

2015
SUPPLEMENTARY
MATERIAL

ENERGY AND GREENHOUSE GAS EMISSIONS



Energy use

Electricity

In 2014/15, Watercare used 167,311 MWh of electricity and sourced 29% of its energy needs internally, through cogeneration in the Rosedale and Mangere wastewater treatment plants and hydrogenation at four of our dams.

	2012/13		2013/14		2014/15	
	MWh	%	MWh	%	MWh	%
Electricity generated through water supply (hydro)	5,591	3.6%	4,364	2.7%	2,274	1.4%
Electricity generated through wastewater treatment (biogas) - Mangere	33,486	21.4%	38,707	24.1%	40,058	23.9%
Electricity generated through wastewater treatment (biogas) - Rosedale	6,598	4.2%	7,124	4.4%	6,806	4.1%
TOTAL internally sourced electricity	45,675	29.2%	50,195	31.2%	49,139	29.4%
TOTAL purchased electricity*	110,661	–	110,442	–	118,173	–
Total electricity consumed	156,336		160,637		167,311	

* a. Includes electricity generation at Mangere wastewater treatment plant fuelled by natural gas

b. Excludes electricity used by Watercare laboratory services

1MWh = 1,000kWh which is a measure of energy used

Major uses of electricity (kWh)

		2013/14	2014/15	Variation
Water supply	Electricity imported for pumping and treatment	27,723,140	34,420,742	24%
Water distribution	Electricity used for pumping water	6,761,500	7,380,419	9%
Wastewater collection	Electricity used for pumping wastewater	23,797,204	25,657,385	8%
Wastewater treatment	Electricity imported by WWTPs	45,606,578	44,272,273	-3%
Other	Business premises	980,455	799,638	-18%

Energy intensity:

Energy required for the treatment and pumping of water in 2014/15: **0.3 kWh/m³**

Energy required for the collection, treatment and discharge of wastewater in 2014/15: **0.84 kWh/m³**

The overall water treatment energy performance is very sensitive to the usage of the Waikato River water treatment plant. As compared to other gravity fed plants, this facility requires far more energy per unit production owing to pumping costs. In 2014/15, the relatively dry summer meant that the lake levels were lower than in 2013/14. This resulted in more water being sourced from the Waikato River, leading to increased energy use for pumping and treating water. Lower lake levels have also led to lower hydrogeneration because of insufficient operating head and/or abstraction volumes.

The reduction in the energy use of business premises is attributable to the relocation of two major offices to our new five star Green Star headquarters.

The overall wastewater treatment energy performance is very sensitive to wet weather due to the infiltration of stormwater in to the wastewater system.

Fuel use by corporate vehicles and plants standby generators (litres)

	2014/15
Fuel card petrol (regular)	125,231
Fuel card petrol (premium)	5,347
Fuel card diesel	395,286
Minitankers diesel	111,210
BOC LPG	646
Total fuel consumption	637,720

The electricity and fuel use displayed here form the total energy use by Watercare, apart from the energy involved in staff travel.

Greenhouse gas emissions

Watercare's 2014/15 greenhouse gas emissions – summary:

Last year, Watercare reviewed its carbon accounting and increased the scope of its reporting, following developments in the GHG Protocol, a widely accepted methodology for organisational carbon accounting.

In 2014/15, 36,622 tonnes of CO₂e (carbon dioxide equivalent) were generated, which is a 7% decrease compared with the previous year. This is mostly due to the carbon content of New Zealand electricity having reduced this year.

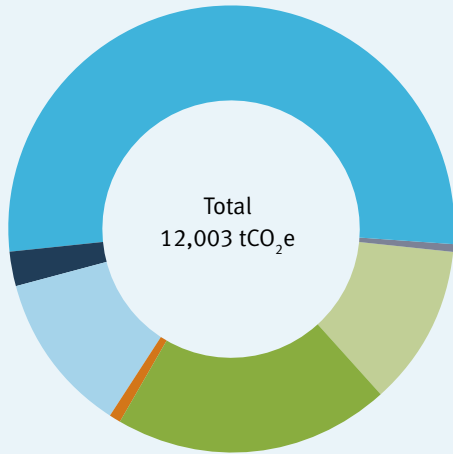
Scope	Category	Emission source	Value	% of total emissions	Unit
SCOPE 1	Stationary combustion	Natural gas use	2,412	6.59%	t CO ₂ e
		Biogas combustion	106	0.29%	t CO ₂ e
	Mobile combustion	Fuel use in corporate vehicles	1,383	3.78%	t CO ₂ e
		On-site fuel use	304	0.83%	t CO ₂ e
	Process Emissions	Wastewater Treatment	6,333	17.29%	t CO ₂ e
	Fugitive emissions	Refrigerants	79	0.22%	t CO ₂ e
		Overflows from network	-		t CO ₂ e
		Fugitive emissions from network	1,384	3.78%	t CO ₂ e
Sub-total Scope 1			12,003	32.77%	t CO₂e

Scope	Category	Emission source	Value	% of total emissions	Unit
SCOPE 2	Purchased electricity	Electricity use	15,529	42.40%	t CO ₂ e
Purchased electricity - Scope 2			15,529	42.40%	t CO₂e

Scope	Category	Emission source	Value	% of total emissions	Unit
SCOPE 3	Purchased goods and services	Lime	7,225	19.73%	t CO ₂ e
	Fuel and energy related activities not included in scope 1 and 2	T&D loss electricity	1,272	3.47%	t CO ₂ e
		T&D loss natural gas	283	0.77%	t CO ₂ e
	Waste generated in operations and WWT	Waste to landfill	154	0.42%	t CO ₂ e
	Business travel	Air travel	108	0.30%	t CO ₂ e
		Taxi	5	0.01%	t CO ₂ e
		Private mileage	44	0.12%	t CO ₂ e
Sub-total Scope 3			9,090	24.82%	t CO₂e

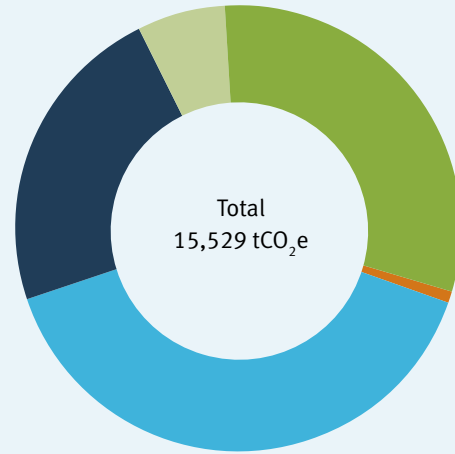
Total in new boundary adopted in 2014			36,622		t CO₂e
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Scope 1 Emissions



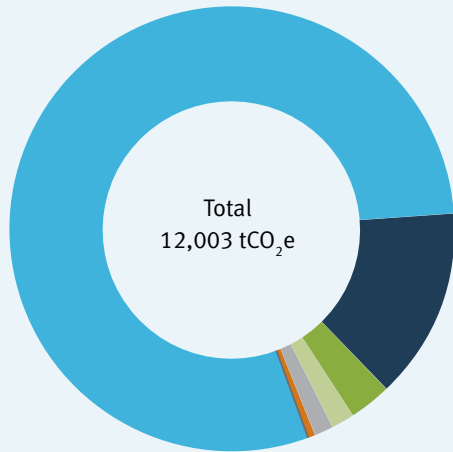
- Natural gas use
- Biogas combustion
- Fuel use in corporate vehicles
- On-site fuel use
- Waste Water Treatment
- Refrigerants
- Fugitive emissions from network

Scope 2 Emissions



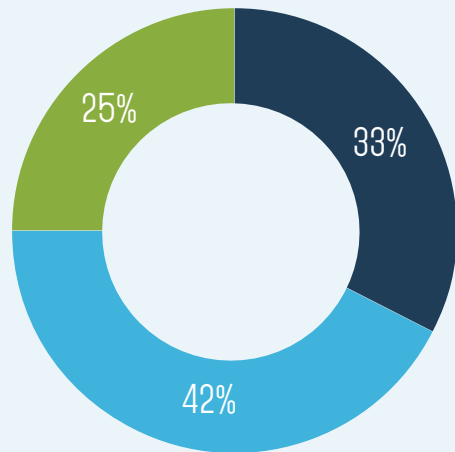
- Electricity imported for pumping and treatment
- Electricity used for pumping water
- Electricity used for pumping wastewater
- Electricity imported by WWTPs
- Business premises

Scope 3 Emissions



- Lime
- T&D loss electricity
- T&D loss natural gas
- Waste to landfill
- Air travel
- Private mileage
- Taxi

Total Emissions per Scope

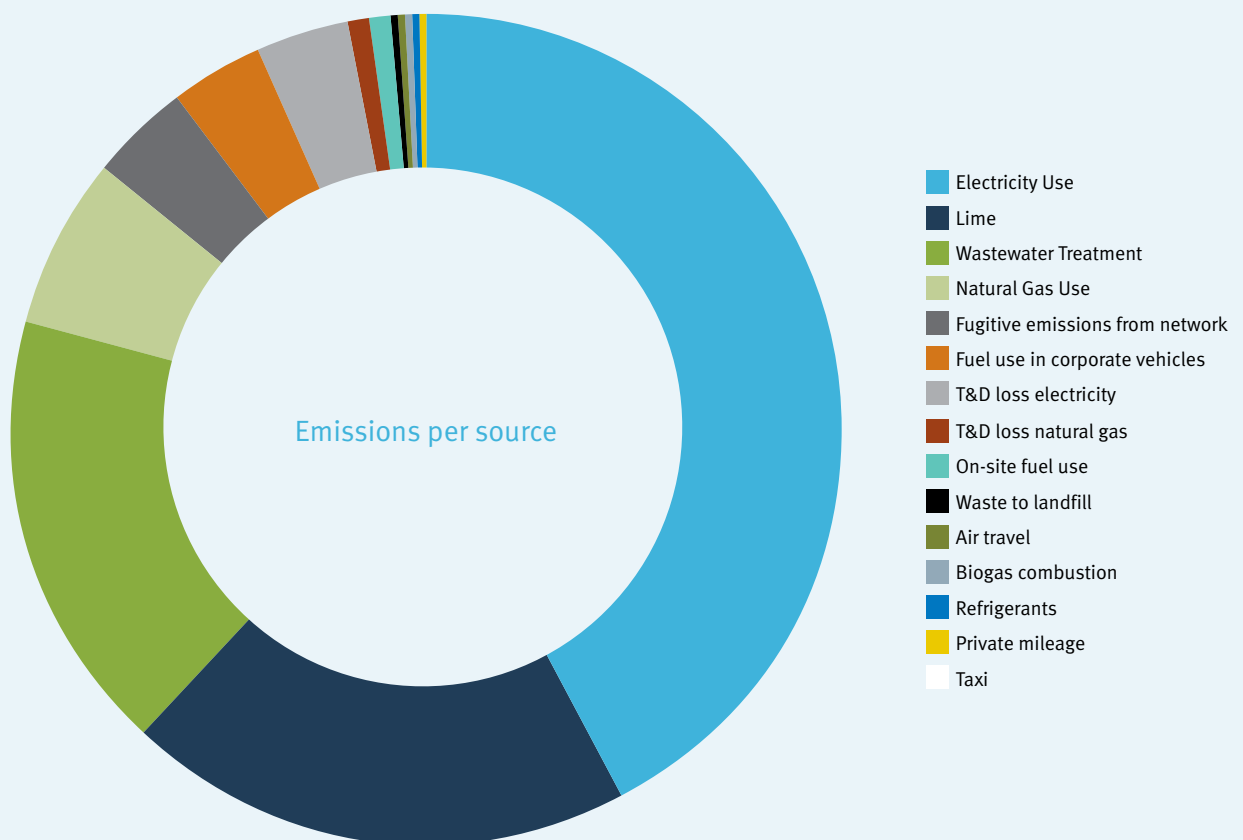


- Scope 1
- Scope 2
- Scope 3

Details

Scope 2 Electricity use					
SCOPE 2	Water supply	Electricity imported for pumping and treatment	4,750	30.59%	t CO ₂ e
	Water distribution	Electricity used for pumping water	1,018	6.56%	t CO ₂ e
	Wastewater collection	Electricity used for pumping wastewater	3,541	22.80%	t CO ₂ e
	Wastewater treatment	Electricity imported by WWTPs	6,110	39.34%	t CO ₂ e
	Other	Business premises	110	0.71%	t CO ₂ e

Scope 3 Lime					
SCOPE 3	Water supply treatment		1,411	19.53%	t CO ₂ e
	Waste water treatment		5,814	80.47%	t CO ₂ e



Comparison with the 1990 baseline:

Aligned with Auckland Council's Low Carbon Action Plan, Watercare reports against a 1990 baseline year. The emission reductions achieved since 1990 are significant. Watercare's greenhouse gas (GHG) emissions are now 80 per cent lower than in 1990, as displayed below, when comparing 2014/15 with 1990 with the same boundaries:

2014/15 Total in new boundary adopted in 2014	36,622	% of total emissions	t CO ₂ e
Scope 1	12,003	32.77%	t CO ₂ e
Scope 2	15,529	42.40%	t CO ₂ e
Scope 3	9,090	24.82%	t CO ₂ e
2014/15 Total in 1990 boundary	26,229	% of total emissions	t CO ₂ e
Scope 1	10,586	40.36%	t CO ₂ e
Scope 2	15,529	59.21%	t CO ₂ e
Scope 3	114	0.43%	t CO ₂ e
1990 emissions	137,990	% of total emissions	t CO ₂ e
Scope 1	132,430	95.97%	t CO ₂ e
Scope 2	5,500	3.99%	t CO ₂ e
Scope 3	60	0.04%	t CO ₂ e

Over the past 10 years, Watercare has completed major upgrades of its two main wastewater treatment plants. Oxidation ponds were decommissioned and sludge lagoons removed. Ultraviolet lights, which require high levels of energy, replaced natural sunlight for the final stages of the treatment process; however, extra emissions were more than offset by savings from the upgrade despite Auckland's growth and the increased scope of Watercare's activities.

Methodology:

Watercare's carbon footprint is calculated in conformance with the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (GHG Protocol) (World Resources Institute, 2004) and informed by the GHG Protocol Scope 3 (WRI, 2011) methodology.

In 2013/14, Watercare undertook a materiality assessment of key emission sources. Following this review, the operational reporting boundary has been extended to also include emissions from:

- Use of lime in treatment processes
- On-site diesel use
- LPG used for forklift operation
- Transmission and distribution of electricity and reticulated natural gas
- Private mileage (for business purposes)
- Taxi use.

The largest Scope 3 emission source not included in the boundary is capital projects. This will be a focus of work in future, as methodologies by which to do so become available.