



CITY OF HOBART MANAGING HOBART'S CARBON FOOTPRINT

BACKGROUND PAPER



City of **HOBART**

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2017**



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PURPOSE OF THIS BACKGROUND PAPER

This background discussion paper forms part of the City of Hobart's review of its climate change strategy. This paper provides information to guide community understanding and awareness of Hobart's carbon footprint, and focuses on:

- local energy use and where greenhouse house gas emissions come from
- opportunities and constraints to identify priority areas for action
- practical examples of City of Hobart and community actions.

This paper has been developed to promote discussion and does not provide a comprehensive overview of all the City's climate actions.

The complementary background paper: Responding to Climate Change, provides further information on the impacts of climate change and adaptation actions to address these.

Both papers are available through the website hobartcity.com.au

HOW TO MAKE A SUBMISSION

The City of Hobart is seeking feedback to develop an updated climate change strategy. To develop sound solutions it will take contributions from individuals, businesses, the broader community and different levels of government. This is why we need your help; to make sure we are on the right track.

Your submission to the draft climate change strategy can be as long or short as you want. You can answer the questions in these background papers or just write about what you think is important. You can email through your feedback or complete the online survey available at the City of Hobart's Your Say website until

5 March 2018.

Online

yoursay.hobartcity.com.au

Email

coh@hobartcity.com.au

Climate strategy in the subject line.

Post

Climate Change Strategy

City of Hobart

GPO Box 503

Hobart TAS 7001

**Submissions should be lodged by
5 March 2018**

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KEY ISSUES

- The world is taking action to limit global warming to below 2 °C. While it is a global issue, the solutions are local.
- All weather, including extreme weather events, is being influenced by climate change.
- Extreme weather events are putting pressure on our local economies, health systems, built and urban infrastructure, ecosystems and food production systems. Climate change will have a long-term impact on our communities.
- Individuals, communities, businesses and government all have a role to play in responding to climate change.
- The Tasmanian Government has committed to a zero net emissions target by 2050.
- The City of Hobart has a head start on emissions reduction in Hobart, with a high percentage of renewable hydro and wind power in Tasmania's electricity mix. In addition, there are over 2200 solar photovoltaic (PV) household systems that reduce demand from the electricity grid.
- Energy use for Hobart has gone down by 3% over the past five years and emissions have reduced by 8%.
- The City of Hobart influences energy use and greenhouse gas emissions by working towards:
 - warm, healthy homes
 - low carbon transport
 - cost saving, energy-efficient businesses
 - greater renewable energy
 - zero waste.
- The City of Hobart reduced its emissions by 70% from 2000 to 2010. It has made \$3.6 million in cost savings from energy efficiency measures since 2010, delivering over 170 projects. It is on track to achieve a further 17% cut in emissions and a 35% reduction in energy use by 2020.



INTRODUCTION

There is an expansive and growing body of scientific evidence that the global climate has changed, and will continue to change over the coming century.

Increased emissions of greenhouse gases from human activity is changing the earth's climate, which in turn is putting pressure on local economies, health systems, infrastructure, ecosystems and food production systems. There has been global agreement to reduce greenhouse gas emissions to limit warming to 2 °C by 2100 to avoid dangerous levels of warming.

The City of Hobart recognises that local governments have a key role, working with their communities, in preparing for and managing climate change impacts and lowering greenhouse gas emissions. Local governments have local knowledge and experience and understand community needs and vulnerabilities. They have a key role in shaping our urban landscapes, responding to emergencies and reducing carbon footprints.

Around the world, cities like Hobart are leading the way on climate action. In 1999, the City of Hobart was the first Tasmanian local government to formally commit to and take action on climate change. It has a program in place that has seen it both reduce greenhouse gas emissions and energy usage as well as preparing Hobart to respond to climate risks.

The City of Hobart has a commitment to see the capital evolve into a strong, vibrant, resilient and sustainable city through the provision of local government services and infrastructure.

The Capital City Strategic Plan 2015–2025, the City's key document to guide development and delivery of asset programs and services, identifies the need for action on climate change. This means reviewing and updating the climate change strategy to make sure actions are in place that continue to decrease Hobart's carbon footprint and help respond to climate change impacts (Strategic Objective 3.1).

The City of Hobart has actions and programs to reduce its energy use and greenhouse gas emissions from its buildings and operations. While it does not directly control community sector emissions and energy use, it can influence them through delivery of its services, demonstration of successful actions, grants for energy saving projects and resources, and information to help households understand and reduce their emissions and energy use.

The City of Hobart works closely with the following organisations to deliver emission reduction projects at a municipal, inter-municipal and regional level:

- Southern Tasmanian Regional Councils Authority
- Southern Tasmanian local governments
- Tasmanian Government, particularly the Tasmanian Climate Change Office
- Local Government Association of Tasmania.

WHY ARE LOCAL GOVERNMENTS TAKING CLIMATE ACTION?

Local government is the closest level of government to communities and has a responsibility under the Local Government Act 1993 to provide for the health, safety and welfare of the community. This role includes taking action on climate change.

The Australian Local Government Association, the peak body representing local government, identifies climate change as one of the top five priorities to act on. It states that effective mitigation of greenhouse gas emissions and adaptation to the impacts of climate change will transform the Australian economy, environment and society.¹

The case for climate action by local governments is also made by the Southern Tasmanian Councils Authority which recognises that 'In managing and preparing for climate change impacts, local governments are best positioned to work with communities due to their:

- responsibility to support and assist local communities
- local knowledge and experience
- understanding of community needs and vulnerabilities
- role in preparing for, responding to and recovering from emergencies
- role in infrastructure design, construction and maintenance
- role in review and update of planning schemes (in relation to identified local impacts and threats)
- ability to effectively disseminate information and provide support to the community.'²

¹ Australian Local Government Association, 'Climate Change', viewed 27 July 2017, <<http://alga.asn.au/?ID=210>>.

² Southern Tasmanian Councils Authority, Regional Councils Climate Change Adaptation Strategy, Southern Tasmania 2013–2017, 2013, p. 7.

CITY OF HOBART'S PRINCIPLE-BASED APPROACH

Building on its existing leadership role, and highlighting the role of local government in responding to climate change, the City of Hobart recognises that:

- climate change is a global issue requiring local solutions
- climate change action is a shared responsibility between local, state and federal governments, communities and the private sector
- local government has an important role in educating communities at the municipal and regional level on climate change as a risk, and options for adaptation and mitigation
- local government must prepare for and manage the impacts of climate change on its assets and services and work to reduce its emissions and energy use
- early climate change adaptation and mitigation action is more cost effective than delayed action
- in many instances, mitigation actions like renewable energy and energy efficient lights can help bring down overall running costs
- collaboration and cooperation on climate change adaptation and mitigation actions by local government provides more effective use of resources.
- The City of Hobart is guided in how it responds to climate change by the following principles, which are to:
 - administer relevant Tasmanian and/or Australian legislation to promote climate action, including the application of relevant codes, such as the Building Code of Australia
 - provide leadership and collaborate across local governments and with the Tasmanian Government to act on climate change
 - manage risks and impacts, and consider opportunities, to assets it owns and manages and services it provides
 - ensure policies and regulations under its jurisdiction incorporate climate change considerations and are consistent with Tasmanian and Australian government approaches to adaptation and mitigation
 - facilitate resilience building and adaptive capacity in the local community by providing information on local climate change risks and mitigation
 - work in partnership with the community, local non-government organisations, businesses and other key stakeholders to implement adaptation and mitigation initiatives
 - contribute appropriate resources to prepare, prevent, respond and recover from detrimental climatic impacts and to reduce greenhouse gas emissions.

What is mitigation?

Mitigation is the action taken to reduce the amount of greenhouse emissions released into the atmosphere. It applies to the economy, community and environment. Examples of mitigation include installation of energy efficient Light Emitting Diodes (LED) lights into buildings, transitioning from petrol to electric cars, and using renewable sources to generate energy such as solar and wind.

City of Hobart and Carbon Action

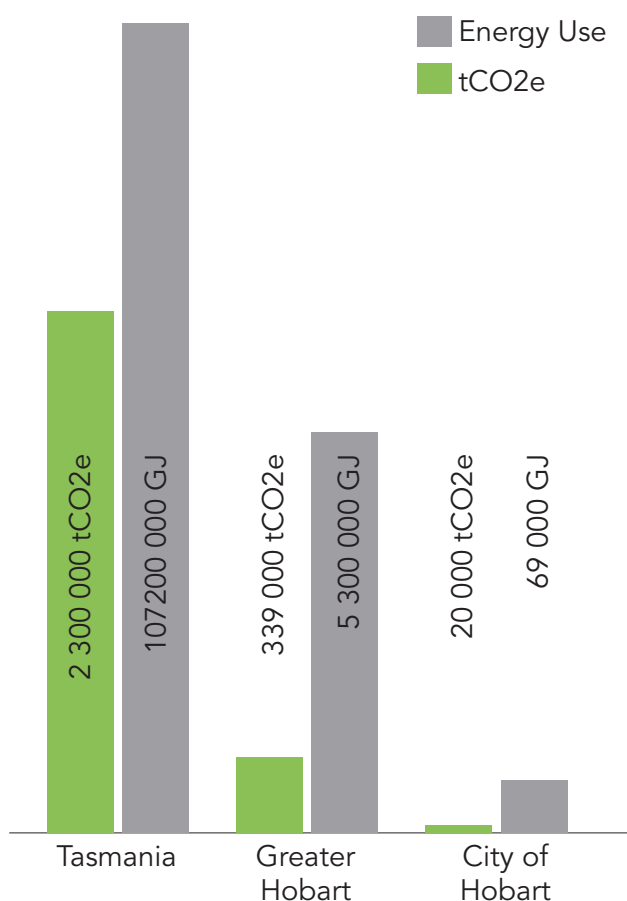
The City of Hobart has a key role in facilitating and supporting energy efficiency, energy conservation and the use of low-emission renewable energy sources.

It aims to influence energy use in Hobart by working towards:

- greater renewable energy
- low carbon transport
- cost saving, energy efficient businesses
- warm, healthy homes
- zero waste.

The City has been one of the earliest movers in Tasmania, working for over 17 years to reduce emissions. This started with reductions in the carbon footprint of the City's own operations and buildings.

City of Hobart footprint vs Tasmania's energy and greenhouse gas footprint



⁵ United Nations Framework Convention on Climate Change, 'The Paris Agreement', viewed 9 June 2017, <http://unfccc.int/paris_agreement/items/9485.php>.

⁴ *ibid.*

⁵ Southern Tasmanian Councils Authority, Regional Councils Climate Change Strategy Southern Tasmania 2013 – 2017, p. 10.

WE ALL HAVE A ROLE TO PLAY

The 2016 United Nation's Paris Agreement, endorsed by 148 nations³ commits to keeping global temperature rise this century below 2 °C above pre-industrial levels and to act to limit the temperature increase even further to 1.5 °C.⁴ Reaching these targets requires mitigation through local, regional and national scale action, meaning that individuals, the community, businesses and governments all have an important role to play.

Individuals, the community and businesses have responsibility for the management of greenhouse gas emissions in the same way that they are responsible for the management of other private impacts.

Local governments are established under state government to deliver legislation at a local level. It is the sphere of government closest to the community and is responsible for the delivery of a wide range of services and management and protection of assets that will be affected by climate change. As well as reducing emissions and managing climate impacts on their own assets and services, local governments should also inform and educate communities to help them understand and respond to climate change impacts and reduce their emissions.

The state and federal governments are responsible for the regulations and policy settings that guide the broader reduction in greenhouse gas emissions. For example, the Tasmanian Government has committed to a net zero emissions target by 2050 to be delivered through two core strategies:

- Tasmanian Energy Strategy—Restoring Tasmania's Energy Advantage
- Tasmanian Climate Change Action Plan 2017–2021: Climate Action 21

The Tasmanian Government owns the electric retail, network and generation businesses and can therefore directly influence the state's transition to a low carbon future.

The roles and responsibilities of the three spheres of government will be separate at times, such as individual local governments reducing their greenhouse gas emissions. Or in the case of the Australian Government, the development of national policy settings that guide the response of other levels of government and the business sector. For government, the roles and responsibilities will intersect and be shared with multiple agencies.⁵

SNAPSHOT OF CITY OF HOBART ACTION AND FUTURE TARGETS

The City of Hobart has an active program to reduce energy use and greenhouse gas emissions from its buildings, assets and operations, including waste management. It has reduced its corporate greenhouse gas emissions by 70% from 2000 to 2010. The biggest emission reductions were from the McRobies Gully landfill, where cogeneration of landfill gases now produces enough electricity to power over 1000 homes. This action alone resulted in over 60% of the emission reductions from 2000 to 2010.

Changes in emission reductions since 2009–10 are shown in Figure 1. The current targets focus on actions to reduce energy use and emissions from electricity and liquid fuels such as diesel and petrol. Given Tasmania's base electricity source is renewable hydro and wind power, an energy reduction target has been adopted alongside the emissions target:

- energy reduction target of 35% below 2009 levels by 2020
- greenhouse gas emissions target of 17% below 2010 levels by 2020.

The current trajectory of declining emissions shows that the City of Hobart is on track to reach its 2020 target. Many of the future reductions in emissions will come from changes in energy use.

Figure 1: City of Hobart emissions since 2009–10

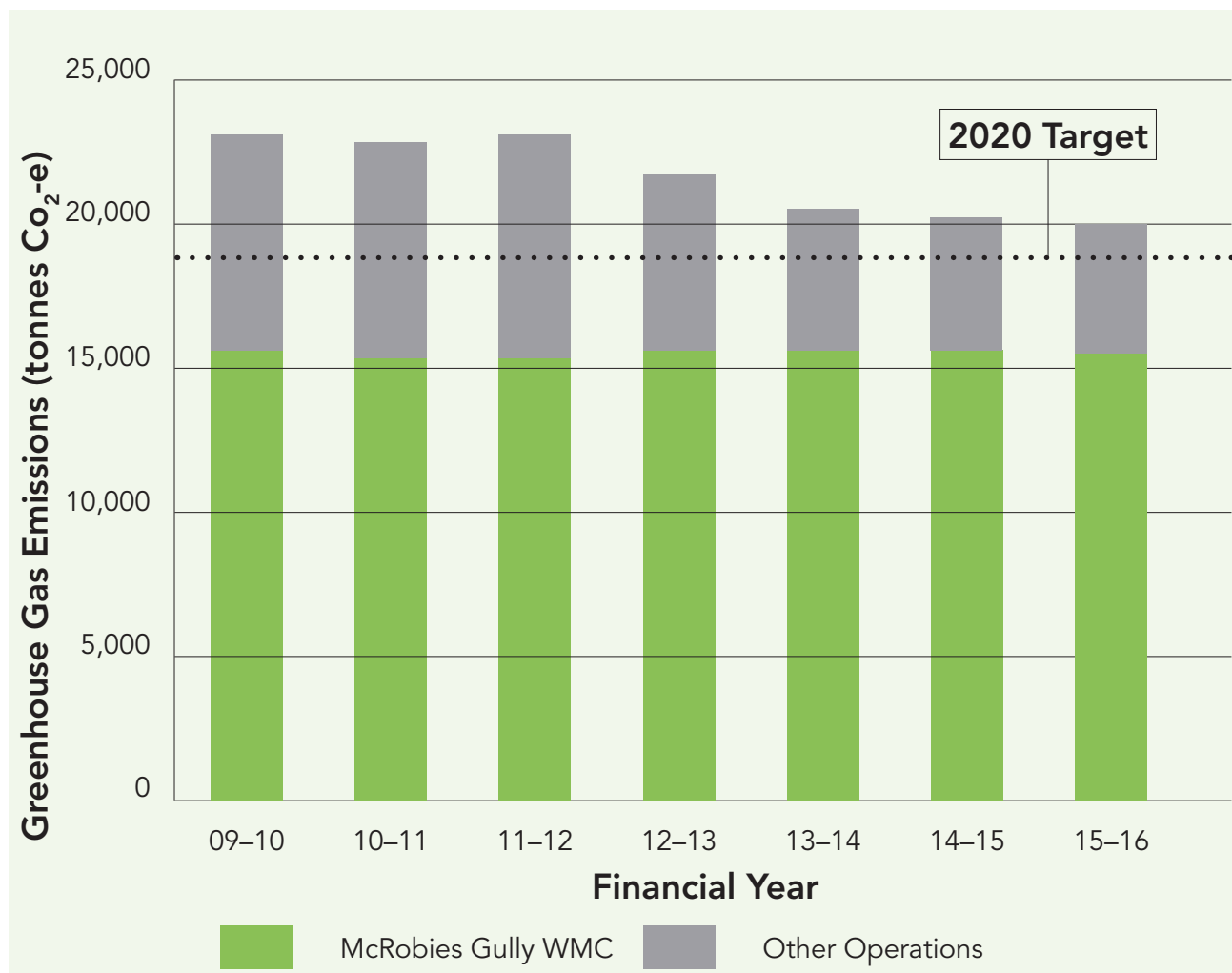




Table 1: Energy use by category for the City of Hobart

Category	Energy use 2009–10	Energy use 2015–16	Energy use 2016–17	15–16 to 16–17 change
Vehicles and plant	40 515 GJ	25 769 GJ	25 847 GJ	0.3%
Doone Kennedy Hobart Aquatic Centre	19 603 GJ	15 737 GJ	15 003 GJ	-4.7%
Street lighting	13 320 GJ	10 330 GJ	9708 GJ	-6.0%
Civic and administrative buildings	12 874 GJ	8028 GJ	7122 GJ	-11.3%
Multi-storey car parks	4116 GJ	3709 GJ	3836 GJ	3.4%
Community halls and parks	2777 GJ	2861 GJ	3302 GJ	15.4%
Depots, waste management, nursery	3536 GJ	1842 GJ	1496 GJ	-18.7%
Public space lighting and fountains	1006 GJ	1404 GJ	1389 GJ	-1.0%
Total	97 747 GJ	69 680 GJ	67 704 GJ	-2.8%



Projects planned for 2017–18 include:

Doone Kennedy Hobart Aquatic Centre

- The windows near the 25 metre pool will be double glazed.
- The hot water thermal storage tank will be decommissioned to reduce heat losses.
- Heat exchangers for the main pool air heating systems will be changed to increase the efficiency of heat transfer.
- Natural gas to be installed to provide improved plant reliability but also the ability to manage maximum electricity demand.
- A system will be installed to recover heat from pool water filter backwash.
- Further variable speed drives will be added to some pumps.

Civic and administrative buildings

- Work to upgrade heating in the Town Hall Lower Ground Conference Room and aldermen's lounge will be completed in 2017.
- New insulation will be installed in the roof of the main Town Hall auditorium.

What is a carbon dioxide equivalent?

Greenhouse gas emissions are measured in tonnes of carbon dioxide equivalent (tCO₂-e). For comparison, a typical sized car being driven 15 000 kilometres per year emits about 4 tCO₂-e/year.

- New building management systems in the Town Hall and Council Centre will enable improvements to building system control, leading to energy efficiency gains at both sites.
- More lights will be upgraded to LED technology in those areas of the Town Hall and Council Centre that have less energy efficient lights.
- **Multi-storey car parks**
- Solar panel systems are to be installed at Centrepont and Hobart Central car parks with a combined capacity of 50 kW.

Community halls and parks

- Fluorescent lights will be replaced with LED alternatives in several buildings during 2017–18, including a number of public toilets.

Depots, waste management and nursery

- More energy efficient heating systems for the Clearys Gates Depot workshops and potential for more solar panels will be investigated.
- A range of energy efficiency works, including lighting and heating, are to be investigated at the Bushland Depot and cost-effective measures will be implemented.

⁶ Hobart's population increases are relatively small, with an increase of 0.4% from 2013 to 2014: City of Hobart, Waste Management Strategy 2015–2030, May 2016, p. 10.

The Hobart community is also playing a role in reducing its energy use and reducing greenhouse gas emissions. Changes in behaviour, uptake of new technologies and increased use of renewables has seen energy use decrease by 8% over the past five years.

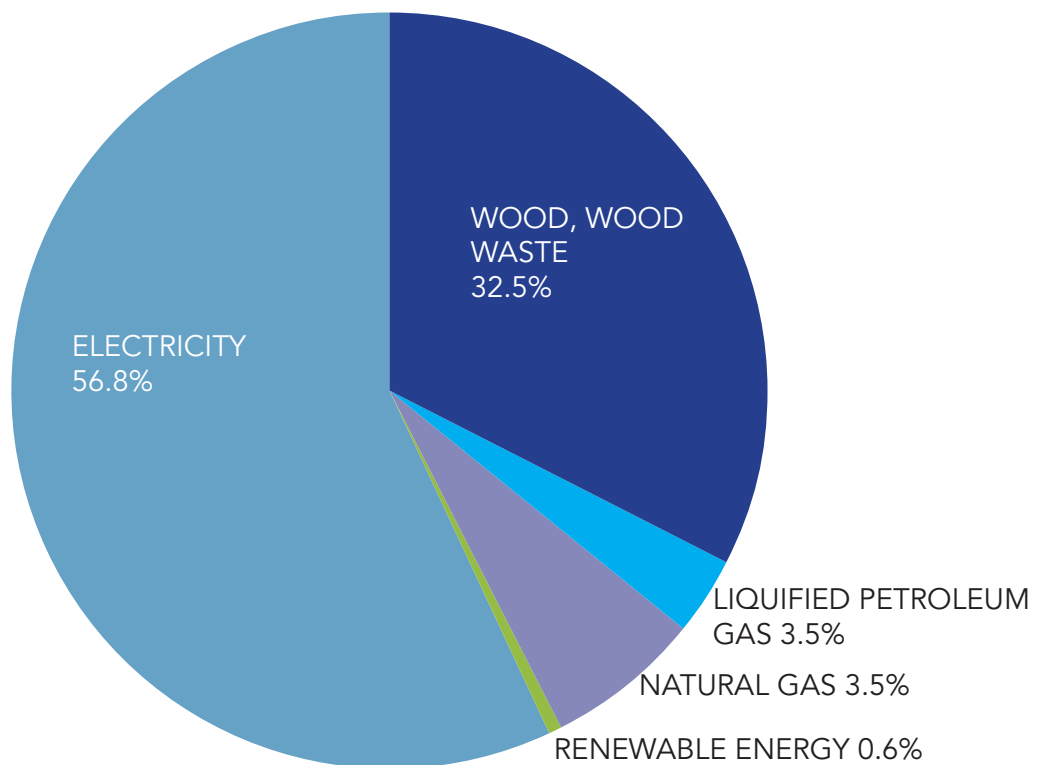
In Hobart, commercial electricity use has decreased by 9%. Combined with a reduction in community residential electricity use of 3%, this has had a positive impact on energy and greenhouse gas results. This happened despite population growth and amid a thriving local economy.⁶ The transition to a low-carbon future will have to be accomplished alongside challenges such as increased population and increased economic activity.

More information on mitigation actions that have been undertaken over the past two decades, or that are scheduled for the current financial year are described in Appendix A.

What is a gigajoule?

A joule is a measurement of energy, a gigajoule (GJ) is equal to one billion (10⁹) joules. A car with typical engine size will use about 40 gigajoules a year, while a four-person household with electric heating and hot water uses an averages 25 gigajoules a year.

Figure 2. Tasmanian community energy use







WASTE SECTOR

As waste breaks down in landfill it creates greenhouse gases such as methane. Waste takes more than 30 years to fully decompose once it is buried. As a result, even though the amount of waste being landfilled can decline, emissions can still continue into the future for decades. The City of Hobart wants to support the move towards a low carbon future by reducing waste generated emissions.

WHO DOES WHAT?

The Tasmanian Government regulates waste facilities and major composting operations across the state.

Local governments are responsible for management of community waste across their municipal areas. The City of Hobart owns and operates its landfill facility, and provides services for the collection and transport of domestic waste, including recycling and green waste, and its composting facility. The City has contracted a private company for recycling services.

The community is responsible for management of their waste including recycling, ensuring that it is appropriately disposed of and separated for collection services provided by the City.

City of Hobart waste operations

The McRobies Gully Waste Management Centre houses the Waste Transfer Station, the Resource Recovery Centre, a commercial composting facility, landfill gas and conversion to energy equipment, recycling and landfill services. Mulch and certified organic compost produced at the site from garden and other organic waste is used by the City in its parks and open spaces, as well as being for sale to the public.

Community waste is included in the City of Hobart's energy and greenhouse gas profile as it owns the McRobies Gully landfill and is able to control its operation. The City reports its actions to reduce waste each year, with the most recent report being the Greenhouse Gas Emissions and Energy Use Annual Report 2015–16.

Waste-related greenhouse gas emissions have reduced by 3% since 2010. This has been due to less waste creation, more recycling and renewable energy generation from landfill methane gas.

PAST AND PRESENT ACTION

The City of Hobart encourages sound waste practices through the following approach:

- waste avoidance
- reuse
- resource recovery and recycling
- reducing the amount of waste going to landfill.

The Resource Recovery Centre was recently upgraded, to enhance recycling, resale and reuse of materials. The centre provides recycling and collection facilities for waste engine oil, paint, concrete, e-waste, white goods, batteries, mobile phones, scrap metal, excess domestic recyclables, cardboard, green waste and fluorescent globes.

About 4500 tonnes of kerbside recycling and 12 000 tonnes of general waste are collected each year, and the successful implementation of a green waste collection service in 2016 diverted around 8000 tonnes of green waste in its first year from the McRobies Gully landfill.

Over the eight years to 2015, general waste going into the City of Hobart landfill has halved. In the past 12 months, a 15% reduction in the amount of waste in the average residential kerbside bin has been achieved (1.67 kg/household/week).⁷

McRobies Gully Waste Management Centre—powering up the city

Landfill gas generated at McRobies Gully is captured and used to generate electricity at a facility owned by AGL. In 2015–16, the landfill extraction system destroyed methane equivalent to 34 992 tonnes of carbon dioxide. This is the same as removing 10 292 cars from the road for a year and produced enough electricity to power around 1212 average Tasmanian homes.

There is also a 20 kW solar panel system installed at the Waste Transfer Station and a 5 kW system at the Resource Recovery Centre to reduce net electricity use at the site.

Green waste collection

In the past 12 months the City of Hobart has collected 170 634 green waste bins. This equates to 674 full trucks of material diverted from landfill thus avoiding future greenhouse gas emissions. A total of 1185 properties have opted in to the service, in addition to the approximately 12 000 properties that the service was originally rolled out to.

Recycling and waste minimisation continues to be improved at City of Hobart events. Material generated by the Taste of Tasmania festival is recycled and composted, diverting it from the landfill. Significant actions are being made to continue this trend at the Taste of Tasmania and other events.

The City of Hobart runs a home composting education initiative involving workshops, public artwork and 'how to' resources aimed at mobilising people to compost their food waste at home.

Work is also underway to assess a food organics collection service to complement the green waste service. This would reduce the amount of waste in kerbside general waste bins, which would have a major impact in reducing both waste to landfill and greenhouse gas emissions.

⁷ City of Hobart, Waste Management Strategy 2015–2030, 9 May 2016.



Waste reduction grants support zero waste

- Now in its third year, the waste reduction grant program operates as part of the Urban Sustainability Grants and offers \$20 000 annually for grants of up to \$5000.
- Nine projects over two years have been given \$40 000 for waste avoidance and recycling projects.

FUTURE RESPONSES

Over the coming four years the City of Hobart aims to help households cut their general waste from 11 kg to 4 kg per week through increased recycling, education and recovery of organics waste such as food scraps.

The City is aiming for zero waste to landfill in Hobart by 2030 and has released a new Waste Management Strategy 2015–30 to guide its actions to achieve this.

The current estimates are that the City's McRobies Gully landfill will reach capacity by 2030. When the capacity of the McRobies Gully landfill is reached the City of Hobart wants to be in a position where there is no material left for disposal to landfill.

The City of Hobart does not intend to open any further landfills, and as such, any residual waste would result in transport and disposal costs to the Copping waste facility in the Sorell municipal area. Therefore, the lower the amount of waste generated by the community, the lower the landfill disposal costs for ratepayers.

The City of Hobart aims to achieve this vision by working collaboratively and supportively with partners across the community, government, and industry sectors to deliver economically, environmentally, and socially beneficial waste reduction programs.

HAVE YOUR SAY

Building on its existing commitment to reduce waste-based emissions, the City of Hobart would like to know:

- What waste-based emission reduction aims do you want for the future?
- How can the community and City of Hobart further help to reduce waste-based emissions?
- What information is required to raise awareness about how residents, businesses and communities can help reduce waste-based emissions?
- How can the City of Hobart respond to climate change?
- What is required to build resilient communities, businesses and natural systems?
- What are the short- and long-term actions that the community or City of Hobart should undertake and why?
- Other comments and suggestions.



RESIDENTIAL AND COMMUNITY SECTOR

WHO DOES WHAT?

The Tasmanian Government has overall responsibility for the provision of the state's energy assets and resources. Unlike other states, the Tasmanian Government owns the retail, network and generation businesses and can therefore directly influence the state's transition to a low-carbon future. It has committed to zero emissions by 2050⁸ as part of the amendments to its Climate Change (State Action) Act 2008.

The City of Hobart has a key role in working towards a low-carbon future. While the City cannot directly control community emissions it can work towards better informing, supporting and working with the community to reduce energy use and emissions.

The community sector, businesses and households are responsible for actions to reduce their energy use and installation of renewable energy technology such as solar and wind.

PAST AND PRESENT ACTION

Residential energy use trends over the past five years indicate that energy efficiency and awareness raising programs, alongside price changes, have had a positive impact in Hobart. Despite having a cold climate (more demand for heating) and homes that have traditionally been difficult to heat because of poor insulation, households in Hobart continue to reduce electricity use.

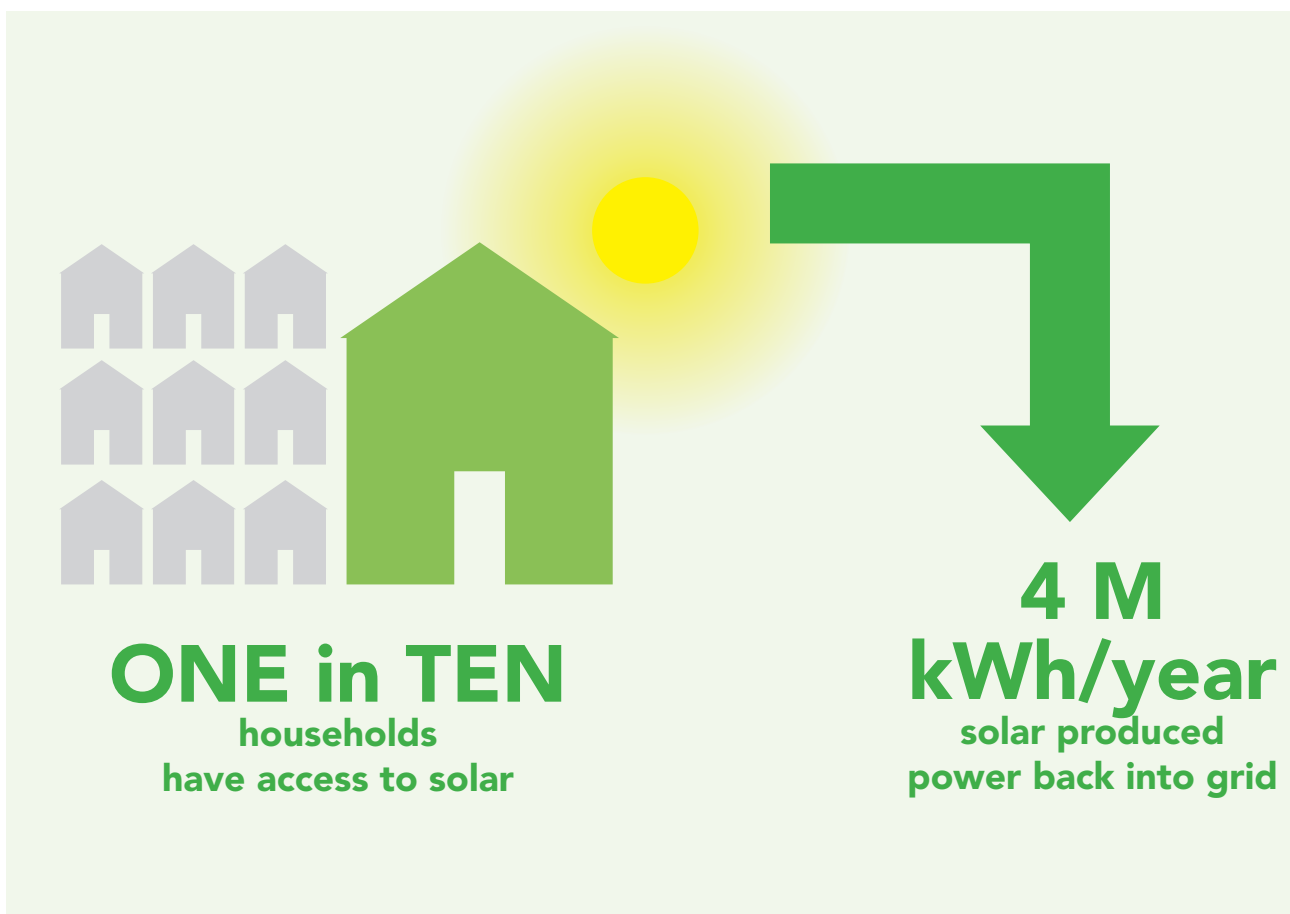
⁸ Tasmanian Government, Climate Action 21, 2017–2021
Tasmanian Climate Change Action Plan, p. 22.

Figure 3: Hobart residential electricity use

Source: City of Hobart, 2017, source data provided by TasNetworks, 2016. Electricity units are typically in kilowatt-hours (kWh), the same as the units charged on electricity bills.



Figure 4: Solar power in Hobart

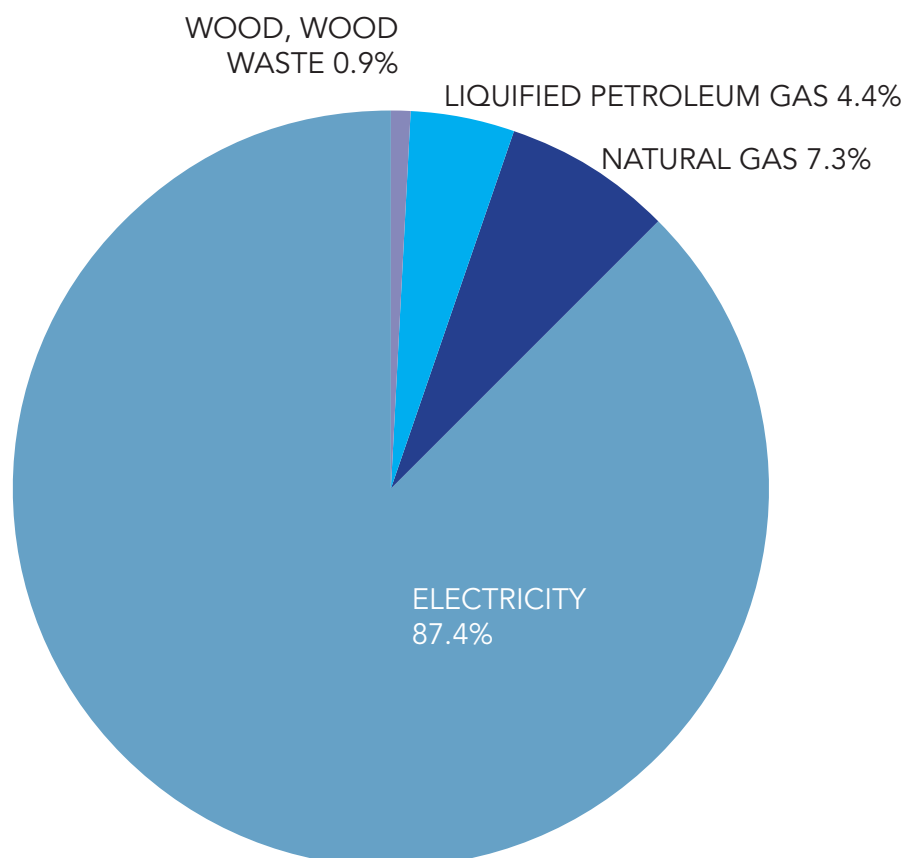


Energy efficiency savings in the residential sector have been easier to accomplish due to the take-up of national subsidies and increased use of heat-pump hot water services, alongside federal government minimum performance standards for appliances.

The colder climate and older building stock has made improving the performance of building stock a priority. The Get Bill Smart program evaluation showed that installing insulation is clearly a beneficial measure. New Zealand, where the climate, building stock and health problems are similar to Tasmania, has focused on insulation and has now insulated one-quarter of all buildings. This has been delivered with information campaigns to change household behaviour to be warmer, drier and healthier. It has made a significant difference to people's lives and reduced costs for the health system.

There have also been several programs focused on improving the health and comfort of low-income households in Tasmania. Consideration has been given to energy price increases impacting the most vulnerable. The Tasmanian Council of Social Services advocates on energy issues and has produced educational material in partnership with Sustainable Living Tasmania.

Figure 5: Residential greenhouse gas emissions



Home Energy Toolkit

For people concerned about their home energy use, the City of Hobart has developed the Home Energy Audit Toolkit for free borrowing through a partnership with the Southern Tasmanian Council Authority's Regional Climate Change Initiative.

The toolkits come with information developed specifically for our Tasmanian climate, tips and equipment to help households conduct a simple home energy-use audit and identify wasted energy. Investing a little time and money on energy efficiency upgrades can really pay off and the toolkits help people make decisions that could save hundreds of dollars each year. As one program recipient said: 'It sure busts a lot of myths about which appliances use power'.

The toolkits include:

- Power-Mate—enables measurement of electricity consumption of all electrical appliances
- Infrared radiometer—used to check for leaks around fridge doors
- Stopwatch—assists in determining flow rate of hot water from showers
- Compass—assists in identifying suitable orientation of roof aspect for hot water and electricity solar panels.
- Thermometer—enables measurement of air temperature around houses.

More than 250 kits have been purchased and at least one is available free from all 29 Tasmanian local governments. The kits are also available to schools through the Take it Home program, which includes curriculum resources for teachers. More information can be found at www.hobartcity.com.au

Dr Edward Hall Environment Grants

Through the Dr Edward Hall Environment Grant program, the City of Hobart provides \$30 000 each year to assist schools, community groups and businesses. Grants of up to \$5 000 are available for projects related to energy efficiency, reducing waste, air quality, water quality, community food gardens, climate change, urban sustainability, sustainable transport, community awareness or local biodiversity. Over the past six years, the grants have supported almost 50 projects in Hobart, including school recycling initiatives, energy awareness, walking school buses and interactive social media campaigns to reduce waste going to landfill in Hobart. For more information go to www.hobartcity.com.au

City of Hobart energy information and awareness

The City developed the publication, Energy Efficient Design Guidelines specifically for Hobart's climatic conditions, and they can be used to improve the energy performance of new homes and renovations. It has also funded the Australian Solar Council Design Series for Homes in Cool Climates that is available at www.hobartcity.com.au

Alongside information and behaviour change programs, local government can foster the adoption of energy efficiency and renewable energy action through financial measures. From 2009–13, the City of Hobart offered a successful program of direct subsidies for insulation, solar hot water systems and building applications that demonstrated energy efficient design.

Southern Tasmanian Home Energy Bulk Buy

A key part of Tasmanian local government activities has been forming strategic partnerships with other organisations such as state government departments, community groups and businesses to deliver programs, projects and events.

The City of Hobart and southern local governments, through the Southern Tasmanian Councils Authority Regional Climate Change Initiative, are collaborating with ecohomeguide.com.au on the Home Energy Bulk Buy. This is a buying group for cheap, energy-efficient heat pumps, hot water services, insulation, LED lighting, solar panels and other products.

Buying in bulk brings down the cost per item. Products chosen for the buy will be based on quality, price and performance.

The Home Energy Bulk Buy is available at the same time as the Tasmanian Energy Efficiency Loan Scheme and delivered from October 2017 through to May 2018.

FUTURE RESPONSES

Warm, healthy homes

Hobart has a predominantly older housing stock which is poorly insulated or not insulated at all. In the colder Tasmanian climate, uninsulated and under-heated homes create cold, damp housing, which impacts our health and wellbeing. The young and old are more sensitive to poorly heated homes. Research shows that children in cold, damp homes exposed to mould can develop asthma and that older people can suffer from circulatory problems such as pulmonary (lung) disease.⁹

The savings to the health system from using healthier, more efficient heating are a lower likelihood of asthma attacks, deaths, hospital admissions, GP visits and pharmaceutical purchases.

Ten actions to take around your home to reduce energy use

1. Install quality insulation, safely.
2. Choose efficient heating sources.
3. Upgrade your hot water system to be efficient, correctly sized and insulated.
4. Install heavy curtains and pelmets to reduce the heat loss from windows.
5. Seal heat-escaping cracks, block unused chimneys and have closable vents.
6. Change showerhead to waste less water.
7. Switch to energy efficient fridges, washing machines or televisions.
8. Dry washing outside in the sun (not inside—too much moisture).
9. Switch to LED lighting.
10. Open windows regularly and at warm times of day to get rid of excess moisture and improve indoor air quality.

⁹ A Grimes et al., Cost Benefit Analysis of the Warm Up New Zealand: Heat Smart Programme, June 2012, New Zealand Ministry of Economic Development, p.3.



House renewable energy

Growth in the solar PV sector has been significant as system costs continue to fall.¹⁰ The systems that residences and commercial buildings are installing are getting bigger. The Australian PV Institute estimates there are over 70 rooftop systems between 10–100 kW in the Hobart area,¹¹ when the average system size a decade ago was 1.5 kW.

More people are taking control of their electricity bills and investing in their own on-site renewable energy systems. Hobart residents that lead the way in both solar PV and solar hot water systems are in New Town, Lenah Valley and Cornelian Bay.

Is solar right for you?

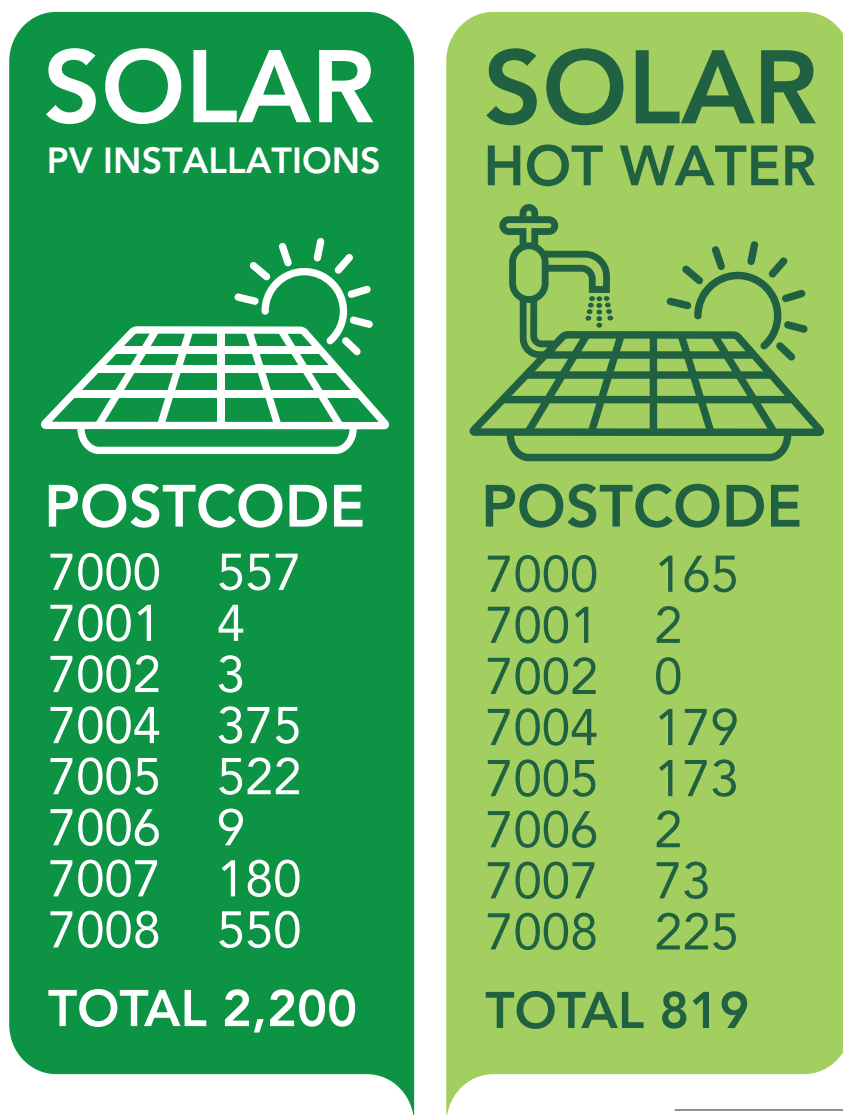
There are a range of factors that determine if installing solar is a good option for your home. The size of the system, building occupants' activities and time of day at home, access to sunlight, quality of product and feed-in tariffs offered by your local energy retailer, all impact the payback period for solar PV systems. Sometimes, solar hot water systems make a better choice or both systems can be installed. In some instances it may not be financially attractive, in which case the building owner may be investing for environmental or other reasons, such as remote area power supply. To help determine whether it makes sense for you, seek a variety of quotes and check the following information sources: www.solaraccreditation.com.au/consumers/solar-faq.html, <http://sustainablelivingguide.com.au/house/install-solar-hot-water>

¹⁰ Australian PV Institute annual reports show decreasing costs of solar in \$/watt, viewed 13 June 2017, <<http://apvi.org.au/reports/>>.

¹¹ Australian PV Institute, 'Mapping Australian Photovoltaic Installations', viewed 13 June 2017, <<http://pv-map.apvi.org.au/historical#4/-26.67/134.12>>.



Figure 6: Solar postcode leader board



There are over 800 homes with solar hot water systems in Hobart.¹² By heating water at the source, the householder saves energy losses from generating, transmitting and storing electricity or gas. Solar hot water systems also take pressure off the electricity system (and the costs of maintaining a bigger grid system). This is particularly beneficial when managing the grid at peak times such as in the morning and in the evening in Hobart.

¹² Australian Government Clean Energy Regulator, 'Postcode data for small-scale installations', viewed May 2017, <<http://www.cleanenergyregulator.gov.au/RET/Forms-and-resources/postcode-data-for-small-scale-installations>>.



HAVE YOUR SAY

Building on existing actions by residents and the community, the City of Hobart would like to know:

- What residential and community energy and greenhouse gas aims do you want for the future?
- How can the City of Hobart further help residents and the community to reduce their energy use and greenhouse gas emissions?
- What information is required to raise awareness about how residents and the community can reduce energy use and greenhouse gas emissions?
- Other comments and suggestions.







TRANSPORT SECTOR

Vehicles with engines powered by fossil fuels such as petroleum and diesel produce greenhouse gases. The City of Hobart wants to support the move towards a low-carbon future by helping to reduce transport-based emissions.

WHO DOES WHAT?

The City of Hobart and the Tasmanian Government's Department of State Growth manage different aspects of transport for access to and around Hobart.

The Tasmanian Government is responsible for managing traffic lights and highways, including the Brooker Highway and the Southern Outlet, and it also has responsibility for the public transport business, Metro Tasmania.

The City of Hobart is responsible for minor roads and the control of most traffic management functions in Hobart other than traffic lights. It has shared responsibility for traffic regulation signs and road line markings. The City is developing a draft transport strategy, which will provide a comprehensive overview of transport issues in Hobart and surrounding areas and key roles and responsibilities.

The Hobart 2025: A Strategic Framework vision also sets out a desire for a highly accessible Hobart through efficient transport options.

Transport fuels, such as petrol, diesel and natural gas and their distribution is provided by the petrochemical sector. They are regulated by the Australian Government to ensure they meet national standards and to reduce the amount of toxic pollutants in vehicle emissions, such as benzene and particulates. The regulations are an essential step by the Australian Government to facilitate the adoption of better, cleaner emission control technology, the more effective operation of engines, and to reduce pollution and vehicle emissions.

The community is responsible for the transport options they choose, such as whether they walk, cycle, drive a vehicle or use public transport, all of which are influenced by their residential location and personal fitness.

PAST AND PRESENT ACTION

The transport sector has undergone a significant change from an established trend of increasing yearly fuel use to a reduction of 12% from 2010–11 to 2014–15. This has, in turn, reduced transport emissions by 12%. Increasing numbers of walkers and cyclists in Hobart are one contributing factor, as well as changes in vehicle ownership and improvements in fuel efficiency. The types of vehicle available are changing; there are now 29 electric vehicles identified in Hobart.¹³ In the past couple of years, the number of registered electric vehicles has doubled.

¹³ The type of vehicle, whether it be plug-in hybrids or fully electric is not specified. However, if plug-in hybrids were included the number is likely to be far higher as taxi fleets have adopted hybrid vehicles, etc.

Difference between electric vehicles and hybrid

Hybrid cars get their power from both petrol and batteries while electric cars get all of their power from electrical sources, and thereby are completely non-polluting zero-emission vehicles.

Hobart has a relatively high number of residences within 5 km of the city centre. This, alongside high-quality tracks and trails into the city, have encouraged many people to walk or ride to work. As a result of accessible and safe infrastructure, Hobart has the highest portion of people who walk to work in southern Tasmania.

Table 2: Weekday trips by local government area

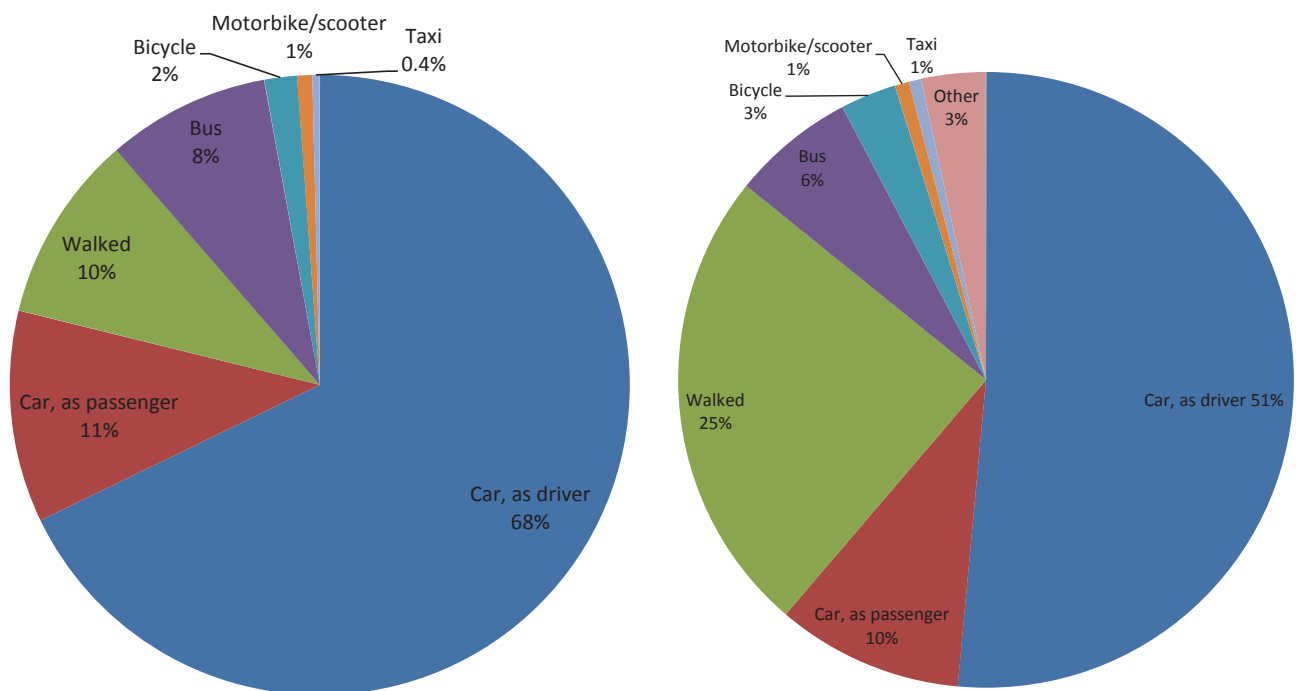
Source: Greater Hobart Household Travel Survey: [www.transport.tas.gov.au/ data/assets/pdf_file/0003/109731/Household_Travel_Survey_Summary_-_Final.pdf](http://www.transport.tas.gov.au/data/assets/pdf_file/0003/109731/Household_Travel_Survey_Summary_-_Final.pdf)

LGA	Car as driver	Car as passenger	Public transport	Walking	Other
Brighton	58.5%	25.1%	5.2%	10.3%	0.8%
Clarence	56.3%	20.4%	4.7%	17.0%	1.6%
Derwent Valley*	56.7%	21.9%	2.6%	18.6%	0.2%
Glenorchy	54.6%	21.1%	4.7%	17.9%	1.7%
Hobart	49.0%	17.0%	2.4%	30.2%	1.4%
Kingborough*	58.8%	19.5%	3.3%	17.5%	0.9%
Sorell*	58.7%	20.2%	7.2%	13.9%	-
Greater Hobart	54.7%	19.8%	4.0%	20.2%	1.3%

Compared to the surrounding regions, only in Hobart has there been a shift away from car usage (for drivers and passengers) for the journey to work. Journeys by bus, bicycle, motorbike/scooter and walking to work have increased.

Figure 7: Mode of journey to work to Hobart

Source: Department of Infrastructure, Energy and Resources, Journey to Work Data Analysis, pp 12–13. http://www.stategrowth.tas.gov.au/data/assets/pdf_file/0005/88610/Journey_to_Work_Report_2011_Census_Analysis.pdf



There are well established plans to progressively upgrade roads and cycling infrastructure in Hobart via the Hobart Bicycle Advisory Committee and Greater Hobart Bike Plan. Examples of other transport initiatives relevant to Hobart include:

- Tasmanian Urban Passenger Transport Framework—a Tasmanian Government plan for improved accessibility, liveability and health outcomes for communities, including a walking and cycling strategy.
- Light rail—community and government proposals to assess the viability of a reinstated north–south light rail route.
- Walking buses—based on volunteers assisting children to walk to school, operates around different schools in Hobart.
- A City with People in Mind plan from architect Jan Gehl, commissioned by the City of Hobart, which focuses on redesigning Hobart around people’s needs.
- Tasmanian Walking and Cycling for Active Transport Strategy—a Tasmanian Government plan to encourage more people to walk and cycle as part of their everyday journeys.

City of Hobart smarter vehicle management

The City of Hobart has already made many changes that are contributing to reduced emissions. For example:

- truck routes have been re-organised to save time, money and fuel
- fuel efficiency standards of vehicles and machinery have become selection criteria for new purchases
- improvements in the way services are delivered has reduced the use of vehicles and machinery
- driver education programs target more fuel-efficient driving techniques
- three new hybrid diesel trucks use up to 30% less diesel than regular trucks
- five compressed natural gas trucks that are used for maintenance and construction generate fewer emissions than traditional trucks
- a hybrid electric vehicle purchased as part of the City of Hobart's fleet is using 400 litres per annum less fuel than the equivalent petrol vehicle
- Hobart parking inspectors use walking, cycling or motorcycles to increase efficiency and get around the inner city effectively, while minimising fuel use.

Why Ride campaign

The Why Ride campaign actively promoted cycling as a positive transport choice in Hobart. It was promoted through side and rear of bus advertising on Metro buses in Hobart, Launceston and Burnie and received 500 pledges. It was supported by a \$15 000 private donation matched with local government funding and community group partnerships with Bicycle Tasmania, including \$5000 from the City of Hobart.

FUTURE RESPONSES

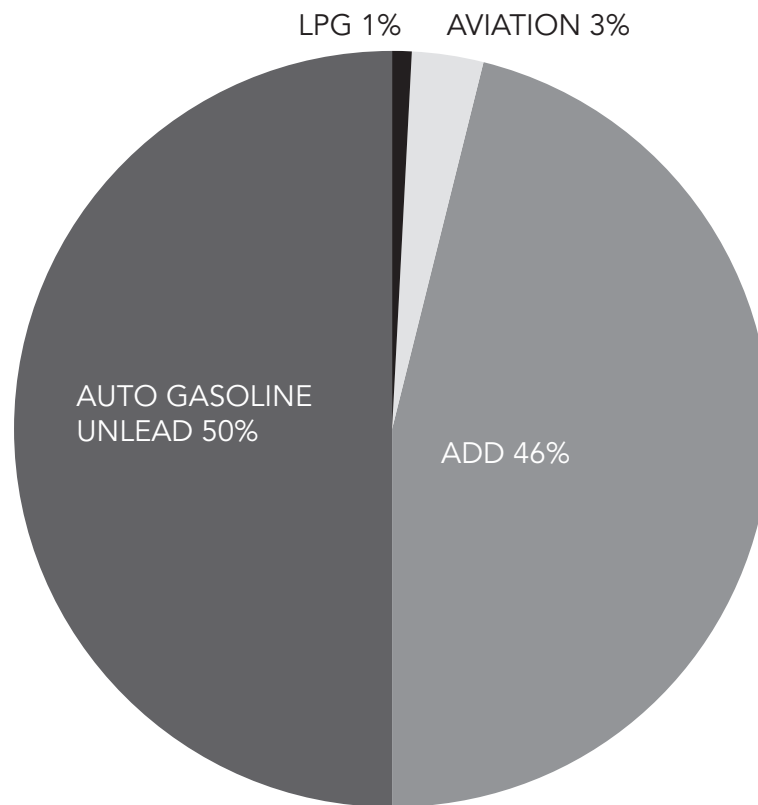
Transitioning away from fossil fuel use remains a major part of the internationally accepted approach to changing the emissions trajectory for the transport sector. This could include:

- increasing the uptake of public transport and active transport options
- switching to low-emission vehicles
- switching to biofuels, such as ethanol and biodiesel
- improving vehicle fuel efficiency
- improving freight efficiency
- travel demand management
- improved urban design.

At the heart of a sustainable transport future is a fundamental rethink of the built environment and the transport principles and infrastructure for the region. The transition towards a more sustainable transport system for Greater Hobart will require changes, along with a commitment from all three levels of government and the community to a coordinated long-term vision.

Figure 8: Transport greenhouse gas emissions 2014–15

Source: City of Hobart, 2017. Data: Australian Energy Statistics, 2017, National Greenhouse Accounts Factors.



NB: All greenhouse gas emissions are presented in tonnes of carbon dioxide equivalent (tCO₂e) as an industry standard and a format that is easy to compare greenhouse gas emissions with different impacts on the atmosphere

10 actions to conserve fuel, increase efficiency and reduce your carbon footprint

1. Walk or ride to work, the shops or friends' houses.
2. Catch public transport.
3. Car share.
4. Choose low-emission vehicles (based on vehicle fuel labels) when purchasing vehicles.
5. Choose hybrid electric or electric vehicles for new purchases.
6. Taxi or car share to increase the number of passengers in each car.
7. Organise a walking bus for your local school.
8. Choose fuel sources less harmful to the environment: biodiesel or ethanol.
9. Don't leave the car on unnecessarily.
10. Get safe, gripping tyres and keep them pumped up to ensure more efficient car travel.

New technologies rising

Emerging transport technologies, like electric cars, ride sharing, and intelligent transport systems can play a role in changing the nature of private transport.

Electric bicycles and electric cars are becoming more commonplace, with 29 fully electric cars currently registered in Hobart.¹⁴ Electric cars are currently more expensive to buy new than standard internal combustion engine vehicles, largely due to high battery prices and the low numbers produced. However, this is expected to change within a decade as manufacturers increase the number of electric cars being produced.¹⁵

Healthy transport

Hobart has a high portion of walkers and cyclists who use the many tracks, trails and footpaths available. Hobart has encouraged more people to navigate the city this way, including school groups through initiatives such as walking school buses.

City of Hobart electric vehicle charging stations

The City of Hobart has installed charging stations into one of its multi-storey car parks and has an electric vehicle (car) as part of its fleet.

While the purchase price may be higher, the running costs of electric cars are lower. This is because recharging an electric car is cheaper than filling an equivalent sized vehicle with petrol or diesel, especially if using overnight off-peak electricity rates, and there are lower maintenance costs due to fewer moving parts.

Ride-sharing services are part of the 'sharing economy' and becoming a more frequently used mode of transport across the world. Ride-sharing services have been permitted in Tasmania since November 2016, although Uber is the only ride-sharing platform provider in operation.

Car-sharing is another option. It is estimated that one car-share vehicle replaces about nine privately owned vehicles, with car-share members driving half the distance of non car-share members.

Intelligent transport systems involve technology that transfers information about and between transport and infrastructure systems for improved safety, productivity and environmental performance. Examples include:

- stand-alone applications such as traffic management systems, which are used to smooth traffic flows by coordinating ramp signals and information, in conjunction with warning systems installed in individual vehicles
- cooperative applications including vehicle-to-infrastructure and vehicle-to-vehicle communications, such as intersection arrival and collision avoidance systems, as well as traffic signal and variable speed control.

The Department of State Growth is exploring the possibility of using intelligent transport systems that drivers can access to help plan their journey, provide journey times adjusted to current conditions in the city, and inform them about accidents or major hold-ups.¹⁶

¹⁴ Australian Bureau of Statistics, 'Data by Region', viewed 14 June 2017, <<http://stat.abs.gov.au/itt/r.jsp?databyearegion#/>>.

¹⁵ Radio New Zealand, 'Electric cars close to price parity, conference told', viewed 14 June 2017, <radionz.co.nz/news/national/307388/electric-cars-close-to-price-parity,-conference-told>.

¹⁶ City of Hobart, unpublished private transport stakeholder consultation outcomes for Module 2: Private Transport, 2017.

Walking buses

A walking bus encourages children to walk in a group to school. The 'bus' travels along a set route to school, picking up children along the way at designated meeting points or at each child's front gate. Children get extra exercise each day which helps them to focus and burn off extra energy. In 2004, South Hobart Primary was the first school in Tasmania to start a walking bus with the help of the City of Hobart and Sustainable Living Tasmania (then Tasmanian Environment Centre) and a federal grant. There are now more than 10 walking buses operating in Tasmania.

Hobart is not uniform in its layout. There are areas where it is easier for people to walk to work and use existing tracks and trails to do so. Some areas are still developing the infrastructure necessary to make people's journeys enjoyable, safe and healthy.

Cycling demand in Hobart is increasing; commuter counts of major cycling paths show an increase of 20–50 cyclists per day between the years 2011 and 2016.¹⁷ To create a network of arterial cycling facilities, on-road cycling paths are needed for higher levels of safety and amenity for all road users. The Sustainable Transport Strategy 2009–2014 includes a plan to connect high-density population areas with streamlined routes into the city.

Map 1: Hobart principal cycling and walking network

Source: City of Hobart, Sustainable Transport Strategy 2009–2014, p 20.



NB: to see updates on the arterial bicycle network route upgrades see: www.cyclingsouth.org

¹⁷ Cycling South, 'Hobart Commuter Counts', viewed 16 June 2017, <<http://www.cyclingsouth.org/index.php/component/k2/item/120-counts>>.

Greater Hobart cycling culture and infrastructure

Greater Hobart metropolitan areas have established a committee for the coordination of cycling infrastructure and programs called Cycling South: the City of Hobart, Brighton Council, Clarence City Council, Glenorchy City Council and Kingborough Council. Cycling South aims to encourage increased recreational and transport usage of bicycles through the development of an integrated cycling network.



HAVE YOUR SAY

Extensive public consultation on transport issues has recently occurred for the development of the City of Hobart's Transport Strategy 2018–30. While this has included consideration of options to reduce energy use and greenhouse gas emissions, additional comments and suggestions can be made through the consultation for the climate change strategy.

The City of Hobart would like to know:

- What transport-based emission reduction aims do you want the community to have for the future?
- How can the community and City of Hobart help reduce transport-based emissions?
- What information is required to raise awareness about how residents, businesses and communities can help reduce transport-based emissions?
- Other comments and suggestions.





COMMERCIAL SECTOR

The commercial sector is vital to the Hobart economy. As for other sectors, it contributes to greenhouse gas emissions in a variety of ways, from fuel consumption for transport and use of electricity through to generation of waste and materials manufacturing. The City of Hobart wants to encourage and support more efficient, cost-effective businesses and a low-emissions future.

WHO DOES WHAT?

The Tasmanian and Australian governments provide the necessary statutory requirements and programs to ensure high quality, energy efficient and climate ready commercial development. They are responsible for standards such as the National Australian Building Rating System and National Construction Code.

Local Governments require these to be met at a development planning stage. The City of Hobart's role is primarily to ensure building standards are met and to provide information to assist with improved energy efficiency. The City of Hobart has aimed to influence commercial building practices through leadership with its own assets.

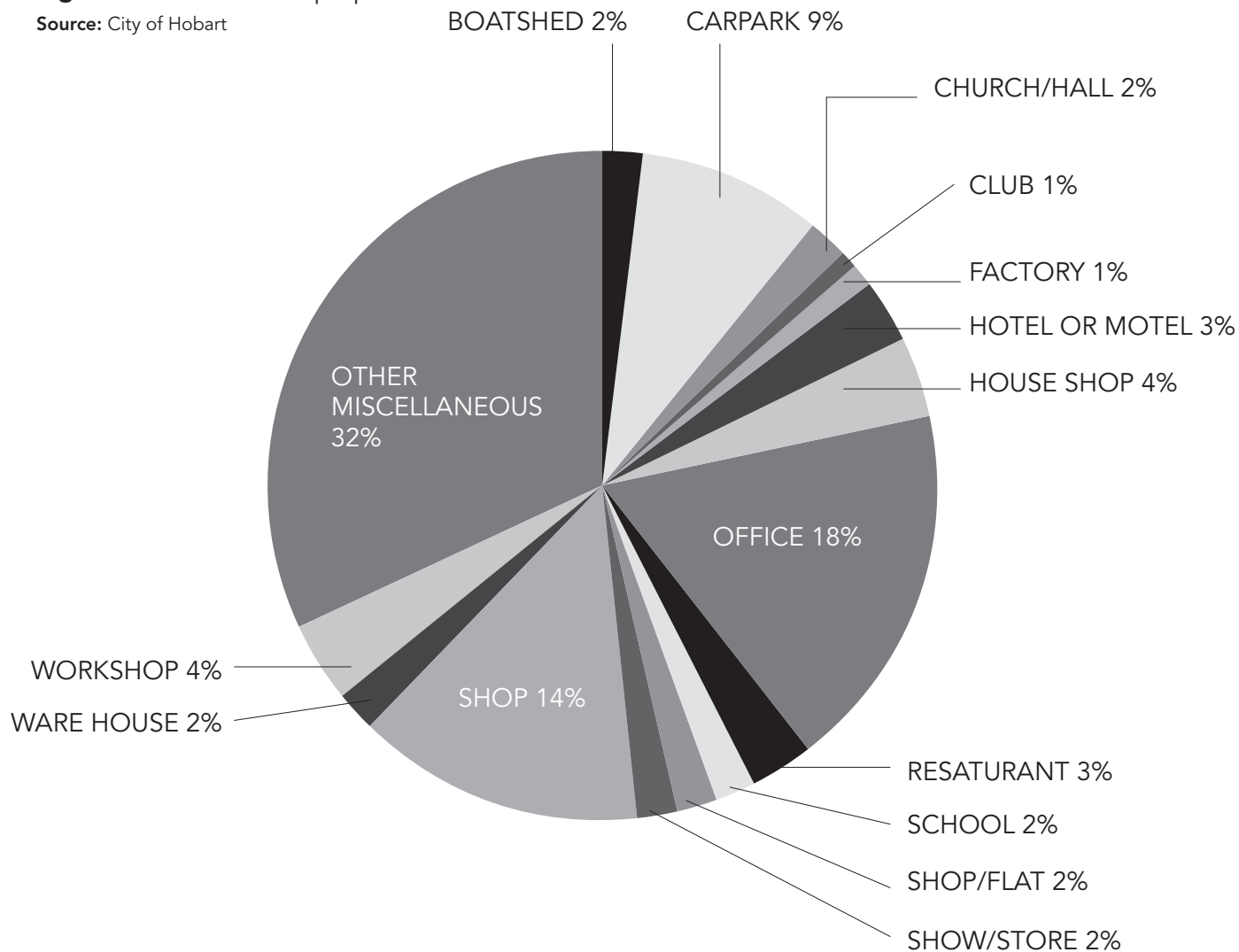
The private sector and non-government organisations provide voluntary and commercial programs to assess, implement and monitor the environmental performance and sustainability of buildings and assets. The Green Building Council of Australia has been a leader in this field, developing the Green Star rating system that consists of four rating tools:

- Green Star—Design & As Built (for any building type)
- Green Star—Communities (for neighbourhoods and precincts)
- Green Star—Performance (for building operations)
- Green Star—Interiors (for fit-outs).

The commercial sector's businesses and industries are responsible for the management of their environmental performance and sustainability of their assets and buildings.

Figure 10: Commercial properties in Hobart

Source: City of Hobart



There are over 6000 local businesses. Hobart's commercial sector consists mainly of offices, shops and accommodation. The commercial sector is responsible for roughly one-quarter of community energy use and greenhouse gas emissions. Building owners are responsible for the energy performance of their buildings, while business and retail tenants are responsible for the fixtures, fittings and behaviour. There are many different types of businesses with different energy uses. This means attempts to reduce energy use have to be individually tailored.

Governments can work closely with large businesses and organisations to find long-term solutions to energy management challenges. There are also stringent energy-efficiency requirements for new buildings as part of the National Construction Code, administered by the Tasmanian Government, including mechanisms to support the uptake of renewable energy.

City of Hobart energy use reductions

The City of Hobart has achieved significant reductions in energy use. Operations reduced energy use from 97 000 GJ in 2009–10 to 69 600 GJ in 2015–16, largely as a result of projects and measures taken by the City to improve energy efficiency. This followed a 75% reduction in corporate emissions from 2000 to 2010.

The well-accepted approach in the commercial sector for medium to larger enterprises is to undertake energy audits for each building. This establishes the high priority actions, costs and benefits, and payback period for investments.

Advocacy can be a key factor in statewide changes that reduce barriers for local businesses to reduce their emissions. The City of Hobart, for example, is working on an environmental upgrade agreements program with the Tasmanian Government.

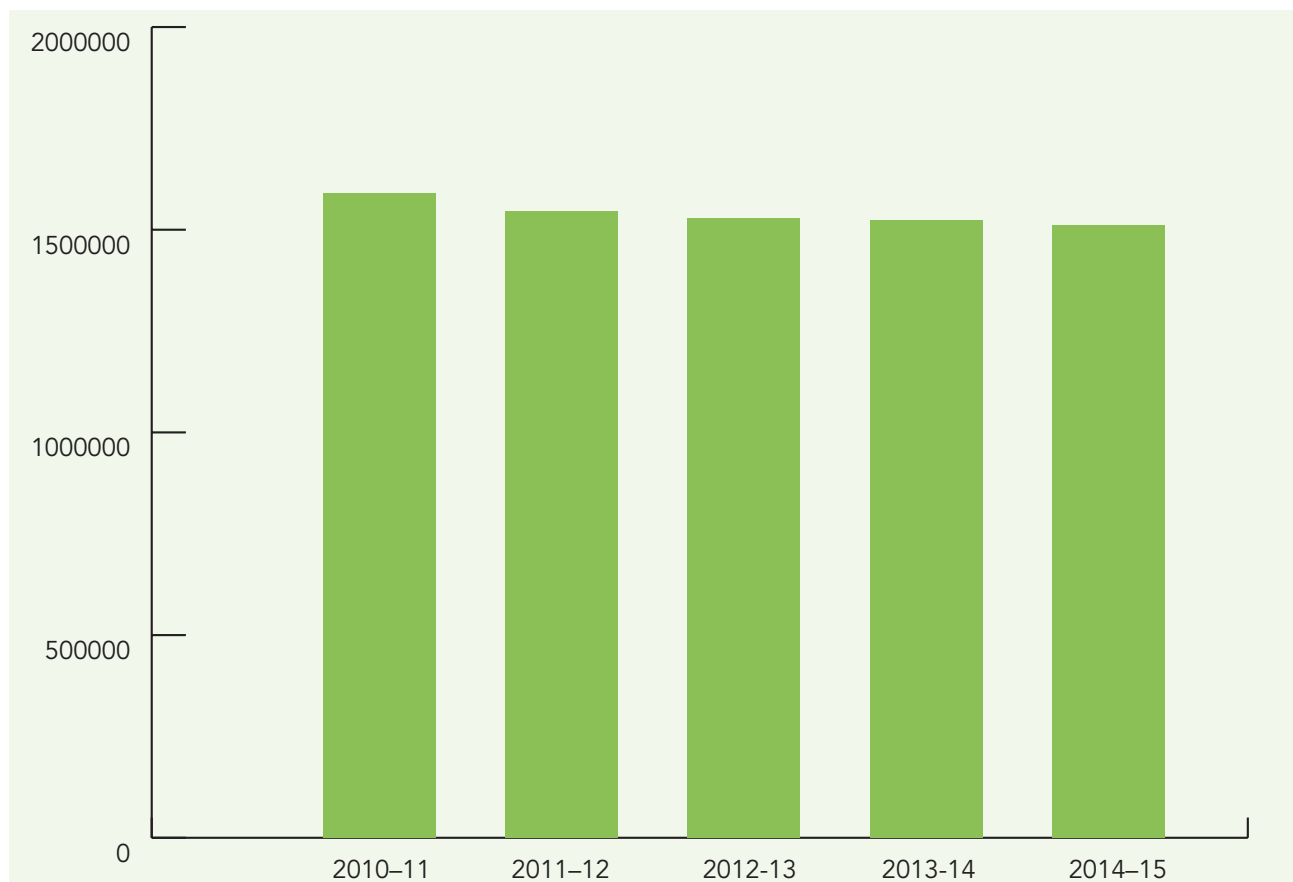
PRESENT AND PAST ACTION

Over the past five years commercial energy use has reduced by 5%. Commercial energy use has primarily declined due to 9% less electricity use over the past five years. This resulted in a 6% decrease in greenhouse gas emissions from 2010–11 to 2014–15.

This decrease occurred despite the number of new commercial connections increasing by 1200 during the same period. Energy efficiency, renewable energy systems and energy price changes are most likely to have influenced this trend.

Figure 11: Commercial energy use

Source: City of Hobart, 2017. Data sources: Australian Energy Statistics, 2017, TasNetworks, 2016, Tas Gas, 2016.

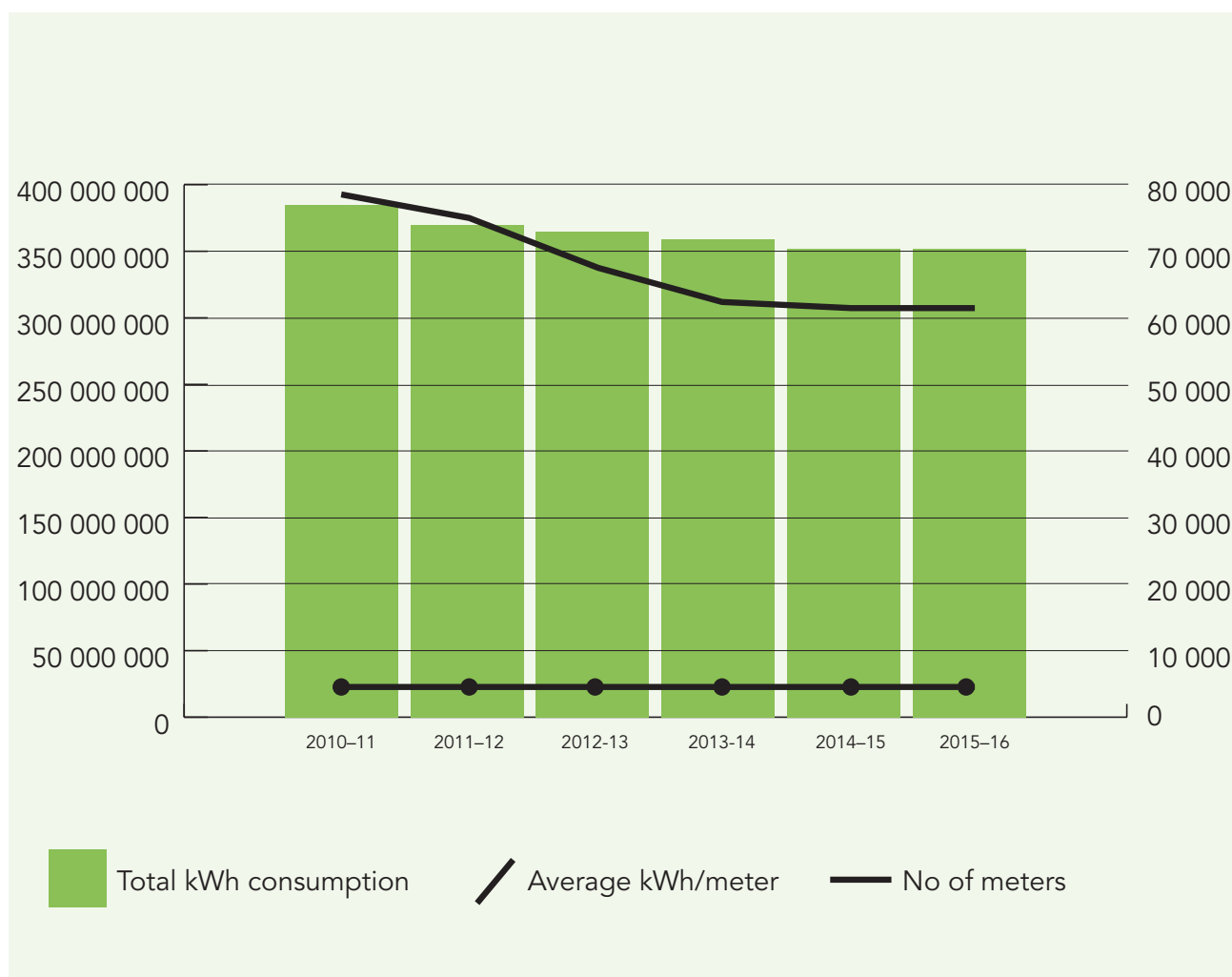


NB: All energy use is presented in gigajoules (GJ) as an industry standard and a format that is easy to convert with other energy values.

Electricity use has decreased per commercial meter and in total.

Figure 12: Commercial electricity use

Source: City of Hobart, 2017. Data sources: TasNetworks, 2016.



NB: Electricity use is represented as kilowatt hour (kWh). One kWh is equal to one unit on electricity bills.

Changes in energy consumption have been influenced by a range of energy pricing and awareness raising measures at local, state and federal government levels. These include:

- National Australian Built Environment Rating System, which measures the environmental performance of buildings and tenancies, and is a cooperative of federal and state governments
- National Construction Code, which sets the minimum new building performance standards that are legislated by every state and territory government
- CitySwitch, which provides a no-cost service that supports commercial office tenants to improve office energy and waste efficiency
- Tasmanian Energy Efficiency Loan Scheme, which is a Tasmanian Government energy efficiency purchasing scheme for households and small businesses
- Tasmanian Government electricity tariff pricing, which generates solar electricity credits on bills (feed-in tariffs) and time-of-use pricing that is used to either encourage electricity use at certain times of day or reduce costs to the whole network.

Doone Kennedy Hobart Aquatic Centre

The Doone Kennedy Hobart Aquatic Centre is a high energy user due to long operating hours, significant heating requirements and pumps and fans. The City of Hobart has undertaken many energy efficiency measures to bring down the centre's emissions and costs. As a result, there was a 19.7% reduction in energy use in 2015–16 compared to 2009–10. Examples of actions include:

- air flow control dampers reduce heat losses when the centre is not open
- replacement of the main centre pool hall lighting with more efficient lights
- car park tower lights were replaced with LED lights
- better control of fans using variable speed drives
- installation of power factor correction systems to make power use more efficient
- upgrades to heating and air conditioning systems, with improved controls and more efficient technology.

FUTURE RESPONSES

There is an ever-growing range of technologies that the commercial sector can implement and activities that can be undertaken to reduce emissions, especially from energy. Not only will these actions reduce emissions, they will often save businesses money as well.

Ten things you can do for your business

1. Choose energy efficient lighting.
2. Install insulation or increase thickness of insulation.
3. Choose efficient heating sources.
4. Upgrade your hot water system to be efficient, correctly sized and insulated.
5. Seal heat escaping cracks, block unused chimneys and have closable vents.
6. Switch to more efficient fridge, washing machine or Televisions.
7. Encourage employees to switch off equipment when not in use.
8. Minimise heating or cooling loads—do fridges have to be on overnight or can soft drinks be re-cooled before business hours?
9. Can you create an insulated area between your business and the outside to prevent heat escaping as doors open?
10. Can your air conditioning operate on timers to avoid excessive heating?

Actions taken by the City of Hobart provide practical examples of the type of positive change that can be achieved. For example, the City of Hobart's energy program has reduced energy use in the Hobart Town Hall, Hobart Council Centre and Tasmanian Travel and Information Centre by 30%. Measures included:

- refurbishing the Town Hall with better insulation, low emissivity glass windows and improved heat pump heating and cooling
- installing higher efficiency components such as new chillers and compressors in the Council Centre building, allowing direct electrical heater banks to be decommissioned
- replacing previous recirculating hot water service at the Council Centre building to deliver hot water more efficiently to hand basins and sinks. The local hot water units no longer have storage so can be set to 40 °C, whereas storage systems must heat to at least 60 °C to prevent legionella
- a heating and lighting energy retrofit project in the Tasmanian Travel and Information Centre, including thicker roof insulation, LED lights installed and improved controls for the heat pump system
- replacing hot water services with energy efficient heat pump systems, with over 30 units now installed. The heat pump systems reduce energy use by over 70% compared to a direct electric unit and can be used in a wider variety of circumstances than solar hot water systems.

Lighting

Lighting can be a major source of emissions and financial costs for building owners. LED light are becoming more efficient, reliable and cost effective. They are different to fluorescent lights in the way they convert electricity to light. They are now significantly more energy efficient, generally last much longer, have lower maintenance costs and do not contain mercury, resulting in less environmental impact at the end of their life.

Electricity consumption from the City of Hobart's street lighting has been reduced by 15.4% over the past four years, largely due to the impact of lighting upgrades with energy efficient LED lights. Some 2300 street lights on the TasNetworks system were upgraded from 80 watt mercury vapour globes to 18 watt LED lights during 2014–15, with a further 200 replaced in 2015–16.

Across the city, savings have been equivalent to the electricity consumption of about 90 typical households.

Heating

Heating is another key focus area. Efficient heating systems not only improve the comfort of office workers or customers, but can reduce operating costs. Other measures include retrofitting buildings with energy efficient measures such as changing windows, increasing insulation and upgrading air conditioning systems.

Financing

The City of Hobart and the Tasmanian Government are investigating an Environmental Upgrade Agreements program for commercial building owners. The agreements are voluntary financial arrangements with favourable loan conditions for building owners to improve their building's energy efficiency and performance. The building owner borrows funds from a finance provider for energy improvements and then repays the loan through their rates. The program currently operates in New South Wales, Victoria and South Australia and is used across a range of commercial buildings to improve their performance and to install renewable energy.



HAVE YOUR SAY

The City of Hobart would like to know:

- What energy and greenhouse gas aims do you want for the commercial sector in the future?
- How can the City of Hobart work with businesses to reduce emissions from the commercial sector?
- What information is required to raise awareness about how businesses can reduce their emissions?
- Other comments and suggestions.



ABBREVIATIONS AND GLOSSARY

Carbon footprint

The amount of carbon people cause to be emitted: their carbon footprint.

Gigajoule (GJ)

Unit of energy measuring 1000 million joules.

Greater Hobart

All of the suburbs in the southern region surrounding Hobart's city centre that are captured by Glenorchy, Clarence and Kingborough local government areas.

greenhouse gas emissions

Gases emitted into the earth's atmosphere that that contributes to the greenhouse effect by absorbing infrared radiation and radiating heat. They include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (NO₂)

Hobart

Hobart municipal area

kW

kilowatts

kWh

kilowatt hours

LED

light emitting diode

MWh

megawatt hours

PV

Photovoltaics

tCO₂e

tonnes of carbon dioxide equivalent



APPENDIX A

CITY OF HOBART'S CLIMATE ACTION

The City of Hobart has an active program to reduce energy use and greenhouse gas emissions from its buildings, assets and operations, including waste management. Its biggest emissions reductions have been from the McRobies Gully Waste Management Centre where cogeneration of landfill gases produces enough electricity to power over 1000 homes and resulted in over 60% of its emission reduction success from 2000 levels by 2010.

Current targets focus on actions to reduce energy use and emissions from electricity and liquid fuels such as diesel and petrol. Given Tasmania's base electricity source is renewable hydropower and wind, an energy reduction target has been adopted alongside the emissions target:

- energy reduction target of 35% below 2009 levels by 2020
- greenhouse gas emissions target of 17% below 2010 levels by 2020.

The following section highlights the energy and emission reduction efforts across operations and buildings, along with ongoing efforts to reduce landfill emissions, including the zero waste to landfill target by 2030.

CITY OF HOBART EMISSIONS AND ENERGY ACTION FOR 2016–17

As part of its environmental management and strategic measurement systems, the City of Hobart monitors its corporate greenhouse gas emissions and energy use and reports annually. The following is largely an extract from its most recent report for the 2016–17 financial year.

The City of Hobart has been measuring and undertaking projects to reduce its greenhouse gas emissions since 1999. During this period it was involved with the Cities for Climate Protection™ program until the program's closure in 2008. Since then, the City has developed its own program to continue reducing emissions and saving energy.

2009–10 is used as the baseline year for reporting, as water and sewerage assets and operations were transferred to what is now TasWater at 30 June 2009. The operation of water and sewerage assets previously comprised a significant proportion of the City of Hobart's greenhouse gas emissions and about 25% of energy use.

WHAT IS MEASURED?

The City measures its Scope 1 and Scope 2 greenhouse gas emissions.

The Scope 2 emissions have been based on a standardised emissions coefficient for electricity of 0.23 tCO₂-e per megawatt-hour (MWh). This has been chosen to eliminate fluctuations resulting from annual changes in the coefficient for Tasmania. These fluctuations are caused by variations in the energy generation mix of renewable hydropower and wind, natural gas (Bell Bay) and largely coal-based electricity imported via Bass Link and can have a very significant impact on comparing one year's emissions with another.

What are Scope 1, 2 and 3 emissions?

Greenhouse gas emissions are counted under three categories. This helps organisations to manage and report on their emissions and avoids double counting.

- Scope 1 emissions are directly emitted, including combustion products from fuel use from vehicles (diesel and petrol), facilities using reticulated natural gas, emissions from waste/landfill (methane) and composting operations (methane and nitrous oxide).
- Scope 2 emissions are created in the processes of generating, transmitting and distributing the electricity used by the City.
- Scope 3 emissions are all indirect emissions (not included in Scope 2).

ENERGY USE

Various sources of energy are used including liquid and gaseous fuels, along with electricity. The unit of energy used is the gigajoule (GJ) or 1000 million joules. For comparison, a four-person household using electricity for heating and hot water consumes about 25–30 GJ/year.

Background

When the City of Hobart joined the Cities for Climate Protection™ program in 1999, its emissions were almost 70 000 tCO₂-e per year: about 10 000 tCO₂-e/year from water and sewerage operations.¹⁸

Between the years 2000 and 2010 greenhouse gas emissions were reduced by over 60%. This was achieved primarily through capturing landfill gas for electricity generation and diversion of green waste to reduce future emissions, along with use of digester gas from wastewater treatment plants.

Only limited further improvements can be made in reducing landfill gas emissions as gas capture is already being used at all suitable areas of the McRobies Gully site. Waste can generate emissions for over 30 years after it has been landfilled, so reducing waste in any given year has a minor impact on that year's emissions.

Given the limited potential for further waste-related savings, the City's primary focus has shifted to reducing emissions from energy use. In 2014, the City set targets to reduce greenhouse gas emissions by 17% and energy use by 35% by 2019–20 from 2009–10 levels.

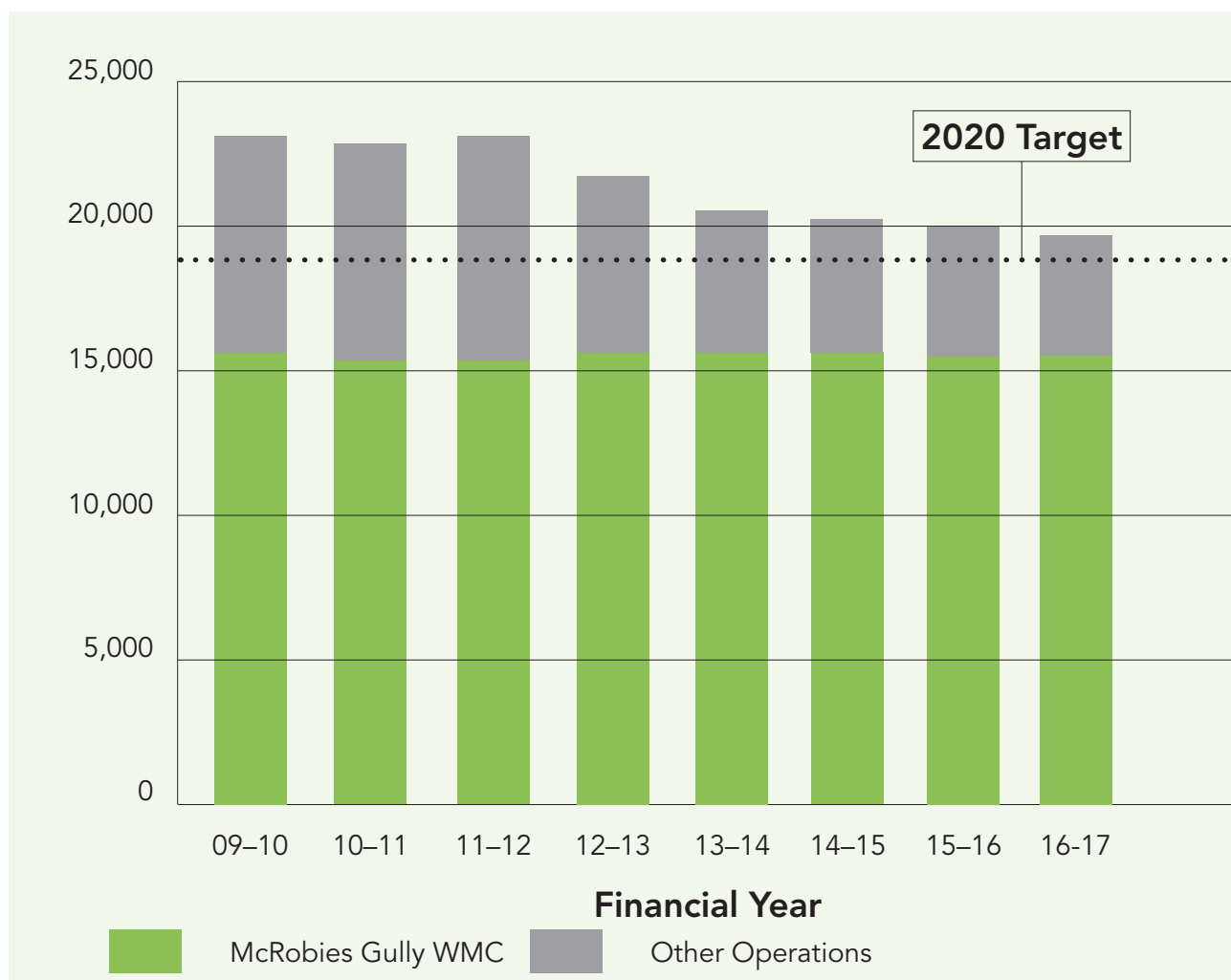
Greenhouse gas emissions 2016–17

The City of Hobart's corporate greenhouse gas emissions for 2016–17 were 19 723 t CO₂-e, including indirect emissions from electricity use. This represents a reduction of 295 t CO₂-e on the previous year and a 2562 tCO₂-e reduction since 2009–10.

The figure below displays emissions data over the past eight years, with the emissions related to the waste activities at the McRobies Gully Waste Management Centre and other operations and facilities.

¹⁸ These values are based on a global warming potential (GWP) factor of 25 for methane.

Figure A1: City of Hobart emissions since 2009–10.



The emissions from the McRobies Gully Waste Management Centre have been relatively stable since 2009–10, while emissions from energy use and other operations have been dropping more significantly.

The largest source of the City's greenhouse gas emissions is the McRobies Gully landfill. Landfill gas collection has been extended across all suitable areas of the site to minimise emissions, but there is a limit to the proportion of gas that can feasibly be extracted. Without gas collection, the emissions from the buried waste would be over 50 000 tCO₂-e per year.

A rise of about 85 tCO₂-e in emissions in 2016–17 resulted from increased composting-related emissions due to the higher quantity of green waste received from the kerbside

collection service. However, if this waste had been landfilled over time it would have resulted in about 500 tCO₂-e of emissions, so there are significant benefits to composting compared to landfilling.

Emissions from other operations have been lowered over recent years. A reduction of 130 tCO₂-e was achieved in 2016–17 compared to the previous year for 'other operations', and these have been reduced by about 1845 tCO₂-e (or 29%) since 2009–10.

The emissions from fleet vehicles and plant in 2016–17 was virtually the same as that in the previous year. Fleet-related emissions are trending lower over time, with some fluctuations.

Energy consumption in 2016–17

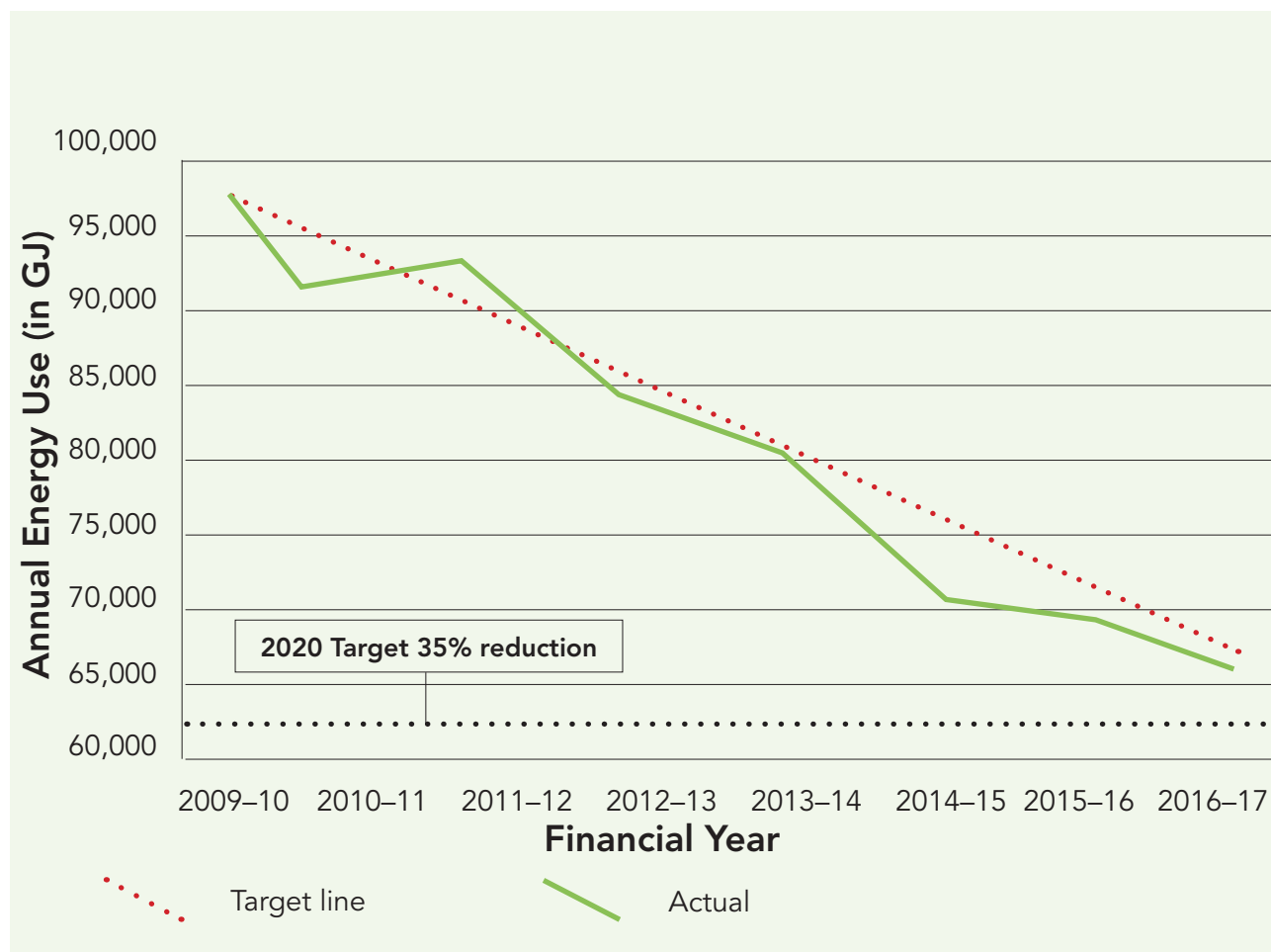
The major energy source for the City of Hobart is electricity, which comprised 60.6% of the total energy use in 2016–17. Liquid fuels, including diesel, petrol and bottled liquefied petroleum gas, used in vehicles and mobile plant, make up about 36.6%. The remaining 2.8% is natural gas used in compressed natural gas trucks and in facilities connected to the reticulated natural gas network.

Energy use has been reduced over recent years, largely as a result of energy efficiency measures. The amount used in 2009–10 was close to 97 700 GJ. In 2016–17, use had declined to about 67 700 GJ or a 30.8% reduction. The change has been relatively broad based, although there have been increases at some sites where additional infrastructure has been installed or there has been increased utilisation of a facility.

The average energy intensity for buildings has been reduced from 370 MJ/m²/year to 243 MJ/m²/year.

Fuel use has declined significantly, with a reduction of over 30% since 2009–10. Figure A2 shows energy use since 2009–10, with the dashed target line showing the straight-line trajectory that the City of Hobart would have to follow to meet its 35% reduction target by 2019–20. The actual result is tracking well ahead of the target line, though savings are becoming more difficult to achieve as the easier, more cost effective and larger energy efficiency works are completed.

Figure A2: City of Hobart energy use since 2009–10.



The total cost of energy in 2016–17 was about \$2.4 million or about 1.8% of the City of Hobart's overall annual budget. This has been reduced from \$3.3 million in 2011–12, which was 2.9% of that year's expenditure. In addition, some of the projects have generated significant maintenance cost savings.

The major energy using activities are building operations, street lighting and vehicles and machinery. Table 1 in the front section lists broad categories of uses and the amount of energy used by each category.

The following sections provide information on factors affecting energy use and projects completed during 2016–17. A summary of significant projects is provided in Table A2.

Table A1: Significant greenhouse gas emission and energy reduction projects 2016–17

Project title	Cost	Savings per annum	Greenhouse gas savings	Energy savings
Hobart Aquatic Centre—302 kW solar panel system	\$430 000	\$80 000	85 tCO ₂ -e/year	1400 GJ/year
Doone Kennedy Hobart Aquatic Centre—building management system upgrade	\$105 000	\$28 000	35 tCO ₂ -e/year	600 GJ/year
Doone Kennedy Hobart Aquatic Centre—plant room replacement of LED tubes	\$4 000	\$1200	1 tCO ₂ -e/year	20 GJ/year
Fleet—ongoing replacement with more fuel efficient vehicles	In vehicle cost	\$20 000 (est)	30 tCO ₂ -e/year (est)	250 GJ/year (est)
Council Centre—customer service area to LED lights	\$30 000	\$11 000	8 tCO ₂ -e/year	130 GJ/year
Council Centre—first floor offices to LED lights	\$50 000	\$15 000	16 tCO ₂ -e/year	270 GJ/year
Town Hall—annex office lights to LED	\$31 000	\$8000	8.5 tCO ₂ -e/year	130 GJ/year
Town Hall—solar panels (25 kW system)	\$28 500	\$4500	7.5 tCO ₂ -e/year	115 GJ/year
Trafalgar Car Park—replacement with LED tubes	\$75 000	\$20 000	15 tCO ₂ -e/year	220 GJ/year
Clearys Gates Depot—office heating to heat pumps	\$70 000	\$15 000	18 tCO ₂ -e/year	290 GJ/year
Clearys Gates Depot—solar panels (10 kW system)	\$14 000	\$3000	3 tCO ₂ -e/year	45 GJ/year
Mornington Nursery—solar panels (3 kW system)	\$4000	\$1200	1 tCO ₂ -e/year	14 GJ/year
McRobies Gully Waste Management Centre—10 kW solar panels	\$14 000	\$3000	3 tCO ₂ -e/year	45 GJ/year
Bushland Depot—solar panels (3 kW system)	\$4000	\$1200	1 tCO ₂ -e/year	14 GJ/year
North Hobart Oval—solar panels (4 kW system)	\$5500	\$1400	1.3 tCO ₂ -e/year	18 GJ/year
City Hall—solar panels (5 kW system)	\$7000	\$1800	1.5 tCO ₂ -e/year	22 GJ/year
Mathers House—solar panels (3 kW system)	\$4000	\$1200	1 tCO ₂ -e/year	14 GJ/year
Public toilets—refurbished with LED lights	\$10 000	\$3000	2 tCO ₂ -e/year	30 GJ/year
Totals	\$886 000	\$230 900/year	238 tCO₂-e/year	3627 GJ/year

*Notes: savings include any associated increase or reduction in maintenance costs. A number of minor projects that were completed in 2016–17 have not been included in the list.

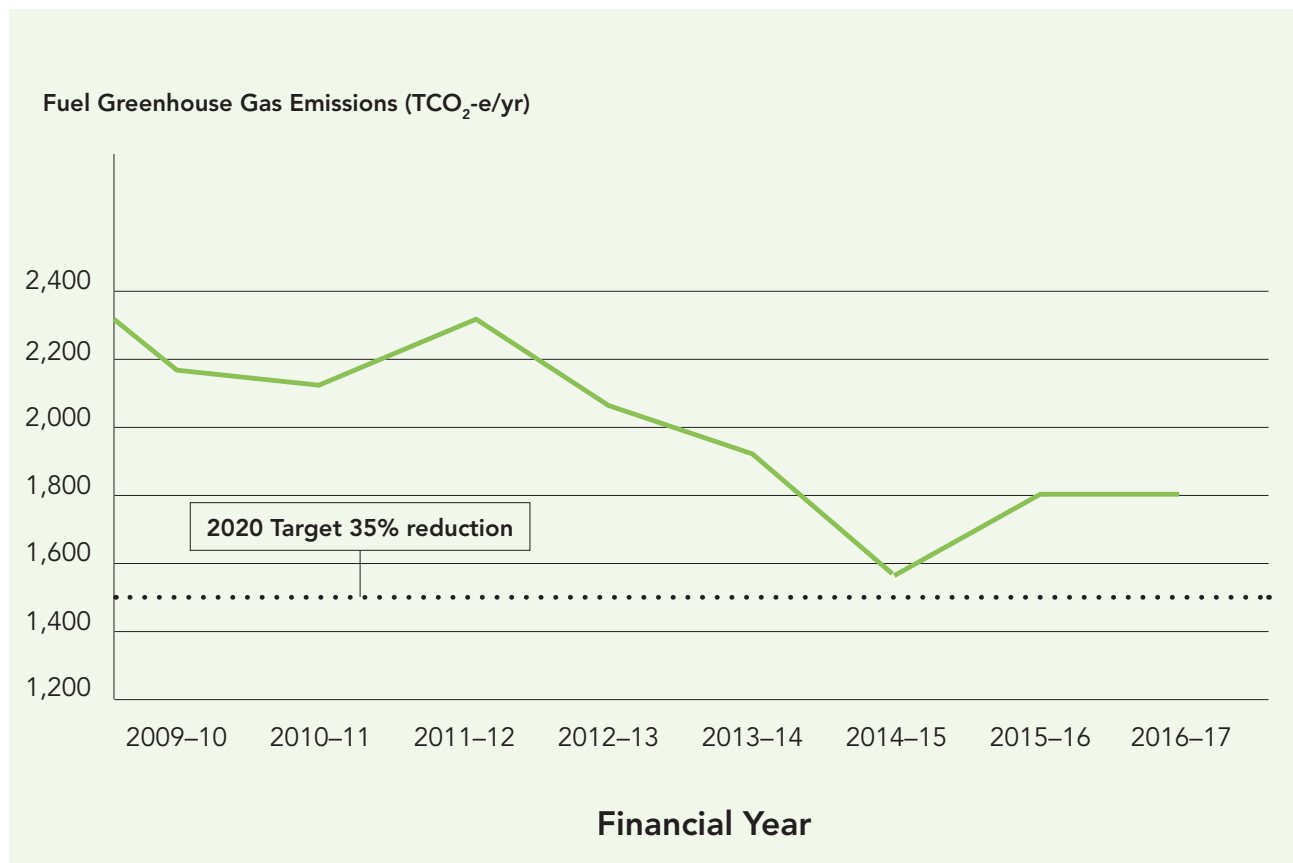
VEHICLES AND PLANT

Vehicle and plant used 36.6% of the City of Hobart's energy in 2015–16. Much of the use was by trucks and heavy plant, including refuse and recycling collection, civil maintenance, civil construction, parks maintenance and Waste Management Centre operations. Fuel use in 2016–17 was virtually unchanged from the previous year, despite increases in usage at McRobies Gully Waste Management Centre where more green waste was received and composted. Fuel use is trending downwards over the longer term (Figure A3).

Work continues to be undertaken to reduce fuel use, including through:

- increasing fuel efficiency standards of new vehicles and plant, with fuel use being part of the selection criteria for purchases
- requiring LED lights be used on vehicles, which allows reduced engine use when the lights are required for prolonged periods
- driver education programs with the aim of more fuel-efficient driving techniques
- identifying areas where plant and vehicle use can be reduced.

Figure A3: City of Hobart fuel-related greenhouse gas emissions 2009–10 to 2016–17



Doone Kennedy Hobart Aquatic Centre

The Doone Kennedy Hobart Aquatic Centre is a high energy use site due to its long opening hours, significant heating requirements and the various mechanical plant systems such as circulating pumps and fans.

A 4.7% reduction in energy use was achieved in 2016–17 compared to the previous year. Several measures were taken during the year to improve efficiency at the site including:

- installation of a further 302 kW of solar panels (in addition to the existing 100 kW system installed in 2015)
- upgrade of the building management control system, with improvements to control of pool and air temperatures and reduction in pumping energy
- upgrade of plant room lights with more energy efficient tubes
- planning of plant resiliency and sustainability improvements, including use of natural gas and changes to the heating and hot water systems.

LIGHTING

Street lighting in Hobart is largely managed and operated by TasNetworks and includes about 5000 lights. There are also several hundred street lights on metered supplies, which are owned and operated by the City of Hobart.

Approximately 200 lights were upgraded to more energy efficient globes during the year.

Electricity consumption by street lighting was reduced by 6%, due to changes to lights in 2016–17 and lights upgraded in the previous year.

Civic and administrative buildings

In the civic and administrative buildings, including the Hobart Town Hall, Hobart Council Centre and Travel Information Centre, a reduction of 11.3% in energy use was achieved in 2016–17.

Significant projects completed during 2016–17 included:

- fluorescent lights were replaced with LED flat panel lights in the Town Hall annex and first floor of the Council Centre offices
- most of the lights in the Customer Services area of the Council Centre were upgraded to LEDs
- a 25 kW solar panel system was installed on the Town Hall annex
- work commenced on replacing the heating systems in the Town Hall in the Lower Ground Conference Room and the aldermen's lounge.

Multi-storey car parks

The City of Hobart owns or leases several multi-storey car parks: Argyle Street, Centrepont, Salamanca, Hobart Central and Trafalgar. In 2016–17 the overall energy use increased slightly after a large decrease over the previous two years.

Lights were replaced in the Trafalgar Car Park with more efficient LED tubes. However, as many of the previous lights had failed and were not working, energy use was largely unchanged though lighting levels were significantly improved. A reduction of about 40% in energy use would have been observed if the previous lights had been fully operational.

Significant maintenance cost savings will also be achieved as the LED lights have significantly longer lives than the equivalent fluorescent tubes.

Community halls and parks

The category of community halls and parks is very diverse, and includes the City Hall, local community halls, sporting facilities, local and historic parks. There was a significant increase in usage in this category in 2016–17 as a result of inclusion of gas by the Flame of Remembrance at the Cenotaph. Excluding the impact of the additional gas usage, a reduction of about 10% occurred across this category.

The hot water services at the Horrie Gorringe Stand at North Hobart Oval were upgraded from liquefied petroleum gas to natural gas, reducing greenhouse gas emissions and improving safety with reduced handling of gas bottles.

Solar panel systems were installed at North Hobart Oval, Mathers House and City Hall in December 2016.

Several public conveniences were upgraded during the year with energy efficient LED lights.

Depots, waste management and nursery

The overall usage at the depots, waste management and nursery sites was significantly lower compared to the previous year (reduction of 18.7%), with savings achieved at a number of locations.

Many of the building heating systems at the Clearys Gates Depot were replaced with more efficient heat pumps. Some of the external flood lights and workshop lights were replaced with energy efficient alternatives.

Solar panels were installed at Clearys Gates Depot, McRobies Gully Waste Management Centre, Mornington Nursery and the Bushland Works Depot on Huon Road.

<C> Public space lighting and fountains

The public space lighting and fountains category includes lighting of walkways, squares and other non-street public spaces and fountains such those in Salamanca Square and Railway Roundabout.

Usage was marginally lower than in 2015–16, with no significant energy efficiency projects undertaken in this category of use during the year.

WORKS PLANNED FOR 2017–18

The following describes some of the works planned for 2017–18 to reduce energy use by fleet and facilities.

Vehicles and plant

No specific projects have been identified for this category, however, work will continue on:

- identifying ways to reduce plant usage and kilometres travelled by the fleet
- improving the energy efficiency of plant and fleet by replacing equipment with more fuel efficient technology
- requiring new vehicles and plant with flashing lights to have LED lighting technology
- continue to monitor the availability of new technology such as electric, hybrid and fuel cell vehicles and plant
- providing driver and operator training in more fuel efficient techniques.

Doone Kennedy Hobart Aquatic Centre

As the Doone Kennedy Hobart Aquatic Centre is a high energy user, this site will continue to be prioritised for energy efficiency improvements. Projects for 2017–18 include:

- double glazing of the windows near the 25 metre pool
- changes to the domestic hot water service to reduce energy use
- decommissioning the hot water thermal storage tank to reduce heat losses
- changes to the heat exchangers for the main pool air heating systems to increase the efficiency of heat transfer
- installation of natural gas to provide improved plant reliability and the ability to manage maximum electricity demand
- a system to recover heat from pool water filter backwash
- further variable speed drives on some pumps.

Street lighting

Street lighting is gradually being upgraded to more energy efficient technology as lights reach the end of their lives. No major upgrades are planned for 2017–18, although it is likely that an LED replacement option for higher wattage lights for standard street lighting will be available in the next few years.

Civic and administrative buildings

Work to upgrade heating in the Hobart Town Hall Lower Ground Conference Room and aldermen's lounge will be completed in 2017. New insulation will be installed in the roof of the main Town Hall auditorium. New building management systems in the Town Hall and Council Centre will enable improvements to building system control leading to energy efficiency gains at both sites. More lights will be upgraded to LED technology in those areas of the Town Hall and Council Centre that have less energy efficient lights.

Multi-storey car parks

Solar panel systems are to be installed at Centrepont and Hobart Central car parks with a combined capacity of 50 kW. These were originally planned for 2016–17, but it has taken longer than expected to finalise the design and gain approval for suitable support structures.

A review of ventilation fan operations is to be undertaken at relevant car parks to identify potential savings.

Community halls and parks

Fluorescent lights will be replaced with LED alternatives in several buildings in this category during 2017–18, including a number of public toilets.

Depots, waste management and nursery

Projects for 2017–18 at the Clearys Gates Depot include investigation of more energy efficient heating systems for the workshops and potential for more solar panels. A range of energy efficiency works including lighting and heating are to be investigated at the Bushland Works Depot and cost effective measures will be implemented.

Public Space Lighting and Fountains

A project to upgrade the Mawson Place cardinal lights to LEDs will be completed in 2017–18 with energy savings of about 70% expected. Other public space lighting, such as the Elizabeth Mall and North Hobart, is to be reviewed to identify further opportunities to reduce energy use.

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