

Delivering our strategy

Natural environment performance report

Water supply

	2019/20	2018/19	2017/18
Water supply dams (number of operational sources over the year)	12*	12*	12*
River sources (number of operational sources over the year)	2	3	3
Groundwater sources (number of operational sources over the year)	13	13	12
'A'-grade water treatment plants	15	15	15
Other water treatment plants	1**	1**	Nil
Length of treated watermains (km)	9,429	9,349	9,187
Service reservoirs	87	85	85
Pump stations	95	94	93
Annual volume produced (ex plant m ³)	166,073,744	159,557,593	153,784,185
Annual volume sold (m ³)***	132,321,049	128,610,171	127,548,898

* Though Watercare maintains Hays Creek, it was out of service in 2019/20. It will be back in service next year and is part of our drought supply augmentation.

** Warkworth Wells Water Treatment Plant was commissioned in December 2018 and has not been submitted for grading.

*** The difference between volume produced and volume sold is due to non-revenue water.

Volume of water by source

	2019/20		2018/19		2017/18	
	Volume (m ³)	%	Volume (m ³)	%	Volume (m ³)	%
Waitākere Dam	2,700,520	2%	3,517,824	2%	3,839,835	3%
Upper Huia Dam	4,772,363	3%	4,684,808	3%	8,102,899	5%
Upper Nihotupu Dam	6,141,941	4%	5,299,609	3%	8,272,721	5%
Lower Huia Dam	12,116,995	7%	10,182,607	6%	6,611,783	4%
Lower Nihotupu Dam	9,503,293	6%	6,035,042	4%	1,329,914	1%
Cosseys Dam	14,291,634	8%	16,665,256	10%	12,388,820	8%
Upper Mangatawhiri Dam	21,188,152	13%	24,687,408	16%	29,291,746	19%
Wairoa Dam	9,139,533	5%	12,722,452	8%	12,265,389	8%
Mangatangi Dam	26,466,287	16%	41,817,529	26%	45,572,241	29%
Waikato River	50,812,241	30%	26,460,059	17%	20,210,713	13%
Onehunga Aquifer	6,848,096	4%	5,147,992	3%	4,326,071	3%
Rural North	1,926,223	1%	1,727,329	1%	1,539,685	1%
Rural South	977,901	1%	928,023	1%	942,431	1%
Total	166,885,179		159,875,938		154,694,248	

Conservation activities

Watercare's activities involve interaction with diverse flora and fauna. We work hard to minimise the impact of our activities and, where possible, to enhance the environment. We allocate significant resources to minimising the effects our dams have on the surrounding freshwater ecologies. This includes simulating flood flows downstream from the dams and implementing a trap-and-haul programme at native fisheries, where migrating fish and eels are transferred around the dams.

Name of site	Ecological attributes	Conservation activities carried out in 2019/20
Southern regional wastewater plants	Habitat	Continued vegetation and noxious/pest weed control on Watercare-owned land – Pukekohe, Waiuku, Clarks Beach, Kawakawa Bay, Beachlands and Owhanake (Waiheke) wastewater treatment plants.
Southern regional wastewater plants	Habitat	Continued pest control (rabbits, possums, rats) at all southern sites.
Hūnua Ranges and Waitākere Ranges Fish Trap-and-Haul Programme	Native bush	Trap-and-Haul programme for the upstream migration of native juvenile eels and whitebait species and downstream migration of adult migrating eels. All trap-and-haul programmes are operated during the respective migrating season. Trap-and-haul at Mangatangi weir continued for the transfer of native torrent fish.
Northern regional wastewater plants	Native bush and wildlife habitat	Continued vegetation and noxious/pest weed control on Watercare-owned land – Army Bay, Waimauku, Helensville, Omaha, Snells/Algies, Waiwera, Warkworth and Wellsford wastewater treatment plants.
Northern regional wastewater plants	Native vegetation	We continue to actively undertake pest control (vermin) at all the northern regional wastewater treatment facilities.
Omaha Wastewater Treatment Plant	Habitat	The Omaha Wastewater Treatment Plant grounds; there is approximately 10 hectares of native plantings that are irrigated by treated wastewater.
Omaha Wastewater Treatment Plant – treated wastewater storage pond	Native vegetation	Pāteke (Brown Teal), native to New Zealand, continue to seasonally swim in the storage pond. These are the rarest waterfowl on the mainland and hence are an important attribute to the area.
Māngere Wastewater Treatment Plant	Habitat for fauna	We have continued to undertake extensive vegetation management and noxious weed removal on Watercare land.
Bird roosts	Foreshore of Manukau Harbour, internationally-renowned for migratory birds	Access bridge built to enable better access and protect waterway. The artificial bird roosts' reconstruction has remained stable with minimal erosion over the past year. The Manukau Harbour and the bird roosts have continued to support more than 20% of New Zealand's total wading bird population with many migratory species including Eastern Bar-tailed Godwits, Wrybills and Southern Pied Oystercatchers.
Coastal walkways	Habitat for fauna	For the Coastal Clean-Up 2020, Watercare employees successfully removed over 10,000 litres of rubbish from the Watercare foreshore coastline.
Foreshore and coastal walkways	Foreshore of Manukau Harbour, internationally-renowned for migratory birds	Planting of 3000 seedlings across foreshore area. Continued co-ordinated pest control activities with Auckland Council's Ambury Regional Park as a defence against invasive pests. The efforts included bait lines and alternate bait pulses, DOC200 traps, live traps, Pindone drops and shooting to reduce the number of pests impacting the bird roost and the Watercare Coastal Walkway. The ongoing support from volunteers for the trap lines and the general public in reporting changes on the foreshore have helped make the foreshore a better place.
Hūnua Ranges revegetation	Native bush	Planting of 303,000 native trees, replacing land previously under pine forestry. Part of an ongoing restoration project, with more plantings forecast for 2020/21.
Waikato RiverCare	Riparian restoration	Riparian planting projects along the lower Waikato River to enhance river water quality.
Central Interceptor Project	Riparian restoration	More than 2000 native seedlings planted on the banks of a tributary of the Waitītiki-Meola Creek on Mt Albert Grammar School land.
Bombay Water Treatment Plant	Riparian restoration	Riparian planting along 800 metres of stream bank. 5320 trees planted in January 2020.

Dams and other operational areas within Waitākere Ranges are covered by the Waitākere Ranges Area Heritage Act. The Auckland Unitary Plan also designates parts of our land as Significant Ecological areas. Some of our sites also have 'heritage protection status' e.g. Nihotupu Filter Station.

Climate change

During 2019/20, our focus was on embedding the impacts of a changing climate into our thinking and processes, following the launch of our Climate Change Strategy in early 2019. The strategy covers specific actions that we will take immediately and establishes a pathway of monitoring and understanding between now and 2025 so that we can adapt to the changing climate based on evolving data and projections.

The strategy establishes two ambitious targets for emissions reductions from our operations which align with keeping the global temperature increase within 1.5 degrees Celsius.

- Net Zero emissions by 2050
- Reduce operational greenhouse gas emissions by 45% by the year 2030.

It also comprises a work plan that consists of 14 portfolios across both adaptation and mitigation.

Work progressed during the year includes:

- A new subcommittee of Watercare's board – Committee for Climate Action – was established in 2020 and the business has contributed to Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan
- Milestones on several climate portfolios such as the following:

Climate modelling and water source

The business case for the Integrated Source Management Model (ISMM) phase 1 upgrades has been approved. This will provide a more robust understanding of recent rainfall patterns. Once established, this will lead to preparation of phase 2, which covers future projections with climate scenarios included. The tool can be used to identify and manage the water sources used to supply Auckland every day.

Treatment and network resilience

The assets value stream has progressed well over the past six months with teams established and priority work plans started. These are truly cross-functional teams that are utilising existing projects and scenarios. The priority areas in this value stream are sea level rise, odour and corrosion, materials and design standards, and wastewater network overflow modelling.

Low-carbon infrastructure

The Enterprise Model's Programme First office has been established at Watercare. This includes construction partners Fulton Hogan and Fletchers as well as a representative from our design consultants. This team is developing processes while also working live on a number of 'transition' projects where they are trialling carbon-reduction opportunities. An 'Infrastructure Carbon Baseline' has also been finalised which predicts the anticipated carbon associated with our construction projects; we believe this is a first in Australasia.

Greenhouse gas emissions

We are continuing to improve and evolve our measurement and management of greenhouse gas emissions. This journey started in the early 2000's as we significantly upgraded the Māngere Wastewater Treatment Plant. This has enabled us to capture the methane and nitrous oxide emissions from the sewage and has unlocked the generation of biogas which is now turned into electricity to help run the plant. Replacing the open-air oxidation ponds and sludge lagoons with land-based treatment resulted in a long-term decrease in greenhouse gas emissions by approximately 80% compared to the 1990 baseline (on page 20 and aligned with Auckland Council's approach in the Low Carbon Action Plan).

In 2013/14 we established an improved reporting framework which included a number of external emissions that should also be accounted for under our footprint (scope 3 emission sources). In 2019/20 we have continued the evolution of our approach, updating emissions factors and methodologies to align with recent updates, and improving data capture.

This year our overall emissions (scope 1, 2 and 3) have increased by 22% in comparison with the previous year. The main reasons for this increase are a rise in electricity consumption and new reporting sources that we have included within our scope. Details are provided below.

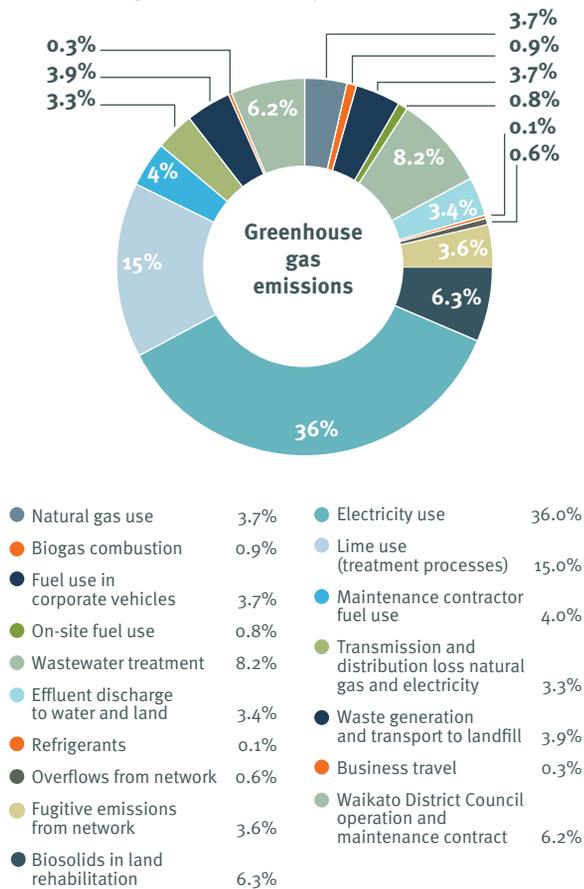
Emission movements over the past year

Scope 1 emissions decreased by six percent, primarily due to the reduction in natural gas consumption at Māngere Wastewater Treatment Plant compared with 2018/19, coupled with changes in emission factors for the reporting year.

Our scope 2 emissions increased by 21% compared with the previous year. This is wholly attributed to the electricity consumption associated with the increased pumping activity from the Waikato Water Treatment Plant undertaken in response to the drought conditions in Auckland. The low water storage levels in the Hūnua and Waitākere dams have resulted in a significant increase to the volume of water sourced from the Waikato River. This source requires about 25x more energy per unit of production, due to pumping uphill from the Waikato River to Auckland city.

The boundary of our scope 3 reporting has expanded this year to include emissions from the newly-established operations and maintenance contract for the management of the three water services for Waikato District Council (which began on 1 October, 2019). For the first time we are reporting fuel use by our external maintenance contractors as well.

Greenhouse gas emissions 2019/20



Focus for 2020/21

There are a number of external influences that will have an impact on our greenhouse gas emissions measurement and performance in the year to come.

We will review our emissions reduction target to align with the Te Tāruke-ā-Tāwhiri: Auckland’s Climate Plan which targets 50% reduction in emissions by 2030. We will also review recent changes to the measurement methodology for wastewater process emissions published by the Intergovernmental Panel on Climate Change (IPCC). The changes in methodology may result in an increased quantity of nitrous oxide and methane gases reported; these have a high global warming potential and therefore emissions impact. These emissions account for approximately 25% of our total emissions and we will work with WaterNZ and other local utilities to understand the implications in New Zealand.

We will be reporting a full year of emissions relating to the three waters contract with Waikato District Council which started in October 2019.

Finally, our reporting boundary for emissions may change significantly with any structural changes that are proposed through the *Water Services Bill* (water industry reform) due to be enacted in 2021.

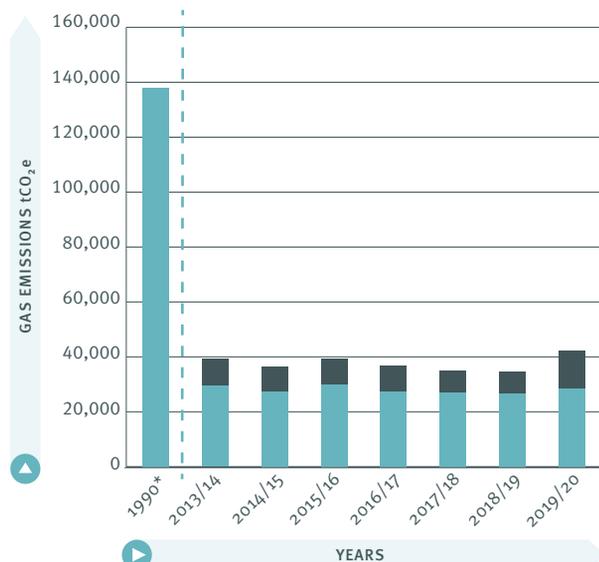
Note 1: Watercare’s carbon footprint has been calculated in accordance with the “Greenhouse Gas Protocol” (WRI, 2004), including all six Kyoto Greenhouse gases and the operational control method. Per protocol, it excludes biogenic CO2 emissions from the burning of biogas which totalled 60,628. AR5 Global Warming Potential values with climate-carbon feedbacks of 34 for CH4 and 298 for N2O have been used.

Note 2: Independent verification of GHG measurement provided by Toitu Envirocare in line with ISO 14064-1:2006. Emissions from Puketutu Island were excluded on the basis of sufficient data not being available to calculate the emissions.

Note 3: Emissions factors are sourced from Ministry for the Environment 2015, 2019 and IPCC 2006. Wastewater emissions include additional industry calculations.

Note 4: Additional breakdown can be found in the energy and greenhouse gas emissions supplement to the annual report 2020.

Performance against baseline (1990 onwards)



* As a result of lack of exact data breakdown for scope 1 and 2, we are reporting this as a combined figure for 1990. See details on page 19

● Scope 1 and 2 ● Scope 3

Scope 1 – Direct emissions e.g Fuel burnt, treatment processes

Scope 2 – Electricity purchased

Scope 3 – Indirect emissions e.g Fuel use by contractors

Energy use and internal generation

Watercare co-generates electricity from biogas at both the Māngere and Rosedale wastewater treatment plants. As well as the financial and environmental benefits, co-generation also improves operational flexibility and resilience. Our water supply arm is an electricity supplier too, with turbines located in the four Hūnua dams generating hydroelectric power.

This year, we used 198,864MWh of electricity, an increase of 12.7% compared with 2018/19.

We generated 22.37% of our total energy use internally, compared with 26.7% last year. Cogeneration at Rosedale Wastewater Treatment Plant was lower than 2018/19 due to one of the co-generation engines being out of service. Cogeneration at Māngere Wastewater Treatment Plant was also lower than 2018/19 due to reduced engine uptime and maintenance issues.

We have had significantly less rainfall this year and supply lakes' storage was low for most of the year as well. To meet demand, we pumped more water from the Waikato River, which consumes more energy than gravity-fed supply from our lakes.

The energy neutrality programme is underway to be achieved at Māngere and Rosedale treatment plants by 2025 (and should result in an energy reduction of about 37GWh). An investigation into control improvements at the Waikato Water Treatment Plant's raw water pumps was completed but not yet implemented due to COVID-19 and drought. An investigation into the Māngere ultraviolet (UV) treatment system is currently underway to quantify savings from the UV upgrade and identify additional potential for savings.

Total energy consumption

	2019/20			%
	Total	Unit	Total GJ	
Grid electricity purchased	153,307.11	MWh	551,905.58	
Electricity – self generation renewable (solar, hydro, biogas)	41,903.92	MWh	150,854.12	
Electricity – self generation non-renewable (natural gas, diesel)	3,652.49	MWh	13,148.95	
Transport – petrol, premium, diesel	713,348.71	litres	27,047.50	
Transport – BOC Gas	870.00	kg	42.63	
Other – Natural gas	1,574.00	GJ	1,574.00	
Total			744,572.38	
Renewable sources			606,176.23	81%
Non-renewable sources			138,396.55	19%

Internal Generation	2019/20		2018/19		2017/18	
	MWh	%	MWh	%	MWh	%
Electricity generated through water supply (hydro)	2,665	1.34%	1,413	0.79%	36	0.02%
Electricity generated through wastewater treatment (biogas) – Māngere	35,108	17.65%	39,298	21.88%	38,118	22.91%
Electricity generated through wastewater treatment (biogas) – Rosedale	6,309	3.17%	7,196	4.01%	6,050	3.64%
Electricity generated from solar	402	0.20%	84	0.05%	–	–
Electricity generated from non-renewable sources	3,652	1.84%	4,834	2.69%		
Total internally sourced electricity	44,484	22.37%	47,990	26.71%	44,204	26.57%
Total purchased electricity	153,307	77.09%	128,441	71.50%	122,172	73.43%
Electricity exported to the grid (solar, hydro, biogas)	-2,580	-1.30%	-1,626	-0.91%		
Total electricity consumed	198,864	100.00%	179,639	100.00%	166,376	

Reusing waste from treatment processes

We aim to reuse as much material as possible from our water and wastewater treatment plants. Watercare uses biosolids from the Māngere Wastewater Treatment Plant to rehabilitate Puketutu Island, which was formerly a quarry. We also maintain dedicated placement sites for solids removed during the water treatment process. In 2019/20, Watercare was able to reuse 57% of the solids from our water treatment process and 81% of the solids from our wastewater treatment process.

Operational waste from:	2019/20	2018/19	2017/18
Water treatment (m ³) – sludge	12,316	12,472	12,494
Wastewater treatment (t) – biosolids, grits and screenings	142,030	137,976	138,885

Metal content in biosolids at wastewater treatment plants

Biosolids from wastewater treatment plants can have a high metal content, due to stormwater run-off from the streets entering combined sewers and through waste from industrial users. The table below displays the metal content of biosolids from the Māngere and Rosedale treatment plants, which produce most of Watercare’s biosolids.

The metal content has increased slightly this year, to 2.43 tonnes from last year’s 2.36 tonnes but is well within the permitted levels specified in the Guidelines for the Beneficial use of Organic Materials on productive land – December 2017.

Substance	2019/20		2018/19		2017/18	
	Concentration (mg/kg)	Disposed weight (tonnes)	Concentration (mg/kg)	Disposed weight (tonnes)	Concentration (mg/kg)	Disposed weight (tonnes)
Arsenic	5.40	0.19	5.09	0.18	5.20	0.19
Cadmium	0.70	0.03	0.73	0.03	0.81	0.03
Chromium	47.00	1.59	43.35	1.55	41.19	1.49
Lead	16.00	0.60	16.24	0.58	18.52	0.67
Mercury	0.50	0.02	0.48	0.02	0.56	0.02
TOTAL	69.60	2.43	65.90	2.36	66.28	2.39

Resource consents

As at 30 June 2020, Watercare had 507 active consents across our network and treatment facilities, and we averaged 492 active consents over 2019/20. Our average rate of compliance with these consent conditions was 96.6%.

The increase in consent conditions with non-compliance during March and April were due to COVID-19: sampling activities that were deemed non-essential were temporarily put on hold and considered “technical breaches”. These were all reported and did not incur any fines or enforcement actions.

We report all non-compliances to Auckland Council, and the council took no formal enforcement actions.

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Total number of active consents	484	474	475	485	482	493	489	497	501	506	506	507
Number of non-compliant consents 1	17	12	7	8	8	14	14	9	27	56	14	17
Number of non-compliant category 3 conditions	–	–	1	–	–	–	–	1	–	–	–	–
Number of non-compliant category 1 or 2 conditions	11	13	14	18	14	15	17	16	12	15	20	18

Resource consent conditions

