dsquared

Towards zero emissions

Detailed Summary Report

Adelaide Hills
COUNCIL

Document Control

Issue	Date	Change	Checked	Approved
01	14/11/24	First issue	DD	JP
02	25/11/24	Update based on feedback	DD	JP
03	29/11/24	Final issue	DD	JP
04	02/12/24	Final for consultation	DD	JP
05	07/02/25	Minor updates	DD	JP

This plan has been prepared by dsquared Consulting on behalf of Adelaide Hills Council.

About dsquared

Our Vision is to think beyond the square.

Our Mission is to create spaces, places, and communities that are positive for both the environment and for people. We will do this by providing our clients with sustainable and bespoke solutions that are innovative, challenge perceived ideas, and push the boundaries of achievement and excellence.

We confirm that all work has been undertaken in accordance with our ISO 9001 accredited quality management system.

Acknowledgement of country

The dsquared team wish to acknowledge the Traditional Custodians of all country throughout Australia, and their cultural, spiritual, physical, and emotional connection with their land, waters, and community. We pay our respects to all Elders past, present, and emerging.

D Squared Consulting Pty Ltd
Trading as dsquared
ACN 159 612 067
ABN 38 159 612 067

Level 1, 199A Rundle Street
Adelaide SA 5000
T: 0488 220 022
E: jacob@dsquaredconsulting.com.au
W: www.dsquaredconsulting.com.au

Project Number: 3030

Contents

Document Control 2
Contents 3
Scope 4
What is the problem 4
Why take action 4
What are the standards 5
What is net zero emissions 5
How do we get to net zero 5
Council achievements 6
Emissions inventory 7
Corporate emissions inventory 7
Community emissions inventory 8
What we heard from the community 9
Emissions reduction opportunities 10
Key categories 10
Road & construction emissions 11
Fleet fuel & community transport 12
Smart energy 14
Resources & supply chain 16
Collaborate & advocate 17
Additional opportunities 17
Implementation 18
Approach 18
Emissions reduction initiatives 19
Net zero pathway 22
Corporate emissions reduction pathway 22
Carbon offsets & sequestration 23
Summary 24
Appendix A Standards & assumptions 25
Appendix B Calculating emissions 28
Appendix C Focus Group Consultation Summary 29

Introduction

This Detailed Summary Report is a supporting document for Adelaide Hills Council's (Council's) Carbon Management Plan and provides an approach to reducing greenhouse gas (GHG) emissions across both corporate and community emissions. The Plan has been developed to build upon Council's Corporate Carbon Management Plan developed in 2019 to provide an updated pathway for Council's ongoing emissions reduction efforts.

Adelaide Hills Council has been demonstrating leadership in sustainability and managing emissions for many years including developing an emissions inventory, implementing emissions reduction initiatives, and supporting the community to reduce environmental impacts as part of grants and programs. This Plan has been developed to continue this journey and support Council in continuing to demonstrate leadership in the local government sector.

Scope

The scope of this Plan is Adelaide Hills Council's operations which are in direct control of the Council, emissions from its supply chain which it can minimise and influence, as well as community emissions where Council can support and facilitate community action to reduce emissions. Where the Council can implement initiatives and programs that support the community to reduce emissions, these opportunities have been identified to ensure Council is considering a holistic approach to transitioning to net zero emissions.

What is the problem

GHG emissions have increased exponentially worldwide since the Industrial Revolution and are a major concern due to their ability to trap more heat in earth's atmosphere, resulting in changes to the climate which can have a negative impact on life. Some of the impacts include the following:

Greenhouse gas (GHG) emissions have increased exponentially and have been scientifically proven to trap more heat in the atmosphere, impacting the climate and resulting in increasing average temperatures, more variable and extreme weather, and rising sea levels.

Extracting and burning fossils fuels significantly impacts natural environments, air quality, water quality, and flora and fauna. For example, there are over 6,500 coal mines worldwide covering approx. 100,000 square kilometres with 8.9 billion tonnes of coal mined each year.

Air quality impacts of burning fossils fuels have been shown to negatively impact health including increasing the likelihood of asthma in children, respiratory complications, and increased likelihood of cancer and diabetes, which increases pressure on healthcare systems that are already under strain.

Fossil fuels are non-renewable, finite, becoming increasing harder to mine and extract, and are susceptible to global supply chains and prices. The price of coal in Australia has doubled since 2020 largely due international markets and the war in Ukraine, increasing electricity prices for Australian's.

Why take action

Although there are a number of negative impacts of increasing GHG emissions, Australia and western countries have benefitted substantially from the technological advancements from the Industrial Revolution, benefits of mining and export markets from fossil fuels, and societal improvements as a result of using fossil fuels to power Australia. However, Australia is having a disproportionate impact on worldwide GHG emissions and have a responsibility to transition to net zero emissions and support worldwide action on climate change. This includes demonstrating what can be done to transition from fossil fuels in a planned way, and how low emission technologies can reduce emissions, costs, and environmental and social impacts.

The below summarises some of the challenges and opportunities for Australia:

Australia's per capita emissions are one of the highest in the world

Australia is the second largest exporter of fossil fuels in the world

Reducing emissions can save costs and improve environmental outcomes

Over 17 billion tonnes of CO_2-e has been emitted from fossil fuel use by Australia

Lowering emissions improves air quality and reduces health impacts

Renewable energy, coupled with storage, is one of the cheapest forms of new energy

Fossil fuels are increasing in cost and are susceptible to global markets and disruptions

Reducing the use of imported fossil fuels improves energy security

What are the standards

To ensure this Plan follows credible information and processes this plan has been developed in line with the GHG Protocol Corporate Standard, Climate Active Carbon Neutral Organisation Standard, and Science Based Targets Manuals and reference documents. The GHG Protocol and Climate Active are the main standards used in this Plan and are summarised below.

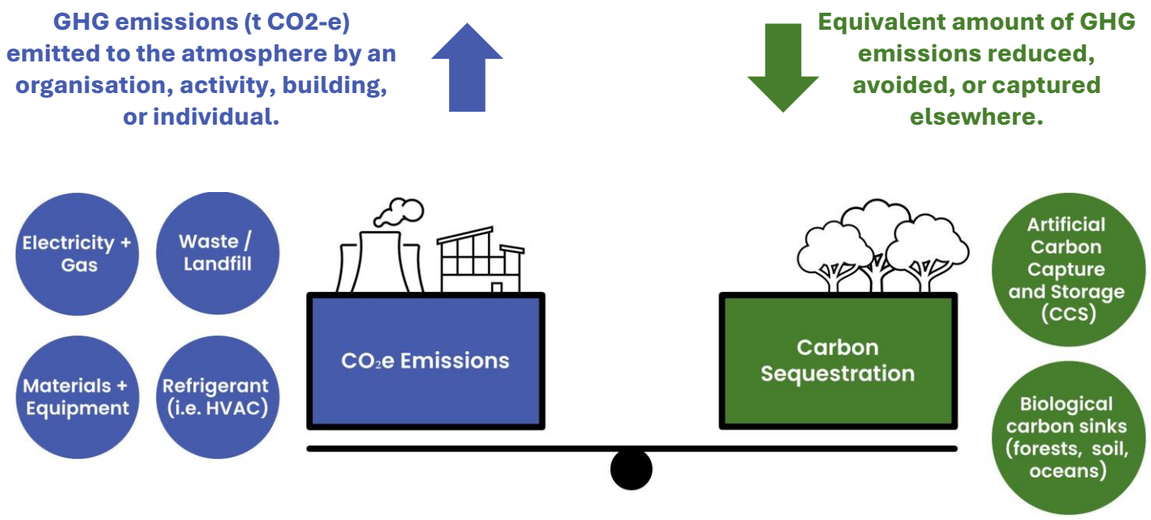
The **GHG Protocol** is an internationally accepted set of standards and resources for GHG emissions accounting and reporting and is used by both public and private entities. The GHG Protocol is referenced by many GHG emissions tools and certifications including Climate Active and the Science Based Targets initiative (SBTi). Although the GHG Protocol includes setting emissions reduction targets, the SBTi standards provide further guidance on setting a target in line with the Paris Agreement.

Climate Active Carbon Neutral Organisation Standards and Technical Guidance Manuals have been used throughout the development of this Plan and associated emission calculations, including setting an emissions boundary and baseline year, to ensure that in the event Council pursues Carbon Neutral certification, the emissions inventory and initiatives will meet the minimum requirements.

What is net zero emissions

This Plan has been developed to set a pathway to reduce emissions in line with the following United Nations net zero definition which acknowledges that reducing emissions is required across society. The aim of the Plan is to reduce emissions as far as possible which will also reduce the amount of additional carbon sequestration required to balance GHG emissions.

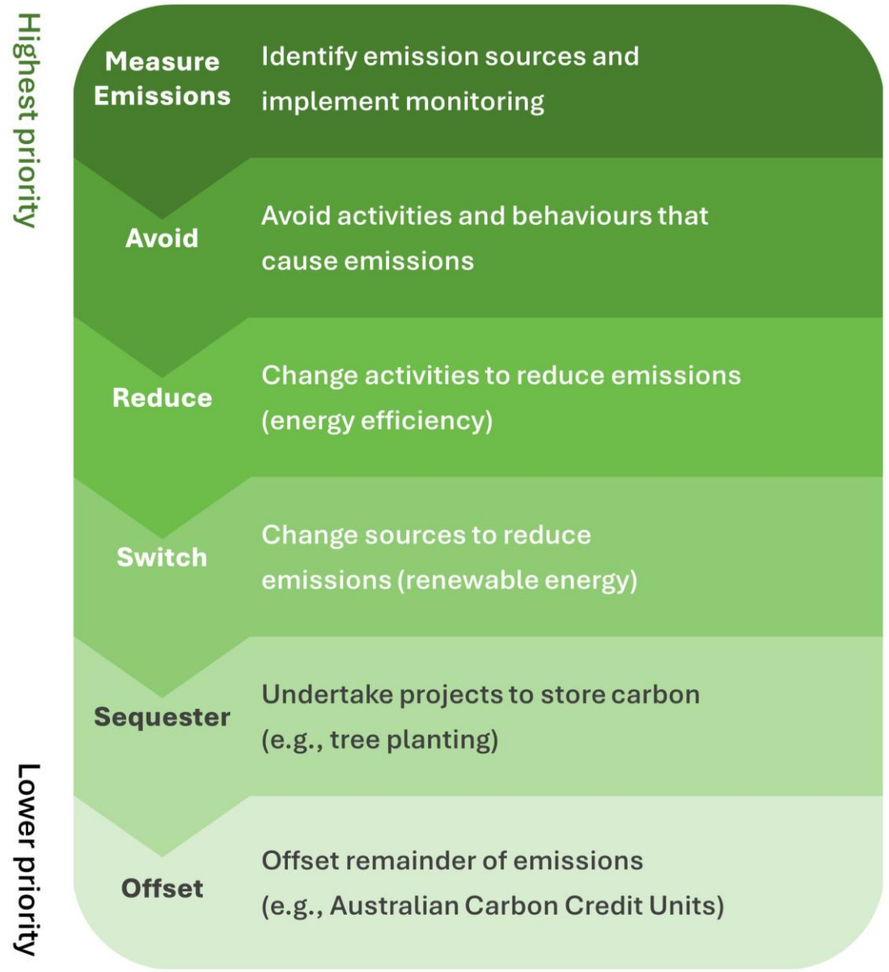
"net zero means cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions re-absorbed from the atmosphere"



This Plan has identified initiatives that will reduce emissions as close to zero as possible and has set reduction priorities and a 2035 interim target to work towards. As Australia and the broader economy decarbonises, it is recommended that Council reviews its progression against the targets identified in this Plan and considers opportunities to reduce emissions to zero prior to 2050 in alignment with the Paris Agreement.

How do we get to net zero

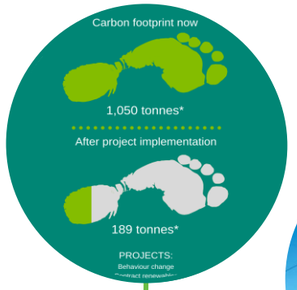
Net zero emissions is a global and sector wide challenge and opportunity which requires all parts of society to work together to reduce emissions. Australia is a signatory of the Paris Agreement and has legislated a 43% emissions reduction target by 2030 compared to 2005 levels to work towards this aim. This will require all levels of government, businesses and the community to work together to reduce emissions to mitigate the impacts of climate change while also working to reduce the environmental, social and health impacts of continued fossil fuel use. To assist Council and the community in understanding emissions, prioritising emissions reduction initiatives, and reduce the impacts of GHG emissions, the following hierarchy has been used to develop this Plan.



Council achievements

Council previously developed a corporate emissions inventory in 2019 which totalled 1,050 tCO2-e and included electricity use in buildings and facilities, streetlighting electricity, fleet fuel use, and water. Since the 2019 inventory was developed, Council has implemented the following projects to reduce consumption, costs and emissions as part of Council operations and services:

Corporate Carbon Management Plan



900 streetlights changed to LEDs, and ongoing LED replacement for remaining 400

Fleet optimisation and 15 hybrid fleet vehicles

EV Charging installed at Heathfield Deport & Stirling Office + Garrod and Woodside

New HVAC systems at Woodside, Gumeracha, Coventry Libraries

Preparation of Sustainable Building Guidelines

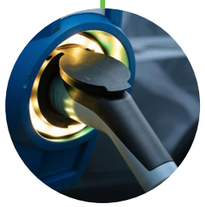
Kerbside waste collection trial to increase FOGO and landfill diversion

LED lighting upgrades across Council facilities

Solar PV installations at Stirling, Woodside, Norton Summit, Gumeracha Depot and Birdwood CWMS

Fleet Management Plan +

Data Management & Reporting Plan



EV Feasibility Report

Stirling, Woodside Offices & Heathfield Deport

14 electric vehicles delivered (Tesla's, Hyundai Kona, and Kia Niro's)

Sustainability Audits at 37 facilities

Irrigation system upgrades to reduce water consumption and emissions

Sustainable procurement review and alignment with ISO 20400

Emissions inventory

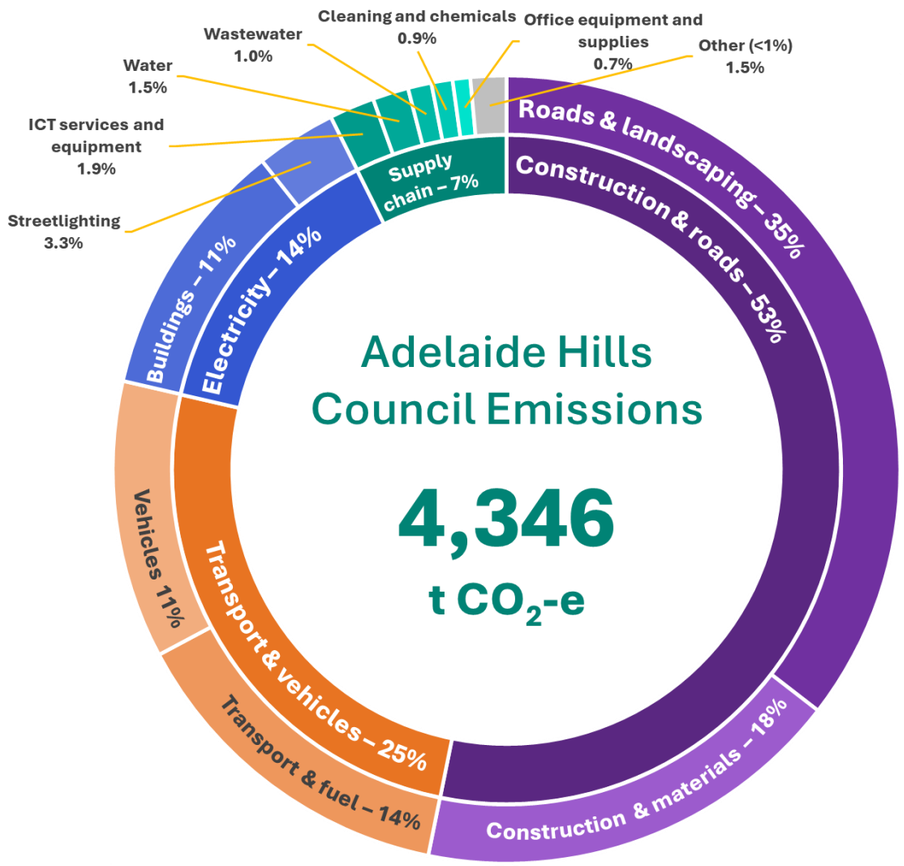
Corporate emissions inventory

To assist in understanding Council's latest GHG emissions and opportunities to reduce emissions, an updated emissions inventory has been developed based on 2022/23 (FY23) data. The FY23 emissions inventory has been expanded to include additional emissions sources to align with the GHG Protocol and Climate Active Carbon Neutral standards, as well as the Best Practice Guide developed as part of the Local Government Association of SA Net Zero Accelerate Program.

There are a number of sources of GHG emissions including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). To enable a comparison, emissions have been calculated based on a standardised unit of measure called carbon dioxide equivalent (CO_2-e) which have been used to calculate Council's emissions inventory based on activity data. CO_2-e converts the relevant GHG emissions into a standardised unit based on their global warming potential (GWP) e.g., the potential for the gases to trap heat within the atmosphere.

The emissions inventory includes Scope 1, 2, and 3 emissions categories in Council's direct corporate control or where Council can influence emissions and totals 4,346 tCO2-e (refer below).

2022/23 emissions inventory



The Scope 1, 2, and 3 definitions and totals are as follows, with Scope 3 supply chain emissions the largest source of emissions. This is typical for local government due to infrastructure such as roads, bridges and buildings being delivered and maintained by councils.

Scope 1
Direct GHG emissions emitted by Council (fossil fuels burnt / gasses released)
354 tCO_2-e

Scope 2
Indirect GHG emissions from electricity consumption
343 tCO_2-e

Scope 3
Indirect GHG emissions from Council's supply / value chain
3,648 tCO_2-e

Top emissions categories

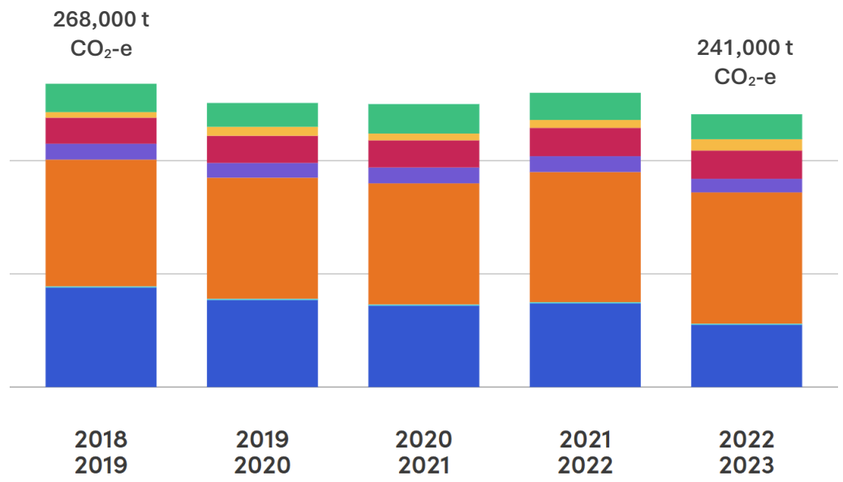
The top Council emissions sources are categorised as follows:

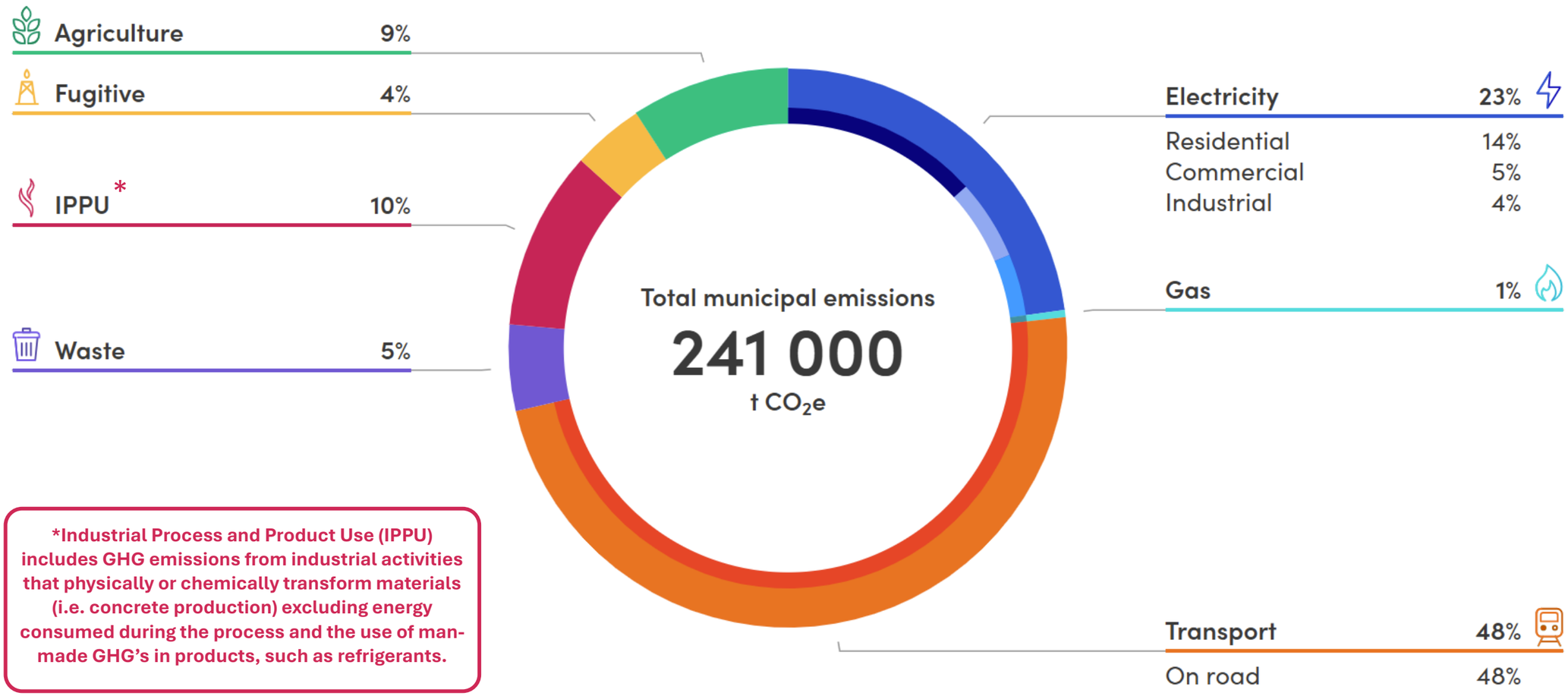
Capital works / roads	Transport & vehicles	Electricity	Supply chain
Construction services and materials for roads, bridges, buildings and facilities maintenance.	Fuel used in fleet vehicles, staff commute & emissions from purchasing vehicles and machinery.	Electricity and natural gas for buildings, facilities, and streetlights.	Supply chain emissions associated with the purchase of goods and services for Council's operations.

Community emissions inventory

To ensure Council is prioritising emissions reduction programs and initiatives that will have the largest impact across the Adelaide Hills, community emissions are also a priority. The Snapshot Climate Tool has been used to understand the communities GHG emissions which are estimated to total 241,000 t CO2-e in FY23. The below graph breaks down the main emissions sources with transport and electricity the largest emissions sources. This differs to many metropolitan councils which typically have a higher share of electricity and less transport emissions and is likely due to the larger area served by Council and longer daily commutes.

Community emissions have been reducing over the last 5 years as renewable energy has increased in the South Australian electricity grid, with emissions reducing by 27,000 t CO_2-e since 2018/19 when community emissions totalled 268,000 t CO_2-e. Emissions are expected to continue reducing as renewable energy generation continues to increase in South Australia. However, emissions sources such as transport have not reduced as quickly as expected as larger, less efficient vehicles such as SUVs and utes have increased in popularity.





*Industrial Process and Product Use (IPPU) includes GHG emissions from industrial activities that physically or chemically transform materials (i.e. concrete production) excluding energy consumed during the process and the use of man-made GHG's in products, such as refrigerants.

What we heard from the community

To ensure this Plan considered feedback from the community, 2 community forums were held with an expression of interest (EOI) run to ensure that a diverse community group provided input. Based on the community sessions, the following key priorities were identified (refer Appendix C for further information):

What we heard

Cost Neutral

Actions by Council for carbon management initiatives should be cost neutral. Rate payer funds should generally not be used for grants and incentives schemes, except for financial support programs for local community groups, sporting clubs and tenants that lease Council facilities, particularly for energy efficiency upgrades or renewable energy. Small grants to assist the community take action were also discussed e.g., e-bikes, composting, reusable sanitary items.

Deals for the Hills

Coordinate options for community energy schemes such as bulk buy, Virtual Power Plants (VPPs), energy banks etc for hills residents.

Facilitate bulk buy for items that support sustainable living, such as E-Bikes and compost systems.

Energy

Council's role is to advocate to State and Federal Governments for improved building standards and planning codes, as well as incentives schemes for energy efficiency upgrades, all-electric transitions, Solar PV and battery installations. Promote available schemes and provide support and education to facilitate uptake, including application and grant writing.

Public and Active Transport

Emissions from transport were recognized as a key priority as they represented the largest share of community emissions.

Focus on improving local public and active transport connections between townships. Consider community bus routes or on-demand bus services (i.e. KeoRide) with a focus on servicing schools, sporting clubs, retail and healthcare hubs and connection to major public transport interchanges with frequent pickups.

Advocate to State Government for improved public and active transport infrastructure

Multifunction Spaces

Review public space management plans and use classifications to allow community to use underutilised areas for community gardens, farmers markets, salvage swapping, community led sessions etc.

City Commute

Reduce commuting to the city via provision of co-working spaces and advocating for improved internet access and NBN upgrades in the region, supporting WFH. Encourage carpooling.

Shared pathways

Implement shared bike/pathways between townships as part of existing pathway infrastructure upgrades program, to encourage active transport modes. This could also be developed as part of a local food pathway tourism trail.

Coordination

Coordinate outcomes of this project with other council strategies and plans (i.e. Bike Infrastructure Needs Analysis)

Electric Vehicles

Support the expansion of local public EV charging such as the RAA EV charging network and considering other opportunities to facilitate chargers in suitable locations.

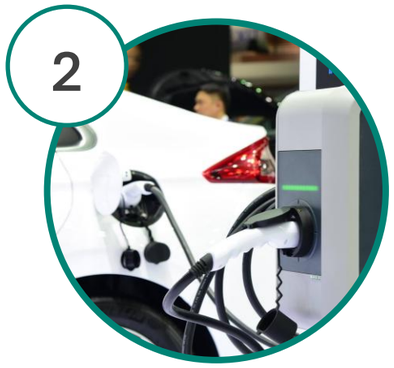
Emissions reduction opportunities

Key categories

Based on the FY23 emissions inventory for both corporate Council operations and community feedback, the following emissions reduction priorities for this Plan have been identified:

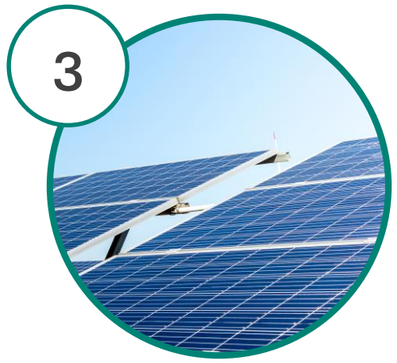
Road & construction emissions

Reducing the embodied emissions of new construction and road projects by incorporating low emissions materials, increased recycled content and improving construction practices and efficiencies. Targeting the highest emissions sources including roads, new buildings and major refurbishments.



Fleet fuel & transport

Transitioning to higher fuel efficiency vehicles such as hybrid electric in the short term, and fully electric vehicles in the medium term, while supporting increased accessibility and availability of electric vehicle charging. Support the community on using sustainable and active forms of transport.



Smart energy

Continue to improve the energy efficiency of Council facilities including supporting community groups and sporting clubs, optimise the installation of rooftop solar and battery storage, and facilitate innovative approaches to renewables and energy management. Support the community on accessing trusted, competitive and effective services to reduce emissions and costs.

Waste, resources & supply chain

Implement sustainable procurement processes to transition to lower emissions and environmentally sustainable suppliers, targeting the largest suppliers and supply chain emissions sources. Support the local economy and businesses to buy local.

Collaborate & advocate

Advocate on behalf of community in support of emissions reduction actions and collaborate with other councils to reduce duplication and share resources. Share learnings and collaborate across government to drive outcomes.

Road & construction emissions

It is recommended that the Council continue to implement and investigate opportunities to reduce Scope 3 emissions for capital works projects and embodied emissions. Based on previous assessments of council projects and inventories, the largest emissions sources are expected to be:

- Asphalt associated with road replacement programs.
- Concrete for curbs and pedestrian pathways and pavements.
- Concrete and steel in capital works and maintenance projects.

It is recommended that the Council consider:

- Optimising designs to reduce the use of high embodied emissions materials.
- Mandating a minimum embodied emissions reduction as part of major capital works projects in line with Green Star requirements. This will require a Life Cycle Assessment (LCA) to be undertaken which will increase consultancy costs but will enable the Council to identify and quantify embodied emission reductions achieved in projects and inform future emission profiles which may include emissions associated with capital works projects.
- Incorporating an embodied emissions / recycled content assessment for all infrastructure projects (e.g. road, pathways, outdoor recreation areas). This could be requested as a value add or preference as part of tender documentation where the respondents are responsible for identifying embodied emission reduction opportunities from local suppliers.
- Expanding the use of recycled and low emission materials as part of infrastructure works and tracking progression over time to reduce embodied emissions and demonstrate leadership to the community.
- Implementing Council's sustainable design guidelines to focus on embodied emissions as well as other emissions reduction actions identified in this Plan for all new capital works and major refurbishments.
- Reducing construction and demolition waste to landfill as part of road and capital works projects.
- Implementing a staged approach, targeting the largest embodied emissions sources and key projects that incorporate large amounts of asphalt and concrete.

However, reducing embodied emissions often has a higher upfront cost and does not reduce operating costs, and therefore Council should focus on local suppliers and opportunities that provide additional co-benefits. This includes supporting circular economy options to buy-back or reuse materials collected as part of kerbside recycling services.

Embodied emissions opportunities

The following embodied emissions opportunities should be considered with a focus on local South Australian suppliers and manufacturers. However, it is expected the majority of options will not be available locally and may increase upfront costs and therefore Council should prioritise projects with the largest impact.

Option	Summary
Low emission / carbon neutral concrete	**Low emission concrete**: Target a 30% emissions reduction through improved process efficiencies + increased recycled content such as slag and fly ash. **Carbon neutral concrete**: Low emissions + carbon neutral certified.
Cross-laminated timber (CLT)	Replacing or reducing the use of steel with timber, Cross-laminated timber (CLT), and Glue-laminated timber (GLT) which has a lower embodied emissions and can be sourced from a renewable material supply.
Green / recycled steel	Investigating steel supplies with a higher percentage of recycled content or green steel which uses lower emission production processes such as green hydrogen.
Reconophalt™ **Reconophalt - Recycled asphalt content**	Continue to use recycled content for asphalt such as Reconophalt which reduces embodied emissions by 20-30%.
RESOURCECO **Recycled Crushed Rock**	Consider options for recycled crush and rock for use as part of infrastructure works.
EPD® **Environmental certifications**	Preferencing products and materials that have Environmental Product Declarations (EPDs) and environmental certifications (GECA, Green Tag, etc.) to prioritise lower impact materials and improve data capture.

Fleet fuel & community transport

Transport emissions relating to fleet fuel consumption, the purchase of new vehicles, and staff commute are a significant source of emissions. Due to fuel consumption being a Scope 1 direct emissions source (fossil fuel combustion and direct emissions to the atmosphere), it is a priority that the Council implement emissions reduction initiatives to support a low and zero emissions fleet transition, as well as more sustainable commutes for the community.

The following provides a summary of the emissions reduction outcomes of transitioning to low and zero emission forms of transport per kilometre travelled. For public transport the figure is based on per person per kilometre travelled based on average trip data and fuel use for Adelaide Metro. In line with Council's transport strategies, it is recommended that Council continue to support public transport infrastructure to support both staff and the community in reducing emission.

Average hybrid

= 10-30% emission reduction

Electric vehicle

= 50-70% emission reduction

100% when charged from solar PV / 100% renewable electricity supply

Bus

= 40-50% emission reduction

Larger reduction if more people catch buses

Trial underway for hybrid buses in Adelaide + fully electric + hydrogen powered

Train

= 70% emission reduction

Larger reduction if more people catch trains and on electrified lines.

Walk / cycle

= 100% emission reduction

+ zero fuel costs, low maintenance and health and wellbeing benefits

E-bike = 3g CO2-e / km (99% reduction)

Council's current light and passenger fleet has transitioned to hybrid vehicles which is expected to have reduced emissions by 10-20% compared to comparable internal combustion vehicle. Council has begun the next stage of procuring low and zero emission vehicles, with 14 passenger EVs delivered for operations.

It is projected that EVs may reach price parity with internal combustion vehicles between 2027 to 2030 as EVs production and material costs reduce with greater uptake and more efficient technologies. As a result, it is recommended Council consider a staged approach to procuring additional EVs which increases in uptake as EV prices reduce. A performance review of existing EVs should also be undertaken to confirm how the EVs have performed from an operations, costs, and emissions perspective.

Low emissions vehicle transition

It is recommended Council consider:

- **Fleet optimisation:** Continuing optimising fleet utilisation, reducing the number of fleet vehicles if possible, and replacing with smaller vehicles if suitable for operations. This will reduce upfront costs, emissions, and operating costs.
- **Fleet policy:** Developing a fleet replacement policy which requires the lowest emissions, operationally suitable vehicle to be purchased at replacement e.g., vehicle emissions should be assessed as part of fleet replacement planning and procurement practices.
- **EV transition:**
  - Continuing to transition existing hybrid light and passenger vehicles to EVs by 2030 based on the current replacement cycle. Vehicles with higher annual kilometres travelled (>10,000km) should be prioritised.
  - Transition medium and commercial vehicles such as utes to hybrid and EVs over the next 3-5 years as vehicle availability increases and costs reduce. Ute options that may be suited for Council expected to be available in 2025 include the following. However, upfront costs, insurance, repair costs and resale value should be considered and monitored as it is expected prices will reduce over the next 2-3 years as more options enter the market.

BYD Shark PHEV
$58k (before on roads)

Ford Ranger PHEV
$75k (before on roads)

  - Increasing budgets to account for the higher upfront cost (30-40% over the next 2-3 years) as well as considering increased repair and insurance costs. Costs for EVs are expected to continue to reduce and Council should monitor the EV market with price parity for light passenger vehicles expected in 2-3 years.
  - Reviewing EV charging infrastructure requirements based on the initial EV rollout. It is expected EV ranges will reach >700km by 2027 which will reduce the need for large numbers of charges.
  - Developing a procedure / approach for EV charging at home for staff that use fleet vehicles for daily commute, as well as implementing processes for public charging.
  - Heavy vehicles to be reviewed in 2-3 years to monitor vehicle availability and costs, including any learnings from the Foton tipper truck trial being undertaken by Council.
- **WHS Risks:** Reviewing risks and opportunities associated with transitioning to EVs including:
  - Work Health and Safety (WHS) issues such as trips for charging cables. Charging sites should include cable management systems and signage.
  - Charging infrastructure including electrical capacity and distances to charging locations.
  - EV fires are topical, however based on worldwide statistics EVs have a 0.0012 per cent chance of catching fire, compared to 0.1 per cent for internal combustion vehicles. However, EV fires can be significantly more difficult to contain due to thermal runaway. Charging locations should preference locations in open car parks and include automatic shutdown isolation buttons in safe locations away from the charging stations to isolate the electrical supply.
  - Back-up power provisions and charging during a power outage.
  - Training and development requirements for employees required to use EVs.
- **Innovations:** Future innovations should be considered including Vehicle-to-Grid (V2G) and Vehicle-to-Home/Building (V2H) which enables EV batteries to be used as energy storage for buildings and grid stability. Options are currently limited to residential scale with the Nissan Leaf and Mitsubishi EVs capable of V2H, and trials for V2G e.g., the Flinders University V2G trial below with grant funding from SA Government.

Public transport

It is recommended Council continue to advocate for improved public transport to and from the Adelaide Hills to support resident commutes to the city, as well as improved services between townships. Innovative options to consider include community bus routes or on-demand bus services (i.e. KeoRide) with a focus on servicing schools, sporting clubs, retail and healthcare hubs and connection to major public transport interchanges with frequent pickups. This could utilise existing Council community buses and provide an expanded service e.g., a discounted bus service for residents.

Sustainable & active transport

Although the Adelaide Hills region has reduced opportunities for residents to walk and ride for daily commutes, increasing the availability of sustainable transport infrastructure is recommended and can also support other industries such as tourism. It is recommended Council consider opportunities to support sustainable transport options such as:

- Bicycle paths that connect major townships, tourist locations, and areas within larger townships. This should be considered in collaboration with other councils where possible.
- Bike racks in town centres and near large shopping districts to support cycling.
- Providing grants to businesses to install EV charging stations to facilitate the EV transition and increase the likelihood of EV owners stopping in the Adelaide Hills and visiting local businesses.
- Working with commercial EV charging station providers to install EV charging in strategic locations. For example, the RAA charging stations in Woodside shown below:

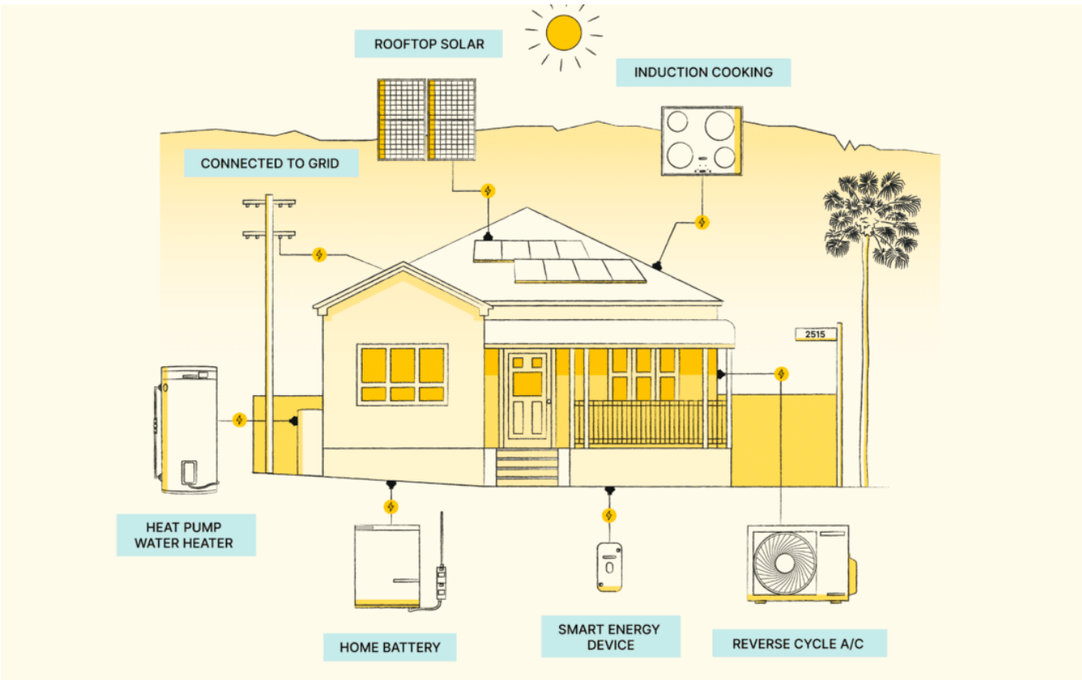
- Providing grants or incentives for residents to purchase an e-bike to enable increased bicycle use in the Adelaide Hills region.
- Providing grants or incentives for residents to use existing public transport options for daily commutes. For example, providing a rebate to assist in reducing public transport costs for daily commutes.

Smart energy

Smart energy systems which support reducing emissions, costs, and improving energy security include:

- Improving energy efficiency and transitioning to all-electric powered buildings and transport. For example, installing heat pumps for hot water, induction cooktops, reverse cycle air conditioning which are more efficient and can provide more comfortable indoor environments, and transitioning to EVs. The below are some examples of the efficiency gains by transitioning to all-electric:
- Incorporating demand management and automation to maximise efficiencies, align with renewable energy generation, support the electricity grid, and reduce costs.
- Transitioning to renewable energy power such as onsite rooftop solar PV and supporting renewables in the electricity grid.
- Incorporating battery storage in homes and businesses and transitioning to EVs which can be powered from onsite solar PV.
- Using EVs for vehicle to grid or vehicle to home (V2G/V2H) to support increased energy dependence. For example, many EVs come with batteries >3x larger than a Tesla Powerwall and have a range which significantly exceeds weekly commutes.

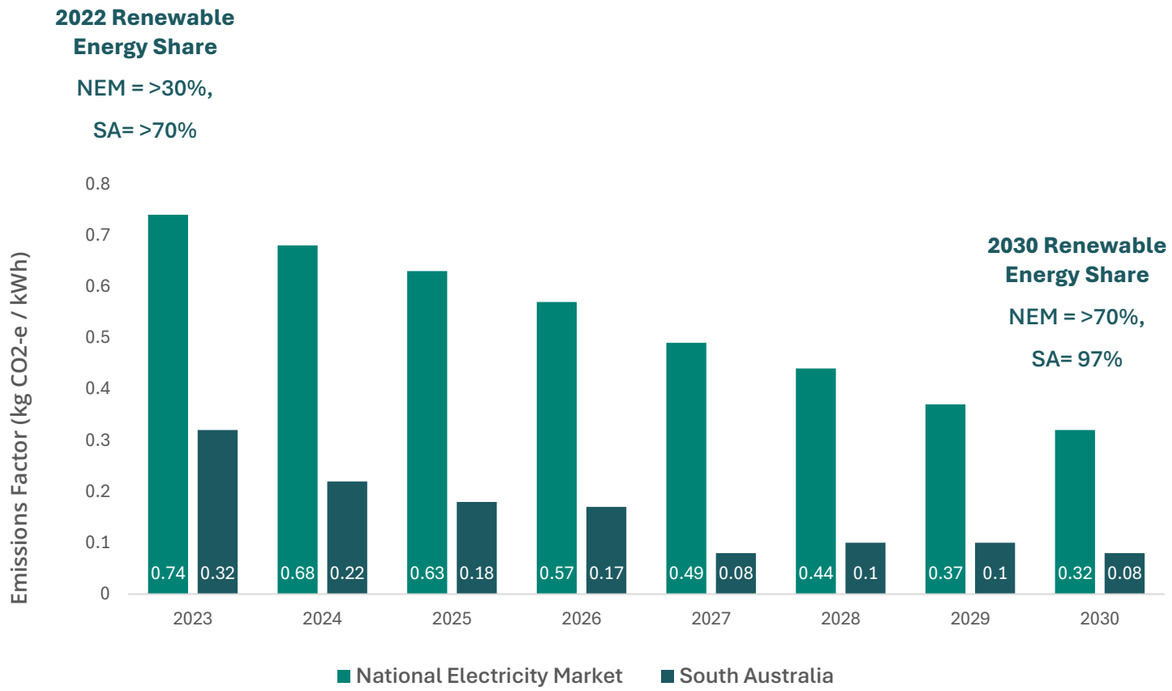
The below is an example of a smart all-electric home developed by the Electrify 2515 initiative which has recently been awarded Federal funding to progress a pilot program to electrify the suburb of 2515.



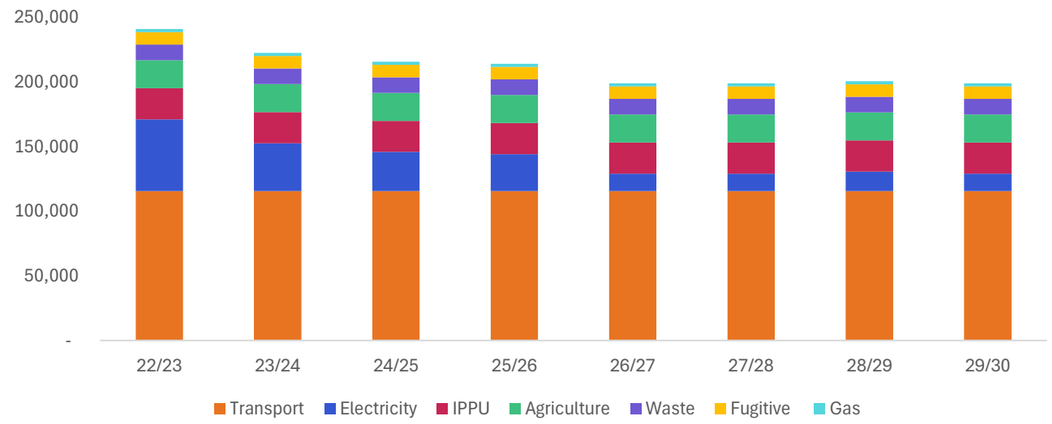
This approach can be adopted by both Council and the community to Many of these options require a knowledge and understanding of the technologies and it is recommended that Council continue to build knowledge and capacity of the options while sourcing expert advice where required.

Renewable energy

Although electricity emissions are currently in the top 5 emissions sources for the Adelaide Hills, increasing renewable energy across Australia and South Australia will reduce electricity emissions significantly. It is projected Australia will reach >70% renewable energy generation by 2030 which has already been achieved in South Australia. In addition, South Australia is on track to reach 100% net renewable energy generation by 2027 supporting the transition to all-electric buildings and transport (refer below).



Based on the renewable energy projections, it is estimated that the Adelaide Hills community emissions could reduce by >25% compared to 2018/19 based on the increasing amount of renewable energy generation in the South Australian grid (refer below).



However, there is no guarantee that the projections, and in particular the renewable energy and electricity transmission investment required to achieve the projections, will be achieved without continued focus on supporting both onsite and offsite renewable energy investment. As a result, it is recommended that increased onsite and offsite solar PV continue to be invested in as part of energy efficiency programs and emissions reduction initiatives.

Council is currently procuring 100% Green Power as part of its electricity contract which reduces electricity emissions to zero and supports renewable energy investment across Australia. It is recommended that Council review its current approach to renewable energy procurement and energy efficiency as the grid decarbonises. and considers the budget required for procuring 100% renewable energy versus using this budget for direct emissions reduction actions in this Plan.

Council facilities

It is recommended that Council continue to adopt best practice energy management for its own facilities and implement the energy efficiency recommendations identified in the sustainability audits undertaken previously. This includes:

- Improving energy efficiency in line with Council's ESD Guidelines for their buildings and facilities.
- Investigating grants such as the Community Energy Upgrade Fund (CEUF), Retailer Energy Productivity Scheme (REPS) and Green Industries SA (GISA) to reduce upfront costs for Council. This includes:
    - Large energy projects such as combined HVAC, Building Management System (BMS), energy storage, energy efficiency, and demand management projects.
    - Applying for GISA grants as part of Council's green waste trials and initiatives.
- Investigating energy efficiency options as part of electricity and supplier contracting arrangements with the LGA Procurement (LGAP) area.

Community energy

One option to support the community in taking advantage of smart energy systems is supporting or implementing community energy programs such as the Community Renewables Program by the City of Mitcham. The City of Mitcham have partnered with Shinehub to deliver a solar PV and battery storage program including bulk-buys for discounted pricing, joining Shinehub's VPP, and installing solar PV and battery storage of Council facilities. The program was developed in 2021 and as of July 2024 has resulted in the successful rollout of solar PV and battery storage systems to over 900 households in the City of Mitcham.

The City of Mitcham was developed 3-4 years ago and has focussed on solar PV, battery storage and VPP participation. Based on an analysis of publicly available data and information provided by the City of Mitcham, the program is estimated to:

- Reduce community emissions by approximately 1%.
- Provide an average 6-7 year payback for households with a hybrid solar PV and battery storage solution.
- Provide a 10-11 year payback for battery only solutions which is the same or greater than the battery warranty.
- Enable households without upfront capital to access payment plans to participate in the program and reduce electricity costs.

These outcomes are similar to residents and businesses obtaining competitive quotes for solar PV and battery storage and it is therefore recommended that Council consider additional due diligence before proceeding with a community energy program. In addition, the Adelaide Hills region differs from metropolitan areas as it is typically colder and has reduced solar availability due to trees and shade. This will likely require larger solar PV and battery storage systems which will increase costs.

It is recommended Council review opportunities to support community energy programs including:

- Adopting the City of Mitcham's program with Shinehub would take advantage of existing processes.
- Implementing a similar program but targeted at the Adelaide Hills. For example, running an expression of interest (EOI) for a solar PV and battery bulk-buy program from local South Australian companies.
- Implementing an expanded program that targets more than solar PV and battery storage to include the all-electric transition for both buildings and transport.
- Implementing or expanding existing grants to target community energy opportunities.

Resources & supply chain

Council procurement

With Scope 3 emissions becoming one of the largest emissions sources for Council, sustainable procurement policies and procedures are a priority. It is recommended that the Council implement improved procurement procedures and criteria to target the largest emissions sources.

This includes investigating criteria and KPIs for the following topics and aligning with ISO 20400:2017 – Sustainable Procurement which Council has already reviewed in full for its operations. Priorities include Professional Services, ICT services and equipment, Cleaning and chemicals, and Office equipment and supplies.

Avoid / reduce and only buy what is required.

Recycled content and reused materials / products.

Buying from local businesses and local manufacturing.

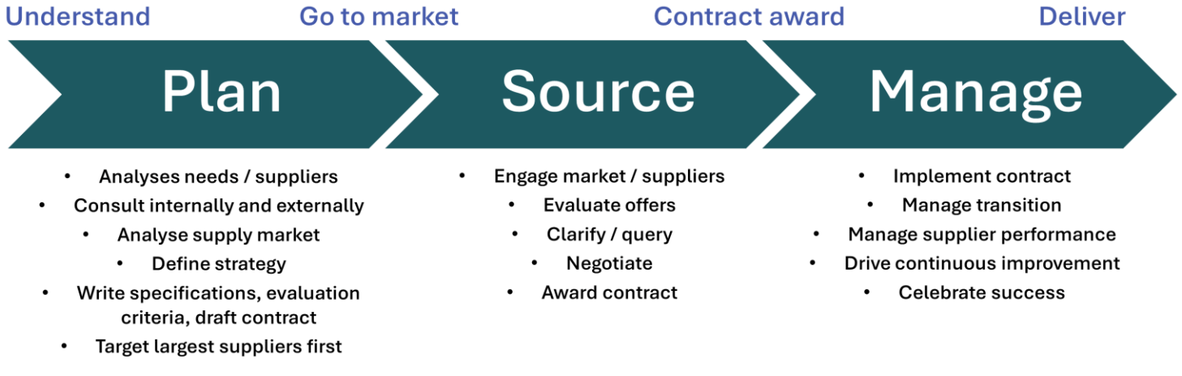
Preferencing low emissions / carbon neutral products and organisations.

Supporting circular economy and closed loop outcomes.

Preferencing products and materials with reduced waste to landfill e.g. can be readily recycled.

Preferencing suppliers with reduced packaging and take-back schemes at end of life.

Key stages of ISO 20400 are outlined below, and it is recommended that Council continue to implement improved procurement practices based on the ISO 20400 review.



Waste

Although relatively small compared to other emission sources, waste to landfill totals can be easily reduced via effective waste separation and connecting waste materials with circular economy outcomes. With approximately 40% of landfill waste consisting of organic food waste and garden organics, increasing organic waste diversion is a key priority both as part of Council's operations and in the community.

Council has recently adopted a weekly green organics service and fortnightly general waste collection for all townships. This is expected to support increased green organic waste diversion while reducing waste to landfill and emissions. It has been estimated that waste emissions will reduce by approximately 740 t CO_2-e which equivalent to 17% of Council's corporate emissions.

Council is already supporting waste separation and diversion through a number of programs including providing kitchen caddies, food and organics waste servicing, and providing weekly organics servicing, and therefore increased awareness and support for residents and businesses should be a focus.

It is recommended that Council:

Monitoring the outcomes of the weekly green organics program and track emissions reduction outcomes.

Continue to provide information and support to the community in adjusting to the weekly service.

Community support & buying local

Although not a direct emission reduction initiative, buying local and supporting local residents and businesses on reducing emissions can provide a range of benefits for the Adelaide Hills region. It is recommended that Council consider:

- Opportunities to support buying local such as marketing and awareness programs.
- Utilising Council facilities for local produce and sustainability events.
- Information and awareness events on emissions reduction initiatives for residents and businesses that will also save money.
- Preferencing local suppliers and companies as part of implementing emissions reduction projects.
- Providing grants and incentives that support residents in buying local and South Australian products and services.

Collaborate & advocate

Collaborate

Throughout developing this Plan and engaging with both the community and other councils it was evident that there is both an expectation that councils will take action from the community and collaborate with other councils and organisations working in climate change mitigation and adaptation. A key example of where this has been particularly successful is the Resilient Hills & Coasts Regional Climate Change Partnership which has recently updated its Climate Change Action Plan. The action plan should be used to identify cross-council initiatives that can benefit both the Adelaide Hills and broader region and communities.

It is recommended that Adelaide Hills Council continue to collaborate with other councils to share learnings and develop programs and initiatives that can be replicated across different councils. This includes working with the LGA to consider opportunities for knowledge sharing and collaborating on across local government programs.

Advocate

Many of the opportunities identified in this Plan can be supported by Council however are also contingent on all support from all levels of government and the community to drive uptake. It is recommended that Council advocate on behalf of the community including advocating for:

- Improved public transport networks and services to reduce transport emissions.
- Improved energy efficiency standards for new buildings and programs to transition existing buildings to all-electric.
- Improved vehicle emissions and efficiency standards.
- Funding for innovative programs such as community energy projects and initiatives.

Additional opportunities

Refrigerants

As a Scope 1 emissions source, refrigerant gases used in air-conditioning and refrigeration systems should be a priority for Council. Refrigerants typically have a high Global Warming Potential (GWP) and refrigerant gases can be up to 2,000 to 4,000x more potent than CO_2. Refrigerants are emitted to the atmosphere when air-conditioning and refrigerant systems have a leak e.g. slow leaks over time or a seal is broken in a reverse cycle air conditioner and needs to be re-gassed.

Based on audits and average recharge data, air-conditioning systems such as split systems and packaged units leak 2.7% of their refrigerants per year. It is recommended that Council:

Continue to collate improved refrigerant data from HVAC contractors and collate a list of air-conditioning make, model and refrigerant type.

Track the replacement of older air-conditioning systems and collate the emissions reduction achieved by transitioning to lower GWP refrigerants

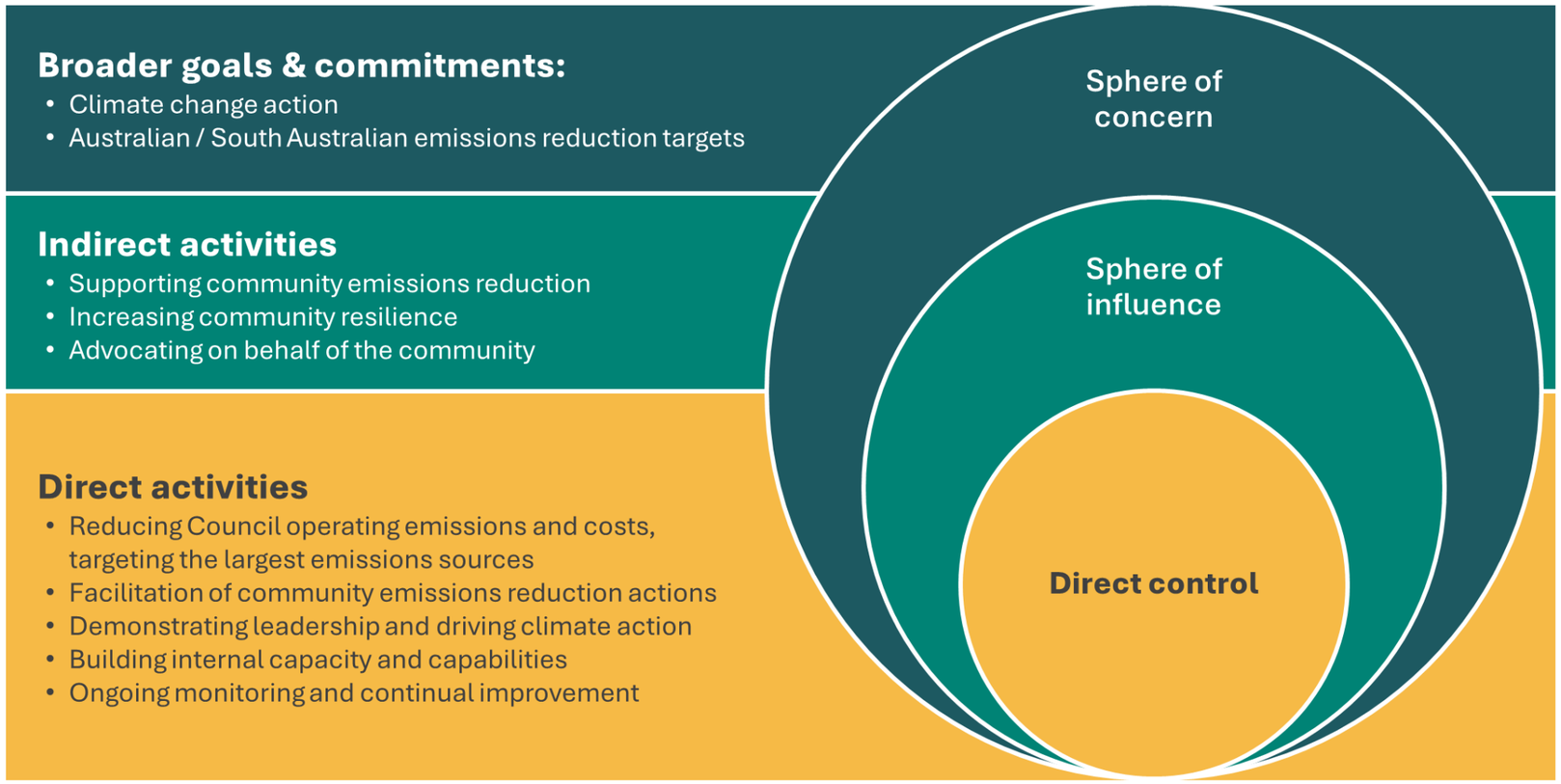
Mandate low and ultra-low GWP refrigerants as part of maintenance and capital works programs in line with the ESD Guidelines.

Implementation

The following section outlines the recommended implementation initiatives, stages and indicative budgets to assist Council in planning for emissions reduction programs.

Approach

The following has been used to guide the recommendations with a focus on direct emissions reduction activities and where Council can use it's influence to support the community on reducing emissions.



Emissions reduction initiatives

The following emissions reduction initiatives will reduce corporate and community emissions across numerous services, facilities and activities. The below emissions reduction initiatives are a recommendation and will be considered for implementation through the budget process. The initiatives are identified as corporate or community actions in line with the following, with some initiatives addressing both corporate and community emissions.

Legend

- Direct Council / Corporate emissions reduction initiatives
- Community emissions reduction initiatives

Initiative		Summary	Indicative resources	Indicative budget	Timing	Indicative target	Emissions reduction
Road & construction emissions							
1	**Infrastructure and capital works embodied emissions**	Continue to implement initiatives to reduce embodied emissions in infrastructure projects and improve data availability and monitoring. This includes low embodied emissions materials that also support increased longevity and reduce maintenance costs. Implement a policy that all major capital works projects over a set threshold must consider embodied emissions.	Allocate an additional 2-3% budget for large capital works and road projects to specify low emissions materials that support local suppliers and services. To be reviewed against whole of life costs e.g., increased longevity and reduced maintenance costs to be quantified.	Approx. $60,000-$90,000 capital budget increase for sealed road projects	From 2025	All major projects aim for: 10% reduction embodied emissions reduction from 2027 20% embodied emissions reduction from 2030	TBC based on project type and assessment
Transport							
2a	**Low emissions fleet transition**	Continue to transition to low emissions vehicles aiming for the procurement of all light and commercial vehicles to be fully electric by 2030. Review current EV transition costs and savings, EV prices, and future trends as part of fleet transition planning.	Budget will be dependent on vehicle type, availability and replacement timeframe, aiming for price parity with combustion vehicles over time.	TBC based on EV rollout review and EV availability and pricing	2030	100% operational emissions reduction for light and commercial vehicles from 2030.	40-80 t CO_2-e reduction per annum for fleet fuel emissions
2b	**EV transition support**	Advocating on behalf of the community for improved EV charging infrastructure.	Existing internal resources	N/A	Ongoing	TBC – Based on overall uptake of low emissions vehicles and EVs in the community.	TBC
Smart energy							
3a	**Renewable energy contract**	Negotiating a 100% renewable electricity power purchase agreement to continue 100% renewable energy for Council facilities and services.	Requires training and expert advice to assess contract options and ensure the agreement is suitable for Council's operations and is cost competitive.	Expert consultant advice and training required $30,000-$40,000	2026	Zero electricity emissions	Approx. 900 t CO_2-e per annum (reducing over time)

Initiative		Summary	Indicative resources	Indicative budget	Timing	Indicative target	Emissions reduction
3b	**Smart energy / energy efficiency**	Implement an annual energy efficiency program for Council facilities based on the sustainability audits, ESD Guidelines, and priorities identified in this Plan. Program to be based on initiatives that achieve a <7-year payback while supporting improved facilities and services, aiming for a 3-5 year payback.	Internal property and facilities management resources to manage program.	Annual budget: $50,000-$75,000	2025-2030	Energy consumption and costs reduced by 5-10% by 2030.	N/A – 100% renewable energy contract in place
3c	**Community energy**	Implement a community energy program to support residents and businesses take advantage of new technologies and services that will reduce consumption, costs and emissions. Can also support Council facilities as part of a broader energy contract. Options include: 1. Engage ShineHub to implement a bulk buy solar PV, battery storage, and VPP program. 2. Implement an Adelaide Hills specific program and expand the scope to capture energy and transport.	1. The ShineHub bulk-buy and VPP program will require internal additional resources to deliver and budget for due diligence checks before proceeding	$97,000 for staff and due diligence requirements	From 2026	To be reviewed and confirmed based on adopted approach.	Emissions reduction potential: 1-2% of community emissions
			2. Developing an EOI and implementing a community energy program will require additional internal resources (1 FTE) and expert advice / consultancy services.	Approx. $240,000			
3d	**Sport & recreation facilities**	Undertake energy and water audits at sports and recreation facilities to identify consumption, cost and emissions reduction opportunities. To be progressed as part of a staged audit and implementation program.	External expert advice for energy and water audits.	Audits: $20,000 Implementation: $100,000	2025	TBC based on audits	TBC based on audits – typically a 3-5% energy reduction opportunity
Waste, resources and supply chain							
4a	**Weekly organics waste services**	Changing waste service to weekly food organics green organics and fortnightly general waste collection.	Internal resources and capital cost required to implement alternative services. Green Industries SA grant may be available to reduce costs.	Capital cost for implementation $341,000	From July 2025	5% reduction in community waste emissions	740 tCO_2-e reduction in waste emissions.
4b	**Supply chain**	Undertake a review of the largest supply chain emissions (top 5) and collaborate with suppliers to identify and implement emissions and cost reduction initiatives. Update procurement processes for large supply contracts to include sustainability and emissions criteria, including opportunities for local suppliers.	Staff training and resources to undertake a supply chain review of top suppliers.	Expert consultant advice and training required $30,000-$40,000	From 2025	Target set by 2026 – To be confirmed based on engaging with suppliers and reviewing opportunities.	TBC

Initiative		Summary	Indicative resources	Indicative budget	Timing	Indicative target	Emissions reduction
Advocacy							
5	**Advocate**	Advocate on behalf of the community for improved standards and services that will reduce consumption, costs and emissions for residents and business. This includes advocating on improved energy efficiency standards, EV charging, and sustainable transport. This could include advocation for: - Improved public transport and funding for cycleways (e.g., cycling trails supporting tourism) - Additional EV charging infrastructure (e.g., RAA EV charging program expansion) and EV incentives. - Statewide community energy programs and funding support.	Existing internal resources.	N/A	From 2025	N/A – Recommend advocacy actions undertaken annually.	N/A
Grant programs							
6	**Grants**	Identify grants and incentives that can support the community on reducing costs and emissions in line with this plan. The Community Development Grants program could be updated to include a focus on emissions reduction opportunities which also support reducing costs. In the event a community energy program does not proceed, consider a new grant program to support residents and businesses on implementing emissions reduction initiatives.	Existing grant programs for community facilities. New grant dependent on community energy outcomes and could be rolled out concurrently with the AHC specific community energy program.	New grant program: $90,000	From 2025	N/A – Community grants not expected to have a direct emissions impact that can be accurately quantified.	N/A

Net zero pathway

The below net zero pathway has been developed to provide guidance on setting an emissions reduction target for Council's corporate emissions only. Due to the scope of this Plan including both corporate and community emissions, achieving net zero emissions will be dependent on both direct emissions reduction actions and the broader economy decarbonising.

Based on the projections, it is estimated that Council could achieve a 30% reduction in emission by 2034/35 compared to 2022/23. This will require Council to continue to investigate and implement emissions reduction programs in line with this Plan, as well as monitoring emerging technologies and solutions to fast track the pathway as the broader economy decarbonises.

The following emissions reduction assumptions have been included in the below pathway:

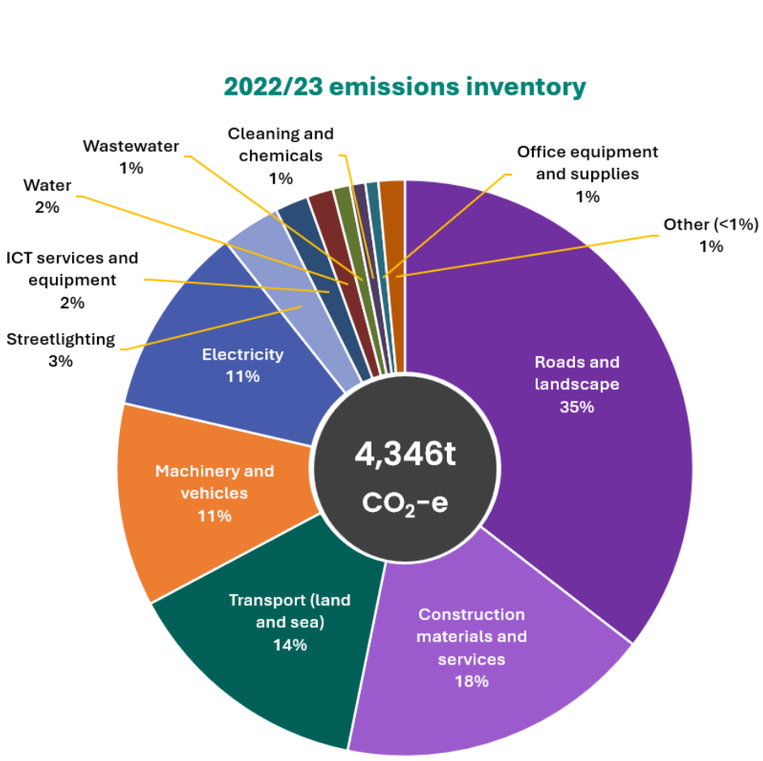
Ongoing 100% renewable energy contract

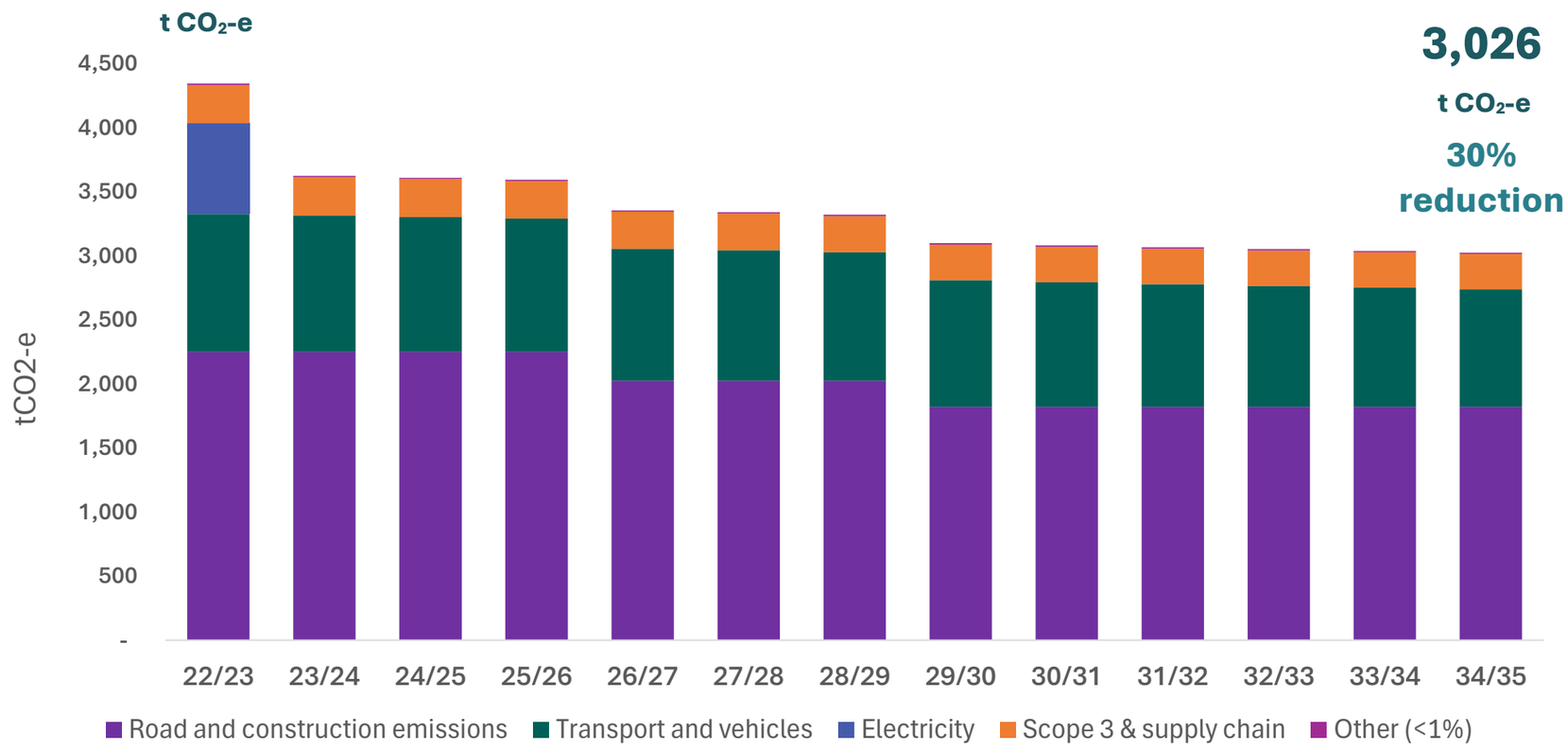
10% reduction in construction emissions by 2027, 20% by 2030

20% reduction in fuel emissions due to EV transition

10% reduction in supply chain emissions

Corporate emissions reduction pathway





Carbon offsets & sequestration

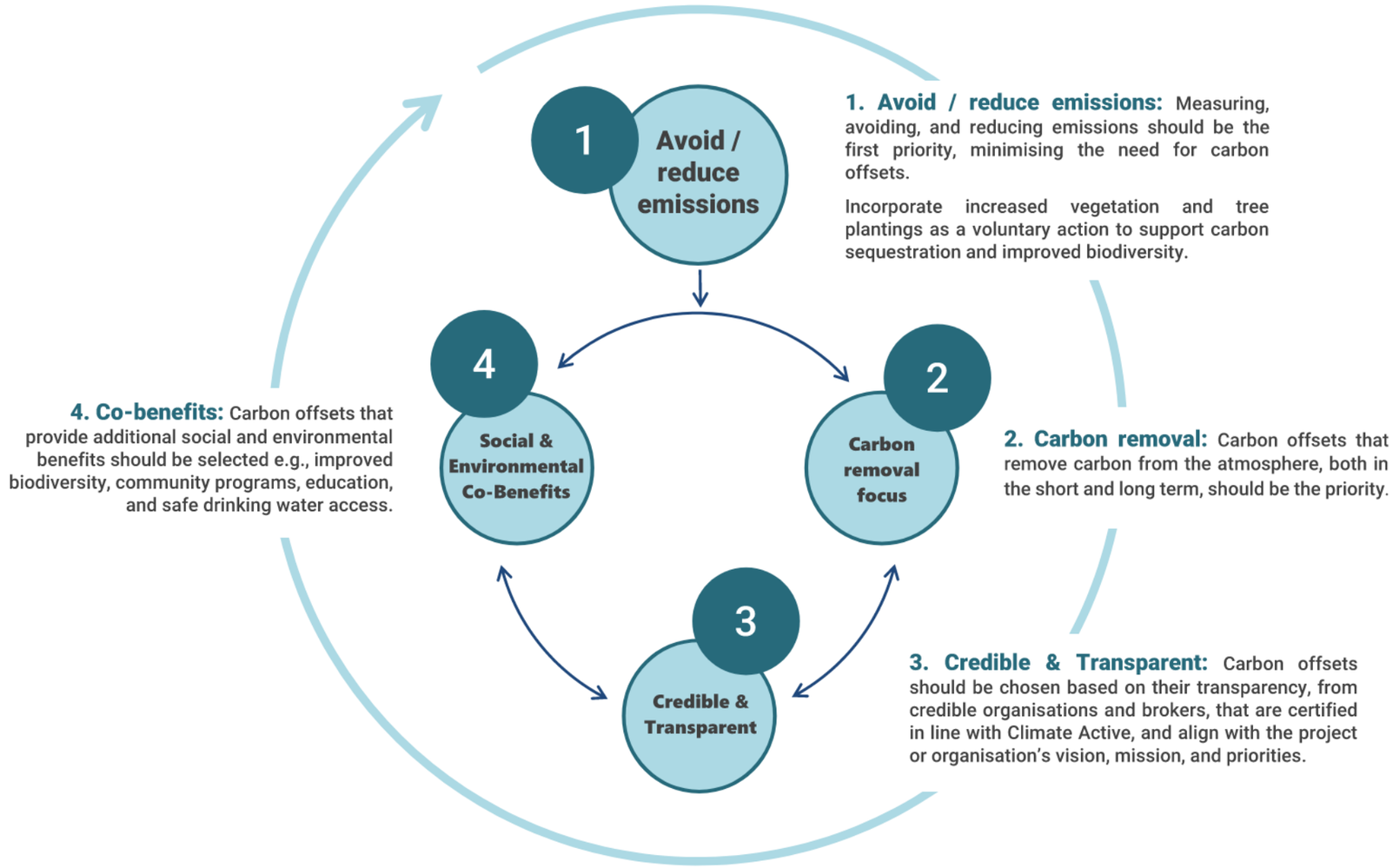
To achieve carbon neutrality prior to the rest of the economy decarbonising, carbon offsets can be purchased based on the equivalent amount of GHG emissions Council emit to the atmosphere. This Plan does not recommend purchasing carbon offsets at this time and focusses on direct emissions reduction actions that Council can implement for both corporate emissions and to support the community. If Council were to purchase carbon offsets to reduce emissions to zero, this is required annually and should follow the below approach (refer below summary diagram):

- Avoid and reduce emissions first
- Carbon removal should be the focus
- Partner with credible and transparent organisations
- Select offsets with social and environmental co-benefits

Carbon offset prices currently range between $10-$15 for international offsets, $35-$40 for Australian Carbon Credit Units (ACCUs), and $70-$80 for ACCUs with additional co-benefits such as social improvements or supporting Aboriginal custodians.

Carbon offset costs

Based on the above projections, in 2030 Council's corporate emissions are estimated to total approximately 3,100t CO_2-e. As a result, carbon offsets would cost approximately $45,000 to $125,000 for international offsets or ACCUs (respectively), or up to $250,000 for ACCUs with additional co-benefits. Although carbon offsets are supporting initiatives and projects to sequester and reduce emissions in the atmosphere, it is recommended that Council focus on direct and local emissions reduction initiatives as a higher priority.



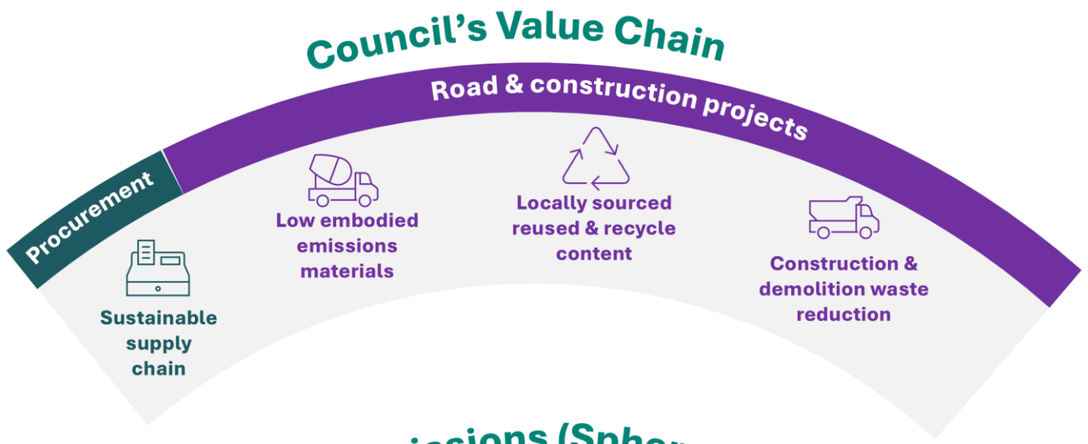
Summary

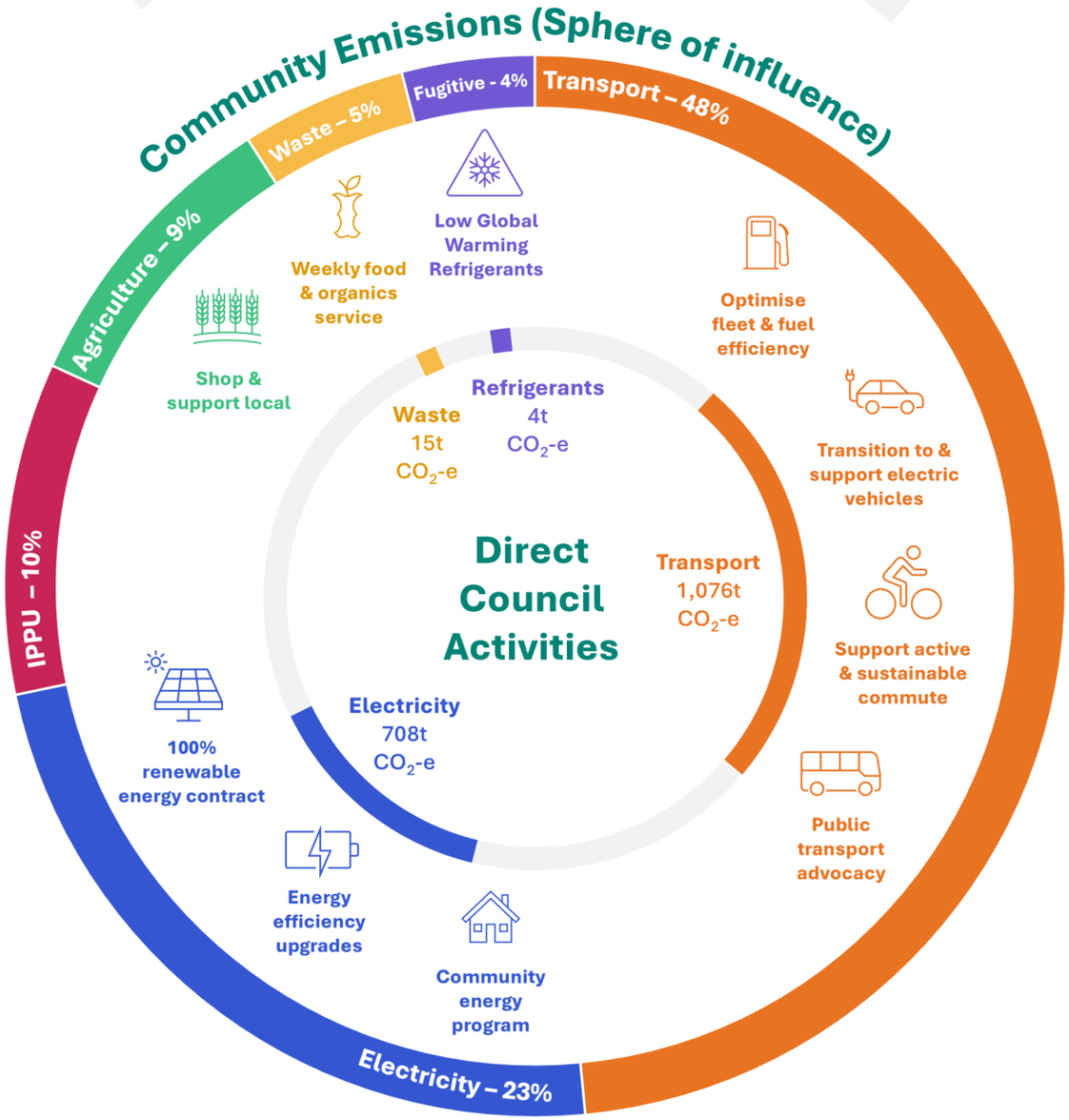
It is recommended that Council continue to demonstrate leadership in emissions management and implement programs to support the community on reducing emissions in line with the priorities identified in this Plan. The adjacent provides a summary of the key actions and recommendations for consideration with both direct and indirect emissions reduction opportunities identified. The recommendations are built on:

- Direct emissions reduction actions Council can take to reduce emissions and costs.
- Indirect emissions reduction opportunities where Council can influence and facilitate initiatives that benefit both Council and the community.
- Indirect emissions reduction opportunities within Council's value chain e.g., the procurement of goods and services.

Key additional recommendations include:

FY23 Baseline	The FY23 inventory developed for this Plan should be used as a new baseline to monitor emissions reduction initiatives and set targets. This aligns with best practice approaches for emissions inventories and will enable Council to track its emissions and reduction measures moving forward.
Emissions reduction initiatives	Implementing immediate emissions reduction initiatives targeting the top 5 emissions sources is recommended. The largest opportunities include construction and road embodied emissions, transport, energy, and supply chain emissions with opportunities to reduce consumption, costs and emissions.
30% emissions reduction target	A 30% corporate emissions reduction target by 2035 is achievable to work towards net zero emissions while Council's supply chain and the economy decarbonises. The emissions inventory and target should be reviewed and updated every 3-5 years to track progression and revise the target if required, with the aim of reaching net zero emissions prior to 2050.
Community emissions	There are a number of ways Council can support the community on reducing emissions including advocacy, education, and collaborating across local, state and federal government to implement emissions reduction programs. A key opportunity for Council to support the community is considering a community energy program which will require dedicated resources and planning based on the needs of Adelaide Hills region.
Planning	This Plan has identified that achieving net zero emissions is dependent on Council's supply chain and the broader economy in decarbonising. However, there are actions Council can take to reduce emissions within its control. It is recommended Council review the opportunities identified in this Plan and incorporate into Council operations and planning.
Publicly commit	It is recommended Council publicly committing to emissions reduction initiatives and targets to work towards, demonstrate leadership, and enable Council to celebrate achievements. Learnings from the Council initiatives should also be shared to support community emissions reduction action.
Net zero pathway	The net zero emissions transition is a journey which is continually evolving as new approaches, technologies and data becomes available. A flexible approach based on a continual improvement model should be adopted to improve over time and work towards net zero emissions. Carbon offsets should be re-assessed when this Plan is next reviewed.





Appendix A Standards & assumptions

This plan has been developed in line with the following standards and certifications to ensure Council is reporting in a transparent and industry recognised manner. This includes international standards, as well as aligning with the Australian Government Climate Active Carbon Neutral Standard. In addition, assumptions have been made based on a number of references and studies to quantify GHG emissions into the future and enable implementation planning to consider future scenarios.

Greenhouse Gas (GHG) Protocol

GREENHOUSE GAS PROTOCOL

The Greenhouse Gas (GHG) Protocol Corporate Standard has been aligned with including setting an emissions boundary based on organisational control and including Scope 1, 2 and 3 emissions in the emissions inventory to capture both direct and indirect emissions.

Additional GHG Protocol guidance has also been used including Scope 2 Guidance and Scope 3 Calculation Guidance documents available on the GHG Protocol website.

Climate Active Carbon Neutral Standard

The Climate Active Carbon Neutral Organisation Standard, Technical Guidance Manual and templates have been used throughout the development of this plan and associated emission calculations to ensure that in the event Council pursues certification, the emissions inventory and initiatives will meet the minimum requirements.

The key stages in developing an emissions inventory and reduction strategy in line with the Climate Active standards include:

- Emissions boundary – Setting a boundary around what is being certified (e.g. Organisation, Building, Precinct, Service or Product). For this plan, the Council's corporate operations would be captured under the Organisation standard.
- Baseline year – A baseline year needs to be set (CY/FY) to begin tracking emissions and develop the initial emissions inventory.
- Register with Climate Active – Registering with Climate Active provides the applicant with templates and calculators to assist with collating the emissions inventory. The Organisation size will determine the applicable fees and requirements.
- Emissions sources – An assessment of the organisations emissions sources and data is undertaken to develop an initial emissions profile. This is used to test emission contributions and start collating data that will need to be included in the inventory.
- Relevance test – Check which emission sources are relevant to the certification and should be included in the inventory.
- Emissions data – Collate detailed emissions data to quantify the emissions and input into the Climate Active Inventory spreadsheet and associated calculators.
- Non-quantified emissions – Confirm which emissions you don't have data for and whether they should be incorporated into the inventory. Where an emissions source has been identified in the relevance test as being required, but data is not available, a data improvement plan is required to include the data in future inventories and an uplift must be applied representing the expected emissions size. For example, if the organisation does not have access to all of its supplier expenditure data, an estimate should be made and percentage (%) added to the emissions total to account for this.
- Emission reduction strategy – Once the organisation has an emissions inventory collated, a 5 year emissions reduction strategy is required to demonstrate how the organisation will reduce its relevant emissions as far as practicable. Realistic, quantified and time bound strategies and actions must be identified that can be reported on annually.
- Carbon offsets – Approved carbon offsets will need to be purchased for the total emissions inventory each year. Options include:
    - Australian Carbon Credit Units (ACCUs)
    - Certified Emissions Reductions (CERs)
    - Removal Units (RMUs)
    - Verified Emissions Reductions (VERs)
    - Verified Carbon Units (VCUs)
- Documentation – The Climate Active documentation is completed throughout the process including the Public Disclosure Statement (PDS), emissions inventory, calculators and associated records for certification. For the audit, it is recommended that a Basis of Preparation document is collated outlining emission data sources and how calculations have been done when not using the Climate Active Calculators. This will support the Registered Consultant or technical assessor in reviewing the data.

Science-Based Target initiative (SBTi)

Science Based Targets follow a similar approach to Climate Active with the exception that Scope 1 and 2 are mandatory however Scope 3 can be excluded unless Scope 3 emissions account for over 40% of the emissions profile. It should be noted that Scope 3 emissions are typically over 80% of a corporate organisation's emissions profile, unless it owns large manufacturing plants or power plants which generate large amounts of Scope 1 emissions.

In addition, Science Based Targets do not provide a certified carbon neutral or net zero outcome via the purchase of offsets but rely on targets and actions to reduce emissions in line with the commitments made under the Paris Agreement.

As a minimum, an emission inventory must be developed, and targets set to reduce GHG emissions in line with either a 1.5°C or well-below 2°C temperature increase pathway. For this to be achieved, a carbon budget must be set to reach net zero emissions by 2050 or earlier.

Assumptions & projections

The following assumptions and projections have been used in developing emissions projections to ensure the Council is prioritising emission reduction initiatives based on the expected context in the future. Electricity and transport are the main focus of the projections as they account for over 60% of Council's GHG emissions, and therefore understanding future scenarios is critical to prioritise emission reduction initiatives.

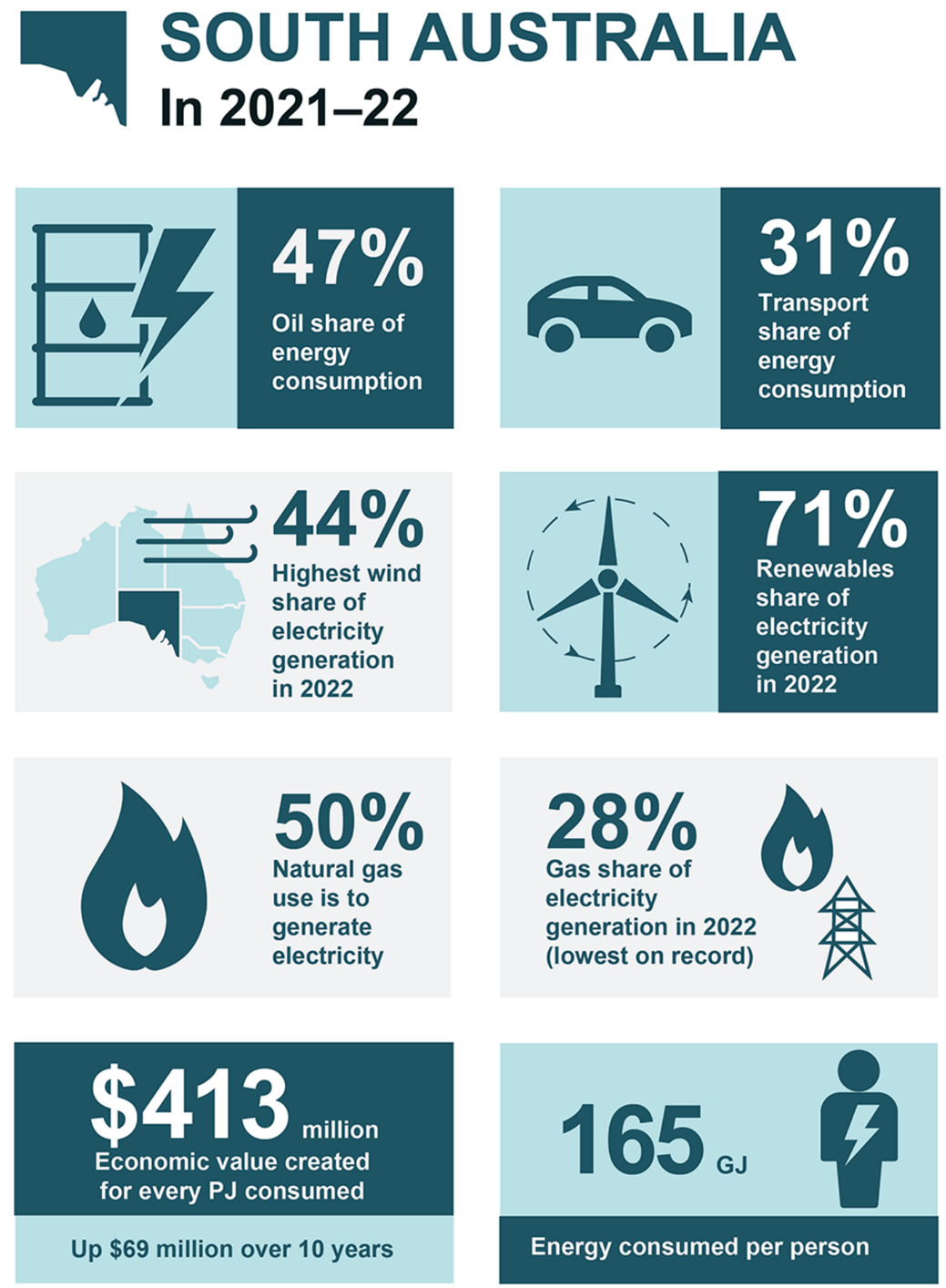
Electricity emissions

The following electricity emissions projectsion have been incorporated to consider how increasing renewable energy will impact the Council's emissions profile.

- Australia's Emissions Projections (October 2023), published by the Department of Industry, Science, Energy and Resources. Renewable energy in South Australia was projected to reach 97% by 2025*.
- Australia's Long-Term Emission Reduction Plan (October 2021) and reference data*. This set of projections includes South Australia reaching 97% renewables in 2025 which may not be likely and was published under the previous government. The plan is currently under review.
- Australian Energy Update 2023 (September 2021) which states that renewable energy generation in South Australia reached 71% in 2022.
- National Greenhouse Accounts Factors (2023) which is the latest available emissions factors for GHG reporting. The latest estimate for electricity Scope 2 and 3 emissions in South Australia is 0.33 kgCO2-e per kWh.
- OpenNEM (National Energy Market) Data (2021/22) which demonstrated over 68% of generation in South Australia in 2021/22 was from renewable energy.
- Clean Energy Australia Report 2022 (April 2022) which states that renewable energy generation in South Australia reached 66.5% in 2020/21.
- AEMO Integrated System Plan (June 2022): Insights into future energy infrastructure have been used to inform potential renewable energy integration.
- The South Australian Government's aspiration to reach net 100% renewable energy generation by 2030, including 100% of energy demand met by renewable energy.

Australia is rapidly decarbonising its energy sources with government, non-government and private industry all playing a part in the transition, and electricity emissions will continue to reduce over time. It is therefore a priority that this Plan reflects a potential pathway for electricity emissions, to ensure emission reduction initiatives and capital is not over invested in electricity emissions related initiatives.

The adjacent image provides a summary of South Australia's key energy statistics for 2021/22 from the Australian Energy Update 2023 which confirmed that SA reached over 70% renewable energy share.



Transport emissions

The following reports and references have been used to inform electric vehicle uptake projectsion and emission reduction outcomes:

- AEMO / CISRO Electric vehicle projections 2022 (November 2022): AEMO publishes reports to assist in modelling the impact of the EV transition on energy demand with approximately 17-18% of new vehicles sales to be an electric vehicle by 2030. This has been used to guide the business-as-usual projection for EV uptake however may be conservative as EV uptake increases.
- Electric Vehicle Council - State of Electric Vehicles (July 2023) which demonstrated that in 2023 approximately 8.4% of new car sales were EVs, up from 3.8% in 2022. The report also highlighted the increasing number of EVs soon to be available in the Australian market which is expected to increase uptake, however highlighted that demand is currently out stripping supply, resulting in long wait times for EVs.

Appendix B Calculating emissions

Introduction

The following section outlines how emissions have been calculated for reference.

Calculating emissions

Once the Scope 1, 2 and 3 activity data has been collated for the identified emissions sources, emissions factors are then used to convert activity data to a CO2 equivalent. Emissions factors are based an average emissions intensity from different activities and are sourced from a range of references including:

- **National Greenhouse Accounts Factors:** Australian Government emissions factors published annually and used as part of National Greenhouse and Energy Reporting (NGERS).
- **Australia's Emissions Projections:** Emissions projections which are updated annually and include future emissions factors for categories such as electricity.
- **Climate Active Carbon Neutral:** For councils that choose to pursue Carbon Neutral certification, Climate Active provides a set of resources which include emissions calculators. The resources and spreadsheets are protected under a License Agreement and can only be used for the purpose of calculating emissions for the participating organisation.
- **Subscriptions / licenses:** Emissions factors typically associated with Scope 3 emissions and embodied emissions are commercially available via subscriptions and licenses, and some open sources.

See below example for calculating emissions:

Emissions calculation example

The below is an example calculation to convert emissions data to t CO_2-e for typical emissions sources for local councils.

Category	Activity Data	Unit	Emissions Factor	Emissions (kg CO_2-e)	Emissions (t CO_2-e)
Electricity	100,000	kWh	**0.77** kg CO_2-e / kWh	77,000	77
Natural Gas	300	GJ	**62.13** kg CO_2-e / GJ	18,648	18.6
Water	50,000	kL	**1.4932518** kg CO_2-e / kL	74,663	75
Waste	50	t	**1,600** kg CO_2-e / t	80,000	80
				Total	**250.6**

Electricity emissions

There are two options for calculating electricity emissions called the Location-based and Market-based approaches.

- **Location-based:** The emissions factor is based on the local electricity grid emissions intensity e.g. the South Australian emissions factor published in the National Greenhouse Accounts Factors. It is expected that Council has previously used the Location-based approach for previous emissions inventories.
- **Market-based:** Represents the emissions intensity from the contractual arrangements of the organisation which takes into account the procurement of renewable energy via Renewable Energy Certificates (RECs typically in the form of Large-scale Generation Certificates (LGCs)) or Green Power. In the event the Council purchases 100% Green Power or LGCs are voluntarily surrendered on their behalf, a market-based approach must be used.

Based on the 2022/23 emissions calculations, the Market-based approach results in electricity emissions being 2-3x higher than using the South Australian emissions factor. However, as renewable energy generation increases across Australia, Market-based electricity emissions will reduce.

For this Plan and the Net Zero Accelerate Program, a Market-based approach has been adopted for the following reasons:

- A Market-based approach enables a consistent calculation of electricity emissions across Australia, allowing local government to compare emissions across jurisdictions.
- Councils such as Adelaide Hills Council elect to purchase Green Power as part of their electricity contract, or some councils have entered into a Power Purchase Agreement (PPA) which includes 100% accredited renewable energy via the voluntary surrender of LGCs.
- During consultation at the end of 2023, Climate Active proposed to mandate a Market-based approach as part of their Carbon Neutral certification standards. Climate Active reforms have not yet been finalised.
- Calculating electricity emissions based on the Australian market supports a greater focus on increasing renewables across Australia. In 2022 and 2023, renewable energy investment and installations have slowed due to a number of reasons including the need for new transmission infrastructure (poles and wires), market conditions (financial), and regulatory challenges.

Appendix C Focus Group Consultation Summary

The following provides a summary of the Focus Group sessions undertaken to gain community feedback on reducing corporate and community emissions.