GLENORCHY CITY COUNCIL COMMUNITY ENERGY USE AND GREENHOUSE GAS FOOTPRINT

SUMMARY REPORT MAY 2019

PUBLISHING DETAILS

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The STCA acknowledges organisations that assisted with the finalisation of the community greenhouse gas and energy profile:

- City of Hobart developed and piloted the initial methodology for community emissions
- TasNetworks provided residential and commercial/industrial sector electricity data
- Australian Government, Clean Energy Regulator for commercial/industrial data to fact check final results

DISCLAIMER

While reasonable efforts have been made to ensure that the contents of the Report are correct, the Southern Tasmanian Councils Authority does not accept responsibility for the accuracy or completeness of its contents and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the report.

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KEY FINDINGS

Our local energy use patterns are changing – disruptive technologies such as electric vehicles and rooftop solar electricity generation systems impact energy use, alongside many other factors such as government programs and incentives. A snapshot of Glenorchy community energy use and greenhouse gas emission trends has been provided by the Southern Tasmanian Councils Authority's Regional Climate Change Initiative**.**

Glenorchy community energy use has increased slightly by 0.18% from 2006-07 to 2016-17. Greenhouse gas emissions have increased by 5% from 2006-07 to 2016-17. Commercial and residential sector electricity use increases drove up emissions, while technology changes, price signals, greater energy efficiency measures and rooftop solar worked to drive down energy use and greenhouse gas emissions.

Community energy use and associated greenhouse gas emissions footprints

Glenorchy City Council municipality 2016-17	7.5 petajoules (PJ)	446,000 tonnes of carbon dioxide (tCO2-e)
Region (across 12 southern Tasmanian municipalities) 2016-17	43 petajoules (PJ)	2,580,000 tonnes of carbon dioxide (tCO2-e)
Tasmania	109 petajoules (PJ) (2016-17)	3,980,000 (tonnes of carbon dioxide (tCO2-e) (2015-16)

Data sources (left to right, top to bottom): Regional Community Energy Use and Greenhouse Gas Footprint, STCA, 2019; Australian Energy Statistics, Australian Government, 2018; Tasmanian Greenhouse Gas Accounts, Tasmanian Climate Change Office 2018

Consumers are increasingly taking local energy generation into their own hands. Over 4.7 million electricity units (kilowatt hour) are returned to the grid annually, generated by local Glenorchy residential and commercial premises.

Harnessing the power of the sun is popular. Over 1,700 rooftops have solar photovoltaic (PV) and 940 rooftops have solar hot water systems in Glenorchy.

Postcode 7011, suburbs Austins Ferry, Berridale, Chigwell and Windermere lead the way in residential solar PV systems. Moonah, Derwent Park, Lutana (7009) has the highest number of commercial solar PV systems

Commercial sector solar PV systems have tripled from 23 systems in 2013-14 to over 52 systems in 2016-17.

Energy based technology shifts are occurring locally. Twenty nine Electric Vehicles (EV's)[1] are now registered in Glenorchy, this has doubled in recent years indicating growth in the sector. Petrol vehicles are being replaced with diesel vehicles. A reduction in vehicle fuel use of 21% from 2006-07 to 2016-17 has seen the dominant trend of increasing yearly fuel use turn around.

Transport is a key focus area, encouraging low emission travel. The transport sector is responsible for at least a third of community emissions. Locally predominantly older vehicles are in use, which are generally more emissions intensive.

Recent electricity use has been relatively flat compared to the earlier half of the decade, suggesting consumers have improved the energy efficiency of buildings or are responding to other factors that drive electricity use to find savings. Consumer behaviour in commercial premises and the home are considered influenced by increasing awareness of energy costs and actions as well as factors such as: local weather; price signals; and the use of energy efficient appliances and materials through government programs; in addition to the influence of population growth. Energy efficiency measures, such as insulation, buffer the impact of extreme temperature events reducing the demand for heating and cooling and decreasing electricity use.

[1] Motor vehicle registration is self-reported through the ABS and may include hybrid as well as full electric vehicles

INTRODUCTION

As discussions on how to reach zero emissions increase understanding our local community energy and emissions footprint becomes more important. Looking at where and why energy is used, and the resulting greenhouse gas emissions, is the first step to identify opportunities for savings and initiatives that benefit local communities.

Local governments have a key role providing up to date and reliable climate change information. The Southern Tasmanian Regional and Municipal Energy and Emissions Project (the Project) 2018 aims to provide insights into emissions intensive sectors of the community and changing technology trends in the local area. It informs the development of individual municipalities' community profiles. The Project was commissioned by the Southern Tasmanian Councils Authority's Regional Climate Change Initiative member councils:

- City of Hobart
- Brighton Council
- Central Highlands Council
- Clarence City Council
- Derwent Valley Council
- Glamorgan Spring Bay Council
- Glenorchy City Council
- Huon Valley Council
- Kingborough Council
- Sorell Council
- Southern Midlands Council
- Tasman Council

Currently there is no common standard amongst Australian local governments for corporate and community energy and greenhouse gas reporting. The Australian Local Government Association has identified appropriate data and methods as the most common barrier to setting community emissions targets[2].This project provides a common and transparent methodology with local and national data inputs to construct accurate community energy and greenhouse gas profiles. It builds on the previous local government voluntary reporting scheme Cities for Climate Protection which ran from 2000 – 2010 and is consistent with National and State Government reporting standards and international reporting programs

[2] Australian Local Government Climate Review – 2018 Report p. 3.

such as the Carbon Development Program, the Compact of Mayors[3] and the Global Protocol for Community Scale Greenhouse Gas Emissions.

The methodology uses public and government information that is reliable, credible and updated regularly, and involved the following:

1. Accessing Australian Energy Statistics to establish a baseline energy snapshot, which was then tailored to a local level.
2. Accurate metered data provided by energy service providers was used, where available.
3. Australian Government National Greenhouse Accounts Factors were then applied to each energy use type to determine total greenhouse gas emissions.
4. Additional records such as the Australian Bureau of Statistics, and Australian PV Institute (APVI) provided more detailed insights into local technology trends.

The scope of community data is limited to:

- a base year, 2006-07, when detailed electricity data is available, the transfer of water and sewerage assets to a regional body occurred and Tasmania joined the National Electricity Market[4].
- current data as of 2016-17, as up to date as the latest Australian Government, Australian Energy Statistics.
- energy based emissions only, excluding methane from agriculture/wastewater and carbon emissions from land clearing currently – as the greenhouse accounting for forest and agricultural emissions is not available in a format for local government reporting. This can be added retrospectively.
- highlights data from the residential, commercial, transport sectors at a municipal level and industrial, agriculture and forestry sectors at a regional level.

[3] led by C40, ICLEI and United Cities and Local Governments, in close collaboration with the UN Secretary General's Special Envoy for Cities and Climate Change, UN Habitat, and the UN Secretary General's office

[4] Data estimates for electricity and all energy uses are available from 2004-05 to align with the international reporting period stated in the Paris Agreement if preferred.

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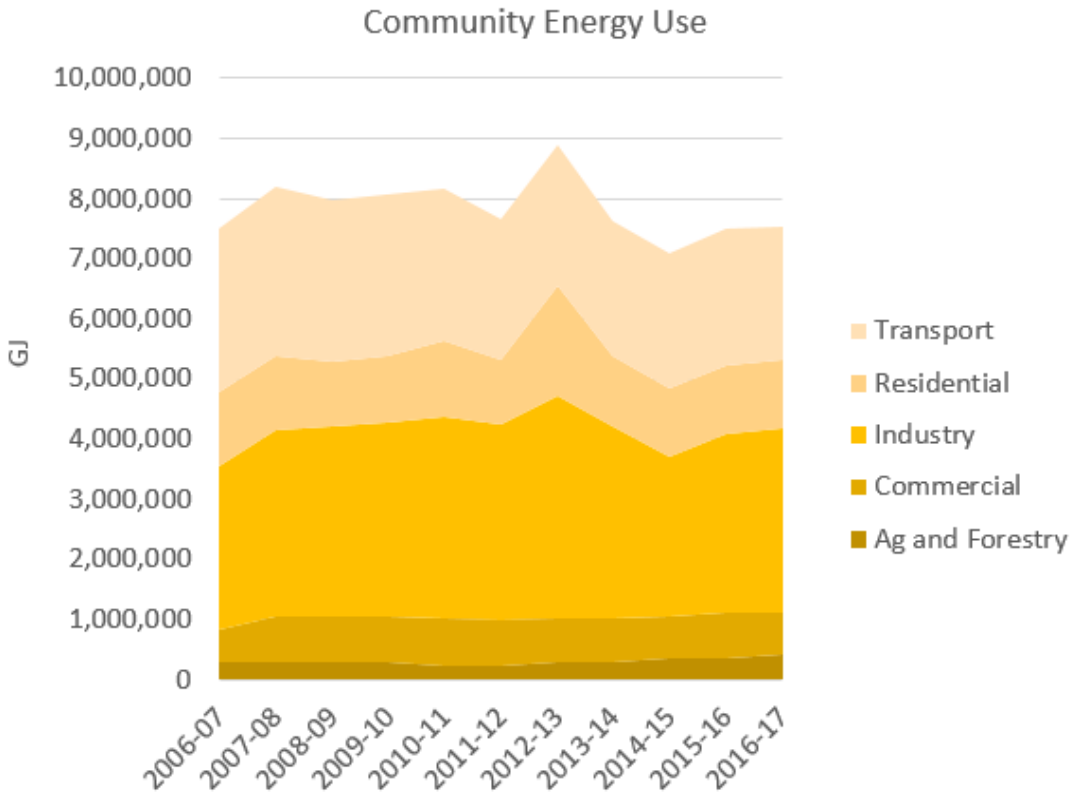
Community energy use has increased by 0.18%[5] from 2006-07 to 2016-17, from 7,520,000 million gigajoules (GJ) to 7,500,000 million in the Glenorchy City Council municipal area. A typical southern Tasmania household uses 25 GJ (7,000 kWh) per annum.

Figure 1: Glenorchy's Community Energy Use



Source: Southern Tasmanian Councils Authority, 2018. Data sources: Australian Energy Statistics, 2018, TasNetworks, 2018. 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. The TasNetworks data is sourced from legacy business systems and includes a variation between 2006/07 and 2007/08 for reasons unknown. The increase in 2012-13 is due to an increase in electricity use data provided by TasNetworks, due to additional Pay As You Go data being measured and added in that single year (with some historic data included).

[5] Midpoint method used for growth

Table 1: Glenorchy's Community Energy Use

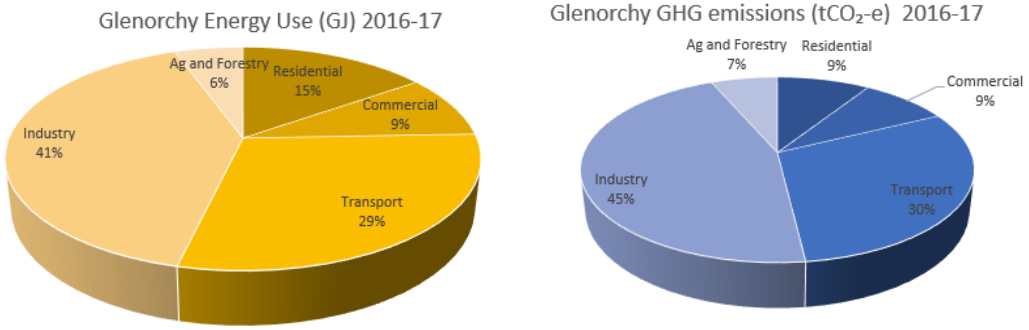
Energy use (GJ)	2006-07	2016-17	Growth*	Total difference between 2006-07 and 2016-17
Residential	**1,233,821**	**1,150,938**	**-7%**	**-82,883**
Commercial	**554,684**	**685,319**	**21%**	**130,635**
Transport	**2,711,700**	**2,203,517**	**-21%**	**-508,183**
Subtotal	**4,500,205**	**4,039,774**	**-11%**	**-460,431**
Industry	*2,726,665*	*3,064,880*	*-12%*	*338,215*
Ag and Forestry	*281,346*	*417,394*	*39%*	*-136,048*
Grand Total	***7,508,216***	***7,522,048***	***-0.18%***	***13,832***

Data sources: Australian Energy Statistics, 2018, TasNetworks, 2018. 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. *The Midpoint method for determining growth rates is used.

Energy reductions have occurred in Glenorchy's transport sector (-508,183GJ). State-wide trends have contributed to decreasing transport sector energy use such as price signals, greater energy efficiency measures in newer vehicles and consumer technology preferences.

The industrial (includes manufacturing, mining and construction) and transport sectors use roughly a third each of total community energy use and the greatest share of community greenhouse gas emissions.

Figure 2: Glenorchy's Community Energy Use and Greenhouse Gas Emissions by Energy Use Sector.

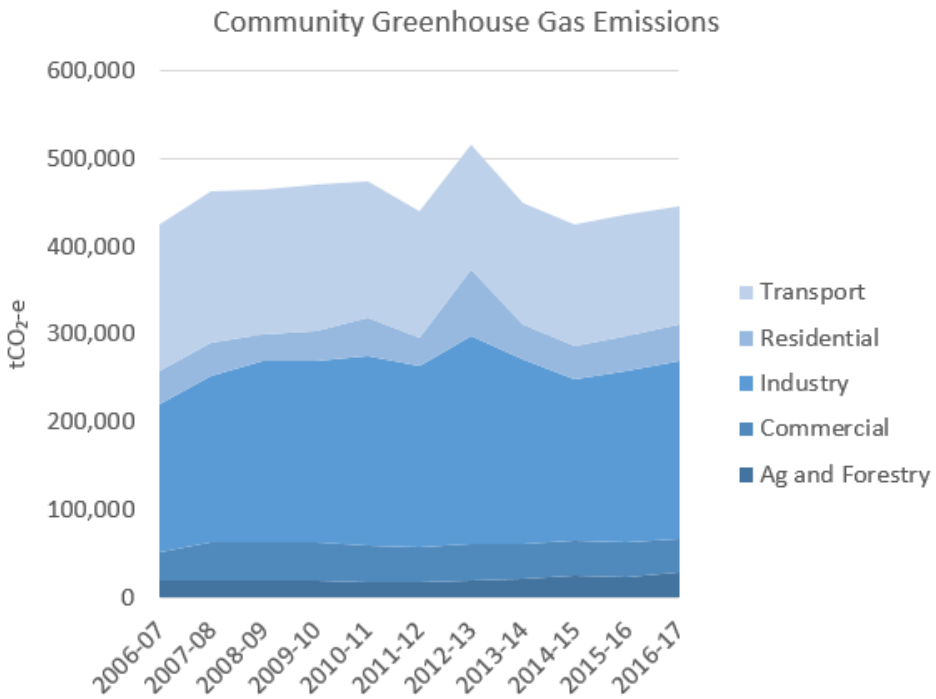


Source: Southern Tasmanian Councils Authority, 2018. Data sources: Australian Energy Statistics, 2018, TasNetworks, 2018, National Greenhouse Accounts Factors, 2016.

Greenhouse gas emissions have increased by 5% due to energy use reductions from 425,594 tCO_2-e in 2006-07 to 446,325 tCO_2-e (the equivalent of 94,000 vehicles driven for one year) in 2016-17. Increasing energy use in the commercial, agriculture and forestry and industry sectors has contributed to higher emissions, working against reductions achieved in the transport sector.

Industrial sector emissions have increased by 32,874tCO_2-e mainly due to an increase in the use of emissions intensive fuels in the manufacturing sector such as coke, black coal, petroluem, diesel and natural gas. These fuel use trends are mainly based on per capita Statewide results.

Figure 3: Glenorchy Community Greenhouse Gas Emissions.



Source: Southern Tasmanian Councils Authority, 2018. Data sources: Australian Energy Statistics, 2018, TasNetworks, 2018, National Greenhouse Accounts Factors, 2016. NB: All greenhouse gas emissions are presented in tonnes of carbon dioxide equivalent (tCO_2e) as an

industry standard and a format that is easy to convert other values. The TasNetworks data is sourced from legacy business systems and includes a variation between 2006/07 and 2007/08 for reasons unknown. The increase in 2012-13 is due to an increase in electricity use data provided by TasNetworks, due to additional Pay As You Go data being measured and added in that single year (with some historic data included).

Table 2: Glenorchy's Community Greenhouse Gas Emissions.

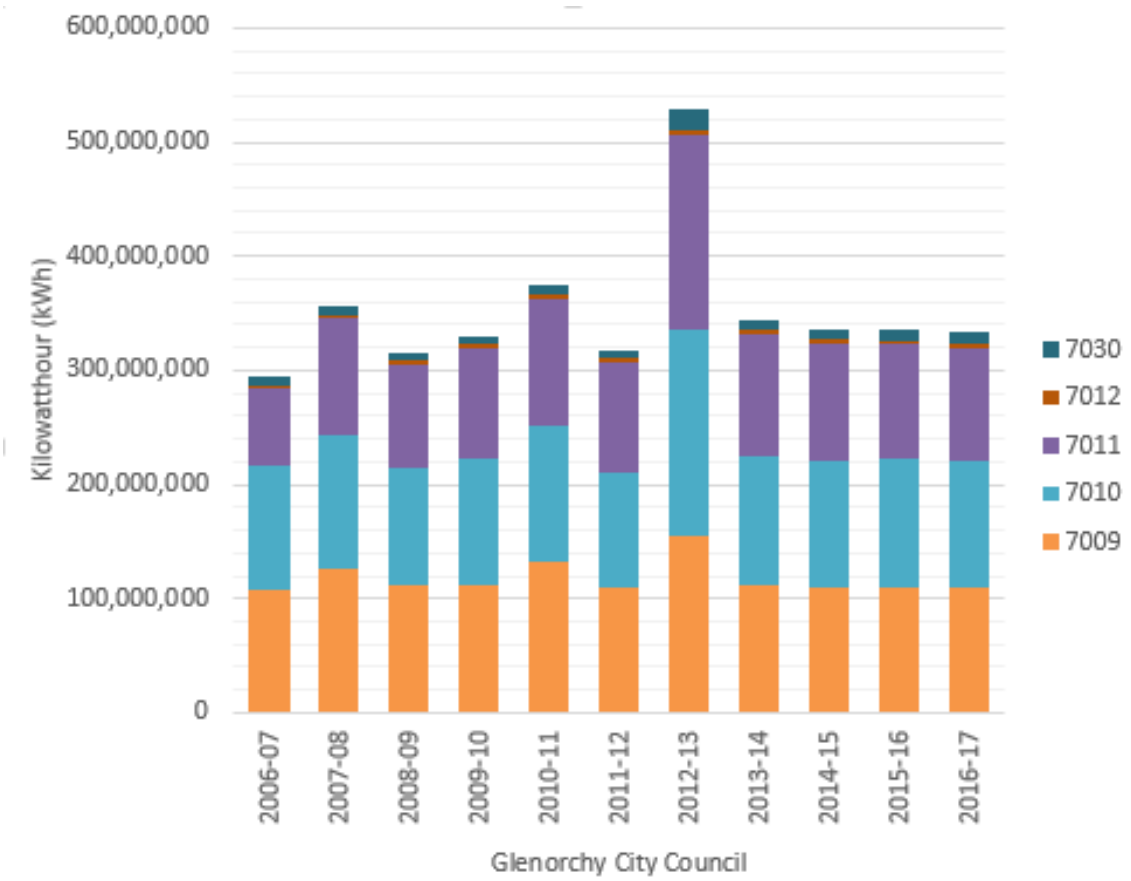
GHG emissions (tonnes of carbon dioxide equivalent (tCO_2-e)	2006-07	2016-17	Growth*	Total difference between 2006-07 to 2016-17
Residential	**37,661**	**40,616**	**8%**	**-2,955**
Commercial	**31,708**	**38,514**	**19%**	**-6,806**
Transport	**166,770**	**135,516**	**-21%**	**-31,254**
Subtotal	**236,139**	**214,646**	**10%**	**-21,493**
Industry	*169,751*	*202,625*	*18%*	*-32,874*
Ag and Forestry	*19,704*	*29,054*	*38%*	*-9,350*
Grand Total	***425,594***	***446,325***	***-5%***	***-20,731***

Data sources: Australian Energy Statistics, 2018, TasNetworks, 2018 and National Greenhouse Accounts, 2016. NB: Greenhouse gas emissions presented in tonnes of carbon dioxide equivalent as an industry standard. *The Midpoint method for determining growth rates is used.

Annual electricity use has increased by 28%[6] over the last decade from 294 to 333 million units or kilowatt hour (kWh) in 2016-17. Electricity use trends have a large impact on overall community energy use, particularly in the residential and commercial sectors where electricity use is responsible for more than half of all energy used.

[6] Midpoint method used for growth

Figure 4: Glenorchy's Community Total Electricity Use. Source: Southern Tasmanian Councils Authority, 2018.

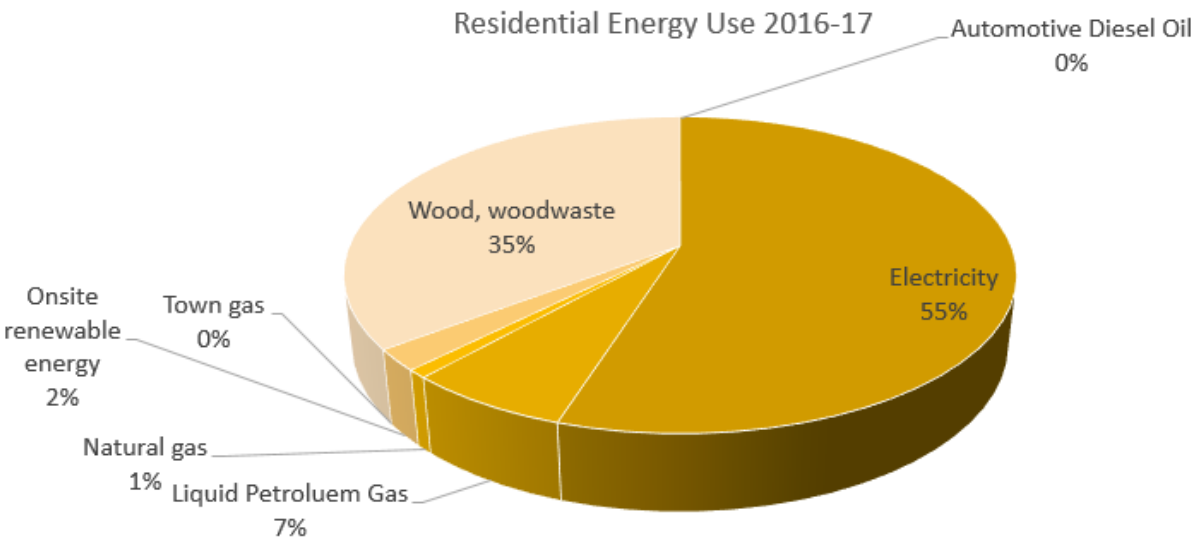


Data sources: TasNetworks, 2018. NB: TasNetworks data includes a discrepancy between 2006/07 and 2007/08 due to changes in record keeping systems The TasNetworks data is sourced from legacy business systems and includes a variation between 2006/07 and 2007/08 for reasons unknown. The increase in 2012-13 is due to an increase in electricity use data provided by TasNetworks, due to additional Pay As You Go data being measured and added in that single year (with some historic data included).

The postcodes with a larger population have consumed more energy.

Wood use has decreased by 32% from 2006-07 to 2016-17 and constitutes more than a third of all residential energy use.

Figure 5: Glenorchy Residential Energy Use.



Source: Southern Tasmanian Councils Authority, 2018. Data sources: Australian Energy Statistics, 2018, TasNetworks, 2018. 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

More consumers are generating and using their own solar rooftop power, decreasing electricity use from the electricity grid. Over 940 rooftops use solar energy to heat hot water[7] in the local area. In Glenorchy, there are over 1,700 solar photovoltaic (PV) systems[8], which means 1-in-13 premises have access to solar[9].

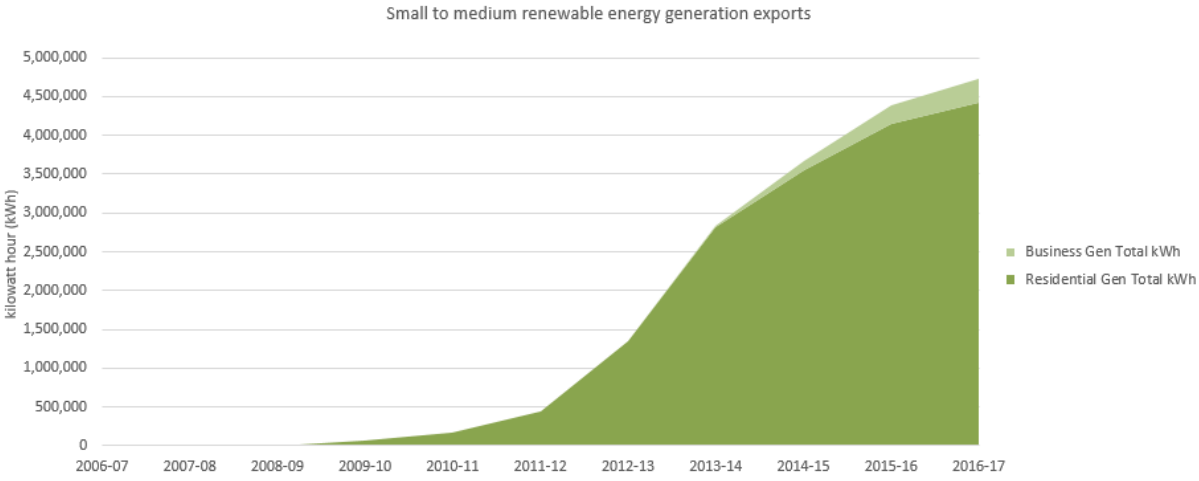
A key change in the commercial sector is the popularity of solar PV systems, with double the number of systems from 23 systems in 2013-14 to 52 systems in 2016-17.

[7] Based on CER small scale technology data, accessed May 2018.

[8] Based on TasNetworks meters that generate back to the electricity grid, 2018 data.

[9] Total buildings based on number of meters (commercial and residential) in 2016-17, 23,629 NMIs divided by 1,823 renewable electricity generation National Meter Identifier's

Figure 6: Glenorchy Renewable Electricity Generation Exported to the Electricity Grid.



Source: Tas Networks, 2018. NB: Electricity use is represented as kilowatt hour (kWh). One kWh is equal to one unit on electricity bills. This includes both commercial and industrial facilities to protect the identification of facilities at a local level.

Residential and commercial solar PV installations **export over 4.7 million units (kWh) of emission free electricity back to grid each year from the Glenorchy municipality**[10]. While solar PV systems are the dominant renewable energy technology in the region, there is a 500W small scale wind system and a 2,520W micro hydro system registered in the area[11].

[10] As of end of 2016-17

[11] Based on postcodes allocated to the area and possibly shared across municipal boundaries

Moonah, Derwent Park, Lutana (7009) has the highest number of commercial solar PV systems while Austins Ferry, Berridale, Chigwell, Windermere (7011) has the highest residential solar PV systems in the Glenorchy.

Table 3: Glenorchy's Renewable Energy Systems by Postcode in 2016-17.

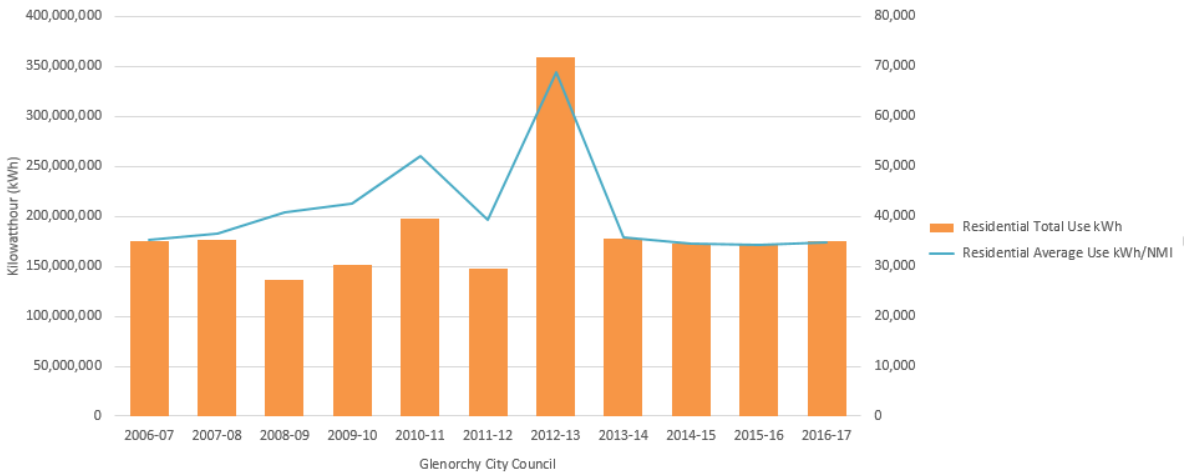
Postcodes	Business meters (NMIs) that generate electricity	Residential meters (NMIs) that generate electricity	Total number of meter connections generating electricity (NMIs)
7009	33	430	463
7010	13	576	589
7011	1	630	631
7012	3	56	59
7030	2	79	81
TOTAL	**52**	**1,771**	**1,823**

Data sources: TasNetworks, 2018

Glenorchy households are using similar amounts (0% increase) of electricity in 2016-17 compared to a decade ago in 2006-07. Total residential electricity consumption has levelled out over the last four years, despite over 273 new residential connections from 2013-14 to 2016-17.

This follows a period of high electricity consumption variability, from 2006-07 to 2012-13.

Figure 7: Glenorchy's Residential Electricity Use.

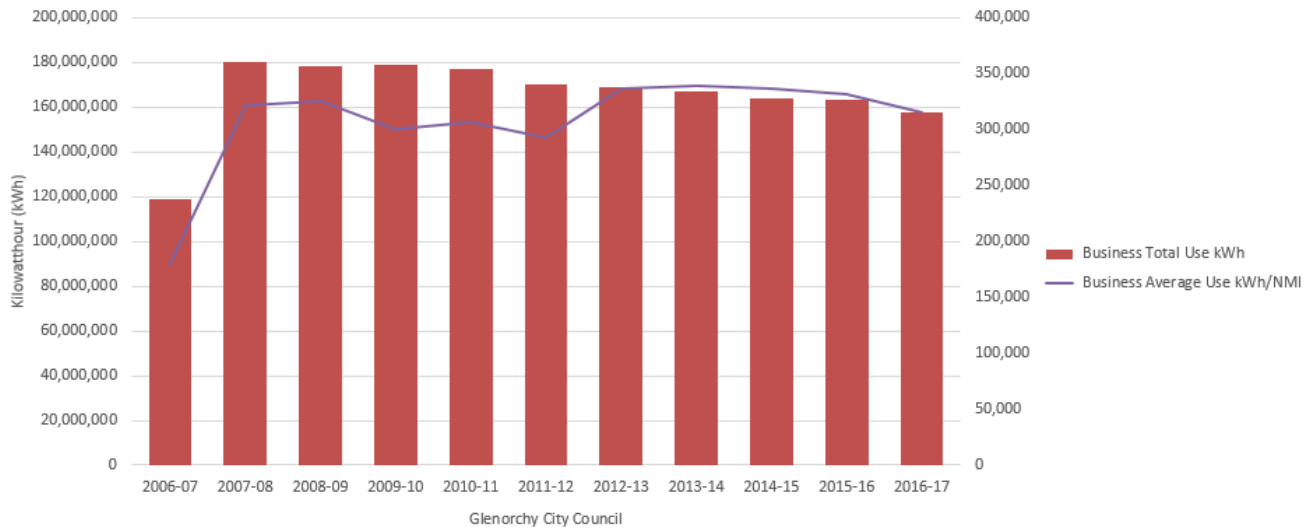


Source: Southern Tasmanian Councils Authority, 2018. Data sources: TasNetworks, 2018. NB: Electricity use is represented as kilowatt hour (kWh). One kWh is equal to one unit on electricity bills. This includes both commercial and industrial facilities to protect the identification of facilities at a local level. The increase in 2012-13 is due to an increase in electricity use data provided by TasNetworks, due to additional Pay As You Go data being measured and added in that single year(including some historical data). The TasNetworks data includes a discrepancy between 2006/07 and 2007/08 due to changes in record keeping systems.

Average electricity use per household has decreased over the last four years from 2013-14 to 2016-17. Residential electricity use per meter decreases are influenced by factors such as price signals, the implementation of the carbon price (2012 to 2015) and increasing electricity costs, as well as the use of more energy efficient appliances and materials through Commonwealth and State Government information and grant incentives. These drivers increase consumer awareness of energy costs and energy actions to drive bill savings in the office and home.

Total commercial annual electricity use has increased from 118 million to 157 million units (kWh) over a decade, partly due to an extraordinary result in 2006-07. Average electricity use per meter also decreased in the commercial sector from 2009-10 to 2016-17.

Figure 8: Glenorchy's Commercial Electricity Use.

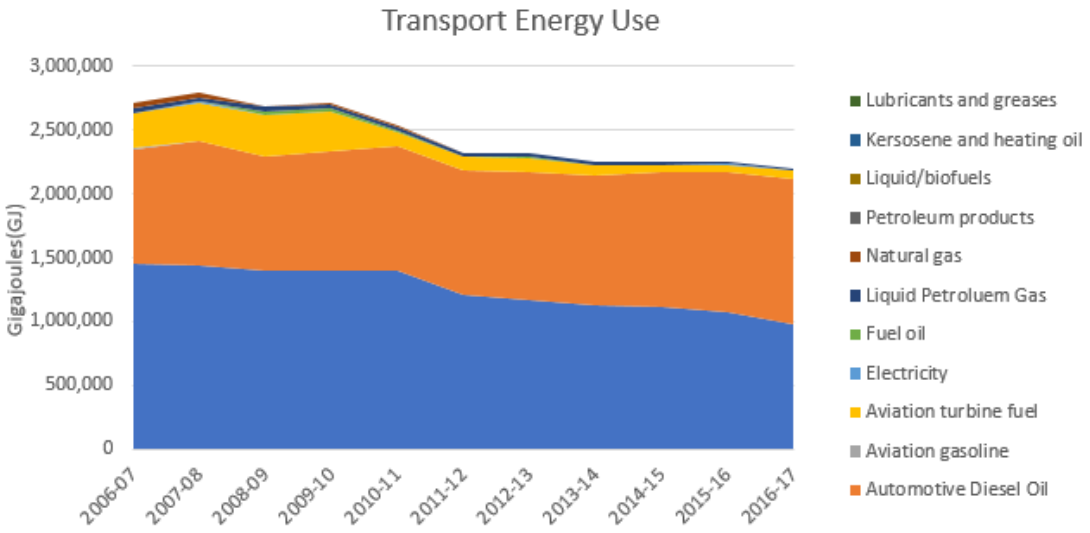


Source: Southern Tasmanian Councils Authority, 2018. Data sources: TasNetworks, 2018. NB: Electricity use is represented as kilowatt hour (kWh). One kWh is equal to one unit on electricity bills. This includes both commercial and industrial facilities to protect the identification of facilities at a local level. The TasNetworks data includes a discrepancy between 2006/07 and 2007/08 due to changes in record keeping systems.

A key change in the transport sector has been the turnaround from increasing energy use to a decreasing trend over the last decade (2006-07 to 2016-17). Energy use has decreased by 21%[12] from 2006-07 to 2016-17, as a result greenhouse gas emissions have reduced by 21% for the same period.

[12] Midpoint method used for growth

Figure 9: Glenorchy's Transport Energy Use.



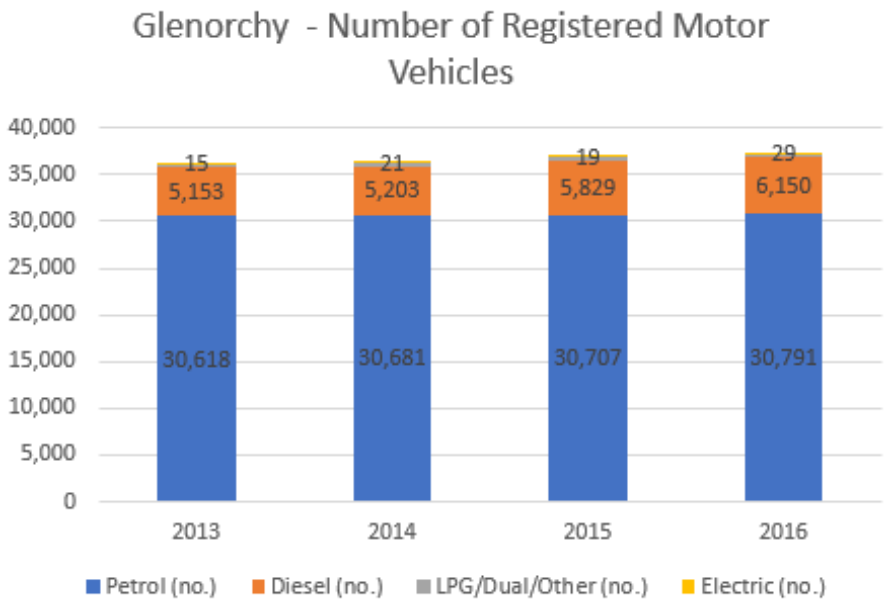
Source: Southern Tasmanian Councils Authority, 2018. Data sources: Australian Energy Statistics 2017, Tas Networks, 2018.

Passenger vehicle petrol and diesel fuel use are the primary source of energy use and greenhouse gas emissions in the transport sector[13]and the total number of vehicles registrations in Glenorchy has increased by over 1,000 from 2013-2016. The main technology shift is a consumer preference for diesel light vehicles over petrol light vehicles, as shown by an increase of 900 diesel vehicles versus 100 petrol vehicles.

Consumers are also selecting emerging technologies such as full electric and electric hybrid motor vehicles. Twenty-nine electric vehicles were registered in Glenorchy in 2016.

[13] Road transport is the largest energy user and ABS motor vehicle registrations (Table 12) indicate predominantly 71% passenger vehicles and 19% light commercial vehicles in Glenorchy, Regional Statistics by LGA2016, Annual (2010-11 to 2015-16)

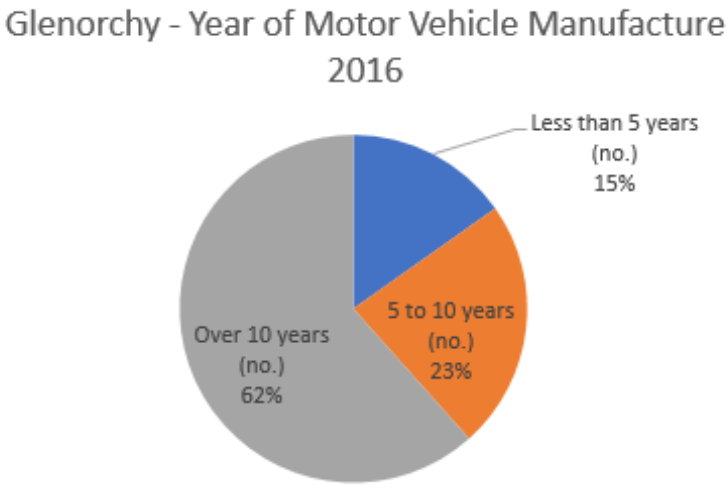
Figure 10: Glenorchy's Motor Vehicle Registrations.



Source: Southern Tasmanian Councils Authority, 2018. Data source: Australian Bureau of Statistics, 2016.

One of the challenges in Glenorchy's community profile is the high percentage of older more emissions intensive vehicles and relatively low use of newer vehicles, which are generally more fuel efficient.

Figure 11: Glenorchy's Motor Vehicle Registrations.



Source: Southern Tasmanian Councils Authority, 2018. Data source: Australian Bureau of Statistics, 2016

FURTHER INFORMATION

A regional summary paper, titled *Southern Tasmania's Changing Energy Use: Information Paper: Regional Greenhouse Gas and Energy Use Trends*, provides a snapshot of national, state and regional greenhouse footprints as well as energy trends across the region, representing 12 southern Tasmanian municipalities.

Each council has been provided with detailed data, some of which is subject to strict confidentiality terms of use to address privacy concerns and commercial sensitivities.

In addition, a step by step guide provides additional support to explain the methodology further, increase transparency and facilitate future updates.

This guide and the regional paper outlines the scope of the methodology, with consideration for time and resources available to councils and includes consideration for other factors influencing the final results.