.<sup>11</sup> The savings are even greater if coupled with a solar PV system.



Source: Figure 3. Breakdown of annual energy cost by appliance (gas vs. electric) p17 of Energy equity in electrifying ACT households, Common Capital

6 Winter energy savings tips to cut costs and keep warm, ACT Government, 3 July 2023 <<https://www.climatechoices.act.gov.au/events-news/news/winter-energy-saving-tips-to-cut-costs-and-keep-warm>>

7 Australian PV Institute (APVI) Solar Map accessed from <[pv-map.apvi.org.au](http://pv-map.apvi.org.au)> on 07 February 2024

8 Based on the numbers of residential gas and electric retail accounts in the ACT from Schedule 2 – Quarter 1 2023–24 Retail Performance Data, Australian Energy Regulator, 21 December 2023, <<https://www.aer.gov.au/publications/reports/performance/retail-energy-market-performance-update-quarter-1-2023-24>>

9 Australian Electric Vehicle Industry Recap 2023, Electric Vehicle Council, March 2024 <<https://electricvehiclecouncil.com.au/wp-content/uploads/2024/03/EVC-Australian-EV-Industry-Recap-2023.pdf>>

10 Energy Consumer: Sentiment & Behaviour Surveys, June 2023, <<https://ecss.energyconsumersaustralia.com.au/sentiment-survey-june-2023/>>

11 Energy Equity in Electrifying ACT Households, Common Capital, 2023



## The Sustainable Household Scheme helps Canberrans to electrify

The community told us that cost is the biggest barrier to transitioning for households in the ACT.<sup>12</sup> As of June 2024, the Sustainable Household Scheme has provided \$208 million (across 18,800 loans) to directly address this barrier by providing zero interest loans to help eligible households electrify.

The scheme offers loans to support Canberrans to swap out their old gas appliances with electric hot water heat pumps, heating and cooling, and induction and ceramic stovetops. Some Canberrans can also access a loan to install solar to help run their electric appliances and achieve further savings.



The ACT Government will need to explore options to accelerate the transition and move towards regulatory options to ensure emissions reduction targets are met. This could include updating the minimum standards for rental properties or prohibiting the installation of new gas appliances towards the end of this decade, consistent with the government's approach to phasing out the sale of new light internal combustion engine vehicles from 2035. Delaying the transition to all-electric homes could lock in high gas costs for consumers and lock in future greenhouse gas emissions for the Territory. The pace of the transition will be examined as the government undertakes the mid-point review of the first IEP in 2027.

The government is aware that noise due to electrification of appliances such as air conditioners, heat pump hot water systems, inverters and batteries could become a growing barrier if not appropriately managed. This issue can be exacerbated in higher density developments or areas where appliances are being installed very close to property boundaries, resulting in adverse health and wellbeing impacts on the community. The government will investigate options to address these concerns, such as technology improvements or regulatory reform.

### Existing actions supporting household electrification and energy efficiency

- ✓ \$280 million committed through the Sustainable Household Scheme to help households electrify, install solar and purchase zero emissions vehicles.
- ✓ Free advice, information and workshops given through the Sustainable Home Advice Program to help households improve their energy efficiency and electrify their home.
- ✓ Australian-first partnership with consumer advocacy group CHOICE helps households develop their own tailored electrification plan to transition off gas.

Households that wish to learn more about transitioning their home can visit [Everyday Climate Choices](#) to access information regarding ACT Government programs and resources to support their transition.

<sup>12</sup> Pathway to electrification: Integrated Energy Plan, report on what we heard, ACT Government, September 2023 <[https://yoursayconversations.act.gov.au/download\\_file/10392/3033](https://yoursayconversations.act.gov.au/download_file/10392/3033)>

## **ACT's one-stop-shop to help households transition: Sustainable Home Advice Program**

As people plan their transition, they may need advice and information tailored to their individual household needs. The ACT Government's Sustainable Home Advice Program is a one-stop-shop for advice on home energy efficiency and electrification.

Households can work with a government energy expert to understand the key steps in their transition and access free support such as in-home energy assessments and education workshops. With its dedicated phone and email support line, the program can also connect households with government rebates and interest-free loans they are eligible for.

To motivate consumers to make informed decisions, the program provides ongoing support for Canberrans through targeted communication and education programs.

### **New actions**

#### **Explore potential regulatory interventions to support electrification**

The ACT Government will explore the most effective and least-cost pathways to reduce fossil fuel gas use in commercial and residential properties. This will include an initial assessment of measures to maximise replacement of gas appliances with electric appliances at end-of-life.

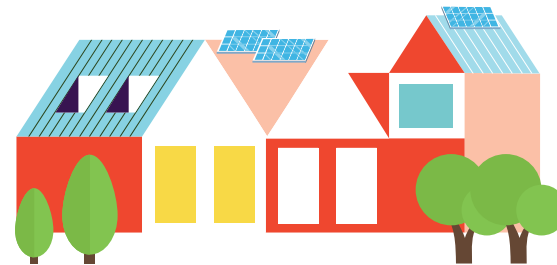
#### **Undertake an independent review of the Energy Efficiency Improvement Scheme (EEIS) to inform its long-term direction**

The Energy Efficiency Improvement Scheme (EEIS) helps households and small-to-medium sized businesses save energy by placing an obligation on electricity retailers to deliver eligible energy saving activities or contribute funds to the ACT Government. Those funds are used for energy efficiency initiatives that align with objects from the [Energy Efficiency \(Cost of Living\) Improvement Act 2012](#). Phase one of the review has recently been undertaken to assess the program's performance and to identify opportunities to support consumers during the transition. The findings of the independent review will be used to improve the EEIS, ensuring the right activities are promoted and confirming these activities are additional to what would not have occurred without EEIS support. The independent review will also guide how priority households can be efficiently supported. Information about the program and the phase one review can be found on [Everyday Climate Choices](#).

In response to the [investigation into wood heater policy](#) in the ACT by the Commissioner for Sustainability and the Environment, the ACT Government has committed to analyse the options, costs and timeframes to transition households away from wood heaters to efficient electric alternatives. This will be done as part of the development of a second action plan to support the implementation of a refreshed [Bushfire Smoke and Air Quality Strategy 2021-25](#). The pathway to phase out wood heaters will be subject to air quality and regulatory impact assessments and community consultation.



## Priority Households



### **Making sure all households can benefit from the energy transition and no one is left behind**

The transition to net zero can only be successful if everyone can participate and access the benefits of electrification. Community and government agree that a fair and equitable transition to net zero is a priority area for government action. Households without the means to make their home energy efficient and all electric, particularly those with low incomes, will need support. People who have the least capacity to pay for energy efficiency upgrades or electrification often live in homes that are the most expensive to heat and cool, and often rely on inefficient appliances that are cheap to buy but expensive to run.<sup>13 14</sup>

Many renters in the ACT live in housing that is expensive to heat or cool; they often do not have a choice in their heating, cooling, cooking or hot water systems. Renters encounter split incentives. Property owners incur the costs of transition and may see financial returns resulting from an improved energy efficiency rating<sup>15</sup> but, as they do not get to enjoy the immediate benefit of improved comfort or reduced bills, they may be reluctant to invest in upgrades.<sup>16</sup> While renters are responsible for paying the energy bill, they have little ability to influence decisions about appliance choices or switch to energy efficient alternatives. During consultation, participants highlighted the importance of keeping community benefit at the centre of the transition and felt a growing number of households would likely find it financially hard to transition yet do not qualify for existing subsidies, rebates and incentives.

Those on lower incomes spend a greater proportion of their incomes on essentials, including energy bills. In Canberra, those in the bottom two income quintiles spend 4.0-4.4% of their disposable income on energy costs, compared with only 2.2-2.4% for the top two quintiles.<sup>17</sup> The connections between energy insecurity, poverty and adverse health effects are well documented.<sup>18</sup>

13 Inquiry into the National Electricity Market, Australian Competition and Consumer Commission (ACCC), May 2022, <<https://www.accc.gov.au/system/files/Inquiry%20into%20the%20National%20Electricity%20Market%20-%20May%202022%20report%2813880615.1%29.pdf>>

14 Tents to Castles, The Climate Council, April 2022

<<https://www.climatecouncil.org.au/wp-content/uploads/2022/04/Tents-to-castles-2022-final.pdf>>

15 F Fuerst, and G Warren-Myers, 'Does voluntary disclosure create a green lemon problem? Energy-efficiency ratings and house prices', Energy Economics, 2018

16 M Lang, R Lane, K Zhao, S Tham, K Woolfe, and R Raven, 'Systematic review: Landlords' willingness to retrofit energy efficiency improvements', Journal of Cleaner Production, 2021

17 Supporting a fair, fast and inclusive energy transition in the ACT, ACTCOSS, July 2023 <<https://actcoss.org.au/wp-content/uploads/2023/08/2023-Report-Supporting-a-fair-fast-and-inclusive-energy-transition-in-the-ACT.pdf>>

18 S Jessel, S Sawyer, and D Hernandez, 'Energy, poverty, and health in climate change: A comprehensive review of an emerging literature' Frontiers in Public Health, 2019.

Many Canberrans experience energy hardship, struggling to pay utility bills due to low energy efficiency housing, low income and high energy costs.<sup>19</sup> Electricity and gas costs have risen faster than general inflation over the past 5 years (28.1% and 24% respectively).<sup>20</sup>

Analysis by Common Capital shows that full electrification of lower income households (including adding solar PV) in the ACT has a net benefit.<sup>21</sup> Overall, a household will receive the highest savings from complete electrification and using solar PV. The more households that are electrified, the greater the net benefits. The sooner households are electrified, the greater the cumulative bill savings, noting that costs are lowest if appliances are upgraded at the end of the life of the appliance. There are additional societal benefits such as lower carbon emissions.

The ACT Government has identified that up to 25,000 private households (owner-occupiers and renters) will require support to transition off gas by 2045.<sup>22</sup> Of these households, approximately 17,100 are owner-occupiers, 6,300 are renters and 1,600 are in other tenure arrangements. These figures include all housing types, including apartments and complex buildings where households typically face greater technical, financial and structural barriers to transition.

## Existing actions for priority households

- ✓ A minimum energy efficiency standard for ceiling insulation for rental properties implemented from 1 April 2023.
- ✓ \$35.2 million of ACT Government and Australian Government funds made available to upgrade community and public housing to meet the ACT's minimum energy efficiency standard for ceiling insulation and complete electrification upgrades.
- ✓ \$2.13 million in rebates provided to date for electric appliances, insulation and solar PV for concession card holders as part of the Home Energy Support Program.
- ✓ Free advice made available for renters to make their home more energy efficient and save money on their energy bills.
- ✓ Eligible customers are supported through a concession or rebate on their electricity bill.
- ✓ The Energy Efficiency Improvement Scheme delivers help to priority households, with a target of 40% of the scheme's energy savings to be delivered to those in need.

Households that wish to learn more about electrification and energy efficiency can visit [Canberra is Electrifying](#) or [Everyday Climate Choices](#) to access information regarding government programs and resources to support their transition.

<sup>19</sup> Supporting a fair, fast and inclusive energy transition in the ACT, ACTCOSS, July 2023 <<https://actcoss.org.au/wp-content/uploads/2023/08/2023-Report-Supporting-a-fair-fast-and-inclusive-energy-transition-in-the-ACT.pdf>>

<sup>20</sup> Supporting a fair, fast and inclusive energy transition in the ACT, ACTCOSS, July 2023 <<https://actcoss.org.au/wp-content/uploads/2023/08/2023-Report-Supporting-a-fair-fast-and-inclusive-energy-transition-in-the-ACT.pdf>>

<sup>21</sup> Energy Equity in Electrifying ACT Households, Common Capital, 2023.

<sup>22</sup> Energy Equity in Electrifying ACT Households, Common Capital, 2023.

## New actions

### **The ACT Government will electrify all feasible public and community housing by 2030**

The government, as the property owner, is responsible for helping Canberrans living in public housing to electrify. This commitment will be delivered together with funding from the Australian Government under the National Social Housing Energy Efficiency Program. All gas appliances in public and community housing will be replaced with efficient electrical appliances for space heating, water heating and cooking. The program will also cover the cost of gas abolishment and any required electrical safety work in these properties. This is in addition to ongoing insulation upgrades, which help to provide safe and comfortable homes for those most in need.

### **Provide \$5.2 million for a pilot to identify a pathway to electrification for private households that most need support**

The Community Partnership Electrification Pilot will allocate \$5.2 million over two years to cover the upfront cost of electrifying space heating, water heating and cooking appliances for identified priority private households. This commitment addresses the cost barrier for these households, ensures they can transition early and engages trusted delivery partners in our community to provide effective support to those who need it most.

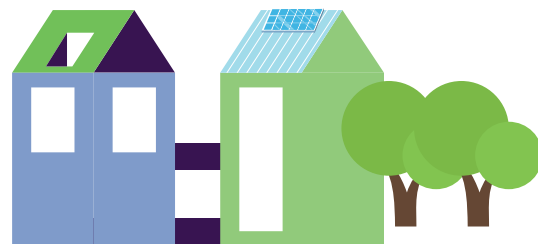
In addition, the ACT Government will **trial replacement of wood heaters in public housing properties** with electric alternatives and make quality improvements to wood heater removal programs so that financial incentives are more accessible to priority households.

The government will also **consider a range of innovative financing mechanisms, regulation and concession reforms to further support those in our community who need the most assistance** to transition away from gas. The government will engage across the community, with other jurisdictions, industry and stakeholders to ensure these funding mechanisms and support measures are sustainable, appropriately designed and provide material support to those who need it most. The government will also begin considering future regulatory options for rental properties so all households can make the switch.





## Complex buildings



### **Finding solutions to electrify existing units, townhouses and mixed-use buildings**

While the solutions to electrify standalone homes are well understood and tested, a range of buildings are more complex, including multi-unit, mixed-use and large commercial developments. These buildings are more complex due to the way they are constructed, their physical traits, building configuration, the diverse nature of the people who live and work in them and their ownership structures. Other cities that decarbonise through electrification of gas systems will face similar challenges.

There are an estimated 40,000 households living in townhouses and apartments in the ACT.<sup>23</sup> Renters are more represented in this building type, with renters occupying 54% of apartments in the ACT compared with 24% of non-apartment dwellings.<sup>24</sup> These households are diverse in size, gender, age and economic background and encompass a higher representation of cohorts such as low-income earners; 30% of households living in apartments in the ACT have an income in the lowest two quintiles compared to 25% for non-apartment households.<sup>25</sup>

Based on the broader rate of connectivity to the gas network across the ACT, around 26,000 households in complex buildings are estimated to need to electrify.<sup>26</sup> Unlike standalone homes, there are likely to be many different owners (operating through owners corporations) in such buildings, making agreement to changes to communally owned infrastructure, such as changing the hot water system from gas powered to electric, more challenging.

A further barrier may be the different uses of complex buildings. Commercial owners and tenants may occupy parts of the same building as residential owners or tenants and are likely to have specific business needs. Businesses within complex buildings may also face additional barriers to electrifying including lack of access to capital or short leases.

Owner-occupiers are likely to experience some benefits from investing in energy efficient electric upgrades due to the anticipated reduction in energy costs. However, investors and landlords may not wish to make significant capital investments in electrification.

Consultation highlighted that the cost of transitioning complex buildings was a concern.<sup>27</sup> Gas appliances and their replacement costs are generally less expensive than the installation of electric equivalents. Labour, professional services, infrastructure (like cabling) and other costs required for electrification that drive the cost difference. These supplementary costs can include design services for tailored solutions, electrical upgrades to the building or network infrastructure, and changes to the building to account for appliance placement, space and ventilation requirements, such as those required for heat pumps.

<sup>23</sup> ABS, 2021 Census.

<sup>24</sup> ABS, 2021 Census.

<sup>25</sup> ABS, 2021 Census.

<sup>26</sup> This number should be taken as a lower bound due to higher rates of connectivity to the gas network for larger buildings (confirmed through industry consultation in the construction sector and Government analysis).

<sup>27</sup> Pathway to electrification: Integrated Energy Plan, report on what we heard, ACT Government, September 2023 <<https://yoursayconversations.act.gov.au/Integrated-Energy-Plan>>.

Physical and building structure issues were also raised during consultation, with some apartment buildings and townhouses not being suitable or equipped for the required installations or infrastructure changes.<sup>28</sup>

While the need to electrify by 2045 is known, many stakeholders also raised the barriers strata managers and owners corporations face in managing decisions and budgets associated with transitioning complex buildings away from gas. There is a risk that owners corporations may not be adequately planning now for the changes to their communal infrastructure, including for the required funding.

## Existing actions to help transition complex buildings

- ✓ \$3.6 million of ACT Government and Australian Government funding for residential apartments to install solar PV.
- ✓ Support for residential apartments to undertake EV ready feasibility studies and upgrade building infrastructure to allow for future EV charger installation.

### New actions

#### **Provide interest free loans to support multi-unit buildings to become electric vehicle ready**

This program will provide funding for units to be made EV ready, allowing unit owners to purchase and install an EV charger at a time that suits them. Installing load managed EV ready infrastructure means that charging can occur within the available electrical capacity of the building, avoiding the significant cost of a substation upgrade.

#### **Deliver a Retrofit Readiness Program for apartment and unit owners to develop a plan to electrify their buildings**

This program will provide education, advice and technical assessments of buildings to provide example pathways to electrification. Advice and administrative support will be provided to help stakeholders understand and make their way through the ACT's unit title rules and regulations. Buildings will also receive a technical engineering report providing a recommended electrification solution that is tailored to the building's specific inputs and needs.

#### **Commence a review of unit titles management legislation to ensure it is fit-for-purpose to support electrification of multi-unit buildings**

Changes to the Unit Titles (Management) Act 2011 (through the Unit Titles Legislation Amendment Act 2023) have made it easier to obtain consent from an owners corporation to install energy and water saving devices. Additional work will be undertaken to ensure legislation is fit-for-purpose, including addressing barriers for electric vehicle adoption and installation of charging infrastructure in unit titled properties.

<sup>28</sup> Pathway to electrification: Integrated Energy Plan, report on what we heard, ACT Government, September 2023 <<https://yoursayconversations.act.gov.au/Integrated-Energy-Plan>>.

The ACT Government will **continue to update the ACT’s planning, building and development regulatory systems** to facilitate the energy transition. The new planning system in the ACT focusses on delivering better outcomes for the residents of Canberra. The government has changed the ACT planning system to provide clearer planning pathways for batteries and electric vehicles. The government is developing a 10-year pathway to achieve world’s best practice sustainable buildings.<sup>29</sup> This pathway will define best practice, contain signposts to guide and support industry in sustainability to their normal operations, and identify initiatives that should be delivered and implemented to shift the ACT’s buildings to ‘world’s best practice’.

The government will also **continue to engage with the Australian Building Codes Board, the Australian Government and other states and territory on the National Construction Code (NCC)**. The NCC sets the minimum required level for the safety, health, amenity, accessibility and sustainability of conditioned space within buildings. In January 2024, the minimum standard for energy efficiency in new homes was increased to be equivalent to a 7-star Nationwide House Energy Rating Scheme (NatHERS) requirement for thermal performance with a whole-of-home energy use budget. There are now requirements for features that support the future installation of ZEV charging equipment, storage systems (electrical equipment) and solar panels (structural integrity of roofing) in new commercial and apartment buildings.



## Business and Industry



### Decarbonising businesses and industrial activities in the ACT

Almost 40% of gas demand in the ACT comes from businesses and industrial activities, meaning they will play a vital role in meeting the ACT’s emissions reduction target of net zero by 2045.

Many businesses will be able to transition in a similar manner to households, with electric technology available and in widespread use. However, there are specific challenges for businesses, depending on their needs.

The majority of small and medium businesses rent their premises and can experience similar barriers to household rental properties where landlords have different incentives. Similarly, businesses within large, multi-tenanted or mixed-use buildings will face the same social, structural and technical challenges to electrification as multi-unit residential buildings.

Feedback from consultation identified cost as the main barrier to businesses electrifying.<sup>30</sup> This included the cost of interruption to businesses during transition, impacts on business cash flow and service times, potential fit-out costs associated with electric appliances taking more space than existing gas appliances, and costs for rewiring and upgrading switchboards.<sup>31</sup> Many participants raised that businesses that lease their premises would need to negotiate with landlords to make the switch to electric.<sup>32</sup> Businesses additionally face pressures for appliance replacements to deliver a return on investment.<sup>33</sup>

29 Building Reform, ACT Government, 2024 <<https://www.planning.act.gov.au/professionals/building-reform>>

30 Pathway to electrification: Integrated Energy Plan, report on what we heard, ACT Government, September 2023 <[https://yoursayconversations.act.gov.au/download\\_file/10392/3033](https://yoursayconversations.act.gov.au/download_file/10392/3033)>.

31 Pathway to electrification: Integrated Energy Plan, report on what we heard, ACT Government, September 2023 <[https://yoursayconversations.act.gov.au/download\\_file/10392/3033](https://yoursayconversations.act.gov.au/download_file/10392/3033)>.

32 Pathway to electrification: Integrated Energy Plan, report on what we heard, ACT Government, September 2023 <[https://yoursayconversations.act.gov.au/download\\_file/10392/3033](https://yoursayconversations.act.gov.au/download_file/10392/3033)>.

33 Pathway to electrification: Integrated Energy Plan, report on what we heard, ACT Government, September 2023 <[https://yoursayconversations.act.gov.au/download\\_file/10392/3033](https://yoursayconversations.act.gov.au/download_file/10392/3033)>.



## What are the opportunities and challenges for industrial activities that use fossil fuel gas in the ACT?

There are options to produce and deliver green gas into the ACT. Green gas is expected to be more expensive than fossil fuel gas is now. Therefore, in future, green gas will be used in the ACT for hard to abate industrial uses, not household use.

Canberra is primarily a services city, with services our largest class of export. There is a limited industrial base, unlike states such as Victoria and NSW. With limited manufacturing and industrial uses in the Territory, most applications already have an electric solution. However, electrification is not always feasible for certain niche applications. A green gas alternative will likely be required for these applications.

In 2023 the ACT Government contracted GPA Engineering to undertake a survey of fossil gas appliances used in the commercial and industrial sector in the ACT to understand how they can transition. The study categorised appliances based on how they are currently manufactured and sourced and assessed, and which processes or appliances could be electrified or would require a source of green gas.

Appliances were categorised as 'retail', 'commercial' and 'industrial' as shown in the following table below.

The survey found that the majority of appliances used within the ACT industrial and commercial sectors have a viable electric alternative, particularly for the retail category and lower temperature commercial uses. However, at present there are no technically feasible, cost-effective options for all industrial gas uses, particularly those that use high heat. This is because:

- > combustion is required by the process or end use
- > the heat requirement for the process is not feasibly met by electrification, or
- > flame is the required outcome.

Aside from availability of an electric appliance, and in addition to barriers outlined above, other factors and considerations can make electrification of an appliance in a business or location challenging, such as power supply and connection upgrades. These will be specific to each case.



# Fossil gas use in the ACT commercial and industrial sector

Where electrification is not feasible, green gas (or liquid biofuel) was typically assessed as the most favourable pathway to decarbonisation. Green gas such as biomethane or renewable hydrogen could play a critical, but targeted, role in decarbonising the ACT's industrial uses that are significantly difficult or impossible to electrify.

A range of factors weigh into which pathway might be most suitable for the ACT as outlined below.

| Gas appliance category   | Percentage of total gas appliances | Key uses  | Decarbonisation option  | Technological difficulty of substitution                         |  |
|--|------------------------------------|---|---|--|--|
| <b>Retail</b><br>Appliances that are produced and purchased at wholesale quantities from 'retail' vendors. There is typically a wide choice and appliances are readily available.  | 57%                                | Fluid heating<br>Heating ventilation and air conditioning (HVAC)                                    | Electrification: Replacement of equipment.                          | Straight forward (>99% of retail appliances).                    | Little to no technological barrier to achieving the requirements of the end use of using an electrified alternative. |
| <b>Commercial</b><br>Appliances that are produced and purchased at a speciality store or via a catalogue. These appliances are easy to find but businesses may have a limited choice in sourcing them.                                   | 40%                                | Fluid heating<br>HVAC<br>Indirect heating   | Electrification: Replacement of equipment, retrofitting/ upgrading. | Straight forward / minor (90% of commercial appliances).         | Electrification is achievable with a small extent of difficulty but is otherwise readily implementable.              |
|  |                                    | Indirect heating<br>Electricity generation from diesel or gas generator<br>Combustion<br>Fire/flame | Electrification OR Green gas supply and/or appliance.               | Moderate/ significant/ impossible (5% of commercial appliances). | Technology has few options available, does not exist, or is impractical to implement.                                |
| <b>Industrial</b><br>Appliances that require bespoke engineering design for process driven application. These appliances are sourced from industrial suppliers due to the difficulty in engineering design and larger cost implications. | 3%                                 | Glass making and ceramics<br>Process heating  | Green gas supply and/or appliance.                                  | Significant/ impossible (84% of industrial appliances).          | Technology does not currently exist, or cannot be readily sourced. Precludes electrification based on requirements.  |

## Pathways<sup>34</sup>

| Considerations      | Biomethane network  | Bottled green gas   | Renewable Hydrogen network or distribution   |
|---------------------|---|---|--|
| <b>Description</b>  | <ul style="list-style-type: none"> <li>&gt; The gas network (or parts of it) remain, supplying biomethane to those consumers who require green gas where electrification is not possible.</li> <li>&gt; Biomethane is produced by purifying the gas generated through the biological decomposition of organic matter.</li> <li>&gt; Biomethane can lead to net-negative emissions (biomethane converts methane into carbon dioxide and carbon dioxide has a less intense global warming potential than methane).</li> </ul> | <ul style="list-style-type: none"> <li>&gt; Discrete bottles of green gas utilised by businesses that require a green gas (either biomethane or bioLPG) but are isolated from the residual gas network, or who are not able to justify the cost of maintaining a network connection, and/or use their appliance irregularly.</li> </ul> | <ul style="list-style-type: none"> <li>&gt; A hydrogen pathway could take the form of:               <ul style="list-style-type: none"> <li>&gt; a blend of hydrogen with biomethane in the gas network;</li> <li>&gt; a 100% hydrogen network; or</li> <li>&gt; compressed or liquified hydrogen that is distributed in bottles (similar to the way LPG is used currently).</li> </ul> </li> <li>&gt; Renewable hydrogen is produced using energy generated from renewable sources to convert water into hydrogen gas.</li> <li>&gt; Renewable hydrogen is a carbon neutral fuel source.</li> </ul>   |
| <b>Substitution</b> | <ul style="list-style-type: none"> <li>&gt; Biomethane is fully compatible with the existing gas network, so could be brought into the ACT without the construction of new transmission infrastructure.</li> <li>&gt; There is little need to replace existing gas appliances to operate on biomethane.</li> <li>&gt; The technology is well understood and mature.</li> </ul>  | <ul style="list-style-type: none"> <li>&gt; Can be substituted as biomethane or bioLPG. However, this solution is not suitable to applications that require large amounts of gas due to high cost and the need to swap cylinders.</li> </ul>  | <ul style="list-style-type: none"> <li>&gt; Like biomethane, hydrogen could be injected into the existing gas distribution infrastructure, or potentially injected into upstream transmission infrastructure and delivered to the ACT.</li> <li>&gt; Hydrogen is incompatible with older, steel-based pipes in distribution networks if used beyond a low blend of hydrogen.</li> <li>&gt; The transition to a 100% hydrogen network would require network upgrades and many appliances would require upgrade or replacement to comply with hydrogen as an energy source.</li> <li>&gt; Technical challenges (material compatibility and hydrogen embrittlement) are the subject of ongoing research.</li> </ul> |

<sup>34</sup> Green Gas Alternatives for the ACT's Commercial and Industrial Sector, GPA, 2024

## Pathways<sup>34</sup>

| Considerations | Biomethane network  | Bottled green gas   | Renewable Hydrogen network or distribution   |
|----------------|---|---|--|
| <b>Cost</b>    | <ul style="list-style-type: none"> <li>&gt; Biomethane produced from waste may provide a lower cost green gas option.</li> </ul>  | <ul style="list-style-type: none"> <li>&gt; BioLPG is likely to be considerably more expensive than traditional LPG.</li> <li>&gt; High costs for businesses that would need to rely on bottles to deliver large amounts of gas.</li> </ul> | <ul style="list-style-type: none"> <li>&gt; Hydrogen is considered more expensive to produce than biomethane at moderate scale.</li> <li>&gt; Hydrogen production (if within the ACT) requires electricity which increases electricity needs and could require considerable and expensive upgrades to the electricity network.</li> <li>&gt; As hydrogen has lower energy density than fossil gas a greater volume is needed to produce the same amount of energy.</li> </ul>  |
| <b>Supply</b>  | <ul style="list-style-type: none"> <li>&gt; Investment in biomethane is proceeding across Australia.</li> <li>&gt; Various agricultural businesses can provide suitable feedstock for biomethane production. However, there are no single point sources within the ACT to provide feedstock for a residual green gas network.</li> <li>&gt; Securing feedstock supply, feedstock quality and quantity are key success factors for the viability of green gas.</li> <li>&gt; Feedstock for biomethane can be valuable for other applications.</li> </ul> | <ul style="list-style-type: none"> <li>&gt; Sources will need to be of sufficient scale to provide commercial quantities of biomethane / bioLPG.</li> </ul>   | <ul style="list-style-type: none"> <li>&gt; Investment in hydrogen around Australia is developing, including with assistance from Australian Government programs such as Hydrogen Headstart.</li> <li>&gt; If sourced outside the ACT, long-term procurement contract needs to be in place (with consideration of implied costs, emissions and equitable network accessibility for ACT users).</li> <li>&gt; Competition around the use of water could reduce its availability for hydrogen production in the future, e.g. impacts of climate change and competition for this limited resource.</li> </ul> |

During consultation, we heard commercial and industrial gas users had mixed opinions on the plan to transition away from fossil fuel gas.<sup>35</sup> Many businesses that require specialised technology (for example for industrial processes) and use large amounts of gas generally had a low-level understanding of alternative renewable energy powered technologies. Many stakeholders emphasised the risk of losing industries that have niche gas uses to NSW, and that the government would need to develop and implement strategies to prevent this.

<sup>35</sup> Pathway to electrification: Integrated Energy Plan, report on what we heard, ACT Government, September 2023  
<https://yoursayconversations.act.gov.au/Integrated-Energy-Plan>

## Existing actions to help decarbonise business and industrial energy use

- ✓ Sustainable Business Program established as a one-stop-shop for businesses to access free technical advice and rebates of up to \$10,000 for businesses to install electric appliances and other sustainable upgrades.
- ✓ Rebates of up to 50% total cost for businesses to transition commercial kitchens to all electric made available through a Commercial Kitchen Trial program.

Business owners and operators who wish to learn more about electrification can visit [Everyday Climate Choices](#) to access information regarding ACT Government programs and resources to support their transition.

### Next steps

Government will **continue working with businesses and industry on the best way to transition away from fossil fuel gas use**. This includes further defining the appropriate role for green gas for those applications where it is required, quantifying the projected green gas demand and evaluating the costs and economics of green gas use in the ACT.



## Transport



### Opportunities, challenges and benefits of zero emissions vehicle technologies

Transport accounts for 64% of emissions in the ACT and is a priority for emissions reduction action. Private vehicle use accounts for about 70% of all transport emissions in the ACT.

Changing the way Canberrans move around will help decarbonise our city. Active transport, including walking, biking and e-scooters, has become increasingly important for urban mobility due to its efficiency, emissions reduction and health benefits as well as reducing road congestion. [The ACT Transport Strategy 2020](#) supports the shift to active transport by improving walkability in neighbourhoods, expanding Canberra's cycle routes and prioritising the development of the light rail network and rapid bus services for a comprehensive public transport system.<sup>36</sup> [The Active Travel Plan 2024-30](#) seeks to enable more people to take up walking and cycling and the [Zero-Emission Transition Plan for Transport Canberra](#) outlines the pathway to achieve the ACT Government's ambition of a zero emissions public transport system by 2040.

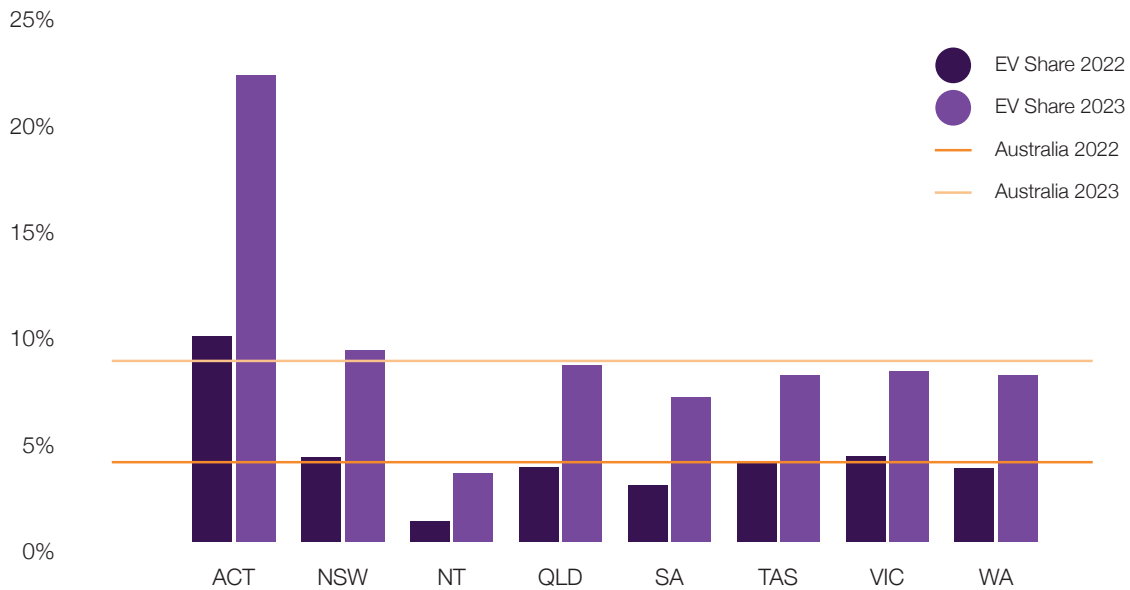
Alongside this, the [ACT's Zero Emissions Vehicles Strategy 2022-30](#) supports the uptake of ZEVs through a range of actions, financial incentives and concessions to achieve the target of 80-90% of new light vehicle sales being ZEV by 2030. The government has also committed to explore phasing out the sale of new internal combustion engine vehicles (like petrol and diesel vehicles) by 2035.

<sup>36</sup> ACT Transport Strategy 2020, ACT Government, 2020, <[https://www.transport.act.gov.au/\\_data/assets/pdf\\_file/0016/1613302/200601-ACT-Transport-Strategy\\_web.pdf](https://www.transport.act.gov.au/_data/assets/pdf_file/0016/1613302/200601-ACT-Transport-Strategy_web.pdf)>

The transition from petrol or diesel cars to ZEVs will not only reduce our transport emissions and support our 2045 net zero target, but can also lead to improved air quality, better health, increased fuel security, lower vehicle maintenance and running costs, and quieter and cleaner roads.

Early policy measures supporting the uptake of ZEVs have been successful, with 22%<sup>37</sup> of new ACT light vehicle registrations being ZEVs in 2023. While ZEV uptake doubled between January 2023 and January 2024, the uptake in the ACT needs to continue to accelerate rapidly to remain on the path to net zero emissions by 2045.

**New EV Sales Share by State/Territory: 2022 vs 2023**



Source: Australian Electric Vehicle Industry Recap 2023 State of Electric Vehicles, Electric Vehicle Council, March/July 2024  
<https://electricvehiclecouncil.com.au/wp-content/uploads/2024/03/EVC-Australian-EV-Industry-Recap-2023.pdf>

The main barriers to ZEV uptake are upfront cost, access to charging infrastructure and range anxiety. Addressing these barriers is central to increasing community adoption.

People who are considering buying an EV are often concerned they will not be able to find places to recharge their vehicle. Providing access to charging across the ACT is vital to supporting EV uptake over the long term. Public charging is particularly important for people who do not have access to charging at home and for visitors to the ACT. Access Canberra data (February 2024) shows around 15% of EVs are registered to a unit, while nearly 85% are registered to a standalone home.

Community feedback also highlighted the difficulty of accessing EV charging infrastructure for commercial vehicles. The ACT Government’s Business Fleet Advisory Service has found that uncertainty around charging infrastructure and a lack of financial support are the major barriers to uptake of EVs in business fleets.

The rate of EV uptake in different settings will require a variety of charging infrastructure to be deployed, with different speeds of charging. Deployment and maintenance of this infrastructure will require support from a skilled workforce. A significant increase in the total number of charging bays (an EV charger may have multiple charging bays) compared to 2023 will be needed, with a rapid rate of increase in the shorter term to meet growing demand. Charging at home is expected to provide the majority of charging needs.

<sup>37</sup> State/territory market share is an approximate estimate calculated after removing an estimate of heavy vehicle sales in each jurisdiction from VFACTS data.

Heavier vehicles, while less numerous than passenger vehicles, contribute significantly greater greenhouse gas emissions per vehicle given their greater weight and utilisation. Commercial vehicles are more likely to be high-use diesel vehicles. Enabling the transition of heavier vehicles as models become available to the Australian market will be key to meeting our 2045 target. For heavy transport, consultation indicated that truck operators may face financial difficulties transitioning their current assets, such as high-value trucks, to low-pollution alternatives.<sup>38</sup> The heavy vehicle transition will need to be enabled by the rollout of supporting infrastructure in the form of high-power DC charging hubs for battery electric vehicles and hydrogen refuelling stations for fuel cell electric vehicles.

## Existing actions to increase zero emissions vehicle uptake

- ✓ \$15,000 zero interest loans available for vehicle purchase and charging infrastructure, zero stamp duty and registration discounts.
- ✓ Commitment to at least 180 public chargers in the ACT by 2025.
- ✓ A nation-leading sales target that 80–90% of new vehicle sales are ZEVs by 2030 and a commitment to phase out new light internal combustion engine vehicles from 2035.
- ✓ Transition to a zero-emission public transport system by 2040 including electrifying the bus fleet, with an initial 106 battery electric buses to be operational by 2026.

To learn more about zero emission vehicles visit [Everyday Climate Choices](#) to access information regarding ACT Government programs and resources.



### New actions

#### Support the installation of fast electric vehicle (DC) charging hubs

The government will work to develop DC charging hubs at strategic locations across the ACT. Feasibility and engineering work will be undertaken to identify the most viable locations, where traffic flow, electrical infrastructure and suitable land are all present. Any hubs located in commercial areas will include charging bays suitable for commercial vehicles owned by small fleet operators who do not have private off-street parking suitable for chargers.

#### Provide rebates of up to \$3000 for fleet operators to install electric vehicle chargers

This program will provide rebates that will leverage co-investment of at least 50% and will give fleet operators the confidence to begin their transition faster than they would otherwise. In doing so, the government will create fleet transition ambassadors to help normalise the transition while driving emissions reductions from highly utilised fleet vehicles.

<sup>38</sup> Pathway to electrification: Integrated Energy Plan, report on what we heard, ACT Government, September 2023 <<https://yoursayconversations.act.gov.au/Integrated-Energy-Plan>>

In addition, the government will **work with stakeholders to provide clarity on the role of hydrogen for heavy road transport**. The government will work with stakeholders to enable sufficient and suitable charging and refuelling infrastructure to support these vehicles. This includes continuing to engage with the Australian Government and New South Wales and Victorian governments on the Hume Hydrogen Highway to include the ACT as a location. Green gas, particularly hydrogen, may be a fuel option for heavy transport applications.

The ACT Government will **support commercial and business fleets to accelerate the adoption of zero emissions vehicles**. Advice and financial support to deploy charging infrastructure will be offered to commercial fleet operators, targeting high pollution emitting vehicles. The support for ACT businesses to transition to ZEVs will achieve significant emissions reduction while realising lower operational costs.

## Enabling the Transition

### The right skills and energy infrastructure for our future energy needs

The critical enablers to underpin the transition of our households, businesses, industry and transport fleet are:

- > a skilled workforce to undertake the necessary work to transition appliances, buildings and our energy infrastructure
- > ongoing 100% renewable electricity that is affordable and secure
- > electricity and gas networks that are fit-for-purpose throughout the transition.

This section of the IEP sets out the challenges in each of these areas and the next steps to enable transition.



**Skills & workforce**



**Ensuring 100% renewable energy**



**Fit for purpose network**



**Managing the gas network**





# Skills

## Building a skilled net zero workforce

An appropriately skilled workforce is crucial to supporting the energy transition. The transition to net zero will create jobs and demand for skills such as electricians, air-conditioning and refrigeration mechanics, electrical engineers and builders in the ACT and nationally. Already, many of the skills required for net zero are in short supply. In addition, some jobs will see reduced demand over time. Meeting the future skills needs and supporting affected workers is a priority for delivering a just transition to a net zero ACT.

The ACT Government commissioned analysis to identify the skills required for the energy transition and examine the impacts of decarbonisation on the ACT's workforce.<sup>39</sup> This analysis found occupations such as air-conditioning and refrigeration mechanics, electrical engineers and builders are forecast to see the greatest growth throughout the transition to 2045 and will play a critical role in developing the infrastructure needed across sectors such as energy, gas supply, building, planning and transport.<sup>40</sup> These will be the trades that design and install the right technology in homes and businesses to make best use of renewable energy, as well as help decommission and remove older appliances.

Modelling highlighted electrical trades as a key occupation currently in shortage, with the shortage expected to remain or grow between now and 2045.<sup>41</sup>



### ACT's Electric Vehicle Centre of Excellence

Australia's first TAFE Centre of Excellence is being hosted at the Canberra Institute of Technology in the ACT, and will focus on electric vehicles. The Centre of Excellence will provide world class training for our future EV workforce and explore new diploma and degree apprenticeship pathways. The Centre of Excellence will lead the charge for Australia on EV skills, information sharing, industry best practice sharing and resource development. Forming part of the Fyshwick Future Energy Skills Hub, the Centre will provide innovative training for mechanics, technicians and manufacturers of light and heavy vehicles and associated fields such as charging infrastructure, installation and

maintenance. In addition, the Centre will network with experienced TAFEs in other states and leverage partnerships with universities, tripartite Jobs and Skills Councils and industry to build up Australia's skills base to support increased EV uptake and the transition to net zero.

<sup>39</sup> Skills for the ACT Transition to Net Zero, Deloitte Access Economics, 2023 <<https://www.climatechoices.act.gov.au/energy/canberras-electrification-pathway/energy-transition-modelling>>

<sup>40</sup> Skills for the ACT Transition to Net Zero, Deloitte Access Economics, 2023 <<https://www.climatechoices.act.gov.au/energy/canberras-electrification-pathway/energy-transition-modelling>>

<sup>41</sup> Skills for the ACT Transition to Net Zero, Deloitte Access Economics, 2023 <<https://www.climatechoices.act.gov.au/energy/canberras-electrification-pathway/energy-transition-modelling>>

By 2045, there will need to be at least a 2% increase in electricians, 2.2% increase in building insulation installers and 1.3% increase in plumbers.<sup>42,43</sup> Increasing the number of skilled individuals will require a growth of vocational education and training (VET) capacity in the ACT.

Some occupations are expected to experience a decrease in demand due to the transition, including occupations such as gasfitters.<sup>44</sup> Identifying suitable career transition paths for these skilled tradespeople is key. Many gas appliances operating today will continue to require servicing and support for years to come, meaning there will continue to be a market for workers in this sector for some time.

Other occupations and sectors will face changing skill requirements and need either formal or informal training to integrate new technology and processes into their roles. This includes motor mechanics and automotive electricians who will need to upskill to service EVs.

## Workforce impacts

### New and emerging

- > Emerging occupations in the ACT relate to the development, deployment and maintenance of renewable energy technologies (**rooftop solar, small-and-large-scale, heat pumps**).
- > **Energy auditors, building inspectors and waste management services** will be needed to support the transition.

### Increased demand

- > Electricians will experience the most significant increased demand as the ACT is electrified.
- > There will be increased demand for **glaziers, insulation installers and windows fitters** to improve energy efficiency in homes.
- > **Private certifiers** with specialisations will be needed to support new and retrofitted buildings.

### Changing skills

- > **Motor mechanics and automotive electricians** will need to undertake formal upskilling to service ZEVs.
- > Policies that incentivise the measurement and disclosure of embodied emissions could result in significant additional re-skilling for traditional building inspectors.

### Disrupted workers

- > Demand for **gasfitters** will gradually decline as gas is decommissioned.
- > **Electrical lines workers** who work above ground will see demand decline as the ACT moves towards underground wiring networks.
- > **Motor mechanics** will face reduced demand as zero emissions vehicles (ZEVs) become more widespread.

Source: *Skills for the ACT Transition to Net Zero*, Deloitte Access Economics, 2023

<sup>42</sup> Skills for the ACT Transition to Net Zero, Deloitte Access Economics, 2023

<sup>43</sup> The Deloitte modelling assumes that gas connections decline by 1% between 2023 and 2030, 3% between 2030 and 2035, and between 10-15% by 2045. It is assumed that 0% of residential/commercial connections will exist in 2045, and that there will be a limited, residual base of industrial customers left on the gas network but supplied only by renewable gas.

<sup>44</sup> Skills for the ACT Transition to Net Zero, Deloitte Access Economics, 2023

[The Jobs and Skills Australia Clean Energy Capacity Report 2023](#) highlights the clean energy sector will be one of the sectors with the strongest employment growth in the Australian economy over the next 10 years. Many of the skills needed to decarbonise already exist in our economy.

Given the need for skilled clean energy workers across Australia, the ACT needs to increase and retain a skilled net zero workforce and diversify our existing workforce. The current shortage of skilled tradespeople, particularly in electrical trades, was raised across most engagement activities throughout consultation.<sup>45</sup> Participants emphasised that education, skill development and workforce readiness will need to be a priority to realise the opportunities of the transition.

### Existing actions to build a skilled net zero workforce

- ✓ Funded training programs through Canberra Institute of Technology (CIT) profile funding, the User Choice Australian Apprenticeships subsidies, Skilled Capital and Fee Free TAFE.
- ✓ Promoted Australian School-based Apprenticeships and Australian Apprenticeships as a valuable pathway into VET, further study and employment by engaging with existing and prospective VET students.
- ✓ Developed industry-specific skills action plans that focus on attracting new students to critical industries, improving training quality, opportunities and innovation, and upskilling existing workers to meet future challenges, including the energy transition.
- ✓ Signed the five-year National Skills Agreement (NSA) between the Australian, state and territory governments.

### New actions

#### Target training subsidies to priority trades that support the energy transition

Subsidies will be increased for the Certificate III in Electrotechnology Electrician. All other priority trades will continue to be supported through the User Choice program at the existing subsidy bands.

#### Undertake a scoping study for the design of a Future Energy Skills Hub at Canberra Institute of Technology

The scoping study will support the feasibility of establishing a hub at the CIT Fyshwick campus. A hub would primarily focus on the electrical trades to mitigate local and national skills shortages and the exploration of a skills pathway to support those working in the gas industry.

<sup>45</sup> Pathway to electrification: Integrated Energy Plan, report on what we heard, ACT Government, September 2023  
<[https://yoursayconversations.act.gov.au/download\\_file/10392/3033](https://yoursayconversations.act.gov.au/download_file/10392/3033)>

# Decarbonised energy systems

## Maintaining 100% renewable electricity

The ACT's electricity demand will increase over coming decades as the population grows, gas is phased out and electric vehicles become the norm. We expect to see total demand increase by around half and peak demand (the maximum demand at any one time) double by 2045.<sup>46</sup>

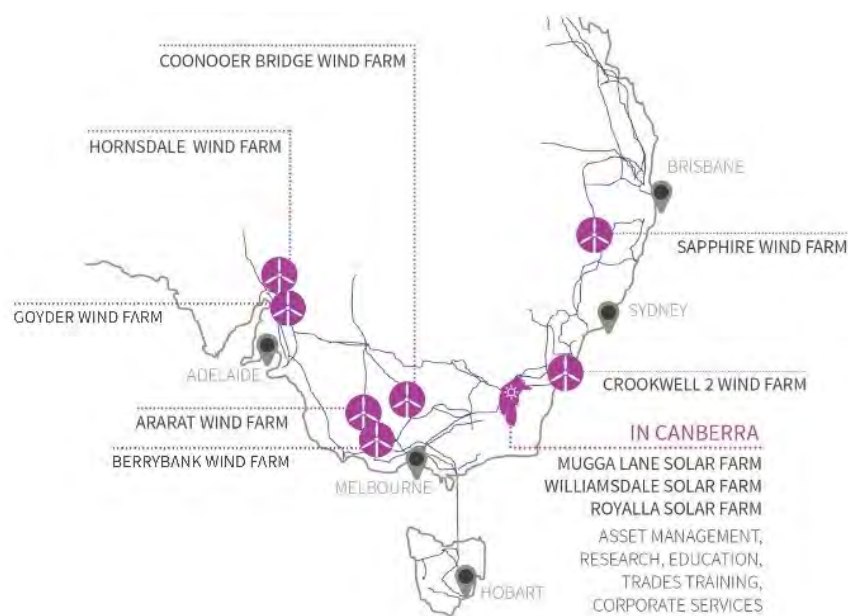
The ACT's energy system will also change and include a large amount of small-scale consumer owned resources, such as rooftop solar units or battery storage, which will influence demand and the way our energy system operates. The growth in demand will also be partially offset by improvements in energy efficiency.

The majority of the ACT's electricity will continue to be imported from the National Electricity Market (NEM). The NEM facilitates the generation and transport of electricity across Queensland, New South Wales, Victoria, South Australia, Tasmania and the ACT. The Australian Government has set a national target of 82% renewable electricity generation by 2030. This will drive an increase in the proportion of renewable electricity in the NEM.

The ACT achieves its 100% renewable electricity primarily through its Large-scale Feed-in Tariff (FiT) Scheme. The renewable electricity target is legislated so the ACT must maintain 100% renewable electricity every year from 2020.

To meet 100% renewable electricity, the ACT ran a series of innovative 'reverse auctions' for large-scale renewable generation across the NEM. Following these auctions, the ACT entered into contracts with renewables generators, including wind farms in South Australia, Victoria and NSW and several solar farms within the ACT. Through these contracts the ACT provides financial support to generators and, in return, receives the Large-scale Generation Certificates (LGCs) they produce. LGCs are tradable certificates that represent the amount of renewable energy that is generated. The ACT voluntarily surrenders the LGCs to the national Clean Energy Regulator. This means the ACT can claim the renewable electricity the LGCs represent toward its 100% target.

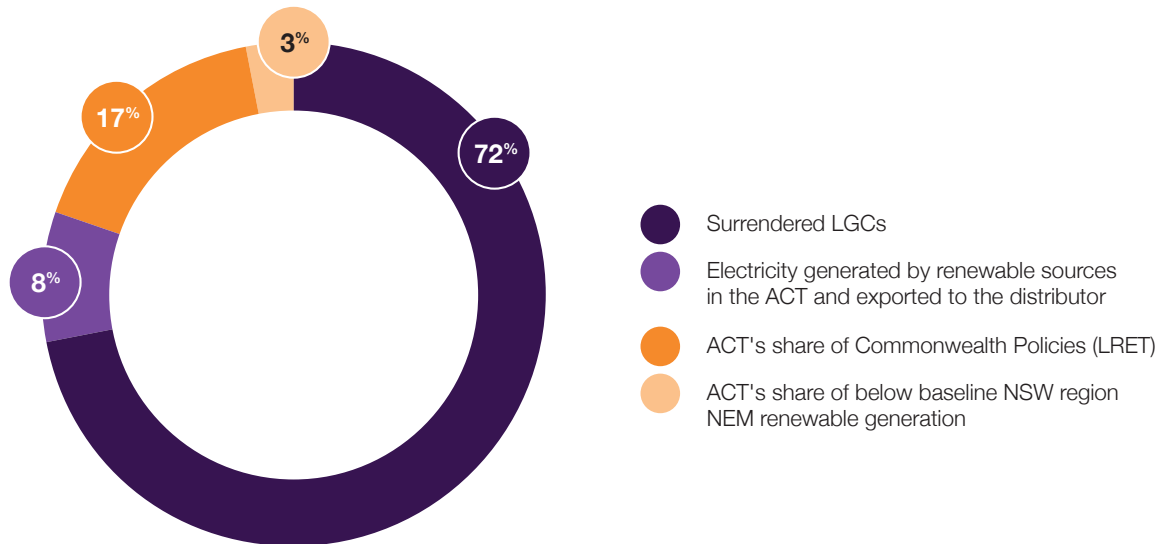
**Map of ACT-supported renewable electricity generation**



<sup>46</sup> Gas Transition Pathway to Net Zero - Phase 1 Report, Energeia and Aurecon, 2024

The remaining part of the ACT's renewable electricity is provided from our share of the Australian Government's Large-scale Renewable Energy Target (LRET) and the ACT's share of below baseline NSW region NEM renewable generation (NSW hydro generation that existed prior to the commencement of the LRET).

### 100% Renewable Energy Target Acquittal



The ACT Government will continue to monitor annual electricity consumption so we have sufficient LGCs to meet the 100% renewable electricity target into the future, and our approach to meeting our target continues to provide value for Canberrans.

### Maintaining a secure and reliable energy system within the National Electricity Market

Canberra enjoys high levels of energy security and reliability. The community has made clear the importance of maintaining this as we transition over the next 20 years. During this time, the NEM will undergo a significant transformation as coal-fired generators retire and are replaced with renewable generation and storage technologies. The ageing coal-fired generator fleet is increasingly unreliable and closures are being brought forward. In 2023, around 60% of electricity generation in the NEM was still sourced from coal.<sup>47</sup>

Due to the intermittent nature of some renewable electricity generation, continuing to provide a reliable and secure energy system will require a different approach. Dispatchable energy options such as utility-scale batteries, hydro storage, gas-fired generation and smart behind-the-meter virtual power plants (VPPs) can smooth out the peaks and troughs associated with intermittent renewable generation (when the sun is not shining and the wind is not blowing).

New transmission infrastructure will be required to transport electricity from areas with the most renewable energy generation (sometimes called 'renewable energy zones' or 'REZ') to where it is needed. This is because the existing NEM transmission infrastructure was developed around the location of coal generators, which are not always the best places to produce renewable electricity.

<sup>47</sup> NEM data dashboard, Fuel Mix, accessed 7 February 2024. <<https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/data-nem/data-dashboard-nem>>

The Australian Energy Market Operator (AEMO) has recognised the need for transmission infrastructure to evolve to meet our future needs and has built a road map for the energy transition in the NEM, known as the Integrated System Plan (ISP). The ISP provides a 'whole of system plan' for supplying affordable and reliable electricity to homes and businesses while our energy systems transition. The ISP also recognises the need to increase the capacity of dispatchable energy storage to address the peaks and troughs inherent in certain renewable electricity generation.

### Existing actions to deliver secure, reliable 100% renewable electricity

- ✓ Delivering 100% renewable electricity supply for the ACT.
- ✓ Supporting national actions to decarbonise our energy systems.

#### Next steps

As the ACT population grows and our homes and businesses electrify, further renewable generation may be needed to maintain our commitment to 100% renewable electricity generation. The ACT Government will **maintain 100% renewable electricity by investing in generation through the ACT Large Scale Feed-in Tariff (LFiT) scheme when needed and reviewing our approach to ensure the scheme remains fit-for-purpose and consistent with best practice.**

In addition, the **ACT Government will continue to work in partnership with the Australian Government, states and territory to decarbonise the National Electricity Market.** The NEM will be appropriately modernised to accommodate and respond to changes in electricity generation and demand, emerging technologies and shifting consumer preferences. This will make sure our energy system meets Australia's future needs for security, reliability, affordability and emissions reduction.



## Energy Affordability

Energy costs typically represent between 2.2% and 4.4% of household disposable incomes in the ACT.<sup>21</sup> While we currently have among the lowest average electricity prices in Australia, the ACT Government recognises the importance of maintaining affordable electricity throughout the transition. By taking gradual steps to manage the transition and planning ahead, The Integrated Energy Plan will minimise the risks that a poorly managed transition could pose to the cost of living. Modelling has shown that in a well-managed, gradual transition, the increases in electricity costs for consumers will be more than offset by their savings from avoided gas consumption.<sup>48</sup>

The ACT already supports those in the community who may have difficulty paying their energy bills. Eligible customers are supported through a concession or rebate on their electricity bill. Eligible customers include holders of a Pensioner Concession Card, Low Income Health Care Card, Health Care Card, Veteran Gold Card Holders and/or ACT Services Access Card. Consumers can access the concession through their energy provider.

To ensure ACT customers have access to affordable electricity, the Independent Competition and Regulatory Commission (ICRC) regulates electricity prices in the ACT. It does this by setting a standing offer electricity price that must be offered by ActewAGL Retail. The standing offer effectively caps electricity prices in the ACT.

## Building a fit-for-purpose local electricity network

### Consumers are driving the transition

Energy consumers are embracing new technologies and taking control of their energy. Canberra has rooftop solar on almost one third of households, one of the highest household battery densities in the world<sup>49</sup>, and has the highest uptake of ZEVs in the nation.

These technologies, often referred to as consumer energy resources (CER), are small-scale resources that generate or store electricity; they include flexible loads that can change demand in response to external signals. Such technology includes rooftop solar, batteries, electric vehicles, electric vehicle chargers and controlled loads such as water heaters and air conditioners. The increased uptake of CER will change the way the current electricity grid and markets operate.

<sup>48</sup> Energy Equity in Electrifying ACT Households, Common Capital, 2023

<sup>49</sup> NextGen Evaluation Report, Review of the alignment of the NGEN Program, Environment, Planning and Sustainable Development Directorate Next Generation Program Review, GHD, 2022

The transition to net zero will enable consumers to be more deliberate about the ways they generate and consume energy. This kind of demand flexibility will encourage consumers to take advantage of times of abundant low-cost renewables while reducing energy use during times of higher cost. Taking advantage of the opportunities available with CER will enable a cheaper energy transition and support reliability of the grid. Growth in CER reduces the need for utility-scale solutions to replace retiring coal capacity in the NEM, particularly if these resources can be coordinated or called upon to complement and support the grid.<sup>50</sup>

A 2022 study by the Australian Renewable Energy Agency (ARENA) estimated that flexible demand, including both large-scale demand and controllable electric vehicle charging and batteries, would generate up to \$18 billion in cost savings for consumers through lower capital and wholesale prices in the NEM by 2040.<sup>51</sup>

This modelling conducted by the ACT, which found that while there are many different approaches to decarbonisation that could be pursued, a decentralised pathway for the energy system would appear to offer the best overall benefits. This pathway would see decentralisation of energy production and storage, with strong gains in energy efficiency, lowering demand on the grid. The expected benefits of cost, the long-term economic viability of the Evoenergy gas network and the forecast reduction in emissions make this pathway with high uptake of CER the most likely. The modelling and additional studies that have underpinned the government's understanding of electrification for the ACT can be accessed at [climatechoices.act.gov.au](https://climatechoices.act.gov.au).

Accessing the full benefits of CER is a priority, and the ACT Government is working with the Australian Government, other jurisdictions and energy market bodies (including the Australian Energy Market Operator and Australian Energy Market Commission) on reforms to realise these benefits, while ensuring adequate consumer protections..

Under a suite of reforms being led by the AEMC, the rollout of smart meters is being accelerated, with an aim of 100% smart meters by 2030. Smart meters are enabling infrastructure that can maximise the benefits of CER technologies. They can help support the equitable distribution of costs between those who have resources such as rooftop solar and customers without solar who may be able to use smart meters to access cheaper tariffs such as the 'solar soaker'. However, the success of the roll-out will be determined by whether consumers are empowered to make informed choices about their energy plans and energy use. Ensuring consumers are provided with timely and clear information to make choices about the right energy plans for them will be a priority for the ACT Government through the rollout.

As Canberra continues to densify and there are more apartment buildings, an increasing number of Canberrans access their electricity via an embedded network. Embedded networks are private utility networks where a building or site owner purchases the energy and sells it on to users, for example to tenants in residential apartment blocks, retirement villages, caravan parks or shopping centres. In response to concerns raised by the public, the ACT Government undertook an independent review into the operation of embedded networks in 2023. The review found that while embedded networks do offer some benefits, customers in embedded networks may have limited access to consumer protections and competitive energy retail offers. Work to address these issues is underway and will help embedded network customers enjoy the same protection against high prices as the rest of the community.

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50 Draft Integrated System Plan 2024, AEMO, 15 December 2023 <[https://aemo.com.au/-/media/files/stakeholder\\_consultation/consultations/nem-consultations/2023/draft-2024-isp-consultation/draft-2024-isp.pdf?la=en&hash=17DED079F7A2066D2872D36B76012749](https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2023/draft-2024-isp-consultation/draft-2024-isp.pdf?la=en&hash=17DED079F7A2066D2872D36B76012749)>

51 Australian Renewable Energy Agency (ARENA), 2022, Load flexibility study technical summary. <<https://arena.gov.au/assets/2022/02/load-flexibility-study-technical-summary.pdf>>



## The role of batteries

Battery storage will play an increasing role in Canberra's electricity grid as we move towards electrifying our city and achieving net zero emissions by 2045. Batteries can help minimise peak demand by storing electricity generated by renewables for deployment at peak times. This can reduce the need for investment in energy network upgrades as peak demand drives network upgrades.



### Types of batteries

Batteries are typically defined by their energy storage capacity (measured in kilowatt hours (kWh) or megawatt hours (MWh)) or maximum power discharge capacity (measured in kilowatts (kW) or megawatts (MW)) rather than their physical size. There are three different scales of battery:

| Type  | Description  | ACT Government projects  |
|---|--|--|
| <b>Behind-the-meter (BTM) batteries (typically up to 200kW)</b> | These help households and other users (such as government or commercial) with local generation to maximise self-consumption and to minimise impact on the energy grid. The financial benefit is their ability to create bill savings through storing electricity for self-consumption, reducing purchasing electricity, especially during peak electricity tariff periods. BTM batteries can also operate as part of a virtual power plant (VPP) and participate in the National Electricity Market. | <p>The Next Generation Energy Storage Program provided rebates to ACT businesses and households to install a battery.</p> <p>The Sustainable Households Scheme provides interest free loans to help eligible households electrify, including installing batteries.</p>   |
| <b>Neighbourhood-scale batteries (100kW to 5MW)</b>             | These are 'in front of the meter' and are connected to the distribution grid. They can help to smooth out generation and voltage fluctuations in specific locations with high solar PV penetration. These batteries can access market revenues through a retailer or aggregator and create value by providing network services.  | The ACT Government, Australian Government and Evoenergy are collaborating to deliver three neighbourhood-scale batteries, in Casey, Dickson, and Fadden. The Suburban Land Agency is considering options for the delivery of neighbourhood-scale batteries.  |
| <b>Utility-scale batteries (&gt;5MW)</b>                        | These allow for greater renewables uptake in the NEM by storing surplus electricity and providing grid stability by acting to reduce the demand on the network at times of peak demand. These batteries directly participate in the NEM and can generate large amounts of revenue based on their size.   | The Big Canberra Battery project is delivering an ecosystem of batteries across the ACT to ensure that our electricity grid remains stable. This includes utility-scale batteries. The Territory has contracted Eku Energy to build a 250 megawatt (MW)/500 megawatt hour (MWh) battery in Williamsdale by 2025. |

## The impact of electric vehicles

Given the importance of peak demand, the impact of electric vehicles (EVs) is an important factor when planning for the future of the electricity network. Modelling has shown that the ACT could expect only a relatively small impact on the grid from the increased rate of EV adoption across a range of scenarios. Even with the ACT's target of 80–90% of new light vehicle sales being electric in 2030, EVs are likely to have only a relatively small impact on the grid when considered alongside growth in demand from the population and broader electrification.

The best time to charge an EV, for both consumers and the grid, is during the daytime. This is when solar is being generated and cheaper electricity tariffs are available. There is spare capacity on the grid as the demand for electricity is usually highest between 5pm and 8pm. If everyone began charging their EV when they got home from work in the evening (convenience charging) this would coincide with the already existing peak electricity demand. As EV adoption accelerates, tariff incentives combined with smart chargers will be needed to discourage EV charging around the evening peak, therefore avoiding costly investment in the grid.

EVs also have the potential to support the grid using vehicle to grid (V2G) or vehicle to home (V2H) technologies. The ACT Government will work with Evoenergy to enable these technologies at the earliest opportunity.

## Network investment

Ongoing investment will be required to continue to deliver an electricity system that remains secure, sustainable and reliable as we electrify and deploy higher levels of CER. The management and apportionment of costs for running gas and electricity networks are governed by national energy regulatory frameworks, determined by the Australian Energy Regulator (AER).

Evoenergy, as the ACT's electricity and gas distributor, submits proposals to the AER on its required expenditure and proposed revenues. In these proposals Evoenergy details its plans on how it will operate, maintain and invest in the electricity and gas networks to meet the ACT's future needs. The AER then determines the costs that can be passed onto consumers. This occurs every five years. At the beginning of 2023 Evoenergy submitted its latest electricity five-year plan.<sup>52</sup>

AER published its determination for the 2024–29 plan on 30 April 2024<sup>53</sup>. The determination allows Evoenergy to recover total revenue of \$1.1 billion over the determination period. \$516 million of this is forecast capital expenditure. The AER's determination notes that it seeks to balance affordability with the expenditure necessary to support the energy transformation and address important emerging issues such as integration of consumer energy resources. Government will continue to work with Evoenergy and the AER to ensure the electricity network is ready to support the increased demand from electrification.

## Existing actions to support a fit-for-purpose network

- ✓ The Big Canberra Battery program is delivering energy storage across the ACT including the 250MW Battery at Williamsdale by 2025.
- ✓ Additional licensing requirements for CER are helping protect consumers and ensuring trades people have the required training and expertise to safely and efficiently install CER.
- ✓ [The Energy Innovation Fund](#) is supporting energy innovation and research in the ACT.

<sup>52</sup> Electricity five-year plan, Evoenergy, January 2023, <<https://www.evoenergy.com.au/About-us/Electricity-network/Electricity-network-plan>>

<sup>53</sup> Essential Energy - Determination 2024-29, Australian Energy Regulator, September 2023 <<https://www.aer.gov.au/industry/registers/determinations/essential-energy-determination-2024-29>>



## Next steps

The ACT Government will work to ensure consumers are empowered to make informed decisions about their energy plans and use through the **rollout of smart metering**.

The ACT Government will **review local energy regulatory and technical requirements to ensure they support the transition**. Appropriate regulatory requirements are necessary to facilitate a growing electricity grid and integration of CER. It is important the regulatory landscape evolves to accommodate changing markets and technology and does not become a barrier to the transition.

The ACT Government will **continue to work with the Australian Government and other jurisdictions on a national Consumer Energy Resources Roadmap**. The roadmap aims to unlock consumer benefits for locally generated and stored power, deliver national reforms for efficient and effective CER integration, deliver on emissions and renewable energy commitments, and drive positive outcomes for all consumers, regardless of income, and the system as a whole.

Following on from the success of the Big Canberra Battery program, the ACT Government will **investigate its future role in battery storage** and whether further projects could be supported. This will include analysis of the feasibility of more utility-scale batteries in the ACT.

## Managing the gas network

### Making a plan to decommission the gas network

Gas demand in the ACT is currently between 7.4–7.7 petajoules (PJ) per annum, with the majority of that demand (60%) coming from residential gas users for heating homes, hot water and cooking. The ACT's commercial and industrial sectors each consume about 20% of the annual gas demand.<sup>54</sup>

This annual gas demand comes from about 138,000 individual gas connections.<sup>55</sup> The majority (97%) of these connections are for homes.<sup>56</sup> The ACT Government has implemented a regulation that prevents new gas connections in most areas. This means that Canberra's gas network will stop growing. In addition, the average amount of gas used by each residential connection is declining and has reduced by more than 25% in the last 10 years.

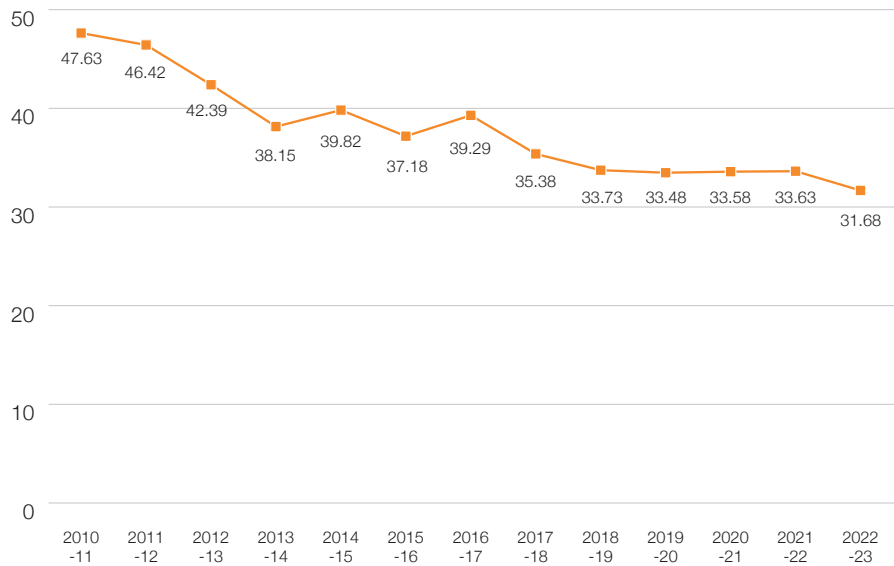
<sup>54</sup> Evoenergy Gas pipeline information - RIN responses, Australian Energy Regulator, November 2023, <<https://www.aer.gov.au/publications/reports/performance/evoenergy-gas-pipeline-information-rin-responses>>

<sup>55</sup> EvoEnergy, 2024

<sup>56</sup> Retail Performance Reporting, Australian Energy Regulator, March 2024, <<https://www.aer.gov.au/industry/retail/performance-reporting>>

### Annual residential consumption per connection (GJ)

Source: Evoenergy RIN



However, there is more work to be done with commercial and industrial users as their gas use has increased. As noted earlier, these users have more complex uses and needs for transition.

Like the electricity distribution network, the management and apportionment of costs for running gas networks is governed by national energy regulatory frameworks and the AER. The AER regulates natural gas pipelines by setting the maximum amount of revenue distributors can earn from consumers.

Every five years Evoenergy, as the ACT's gas distributor, submits proposals to the AER on its required revenues and how these costs are passed on to consumers. Evoenergy will need to submit its next [gas network five-year plan](#) in time for 2026.<sup>57</sup>

One of the challenges will be carefully managing the capital investment and depreciation of regulated gas assets owned and operated by Evoenergy through these five-year determinations. These assets have an expected economic life and the AER allows Evoenergy to recover its investment from consumers over that period, usually between 50 to 80 years. This approach is designed to spread the cost of the investment over a long period to manage the cost for consumers. However, as the ACT begins to phase out the use of fossil fuel gas, the economic life of these assets will decrease and a plan for decommissioning them will be required.

We heard from the community that the current cost of leaving the gas network and abolishing a gas network connection is a barrier to completing a transition.<sup>58</sup> The AER noted service abolishment as a key consideration for its 2023 gas network determinations in Victoria. The apportionment of cost for abolishment of gas connection services, while ensuring a safe, efficient and equitable transition, will be key considerations of the AER's 2026 gas network determination.

The AER identified that without regulatory certainty and appropriate management by regulators, there is a risk that the impact of declining gas demand will lead to a significant increase in prices to access gas for consumers who remain on the fossil fuel gas network. The ACT Government will work closely with the AER to consider options for how best to apportion future costs.

<sup>57</sup> Electricity five-year plan, Evoenergy, January 2023, <<https://www.evoenergy.com.au/about-us/about-our-network/electricity-five-year-plan>>

<sup>58</sup> Integrated Energy Plan, Public Survey Report, The Social Desk, March 2024, <[https://hdp-au-prod-app-act-yoursay-files.s3.ap-southeast-2.amazonaws.com/8217/1073/8662/Integrated\\_Energy\\_Plan\\_Public\\_Survey\\_Report.pdf](https://hdp-au-prod-app-act-yoursay-files.s3.ap-southeast-2.amazonaws.com/8217/1073/8662/Integrated_Energy_Plan_Public_Survey_Report.pdf)>

Early and prudent planning, in collaboration with Evoenergy, is required for connection abolishment and the gradual decommissioning of the gas network. Evoenergy will be required to work closely with stakeholders, regulators and government to develop strategies for the early identification and management of areas of the network at risk of becoming economically unviable.

### LPG uptake

In the ACT, liquid petroleum gas (LPG) is most often used in small, pressurised cylinders for outdoor equipment such as barbeques, and in areas where gas network connections are not available. LPG is a fossil fuel and is typically used for heating, cooking and as generator fuel. The overall carbon footprint of LPG is generally considered to be higher than natural gas (methane) as it needs to be transported by truck or ship and must be stored in pressurised tanks.

Replacing a piped gas connection with bottled LPG will not help with emissions reductions. The ACT Government will continue to monitor the uptake and use of LPG, consider the need for further policy or regulatory intervention, and continue to engage with the Australian Government and other state and territory governments on LPG.

### Existing actions to manage the gas network

- ✓ Introduced a regulation to prevent new gas network connections in the ACT in December 2023 (the restriction does not apply to existing connections).
- ✓ Developed a governance framework to allow exemptions to the regulation in limited circumstances for connections on commercial and community facility land use zones.

### New action

#### **Develop policy and regulatory frameworks to support safe, efficient and equitable decommissioning of the gas network**

Given the ACT Government has signalled the eventual shut down of the gas network, it is important to investigate whether the current regulatory process is fit-for-purpose and is achieving a balance of safe, efficient, cost effective and equitable outcomes. A gas meter abolishment policy will be developed in partnership with the AER, Evoenergy and the Utilities Technical Regulator ahead of the AER's consideration of Evoenergy's 2026 Gas Network Access Arrangement. The existing technical and legislative frameworks will be reviewed in partnership with government regulators. This work will feed into broader policy considerations relating to a future gas network decommissioning policy and associated technical codes.

# Government Leadership

The ACT Government will lead by example in the energy transition. It is responsible for a large portfolio of public assets including public schools, hospitals, public housing, pools, offices and other public buildings, which comprise around 7% of the total ACT gas consumption.

The government has already achieved early successes, including the [Zero-Emission Transition Plan for Transport Canberra](#), endorsed in 2020, outlines the strategic pathway for the ACT to transition to a zero emission public transport system by 2040. This includes replacing legacy diesel and Compressed Natural Gas (CNG) buses from the Territory's public transport network with zero emission buses by 2040 or earlier. In addition, 100% of the electricity needed to power the light rail vehicles and the maintenance and administration buildings is from renewable electricity.<sup>59</sup> Light rail to Woden will also be powered by 100% renewable electricity.<sup>60</sup>

## Existing action towards net zero government

- ✓ Built the first all-electric office building in Dickson.
- ✓ Built three all-electric government schools.
- ✓ Designed the Canberra Hospital expansion to be all electric, a first for a major hospital in a southern hemisphere cold climate.
- ✓ Procured an initial 106 battery electric buses (BEBs), to be delivered between 2024 and 2026.
- ✓ Equipped the new Woden Depot to charge up to 100 BEBs.
- ✓ Undertook a feasibility study into locations for future northside depots.

## New actions

### Electrify all ACT Government owned and operated buildings where possible by 2040

This will be achieved through an ambitious new Electrification of Government Gas Assets (EoGGA) Program. The EoGGA will coordinate gas asset replacement and associated electricity network upgrades at ACT Government owned and operated facilities as well as support community electrification readiness and Evoenergy network planning across the Territory. By partnering with industry the ACT Government will support further development of the capability and capacity of the sector to deliver electrification works in the ACT. Case studies and lessons learnt from the delivery of EoGGA will be shared and showcased between industry, government and the community to provide examples and possible pathways to electrification that could be applied across different types of facilities and scenarios.

59 Sustainability, Canberra Metro, 2024 <<https://www.canberra-metro.com.au/about/sustainability>>

60 Light Rail Stage 2A - City to Commonwealth Park, ACT Government, <<https://www.canberra-metro.com.au/stage-2a/>>

## Transition ACT government fleet vehicles to zero emission vehicles and install chargers at ACT Government sites

The ACT Government fleet has had the greatest adoption of ZEVs among Australian state and territory governments. Since July 2020, all newly leased passenger vehicles must be zero emissions where fit-for-purpose. Currently, 34% of the ACT Government passenger fleet are ZEVs and a further 30% are hybrid vehicles. Around 400 EV chargers are deployed to support ACT Government vehicles.

In addition, the ACT Government will **pursue alternative zero emissions options, such as green gas, for ACT Government facilities that cannot be electrified.** The **Zero-Emission Transport Plan for Transport Canberra will be updated.** The update will include lessons learned so far and consider the latest in thinking and industry best practice for timely transition of the bus fleet to zero emissions. The update will also include planning for the infrastructure needed to support the transition and include growth of the bus fleet to meet Canberra's public transport needs.

## Indicators

Regular monitoring and evaluation will be an important part of tracking our progress to net zero.

The below indicators will help us track the success of The Integrated Energy Plan and measure the transition away from fossil fuel gas. They are in addition to existing targets to drive decarbonisation, including emissions reduction and zero emissions vehicle uptake goals.

Progress will be reported regularly to the community through the Minister's Annual Report under the [Climate Change and Greenhouse Gas Reduction Act 2010](#) and on the [Everyday Climate Choices website](#).



# Energy transition indicators

| Area                                    | Metric   | Description   |
|---|--|---|
| <b>Households</b>                       | Number of households participating in government programs.                                 | The number of households receiving financial assistance or support such as attending workshops or using online tools.   |
| <b>Priority Households</b>              | Number of priority households participating in government programs.                        | The number of priority households receiving financial assistance or support such as attending workshops or using online tools.  |
|   | Number of public housing properties electrified and percentage of total stock electrified. | The ACT Government has committed to electrify all public housing by 2030. These figures will indicate how the program is tracking.  |
| <b>Businesses</b>                       | Number of businesses participating in government programs.                                 | The number of businesses receiving financial assistance or support such as attending workshops or receiving advice.   |
| <b>Zero emissions vehicles</b>          | Number and proportion of Zero Emission Vehicles registered in the ACT.                     | The ACT's Zero Emissions Vehicles Strategy 2022-30 (ZEV Strategy) supports the uptake of ZEVs to 80-90% of new light vehicle sales by 2030.   |
| <b>Renewable electricity generation</b> | Total number, capacity and generation of solar PV.   | The total number of solar PV systems, their capacity and generation in the ACT.   |
| <b>Electricity network reliability</b>  | Customer Average Interruption Duration Index (CAIDI).                                      | A measure of how long, on average, a power outage lasts before service is restored after each outage. Evoenergy publishes this by 31 December every year.                                     |
|   | Interruption Frequency (SAIFI) Number.   | The frequency with which supply to customers may be interrupted, expressed as the Supply Average Interruption Frequency Index (SAIFI).  |
|   | System Average Interruption Duration Index (SAIDI) minutes per customer.                   | A measure of the average time a customer will experience poweroutages within a year, including both planned and unplanned outages.<br><br>Evoenergy publishes this by 31 December every year. |
| <b>Gas</b>                              | Annual gas use.  | Total annual gas (demand) for the ACT.  |
|   | Annual gas use per connection class.   | Annual gas use will be split by building connection class.  |
| <b>ACT Government gas assets</b>        | Number of sites supported through the EoGGA program.                                       | The EoGGA program will coordinate gas asset replacement and electricity network upgrade works at ACT Government sites. The number of site upgrades will indicate how the program is tracking. |
| <b>Fossil fuel gas emissions</b>        | Annual gas emissions.  | The ACT Government will monitor gas emissions from the burning of fossil fuels gases. This will measure the percentage of gas emissions of total emissions.                                   |
| <b>Transport emissions</b>              | Annual petrol, diesel and LNG emissions.   | This will measure petrol, diesel and LNG emissions as a percentage of total emissions.  |







## More information

With small steps and smart choices, we can all make a big difference for our environment.

To find out more about the ACT's pathway to electrification and what supports and incentives are available, visit the [Everyday Climate Choices](#) website.