CLARENCE CITY COUNCIL COMMUNITY ENERGY USE AND GREENHOUSE GAS FOOTPRINT

SUMMARY REPORT MAY 2019

PUBLISHING DETAILS

The Southern Tasmanian Regional and Municipal Energy and Emissions Project 2018, was endorsed in the Regional Climate Change Initiative (RCCI) Action Plan 2017-2019, by the Board of the Southern Tasmanian Councils Authority (STCA) in June 2017.

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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

CLARENCE CITY COUNCIL SUMMARY

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 Clarence community energy use and greenhouse gas emission trends has been provided by the Southern Tasmanian Councils Authority via the Regional Climate Change Initiative**.**

Clarence community energy use has increased by 2% from 2006-07 to 2016-17. Greenhouse gas emissions have increased by 6% 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

Clarence City Council municipality 2016-17	8.6 petajoules (PJ)	516,000 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 7.8 million electricity units (kilowatt hour) are returned to the grid annually, generated by local Clarence residential and commercial premises.

Harnessing the power of the sun is popular. Over 2,821 rooftops have solar photovoltaic (PV) and 827 rooftops have solar hot water systems in Clarence.

Postcode 7018, suburbs Rosny, Bellerive, Howrah, Tranmere, Mornington and Warrane, lead the way in residential and commercial solar PV systems.

Commercial sector solar PV systems have tripled from 22 systems in 2013-14 to over 66 systems in 2016-17.

Energy based technology shifts are occurring locally. Twenty nine Electric Vehicles (EV's)[1] are now registered in Clarence, 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.

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

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 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:

[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

- 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.

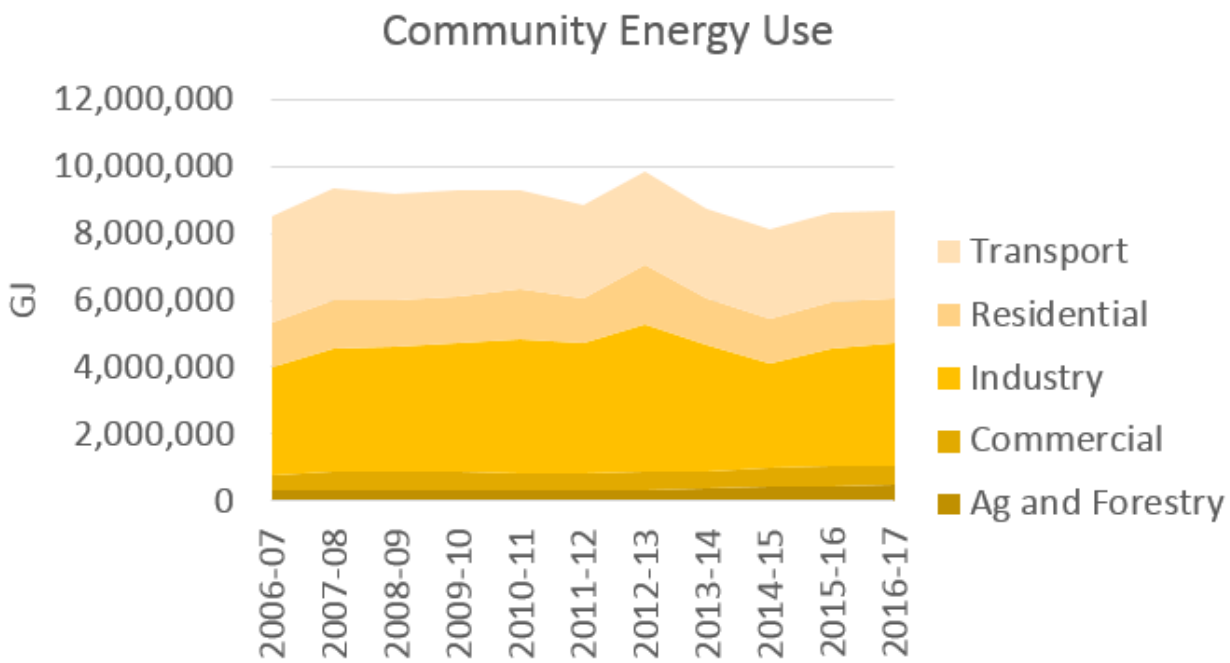
CLARENCE CITY COUNCIL

Community energy use has increased by 2%[5] from 2006-07 to 2016-17, from 8.5 million gigajoules (GJ) to 8.6 million GJ in the Clarence City Council municipality. A typical southern Tasmania household uses 25 GJ (7,000 kWh) per annum.

[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.

[5] Midpoint method used for growth for consistency

Figure 1: Clarence'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 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.

Table 1: Clarence's Community Energy Use

Energy use gigajoules (GJ)	2006-07	2016-17	Growth	Total difference between 2006-07 and 2016-17
Residential	**1,321,696**	**1,375,214**	**4%**	**53,518**
Commercial	**432,112**	**570,210**	**28%**	**138,098**
Transport	**3,213,904**	**2,611,606**	**-21%**	**-602,298**
Subtotal	**4,967,712**	**4,557,030**	**-9%**	**-410,682**
Industry	*3,231,641*	*3,632,492*	*12%*	*400,851*
Ag and Forestry	*333,451*	*494,695*	*39%*	*161,244*

Grand Total	**8,532,804**	**8,684,217**	**2%**	**151,413**

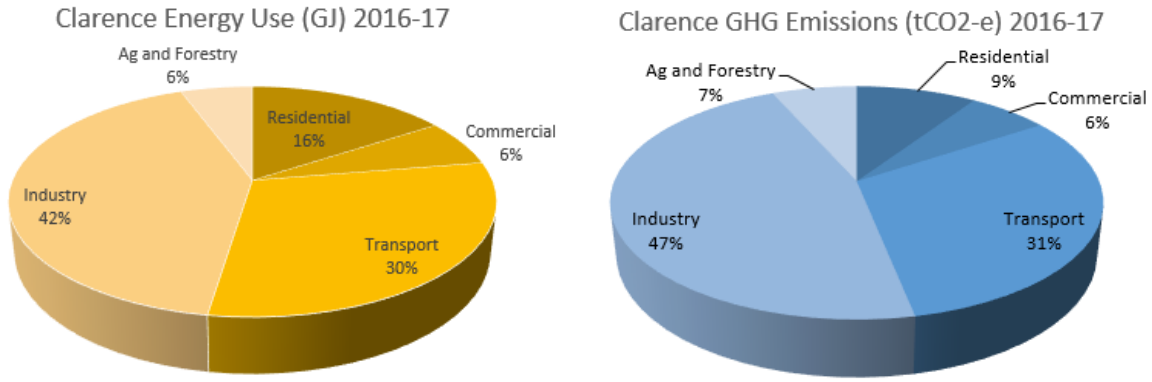
Data sources: Australian Energy Statistics, 2018, TasNetworks, 2018. NB: All energy use is presented in gigajoules (GJ) as an industry standard and a format that is easy to convert with other energy values. The Midpoint method for determining growth rates is used.

Energy reductions have occurred only in Clarence's transport (-602,298GJ) sector. 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.

Clarence's industry (includes manufacturing, mining and construction) (400,851GJ) sectors were responsible for the greatest increase in energy use, followed by the agriculture and forestry, commercial and residential sectors.

Clarence's transport sectors use roughly a third each of total community energy use and community greenhouse gas emissions.

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



Source: Southern Tasmanian Councils Authority, 2018. Data sources: Australian Energy Statistics, 2018, TasNetworks, 2018, National Greenhouse Accounts Factors, 2016. NB: "Ag" is abbreviated Agriculture

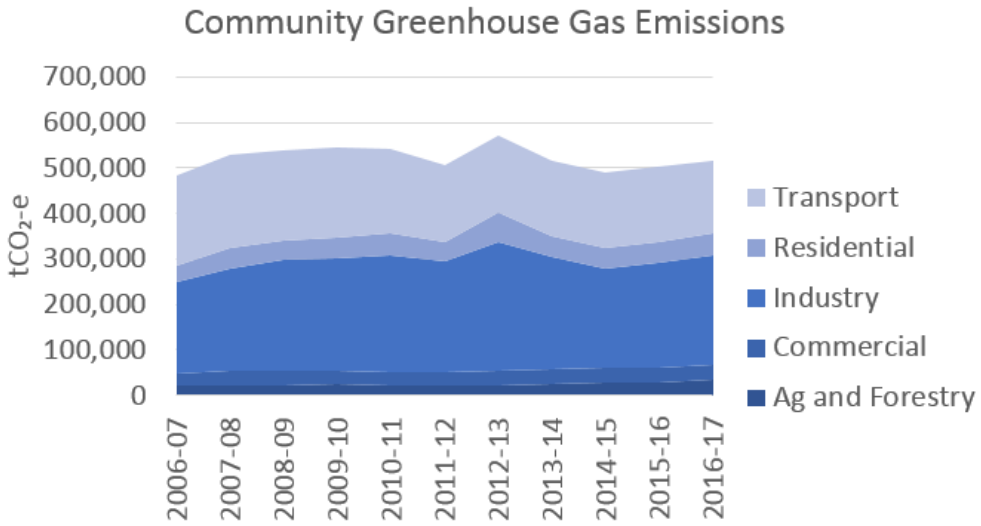
Greenhouse gas emissions have increased by 6%[6] from 484,214 tCO_2-e from 2006-07 to 516,458tCO_2-e (the equivalent of 109,000 vehicles driven for one year) in 2016-17.

[6] Midpoint method used for growth for consistency

Increasing energy use in the residential, commercial, industrial, agriculture and forestry sectors has contributed to higher emissions, working against reductions achieved in the transport sector.

Industrial sector emissions have increased by 38,962tCO_2-e mainly due to an increase in the use of emissions intensive fuels in the manufacturing sector such as coke, black coal, petroleum, diesel and natural gas. These fuel use trends are mainly based on per capita Statewide results.

Figure 3: Clarence's 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 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 is sourced from legacy business systems and includes a variation between 2006/07 and 2007/08 for reasons unknown.

Table 2: Clarence'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 and 2016-17**
Residential	**36,873**	**48,753**	**28%**	**11,880**

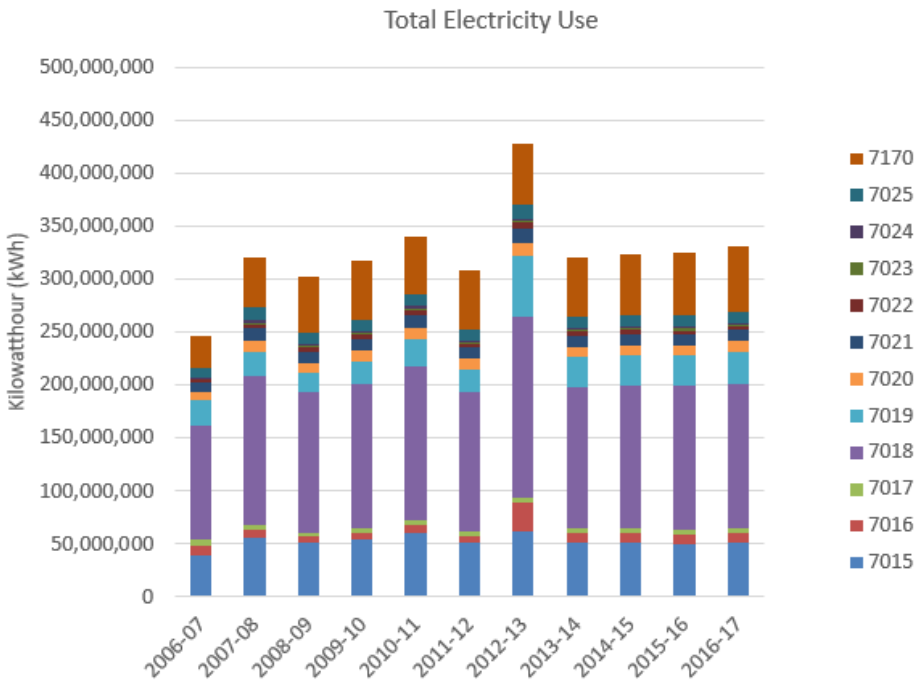
Commercial	**25,144**	**32,505**	**26%**	**7,361**
Transport	**197,655**	**160,614**	**-21%**	**-37,041**
Subtotal	***259,672***	***241,872***	***-7%***	***-17,800***
Industry	201,189	240,151	18%	38,962
Ag and Forestry	23,353	34,435	38%	11,082
Grand Total	**484,214**	**516,458**	**6%**	**32,244**

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 29%[7] over the last decade from 246 to 331 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.

[7] Midpoint method used for growth for consistency

Figure 4: Clarence's Community Total Electricity Use

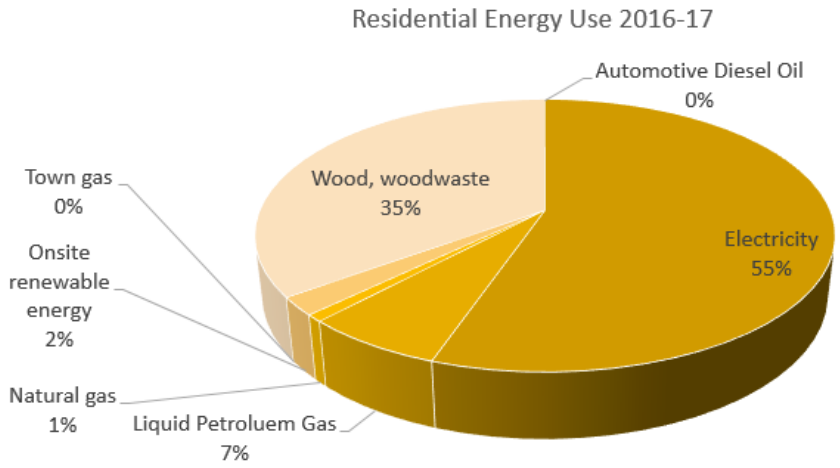


Data sources: TasNetworks, 2018. Source: Southern Tasmanian Councils Authority, 2018. The increase in 2012-13 is due to an increase in electricity use data provided by TasNetworks, due to additional Pay As You Go data being measured and added in that single year(including some historical data). The TasNetworks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

The postcodes with a larger population have consumed more electricity and have higher total energy consumption.

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: Clarence's Municipal Area Residential Energy Use



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

More consumers are generating and using their own solar rooftop power, decreasing electricity use from the electricity grid. Over 827 rooftops use solar energy to heat hot water[8] in the local area. In Clarence, there are over 2,800 solar photovoltaic (PV) systems[9], which means 1-in-10 premises have access to solar[10].

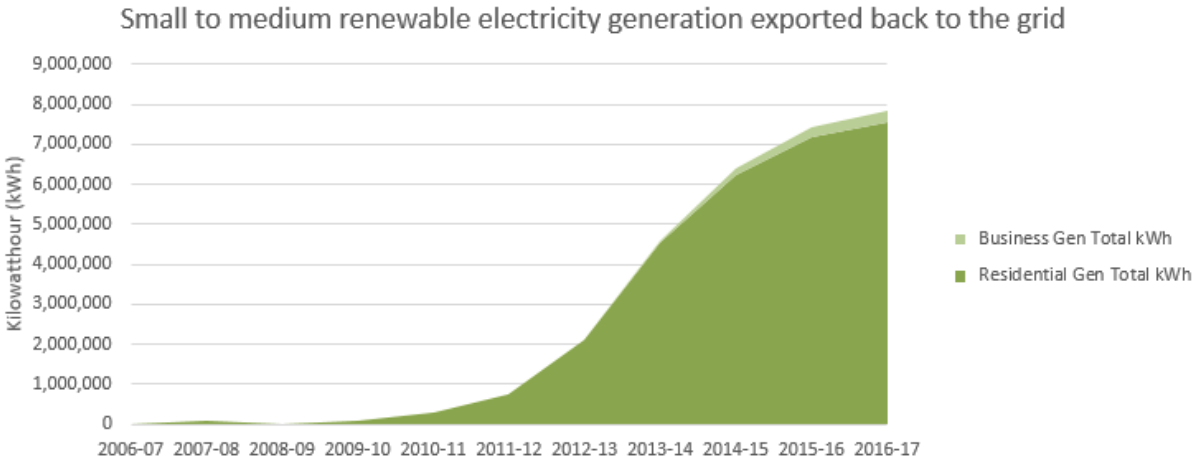
A key change in the commercial sector is the popularity of solar PV systems, with triple the number of systems from 22 systems in 2013-14 to 66 systems in 2016-17.

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

[9] Based on Tas Networks meters that generate back to the electricity grid, 2018 data.

[10] Total buildings based on number of meters (commercial and residential) in 2016-17, 25,979 NMIs divided by 2,820 renewable electricity generation NMI's

Figure 6: Clarence's Renewable Electricity Generation Exported to the Electricity Grid.



Source: 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.

Residential and commercial solar PV installations **export over 7.8 million units (kWh) of emission free electricity back to grid each year from the Clarence municipality**[11]. While solar PV systems are the dominant renewable energy technology in the region, there are three small scale wind systems registered in the area; a 1kW, 1.5kW and 10kW system[12].

Rosny, Bellerive, Howrah, Tranmere, Mornington and Warrane (postcode 7018) has the highest number of commercial solar PV systems and the highest residential solar PV systems in the Clarence municipality.

Table 3: Clarence'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)
7015	13	488	501

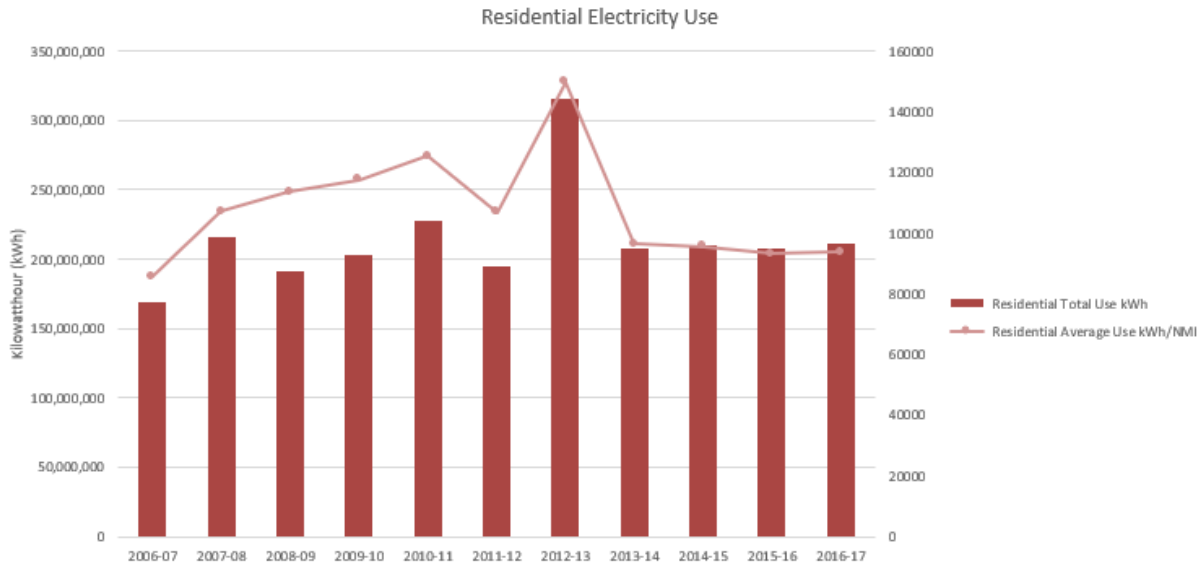
[11] As of end of 2016-17

[12] Based on postcodes allocated to the area and possibly shared across LGA boundaries

7016	4	78	82
7017	1	59	60
7018	19	980	999
7019	2	190	192
7020	2	197	199
7021	0	137	137
7022	1	64	65
7023	0	29	29
7024	0	51	51
7025	10	140	150
7170	14	342	356
Grand Total	**66**	**2,755**	**2,821**

Data sources: TasNetworks, 2018

Figure 7: Clarence's Residential Electricity Use



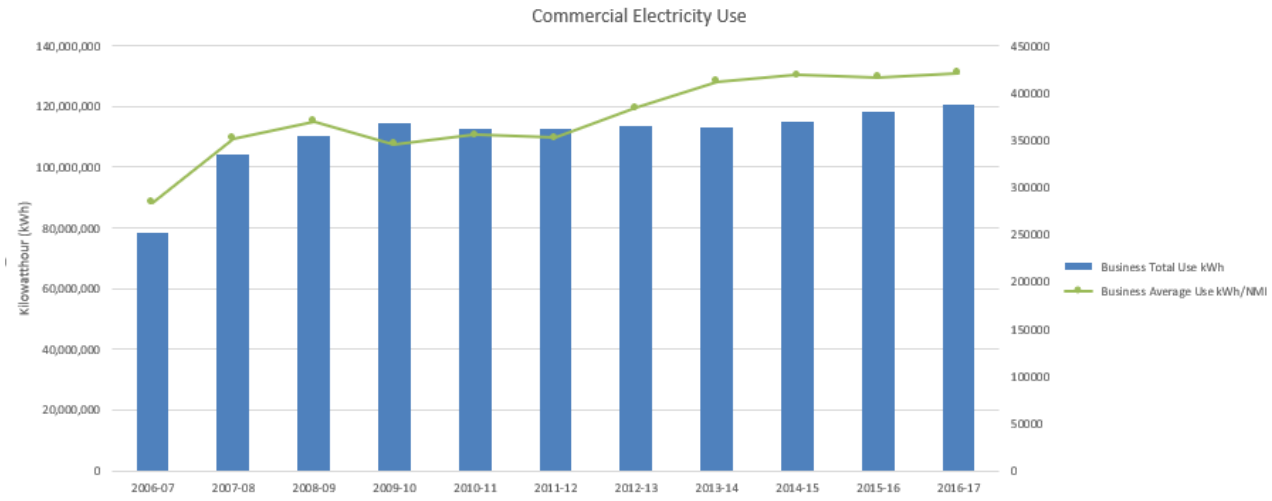
Source: Southern Tasmanian Councils Authority, 2018. Data sources: TasNetworks, 2018. NB: Electricity use is represented as kilowatt hour (kWh). One kWh is equal to one unit on electricity bills. This includes both commercial and industrial facilities to protect the identification of facilities at a 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 is sourced from legacy business systems and includes a variation between 2006/07 and 2007/08 for reasons unknown.

Total residential electricity consumption has risen over the decade 2006-07 to 2016-17, from 168 to 211 million units of electricity (kWh). Average electricity use per household has decreased over 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 2014) 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 78 million to 120 million units (kWh) over a decade, partly due to an extraordinary result in 2006-07. Average electricity use per meter and total electricity use increased in the commercial sector from 2009-10 to 2016-17. New commercial sector meter connections reached a peak in 2009-10 and decreased to 2016-17 to be 25 more than 2006-07 levels.

Figure 8: Clarence's Commercial Electricity Use

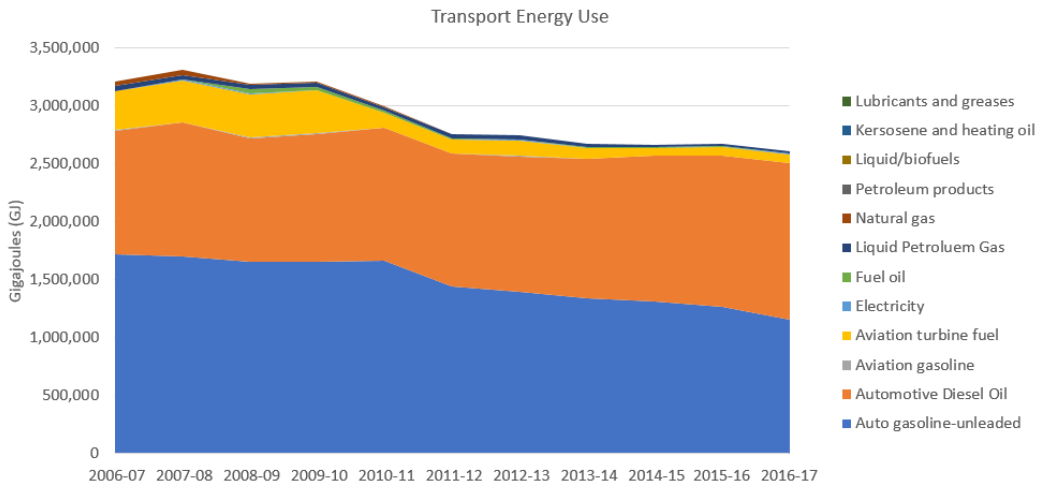


Source: Southern Tasmanian Councils Authority, 2018. Data sources: TasNetworks, 2018. NB: Electricity use is represented as kilowatt hour (kWh). One kWh is equal to one unit on electricity bills. This includes both commercial and industrial facilities to protect the

identification of facilities at a local level. The TasNetworks data is sourced from legacy business systems and includes a variation between 2006/07 and 2007/08 for reasons unknown.

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

Figure 9: Clarence's Transport Energy Use



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

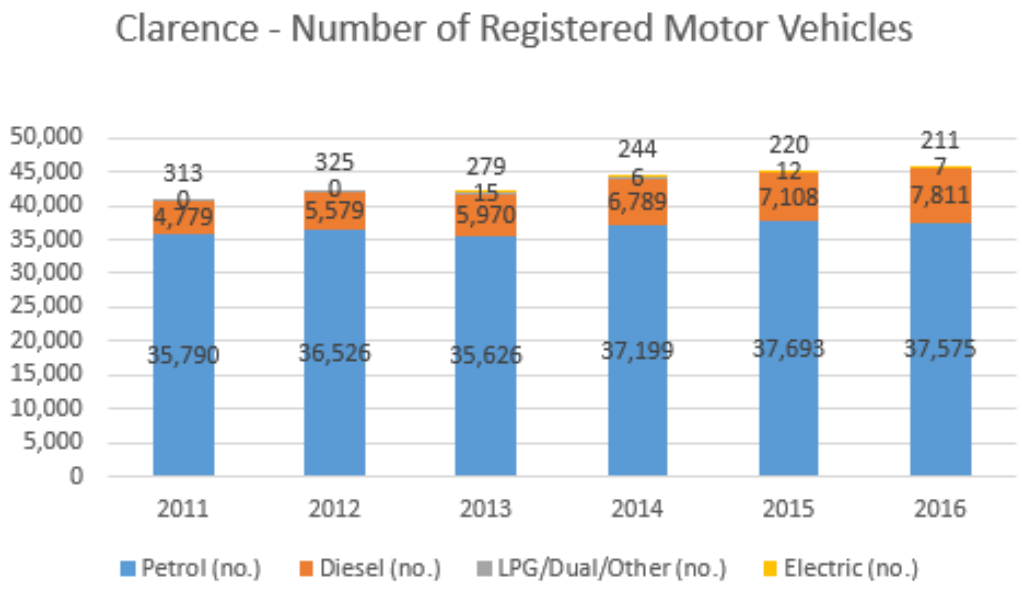
Passenger vehicle petrol and diesel fuel use are the primary source of energy use and greenhouse gas emissions in the transport sector[13] and the total number of vehicles registrations in Clarence has increased by over 1,000 from 2013-2016.

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.

Twenty-nine electric vehicles were registered in Clarence 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 Clarence, Regional Statistics by LGA2016, Annual (2010-11 to 2015-16)

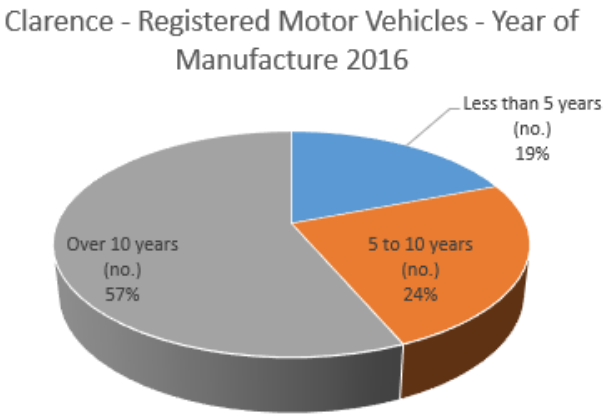
Figure 10: Clarence- Number of Motor Vehicle Registrations



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

One of the challenges in Clarence'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: Clarence's Motor Vehicle Registrations, Year of Manufacture



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.