RUAMĀHANGA STRATEGY

CLIMATE CHANGE STRATEGY

TE KAUNIHERA-Ā-ROHE O TARATAHI
CARTERTON
DISTRICT COUNCIL

SOUTH WAIRARAPA
DISTRICT COUNCIL
Kia Reretahi Tātau

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1 Introduction

Climate Change is the biggest environmental challenge we are facing.

As Wairarapa is already experiencing the effect of Climate Change, especially sea level rise and erosion, Carterton District Council (CDC) and South Wairarapa District Council (SWDC) are committed to doing their part in mitigating Climate Change (reducing the greenhouse gas emissions).

In 2015, the Mayors signed the New Zealand Local Government Leaders' Climate Change Declaration and committed to:

- Develop and implement ambitious action plans that reduce greenhouse gas emissions and support resilience within our own councils and for our local communities. These plans will:
    - o promote walking, cycling, public transport and other low carbon transport options;
    - o work to improve the resource efficiency and health of homes, businesses and infrastructure in our district;
    - o support the use of renewable energy and uptake of electric vehicles.
- Work with our communities to understand, prepare for and respond to the physical impacts of climate change.
- Work with central government to deliver on national emission reduction targets and support resilience in our communities.

The Ruamāhanga Strategy has been developed to reduce the carbon footprint of Carterton District Council and South Wairarapa District Council.

This strategy:

- presents the districts (socio-economic, environmental and cultural contexts);
- explains what Climate Change is and what may be the impact for Wairarapa;
- presents the greenhouse gas inventory for the Wellington Region (lead by Greater Wellington)
- presents the inventories of greenhouse gas emissions from Wairarapa and from council's activities for each Councils;
- sets up targets;
- presents an action plan (short, medium and long term).

This strategy will be updated regularly.

2   Executive summary

Climate Change is the biggest environmental challenge we are facing.

As Wairarapa is already experiencing the effect of Climate Change, especially sea level rise and erosion, Carterton District Council (CDC) and South Wairarapa District Council (SWDC) are committed to doing their part in mitigating Climate Change (reducing the greenhouse gas emissions).

The Ruamāhanga Strategy has been developed to reduce the carbon footprint of Carterton District Council and South Wairarapa District Council.

Socio-economic context

With a population of 19,776 in 2018, South Wairarapa and Carterton Districts are attractive, and the population had a +23.7% growth between 2006 and 2018 (around +1.8% per year). South Wairarapa and Carterton Districts are rural districts with a density of 5.4 pers/km^2.

Households in the districts own more motor vehicles than the average in Wellington Region. 54.4% of the households own two or more vehicles (42.5% for Wellington Region) and 41.9% own one or less motor vehicle (53.2% for Wellington Region).

In 2018, the main fuel type for the district's households was wood (74.7%), followed by electricity (59.9%). Bottled gas and coal respectively had a 43.6% and 73.2% decrease between 2013 and 2018.

In 2018, unemployment in South Wairarapa and Carterton Districts was lower than in Wellington region (4.4% compared to 6.2%). The main industries are agriculture, forestry and fishing (21.9% of the workforce) followed by manufacturing (10.7% of the workforce).

64% of the residents from South Wairarapa and Carterton Districts worked within the districts. 61.7% of the residents drove a car, truck or van to travel to work. Public transport (trains and buses) are used by 9.2% of the residents to go to work and 5.3% of the residents walked, jogged or biked.

Almost 90% of the workers in South Wairarapa and Carterton Districts live within the districts.

Environmental context

Carterton and South Wairarapa Districts have dry and warm summers and wet and mild winters.

The districts are mainly covered by farmlands (55.7%, including 6.7% of planted forests), closely followed by natural areas (43.8%, including 35.7% of natural forests). The farmlands and the four settlements of Featherston, Greytown, Martinborough and Carterton are mainly located in the Wairarapa plains and the Eastern Wairarapa. The Tararua Range and the Aorangi Range are the main natural areas of the districts.

Carterton and South Wairarapa Districts have a 142-kilometre shoreline. The coast has the settlements of Ngawi, Tora and Flat Point, but is mainly rural or natural areas.

Historical and cultural context

The Wairarapa has a strong mana whenua history with many important Māori heritage sites. The cultural landscape includes those places associated with ngā atua (deities), taniwha and kaitiaki (guardians and protectors of places), as well as places discovered, visited and or named by ancestors and explorers.

What is Climate Change and its impact for Wairarapa

According to the UNFCCC[1], Climate Change means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

Climate Change impacts are global and affect Wairarapa. These impacts for Wairarapa could be:

- increased risk to coastal roads and infrastructure from coastal erosion and inundation, increased storminess and sea-level rise,
- increased risk to surface flooding. River flooding may also become more frequent and more intense.
- more frequent droughts are likely to lead to water shortages, increased demand for irrigation and increased risk of wildfires.
- warmer temperatures, a longer growing season and fewer frosts could provide opportunities to grow new crops. Farmers might benefit from faster growth of pasture and better crop growing conditions. However, these benefits may be limited by negative effects of climate change such as prolonged drought, water shortages and greater frequency and intensity of storms.
- biodiversity is suffering from Climate Change due to the rate of change being very fast compared to historic change species have experienced.
- The ocean is becoming more acidic because the it absorbs a huge quantity of CO_2 released in the atmosphere. This affects negatively all the marine species, especially seashells.

Wairarapa Combined District greenhouse gas inventory

In 2018/19 reporting year, the Wairarapa Combined District emitted gross 1,734,320 tCO_2e and net 353,460 tCO_2e.

The biggest sector is agriculture (77.8%), followed by transport (15.7%). Stationary energy (3.4%), Waste (2.3%) and Industry (0.8%) are minor sources of emissions in the Wairarapa.

Total gross emissions fell by 7%, from 1,871,095 tCO_2e in 2001 to 1,734,320 tCO_2e in 2019. Reductions in emissions from stationary energy, waste and agriculture are responsible for the fall in total gross emissions. As the area's population has risen (by 22%, from 39,090 to 47,590), per capita gross emissions have reduced by 24% from 47.9 tCO_2e in 2001 to 36.4 tCO_2e in 2019.

Net forestry sequestration reduced by 30% between 2001 and 2019 causing net emissions to increase from net-negative total emissions (-91,460 tCO_2e in 2001) to net-positive emissions (353,460 tCO_2e in 2019).

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[1] United Nation Framework Convention on Climate Change

Two greenhouse gas inventories have been completed, one for CDC and one for SWDC. The results are the following:

	t CO_2e - CDC	t CO_2e – SWDC
Corporate Services	14.22	34.29
Community Services	60.81	20.03
Operations	109.39	53.67
Water	517.28	613.10
Parks and Reserves	63.42	30.10
Regulatory	12.00	12.91
GROSS EMISSIONS	**777.12**	**764.10**

Table 1: Emissions by business units in 2018

	t CO_2e - CDC	t CO_2e – SWDC
Scope 1	149.13	60.99
Scope 2	137.14	79.34
Scope 3	490.85	623.77
GROSS EMISSIONS	**777.12**	**764.10**

Table 2: Emissions by scopes in 2018

	t CO_2e - CDC	t CO_2e – SWDC
Electricity	147.52	85.35
Transport	149.73	62.92
Wastewater	447.82	567.07
Water Supply	21.64	46.04
Waste	10.40	2.73
Refrigerant	0.00	0.00
GROSS EMISSIONS	**777.12**	**764.10**

Table 3: Emissions by sources in 2018

	t CO_2e - CDC	t CO_2e – SWDC
GROSS EMISSIONS	**777.12**	**764.10**
Sequestration (forests)	*-7,249.34*	*-2,513.47*
Harvest emissions	*0*	*4,950.74*
TOTAL	-7,249.34	2,437.27
NET EMISSIONS	**-6,472.22**	**3,201.37**

Table 4: Forestry

Targets

Carbon targets have been set up. They are ambitious but also, achievable and realistic. Being small councils, we must be aware of our limits.

During the period 2020 – 2030, Carterton and South Wairarapa District Councils aim to:

- Reduce their gross greenhouse gas emissions,
- Increase the reservoirs, therefore the amount of greenhouse gas sequestered every year,
- Reduce biogenic methane by 10% below 2017 levels.

Action Plan

To achieve these targets, the councils set up an action plan. The actions are intended for:

- Councils: lead by example:
  o Council's activities
  o Optimise the fleet vehicles
  o Reduce energy consumption
  o Reduce the use of non-renewable energy
  o Reduce water consumption, therefore wastewater
  o Reduce solid waste
  o Increase the carbon reservoirs
  o Communicate and educate
- Community and businesses: support low carbon behaviours and circular economy:
  o Reduce the use of combustion engine vehicles
  o Promote healthy homes
  o Promote local food and locally made goods and services
  o Reduce solid waste
  o Increase the carbon reservoirs
  o Engage the community and businesses in the carbon footprint reduction

3 Socioeconomic context

3.1 Carterton District (CD)

3.1.1 Population

	2006	2013	2018	Change between 2006 - 2018	2043 (forecast)	Change between 2018 - 2043
Population	7,098	8,235	9,201	+29.6%	11,435	+24.3%

Source: id community, 2019

Table 5: CD's population

	Population 2018	Land area	Density (pers/km^2)
Population	9,201	1,180 km^2	7.80

Source: id community, 2019

Table 6: CD's population density in 2018

Between 2006 and 2018 Carterton District's population increased quickly (average: 2.2% per year) and passed from 7,098 in 2006 to 9,201 in 2018. The forecast shows that the population will keep increasing even though it is slower (average: 0.9% per year). The population in 2043 is estimated to be 11,435.

CD's density is low (7.80 persons per km^2).

3.1.2 Households

3.1.2.1 Households and dwellings

	2006	2013	2018	Change between 2013 – 2018
Households	2,751	3,294	3,657	+11.0%
Dwellings	3,195	3,738	4,131	+10.5%

Source: id community, 2020

Table 7: CD's households and dwellings

CD had a 11% increase in households and a 10.5% increase in dwellings between 2013 and 2018.

3.1.2.2   Car ownership
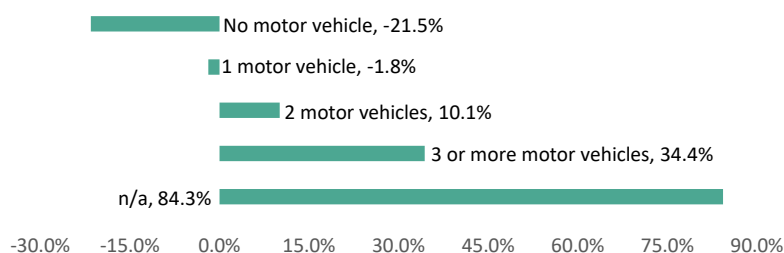
Source: id community, 2020

Figure 1: CD's households car ownership change between 2013 and 2018

Households with 2 motors vehicles or more increased by 44.5%. Households with 1 vehicle or less decreased by 23.3%. Because CD is a rural district and due to limited public transport, people rely on their own cars.

3.1.2.3   Household fuel type
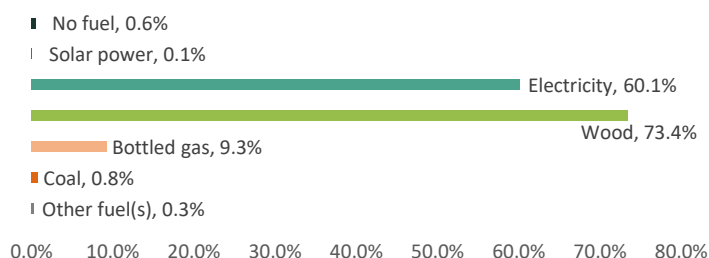
Source: id community, 2020

Figure 2: CD's households fuel type in 2018

Wood (73.4% of the households) and electricity (60.1% of the households) are the two main fuels for the households in CD in 2018.

3.1.3   Employment

3.1.3.1   Employment status

	2013		2018		Change between 2013 – 2018
	Number	**%**	**Number**	**%**	
Employed	4,062	94.4	4,734	93.8	+16.5%
Employed full-time	*3,015*	*70.0*	*3,492*	*73.8*	*+15.8%*
Employed part-time	*1,047*	*24.3*	*1,242*	*20.0*	*+18.6%*
Unemployed	243	5.6	240	6.2	-1.2%
Total labour force	**4,305**	**100.0**	**4,974**	**100.0**	**+15.5%**

Source: id community, 2019

Table 8: CD's residents employment status

The unemployment rate in 2018 for CD was above the national rate of 5.8%.

3.1.3.2   Workforce profiles
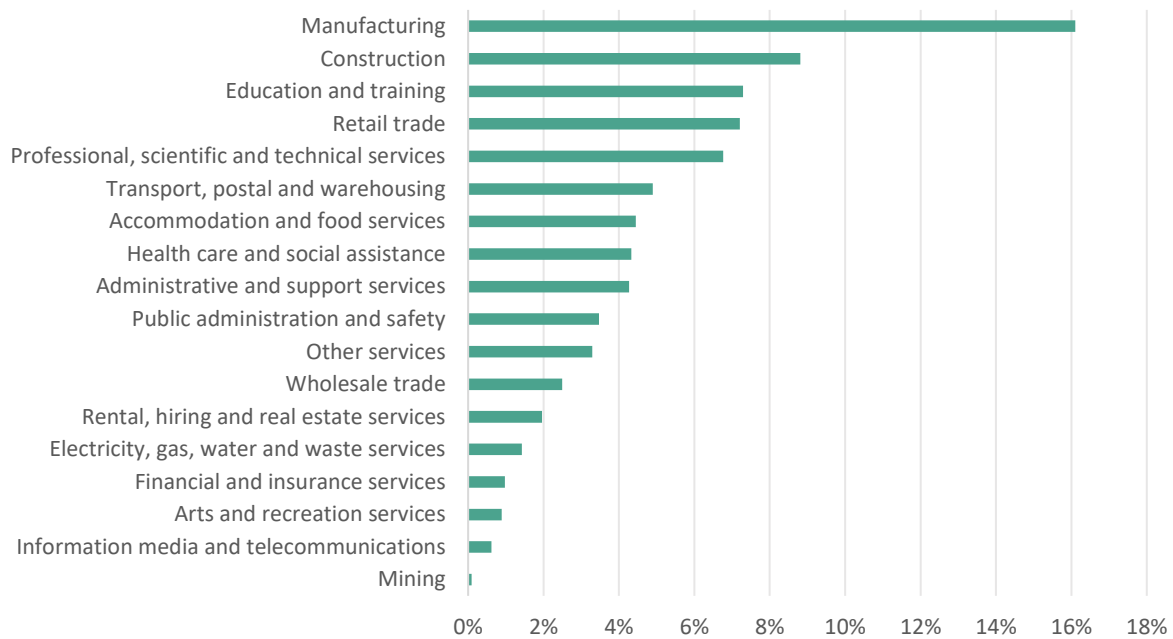
Source: id community, 2020

Figure 3: CD's workforce industry sector of employment in 2018

Agriculture, forestry and fishing is the biggest sector and represents almost 18% of the workforce profile. Manufacturing is the second biggest sector with over 16% of the workforce.

3.1.3.3   Carterton's residents place of work

Source: id community, 2020

Figure 4: CD's residents place of work in 2018

Over 75% of the CD's residents works in Wairarapa (57% in CD, 15% in Masterton District and 5% in South Wairarapa District). 6% of the CD residents work in Wellington City. A small number of residents works in Lower Hutt City, Upper Hutt City, Porirua City, Auckland City and Tararua District.

3.1.3.4   Method of travel to work
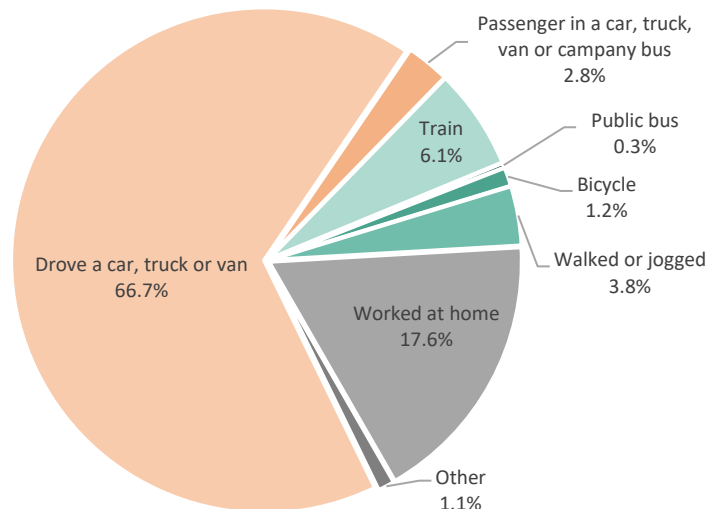
Source: id community, 2020

Figure 5: CD's residents' method of travel to work in 2018

Almost 70% of the CD's residents use a high carbon emission way of transport to work (drive a car, truck or van or be a passenger, drive a motorbike or power cycle). 11.4% of residents use a low carbon way of transport to go to work (train, walk or jogged, bicycle, public bus).
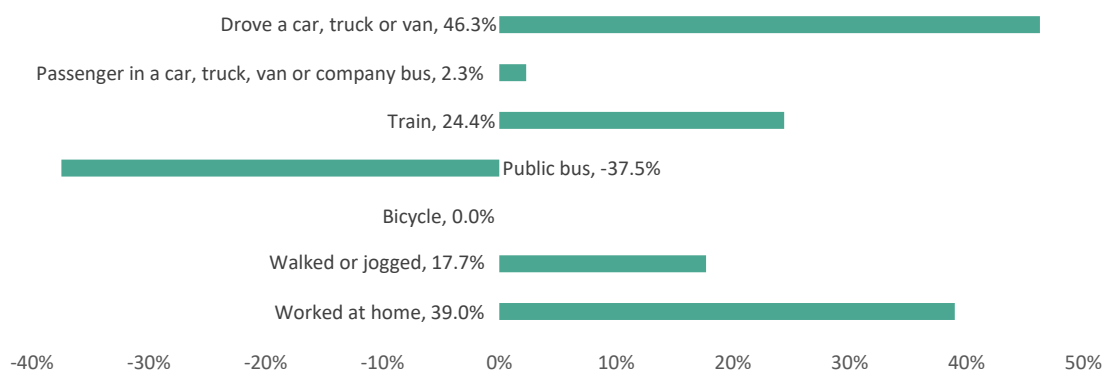
Source: id community, 2020

Figure 6: CD's residents' method of travel to work change between 2013 and 2018

The low carbon way of travel (train (+24.4%) and walked or jogged (+17.7%)) increased between 2013 and 2018. However, the bicycle users stayed stable and the public bus users decreased (-37.5%). Moreover, the high carbon emission way of travel increased (+46.3% for the car, truck or van users).

3.1.3.5 Carterton's workers place of residence
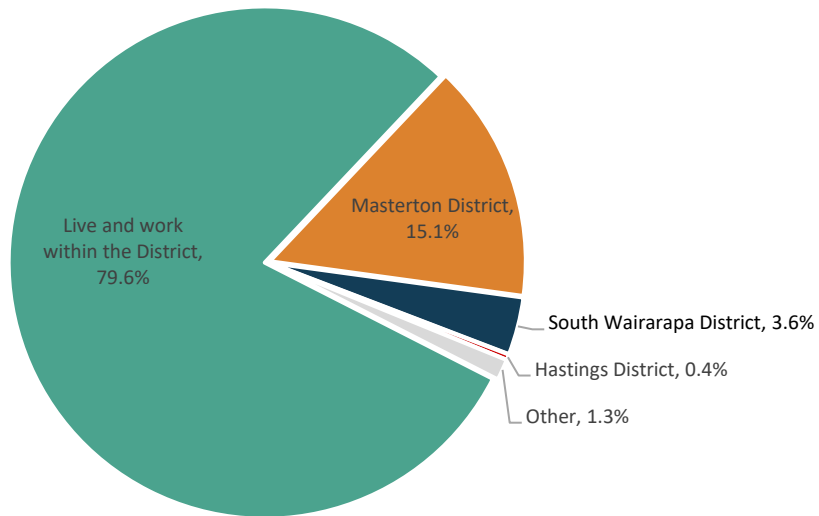
Source: id community, 2020

Figure 7: CD's workers place of residence in 2018

Over 98% of the Carterton's workers lives in Wairarapa (80% in CD, 15% in Masterton District and 4% in South Wairarapa District).

3.2 South Wairarapa District (SWD)

3.2.1 Population

	2006	2013	2018	Change between 2006 - 2018	2043 (forecast)
Population	8,892	9,525	10,575	+18.9%	12,733
Featherston	*2,340*	*2,250*	*2,487*	*+6.3%*	*3,127*
Greytown	*2,067*	*2,202*	*2,466*	*+19.3%*	*3,581*
Martinborough	*1,323*	*1,470*	*1,767*	*+33.6%*	*2,325*
Rural areas	*3,159*	*3,606*	*3,852*	*+21.9%*	*3,700*

Source: id community, 2020

Table 9: SWD's population

	Population 2018	Land area	Density (pers/km^2)
Population	10,575	2,457 km^2	4.3

Source: id community, 2019

Table 10: SWD's population density in 2018

Between 2006 and 2018 South Wairarapa District's population increased quickly (average: 1.5% per year) and passed from 8,892 in 2006 to 10,575 in 2018. The forecast shows that the population will keep increasing even though it is slower (average: 0.7% per year). The population in 2043 is estimated to be 12,733.

SWD's density is very low (4.3 persons per km^2).

3.2.2 Households

3.2.2.1 Households and dwellings

Number of persons usually resident		2006	2013	2018	Change between 2013 – 2018
Households		3,624	3,939	4,398	+11.7%
Dwellings		4,806	5,334	5,724	+7.3%
		Featherston			
	Households	*963*	*990*	*1,035*	*+4.6%*
	Dwellings	*1,077*	*1,149*	*1,170*	*+1.8%*
		Greytown			
	Households	*849*	*915*	*1,059*	*+15.7%*
	Dwellings	*1,002*	*1,122*	*1,245*	*+11.0%*
		Martinborough			
	Households	*573*	*621*	*759*	*+22.2%*
	Dwellings	*855*	*954*	*1,059*	*+11.0%*
		Rural areas			
	Households	*1,233*	*1,398*	*1,545*	*+10.5%*
	Dwellings	*1,857*	*2,106*	*2,250*	*+6.8%*

Source: id community, 2020

Table 11: SWD's households and dwellings

SWD had an 11.7% increase in households' number and an 7.3% increase in dwellings between 2013 and 2018. The biggest increase happened in Martinborough (+22% households and +11% dwellings), followed by Greytown (+15.7% households and +11% dwellings).

3.2.2.2 Car ownership
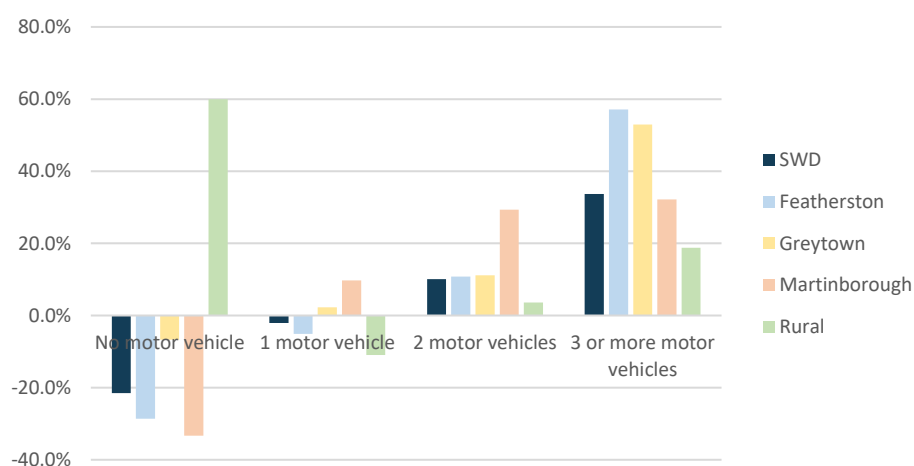
Source: id community, 2020

Figure 8: Car ownership change between 2013 and 2018

The percentage of households with 3 or more motor vehicles increased by almost 34% between 2013 and 2018 (mainly in Featherston and Greytown) and the number of households without a motor vehicle decreased by 21.5%. This increase of households with 3 or more motor vehicles can be explained by the fact that SWD is a rural district, people living there rely on their vehicles.

3.2.2.3 Household fuel type
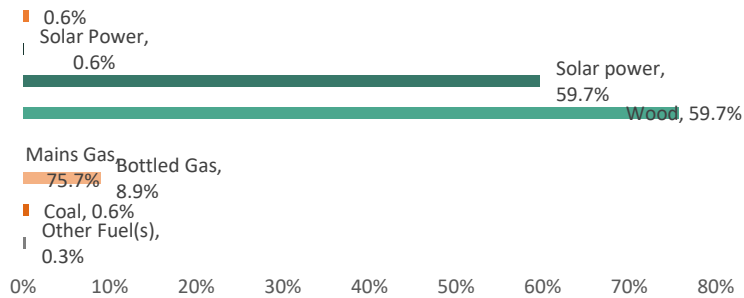
Source: id community, 2020

Figure 9: SWD's households fuel type in 2018
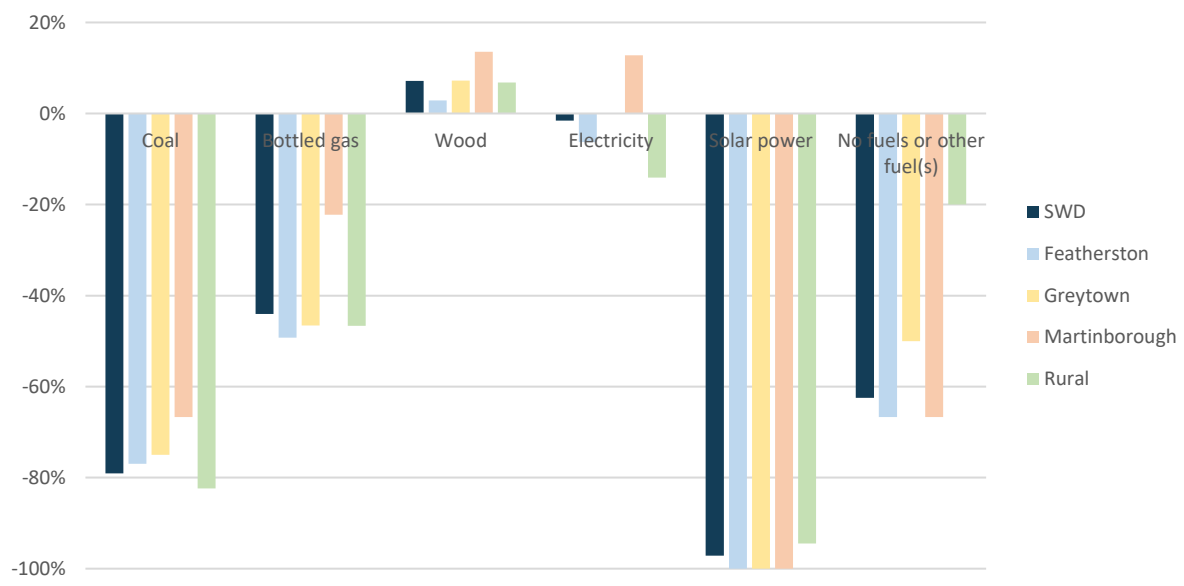
Source: id community, 2020

Figure 10: Households fuel type change between 2013 and 2018

The fuel type which are high greenhouse gas emitters such as coal and gas are decreasing. The use of wood increased everywhere in the district.

3.2.3 Employment

3.2.3.1 Employment status

Employment status	2013		2018		Change between 2013 – 2018
	Number	**%**	**Number**	**%**	
Employed	4,788	94.8	5,685	96	+18.7%
Employed full-time	*3,528*	*69.9*	*4,239*	*71.6*	*+20.2%*
Employed part-time	*1,260*	*25.0*	*1,446*	*24.4*	*+14.8%*
Unemployed	261	5.2	237	4.0	-9.2%
Total labour force	**5,046**	**100.0**	**5,922**	**100.0**	**+17.4%**
Featherston					
Employed	*1,002*	*89.5*	*1,191*	*91.7*	*+18.9%*
Unemployed	*117*	*10.5*	*108*	*8.3*	*-7.7%*
Greytown					
Employed	*1,044*	*95.1*	*1,251*	*96.8*	*+19.8%*
Unemployed	*54*	*3.2*	*42*	*4.9*	*-22.2%*
Martinborough					
Employed	*759*	*95.8*	*969*	*97*	*+27.7%*
Unemployed	*33*	*4.2*	*30*	*3.0*	*-9.1%*
Rural areas					
Employed	*1,986*	*97.2*	*2,274*	*97.6*	*+14.5%*
Unemployed	*57*	*2.8*	*57*	*2.4*	*0%*

Source: id community, 2019

Table 12: SWD's resident employment status

The unemployment rate in SWD is below the national rate (5.8% in 2018). However, Featherston is above the national rate (8.3% unemployment) but this rate has decreased since 2013. The district's employment increased a lot since 2013 (+18.7%), especially in Martinborough (+27.7%).
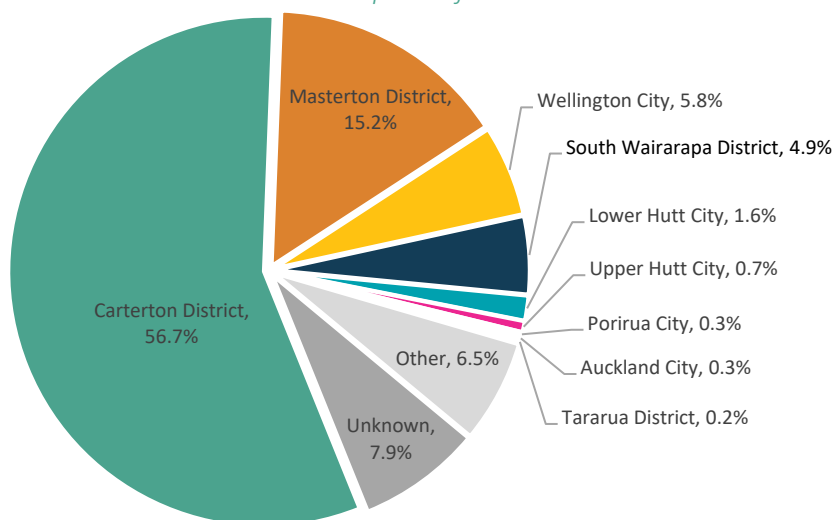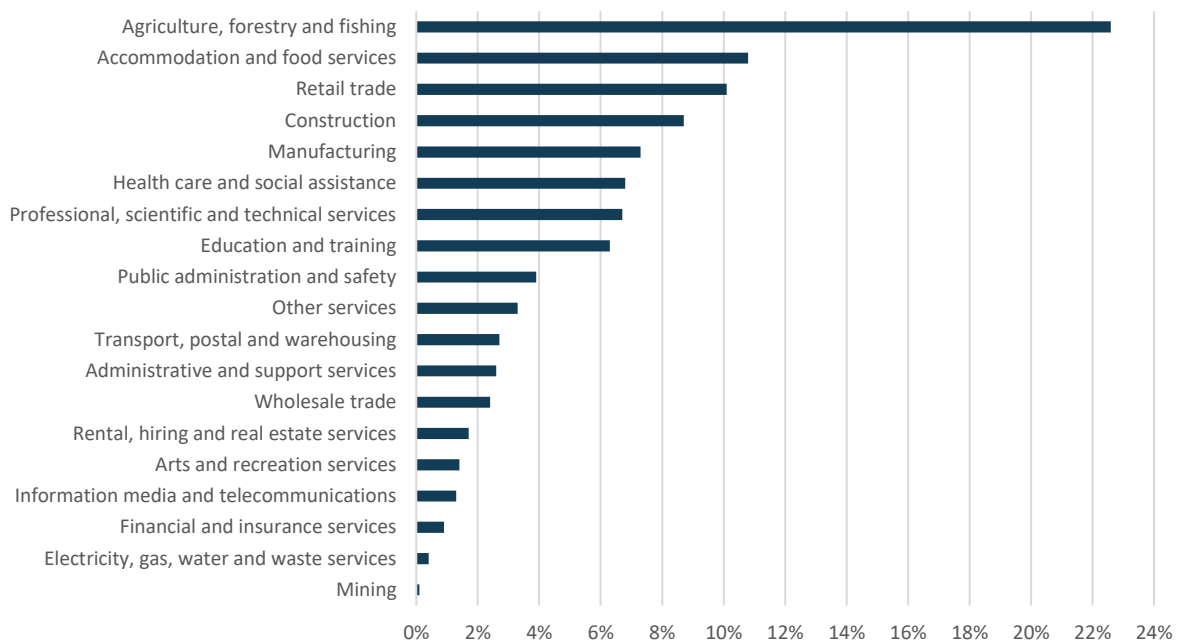
Source: id community, 2020

Figure 11: SWD's workforce industry sector of employment in 2018

Agriculture, forestry and fishing is the biggest sector and represents over 22% of the workforce profile. Accommodation and food services is the second biggest sector with 10.8% of the workforce, followed very closely by retailed trade (10.1%).

3.2.3.3 South Wairarapa's residents place of work[2]
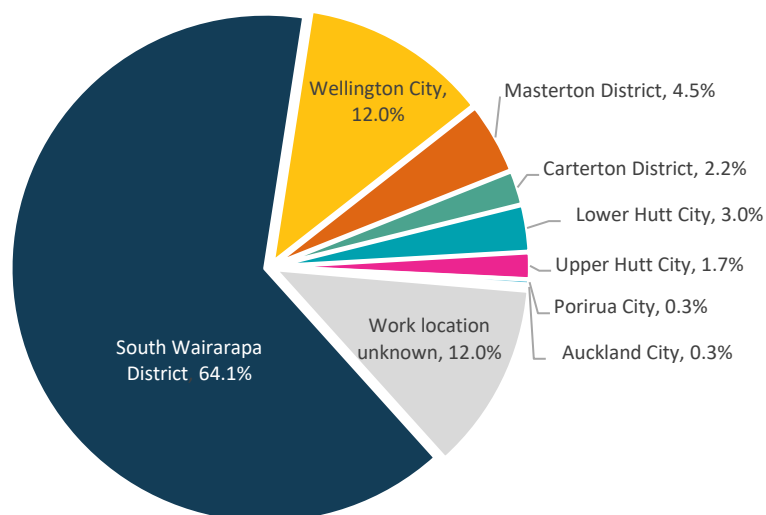
Source: id community, 2020

Figure 12: SWD's residents place of work in 2018

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[2] No data available for each town

Over 70% of the SWD's residents works in Wairarapa (64% in SWD, 5% in Masterton District and 2% in Carterton District). 12% of the residents works in Wellington City. A small number of residents works in Lower Hutt City, Upper Hutt City, Porirua City and Auckland City.

3.2.3.4   Method of travel to work
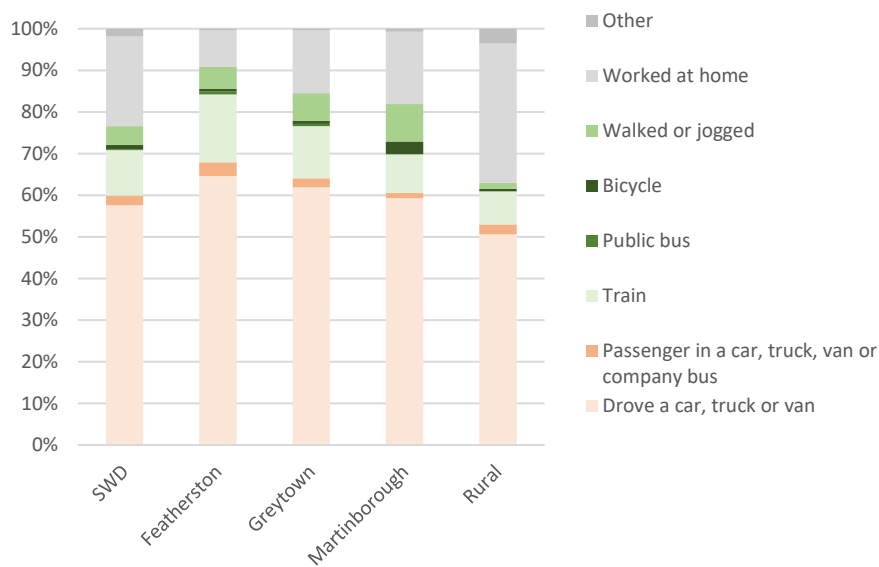
Source: id community, 2020

Figure 13: Residents' method of travel to work in 2018

Almost 60% of the SWD's residents use a high carbon emission way of transport to work (drive a car, truck or van or be a passenger, drive a motorbike or power cycle). 16.7% of the residents uses a low carbon way of transport to go to work (train, walk or jogged, bicycle, public bus).

These trends are about the same for the three towns. However, we note a higher use of the train in Featherston (due to the train station) and of the bicycle in Martinborough. The rural areas' residents mainly use motor vehicles to go to work or work from home.
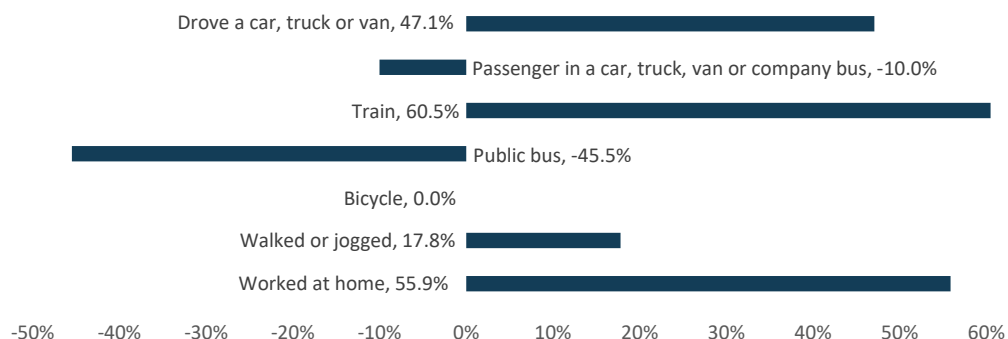
Source: id community, 2020

Figure 14: SWD's residents' method of travel to work evolution between 2013 and 2018

The train users (+60.5%) increased quicker than the car, truck or van users (+47.1%) between 2013 and 2018 and the walkers/joggers increased by 17.8%. However, the public bus users decreased by 45.5%.

South Wairarapa's workers place of residence[2]
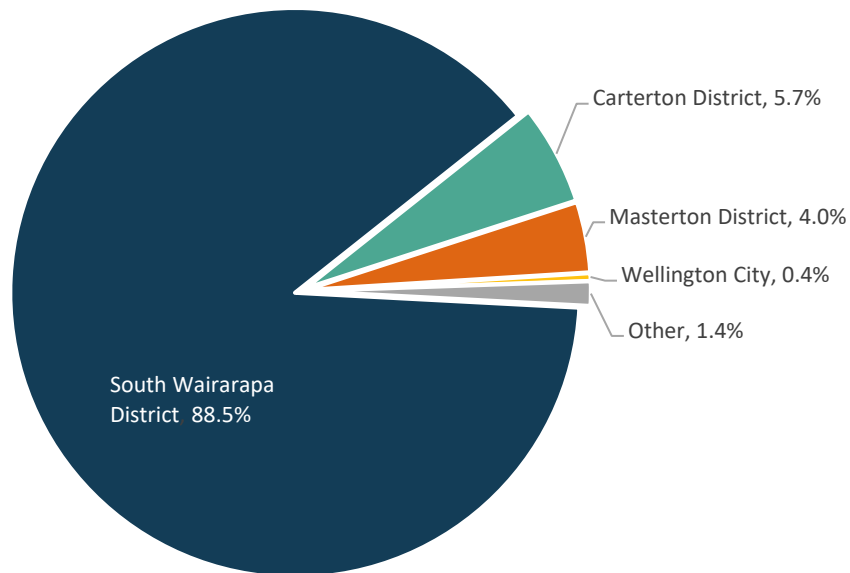
Source: id community, 2020

Figure 15: SWD's workers place of residence in 2019

98% of the SWD's workers live in the Wairarapa (88% in SWD, 6% in CD, 4% in Masterton District).

4 Environmental context

4.1 Climate

The following data are provided by the NIWA[3]. They have been recorded between 1981 and 2010 in Masterton.

Temperature

See Figure 21, page 27.

Wairarapa enjoys warm summers and mild winters even though frost may happen.

In summer maximum air temperatures range from 20°C to 28°C, but temperatures above 30°C have been recorded. High temperature may be accompanied by a strong dry foehn winds from the northwest.

Winter is mild in the north of the region and cooler in the south. Typical winter daytime maximum air temperatures range from 10°C to 16°C.

Frost occurs mainly in winter even though frosts can happen occasionally all year around. July and August are the months with the most frosts recorded (12.9 and 13.2 days respectively).
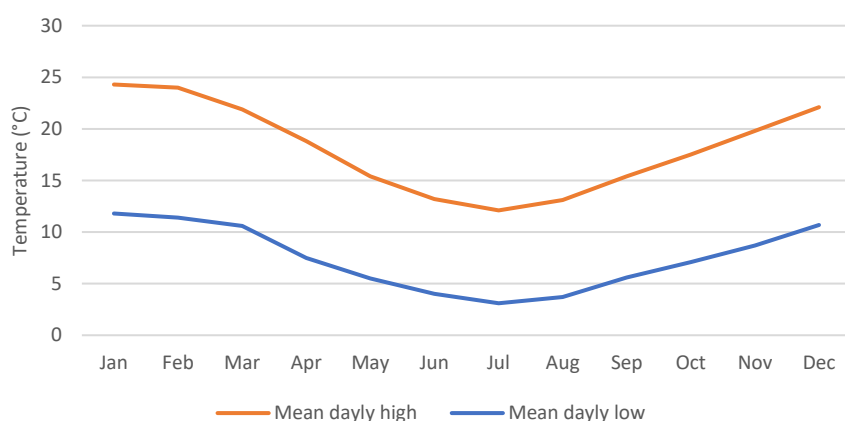
Source: NIWA 2012

Figure 16: Mean temperature in Masterton for 1981 – 2010

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[3] National Institute of Water and Atmospheric Research
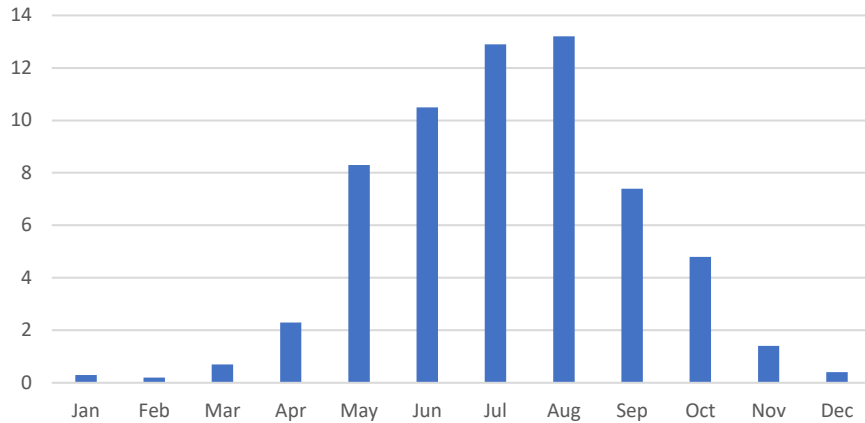
Source: NIWA 2012

Figure 17: Mean monthly value in Masterton for 1981 – 2010, Numbers of days of ground frost

Pluviometry

See Figure 22, page 28.

Rainfall is influenced to a large extend by the Tararua Range that lie across the west to east movement of the weather systems.

The ranges are wetter than the plains. Eastern Wairarapa is also slightly wetter than the plains:

- over 2,000 mm for the Tararua range and 1,800 mm of the Aorangi range,
- under 800 mm for Martinborough and the plains around,
- between 1,000 and 1,400 mm for the Eastern Wairarapa.

Masterton receives 927.6 mm of rain every year. January (44.4 mm and 7.1 wet days) and April (54 mm and 9.2 wet days) are the driest months. May (93.6 mm and 11 wet days), June (105.3 mm and 13.2 wet days) and July (90.9 mm and 14.1 wet days) are the wettest.
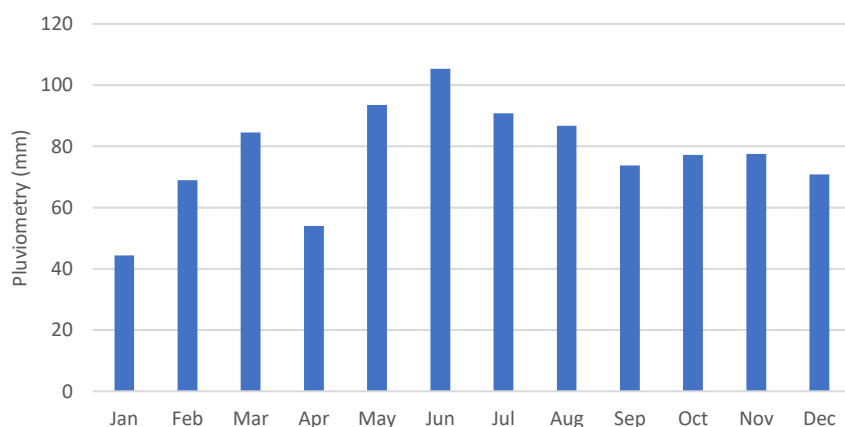
Source: NIWA 2012

Figure 18: Mean monthly pluviometry in Masterton for 1981 – 2010
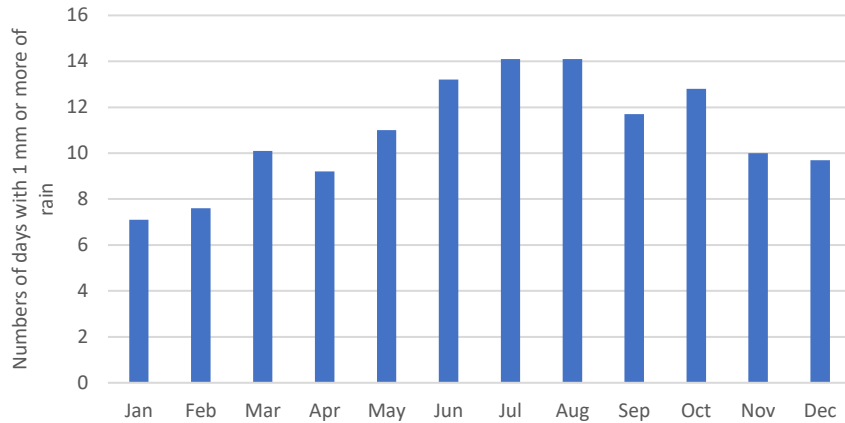
Source: NIWA 2012

Figure 19: Mean monthly value in Masterton for 1981 – 2010, Numbers of days with 1 mm or more of rain

Sunshine

See Figure 23, page 29.

Summer is the sunniest time of the year (238.6 hours of sunshine in January and 221.3 hours of sunshine in December) when winter is the least sunny time of the year (99.9 hours of sunshine in June, 114.9 hours of sunshine in July).
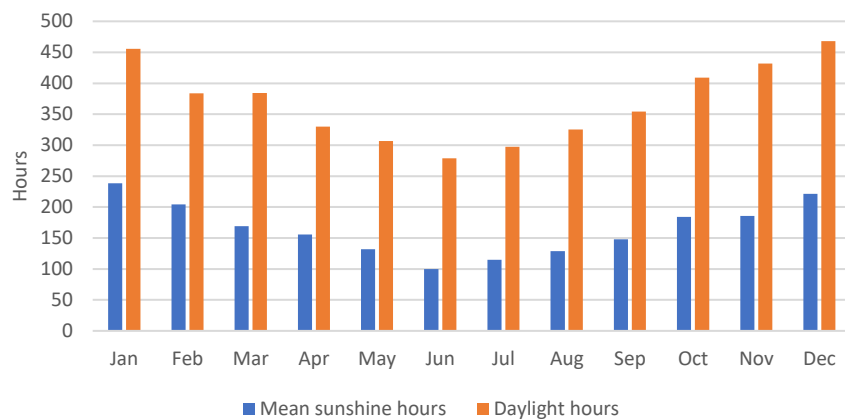
Source: NIWA 2012

Figure 20: Mean monthly hours of sunshine in Masterton for 1981 – 2010

Masterton receives 1,982.1 hours of sunshine every year. The Tararua range is the least sunny part of the region (under 1,750 hours of sunshine yearly) when the coast is the sunniest part of the region (2,100 hours of sunshine every year).

Wind

The strongest winds happen at the summit of the ranges (mean annual average between 8 and 9 m/s). The wind in the Wairarapa plains range between 2 and 3 m/s. The wind gets stronger and stronger as we move east and ranges from 5 m/s (west of Eastern Wairarapa) to 7 m/s (east of Eastern Wairarapa).

In summer the winds are mainly dry north-westerlies and in winter, they are moist south and south-easterlies.

Mean annual temperature in Carterton and South Wairarapa districts

Temperature (degree Celsius)
- 7 to 8
- 8 to 9
- 9 to 10
- 10 to 11
- 11 to 12
- 12 to 13
- 13 to 14
- Lakes
- Rivers
- Territorial Authorities
- Towns

Sources:
NZ topo 250, LINZ
LUCAS NZ, Land use map 2016, MfE
NIWA 2012
Territorial Authorities 2019, Stat NZ
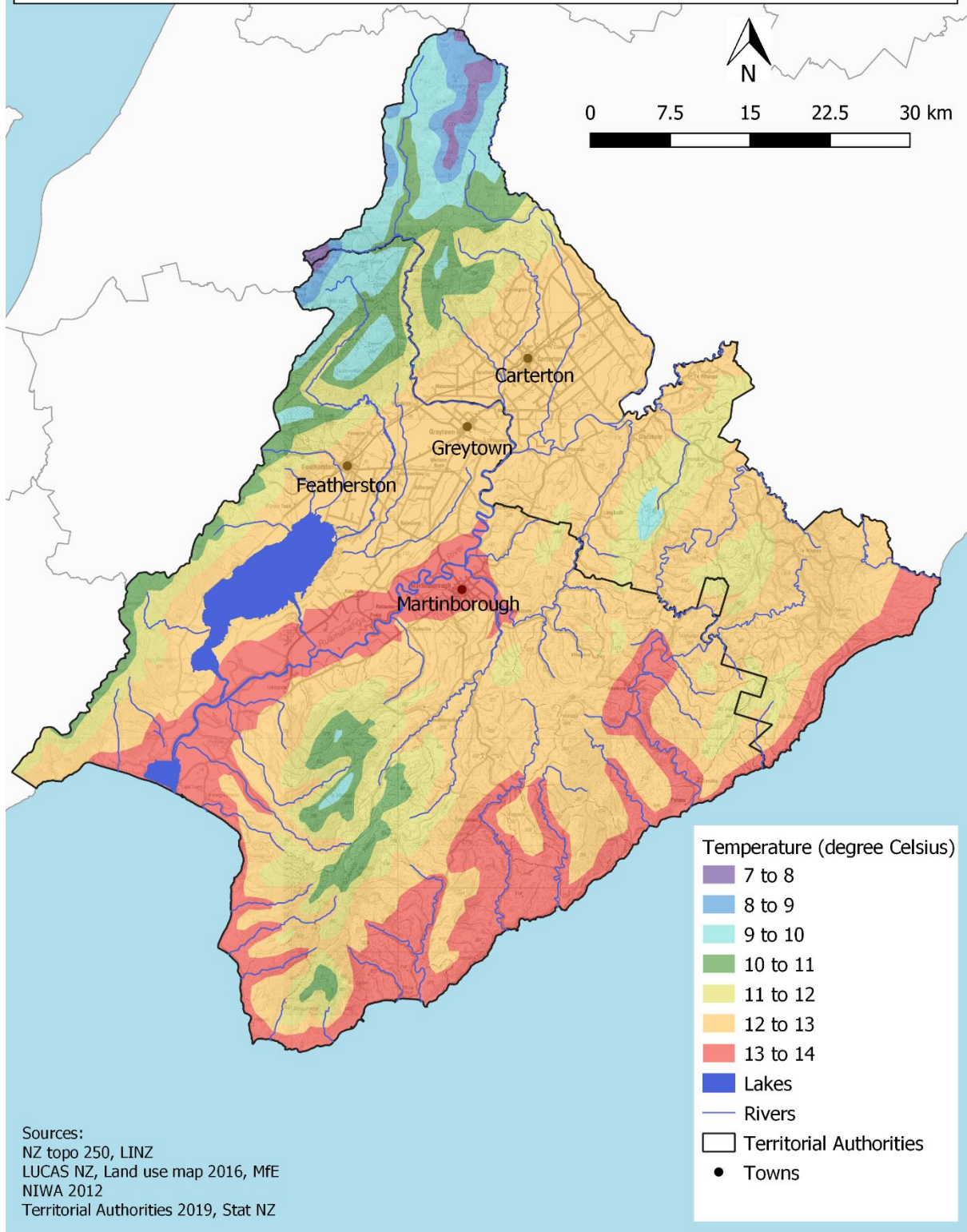
Figure 21: Mean annual average temperature for CD and SWD

Mean annual total rain in Carterton and South Wairarapa districts

Pluviometry (mm/year)
- <800
- 800 to 900
- 900 to 1000
- 1000 to 1100
- 1100 to 1200
- 1200 to 1300
- 1300 to 1400
- 1400 to 1500
- 1500 to 1600
- 1600 to 1800
- 1800 to 2000
- >2000
- Lakes
- Rivers
- Territorial Authorities
- Towns

Sources:
NZ topo 250, LINZ
LUCAS NZ, Land use map 2016, MfE
NIWA 2012
Territorial Authorities 2019, Stat NZ
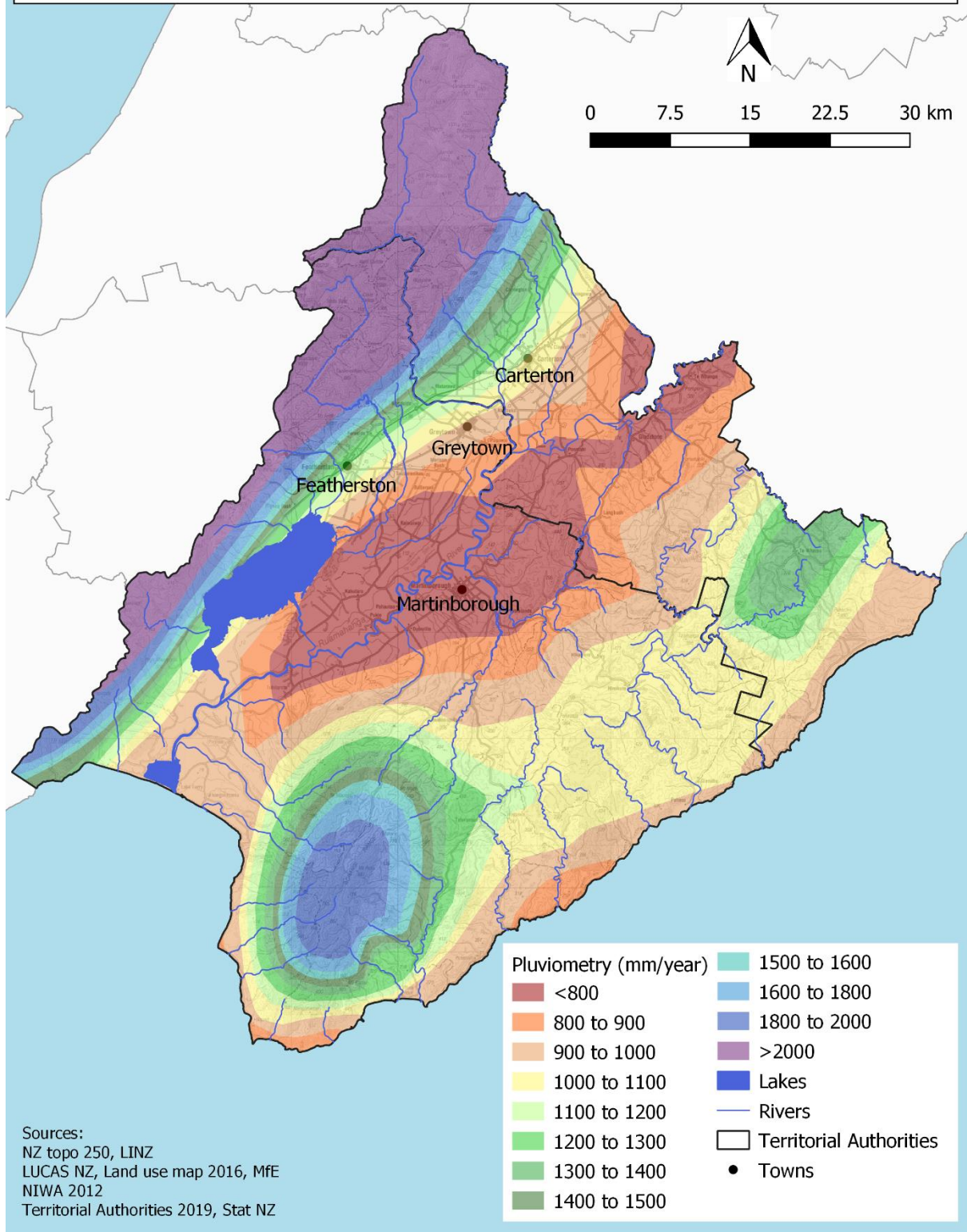
Figure 22: Mean annual total rainfall for CD and SWD
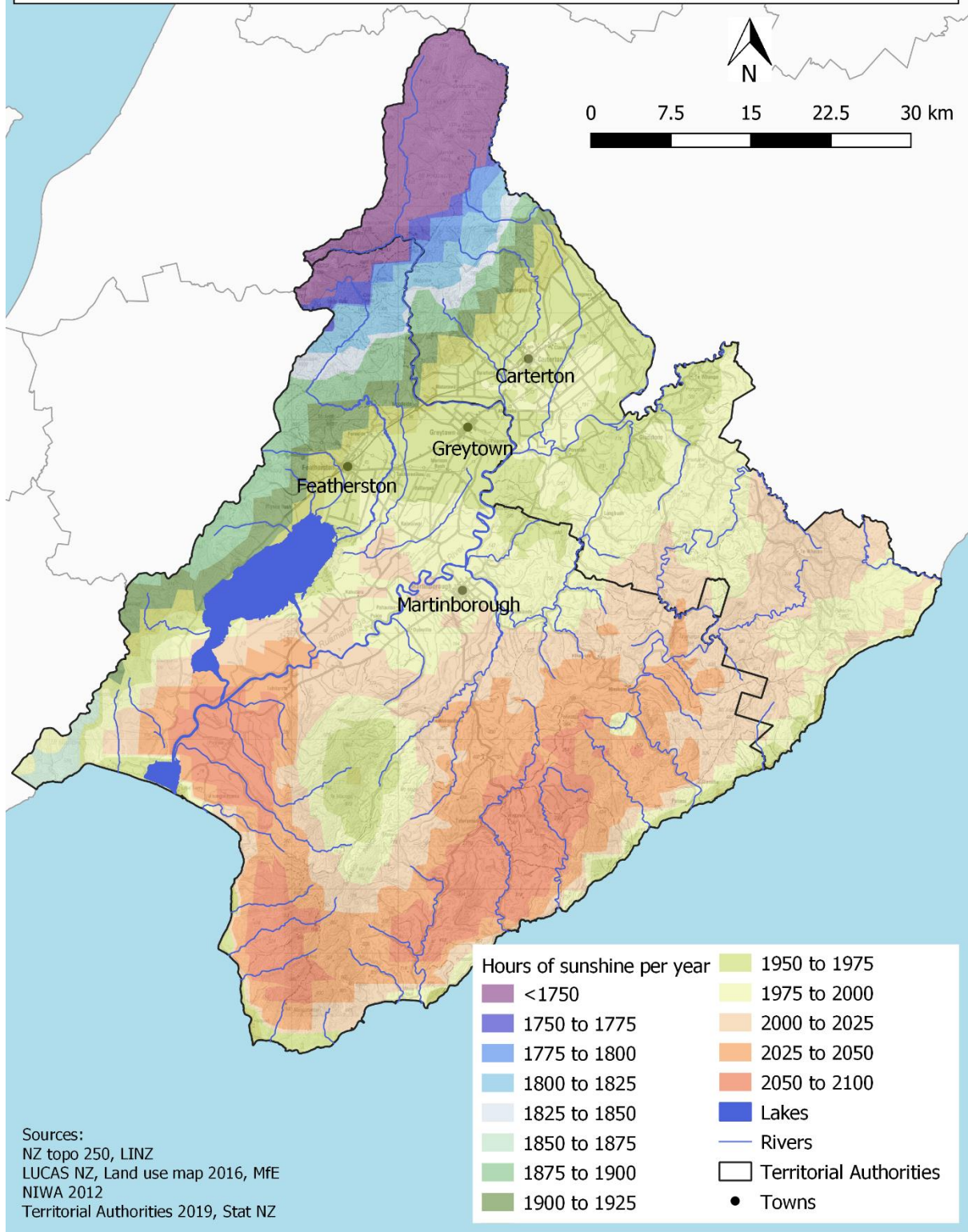
Figure 23: Mean annual sunshine hours total for CD and SWD

Mean annual average wind in Carterton and South Wairarapa districts

Wind (m/s)
- 3 to 4
- 4 to 5
- 5 to 6
- 6 to 7
- 7 to 8
- 8 to 9
- Lakes
- Rivers
- Territorial Authorities
- Towns

Sources:
NZ topo 250, LINZ
LUCAS NZ, Land use map 2016, MfE
NIWA 2012
Territorial Authorities 2019, Stat NZ
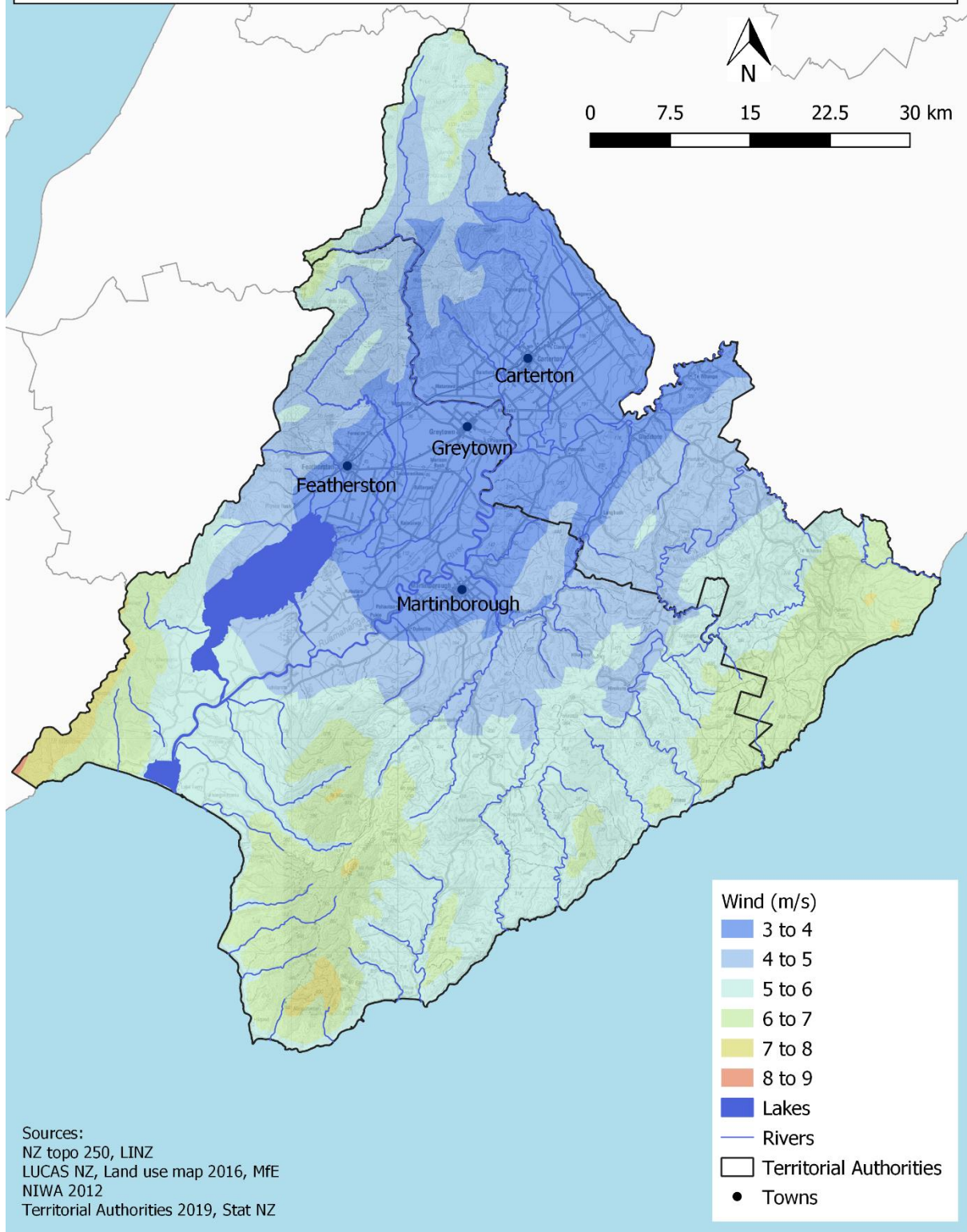
Figure 24: Mean annual average wind for CD and SWD

4.2   Landscape features

Carterton and South Wairarapa Districts are mainly rural districts. The main features in the landscape are:

- The Tararua range in the North-West: mainly native forest
- The Aorangi range in the South of SWD: mainly native forest
- The plains between the ranges: mainly high producing exotic grassland but also wetlands around Lake Wairarapa and Lake Onoke.
- East of Wairarapa: this part is more rugged. The lowest part are mainly low producing grassland and the highest part are mainly forest (planted and native).

As shown in the Figure 25, page 33 and Figure 26, page 34, the landscape and the landcover depends very much on the ground elevation.

4.3   Landcover

	Surface (km²)	Percentage (%)
Agriculture and Forestry	2025	55.7%
Grassland - High producing	*1137*	*31.3%*
Grassland - Low producing	*595*	*16.4%*
Planted forest	*243*	*6.7%*
Cropland	*51*	*1.4%*
Natural areas	1594	43.8%
Forest - Natural	*1299*	*35.7%*
Grassland - With woody biomass	*176*	*4.8%*
Wetland	*120*	*3.3%*
Settlements	12	0.3%
Other	5	0.1%
TOTAL	**3636**	**100%**

Table 13: Landcover in 2016 for CD and SWD

4.3.1   Rural areas

The majority of Wairarapa's environment has a rural character, in which the environmental quality is largely determined by prevailing natural elements, whether the land is used for primary productive purposes or for conservation purposes.

Rural land is a significant resource due to the economic value of primary production activities to Wairarapa, and the associated processing and service industries. The use of this resource is constantly changing, in response to economic demands and conditions. The continued prosperity of Wairarapa as a whole is largely dependent on the use of rural resources adapting to changing economic opportunities.

The rural environment is typically characterised by the following elements:

- Open space, natural landscapes, and vegetation predominate over the built environment;
- Working productive landscape, with a wide range of agricultural, horticultural and forestry purposes;
- Large areas of exotic and indigenous vegetation, including pasture, crops, forest and scrublands;
- Place where people live and work, with low population density;

Significant areas of the Rural Zone are held in public ownership and managed for conservation purposes, with the key assets being the Tararua and Aorangi Forest Parks and Lake Wairarapa. Aside from their intrinsic ecological values, Wairarapa's conservation management areas also have important cultural, economic and recreational values. These areas are perceived to be part of Wairarapa's rural environment, although they differ from the primary production areas in their land use, environmental character and amenity values.

4.3.1.1   Agriculture and forestry

See Figure 27, page 35.

In South Wairarapa and Carterton Districts, agriculture, forestry and fishing represents 20.4% of the workforce industry sector of employment (2018). The land used for agriculture and forestry represents 55.7% of Carterton and South Wairarapa districts combined.

Most of the high producing grassland is located in the Wairarapa Plain and the low producing grassland is located in the East of Wairarapa. The planted forests are mainly in the East of Carterton district. Areas of planted forest can be found around the Aorangi and the Tararua ranges.

4.3.1.2   Natural areas

See Figure 28, page 36.

The natural forest covers 35.7% of South Wairarapa and Carterton Districts. It is mainly located in the Tararua and the Aorangi Ranges and in the Eastern Wairarapa.

South Wairarapa District presents 120 km^2 of wetlands, mainly located around Lake Wairarapa and lake Onoke. These wetlands are very important for the biodiversity.

4.3.2   Human infrastructure

See Figure 29, page 37.

Both districts contain a variety of residential areas, including those within the main urban communities of Carterton, Featherston, Martinborough and Greytown, as well as smaller coastal and rural settlements.

Most of the infrastructure is located in the Wairarapa plain.

Featherston, Greytown and Carterton are connected by the State Highway 2 (SH2) and Martinborough is connected to Featherston with the State Highway 53 (SH53). Bidwills Cutting road is the link between Martinborough and Greytown and Ponatahi road is the link between Martinborough and Carterton.

Featherton, Greytown and Carterton are linked with the railway. They both have a train station.

The settlements cover only 0.3% of the land of both districts.

Main landscape features in Carterton and South Wairarapa districts

Tararua range

Carterton

Greytown

Featherston

Martinborough

Plains

Eastern Wairarapa

Aorangi range

Sources:
NZ topo 250, LINZ
Territoral Authorities

Main landscape features
Territorial Authorities
Towns
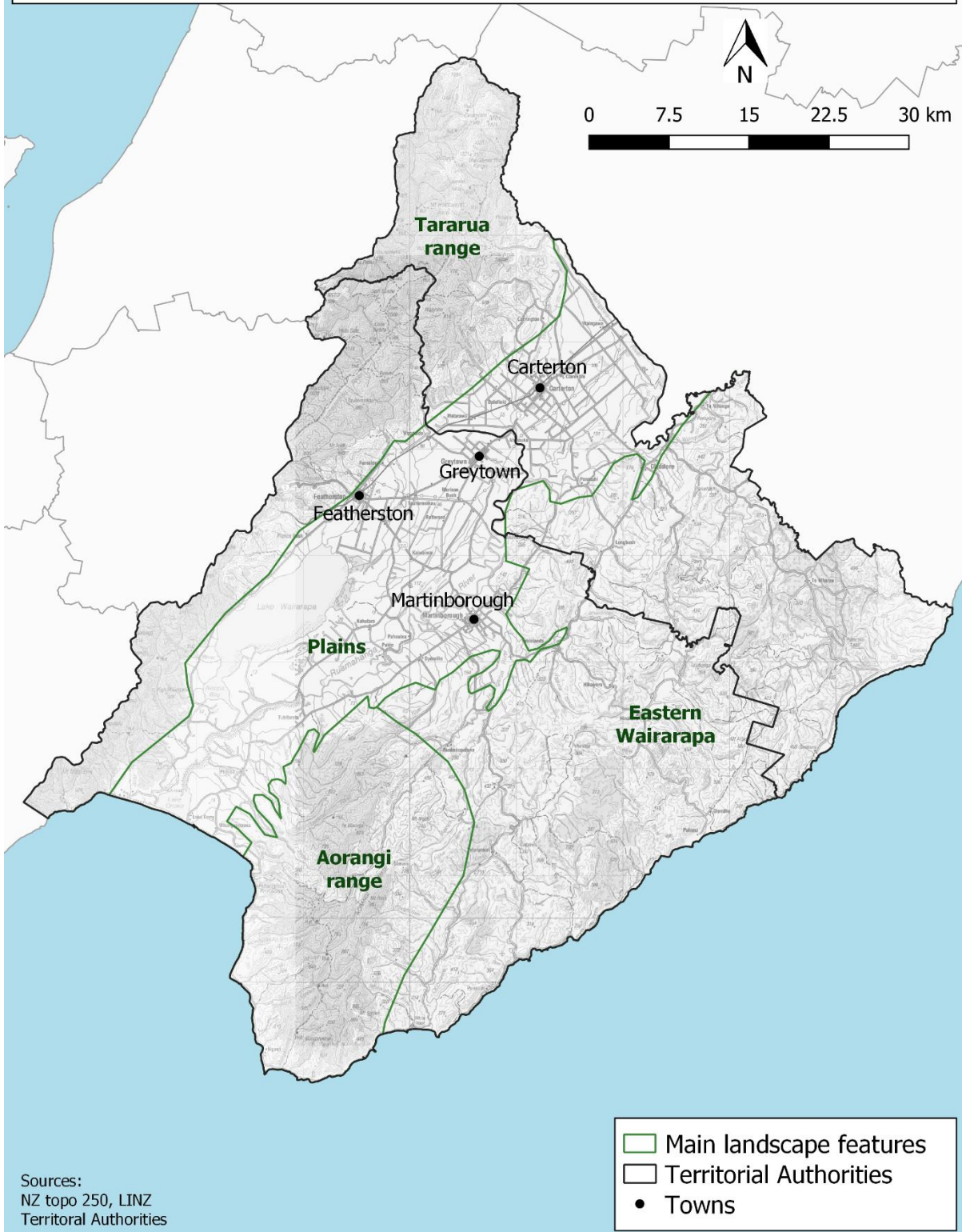
Figure 25: Main landscape features for CD and SWD
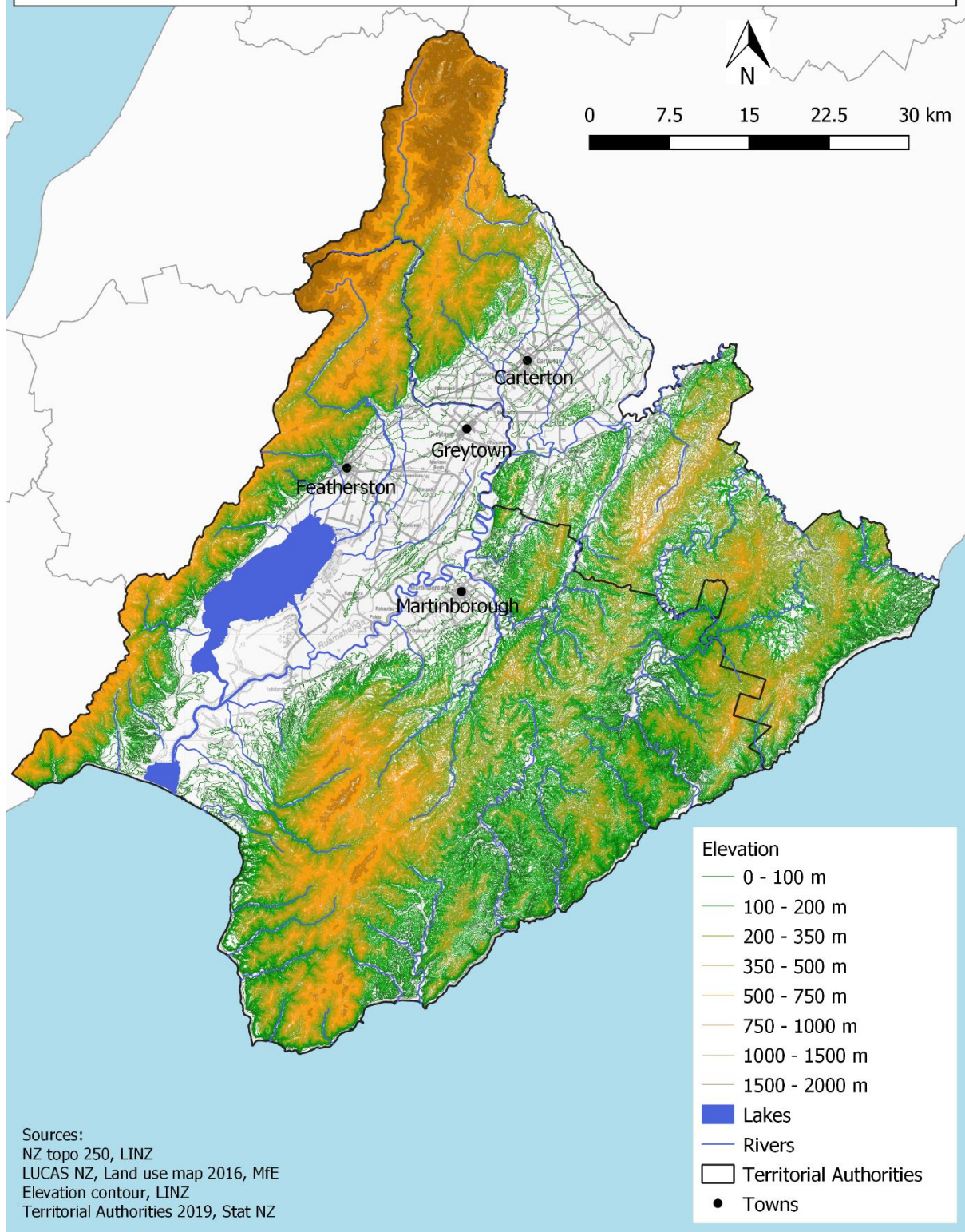
Figure 26: Elevation for CD and SWD

Agriculture and forestry in Carterton and South Wairarapa districts

Legend:
- Planted Forest
- Grassland - High producing
- Grassland - Low producing
- Cropland
- Lakes
- Rivers
- Territorial Authorities
- Towns

Towns shown: Carterton, Greytown, Featherston, Martinborough

Sources:
NZ topo 250, LINZ
LUCAS NZ, Land use map 2016, MfE
Territorial Authorities 2019, Stat NZ
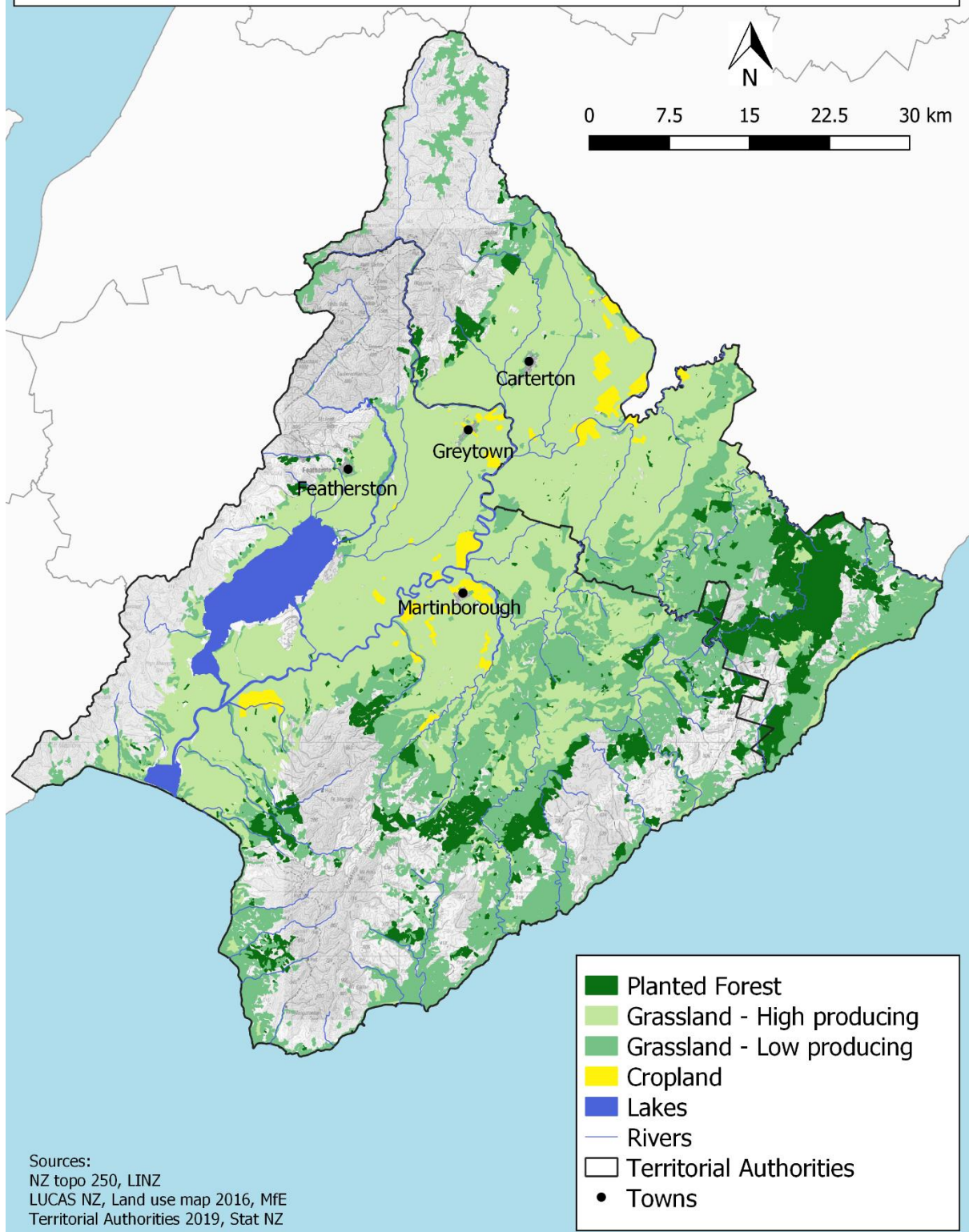
Figure 27: Agriculture in CD and SWD

Figure 28: Natural areas in CD and SWD

Figure 29: Human infrastructures in CD and SWD

5 Historical and cultural context

The Wairarapa has a strong mana whenua history with many important Māori heritage sites. The cultural landscape includes those places associated with ngā atua (deities), taniwha and kaitiaki (guardians and protectors of places), as well as places discovered, visited and or named by ancestors and explorers.

5.1 History

5.1.1 Pre-European era

Well established Māori communities lived in the southern Wairarapa since the 14th century. They were descended from a place of origin in the Pacific known to them as Hawaiki.

They were communities of people who:

- hunted and gathered food from the rocky shoreline, the coastal environment and the lakes, primarily harvesting tuna (eels) but also other native species including kokopu (whitebait) and piharau (lamprey)
- ventured into the interior to hunt for forest birds and gather other wild produce from the inland valleys, wetlands and hills.
- developed areas of land for the cultivation of kumara and probably also taro and gourd.

For centuries the natural environment has provided both material and spiritual sustenance for Māori communities. Lake Wairarapa and the South Wairarapa coastline are of immense cultural, spiritual and historic significance to Māori.

Wairarapa Māori regarded the lakes and their surrounding lands as an important source of physical and spiritual well-being, seeing it as a taonga, handed to them by their ancestors to be cherished. The land, the waters and all their inhabitants, human and non-human alike, were part of a wider world governed by gods and were tapu or sacred.

5.1.2 European colonisation

European settlers arrived on the margins of Wairarapa Moana in the early 1840s, bringing with them a completely different set of cultural values and a truly foreign way of looking at and assessing land.

For the early settlers, the land was a great opportunity to develop farming: *"The land is for the most part covered with fern and coarse grass, easily cleared and affording ample pasturage for cattle in its present state"* wrote the New Zealand Company's surveyor Robert Stokes in 1841. In 1844, the surveyor Henry Tiffen wrote that the soil is very fertile and up to six feet deep in places. He also said that the land around the bottom lake was prone to be flooded but if the lake could be kept at a lower level, 4,000 acres of rich watered meadow land would be available for graziers.

In 1844, the first stations were established around the shore of the lake. The Wharekākā farm was the first extensive sheep station in New Zealand. Then started the disagreement between Māori and Pākehā over the control of the lake Onoke outlet. Māori wanted a high-water level for tuna (eel) fishing when Pākehā wanted a low-water level for grazing.

In the 1850s, the Māori started to sell their land to the Pākehā after leasing was made illegal by the Crown. Māori made it clear the sale did not include the bed of the lakes and that they were selling to the tahakupu, the highwater mark. The failure to properly survey the land, and the disagreement over exactly what had been sold and what had been retained by Māori was to lead to tension over ownership of the land uplifted in the 1855 earthquake, and the ability to control the outlet to the sea.

This disagreement ended in 1896 when tangata whenua gifted the lakes to the Government. The settlers were then free to:

- Stop bank the Ruamāhanga river, the Lake Wairarapa Lake and the Lake Onoke.
- Drain the rich swamp pasture.
- Control the Lake Onoke outlet.

What has been gifted was the Native Land Court title the Crown had forced on Māori, and with it control of the outlet at Onoke. What had not been gifted, were the waters and fisheries of Wairarapa Moana. Premier Richard Seddon, who can take much of the credit for the gifting of the lakes said, *"The waters are still yours and so are the fish"*. However, after a few years, these words were forgotten.

The last major wetland destruction around the lake happened in 1974 when the Te Hōpai Lagoon has been drained and turned into pasture.

5.2 Cultural context

Kaitiakitanga

Kaitiakitanga encompasses guardianship, preservation, conservation and protection. In its simplest form kaitiakitanga is the responsibility to care for the physical, ecological and spiritual well-being of a place or resource to ensure harmony within the environment and protection against elements that cause permanent imbalances.

The primary kaitiaki or guardian were the Atua; Tāne is the kaitiaki of the forest and Tangaroa is the kaitiaki of the sea. A kaitiaki can be spiritual (such as a taniwha) or physical such as the tōtara log of Wairarapa Moana.

Lake Wairarapa

Lake Wairarapa is of immense cultural and spiritual significance to Māori.

Traditional fishing (such as tuna/eel fishing) was a major activity on the lake. "*Throughout the ages, the mouth of Wairarapa Moana has paid homage to its eel migration by obligingly closing its mouth at the end of February or the beginning of March. Legend records that Rākai Uru, the taniwha who is the caretaker of the lake, is responsible for this seasonal closing. Rākai Uru takes the form of a large tōtara log. When the migration is about to take place he makes a journey out to sea, and the mouth of the lake closes behind him*"[4]. Māori exported as many as ten tons of tuna/eels annually as far away as the Bay of Plenty.

With the changes to the Lake Wairarapa wetlands over the past 150 years many traditional fishing sites and sources of plant materials such as flax, ti (cabbage tree) and pingao have been lost or greatly reduced. With appropriate management and plantings, some of these sites could be restored specifically for the sustainable harvest of cultural materials, which would have the additional benefit of increasing habitat diversity for wildlife.

Guidelines for the management of the Lake Wairarapa wetlands have been produced and adopted by interested parties.

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[4] T.V. Saunders 'The eels of Lake Wairarapa', Te Ao Hou, June 1965.

Nowadays, projects are being led in order to restore wetlands (therefore the important role to local iwi for gathering kai moana) around Lake Wairarapa. For instance, the Pou Aruhe Saltmarsh Freshwater Initiative near Lake Onoke is an ambitious project with Greater Wellington Regional Council, mana whenua and local conservation groups. Ra Smith[5] said Māori bring important values to these projects which could connect the whole region.

Ruamāhanga river and other rivers

Ra Smith says, "*We [Māori] think of rivers as a character, and the character of the river holds the mauri[6], often called the life force*".

"*On the opposite side from where the two rivers meet is the whare kōhanga, a place like a maternity ward. When babies were born they would take the whenua [placenta] and be buried in the ground, and they would take the baby down into the river and make up a lullaby. It was no rockabye baby, it was eight verses of very intense lullaby about the blessing of the baby and its life expectancy.*"

Ra Smith says the most important confluence was where the Ruamāhanga met Lake Wairarapa, a point that no longer exists.

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[5] Ra Smith is part of the Ngāti Kahungunu ki Wairarapa iwi.

[6] According to the Māori Dictionary, Mauri is "life principle, life force, vital essence, special nature, a material symbol of a life principle, source of emotions - the essential quality and vitality of a being or entity. Also used for a physical object, individual, ecosystem or social group in which this essence is located".

6 Climate Change and impacts for Carterton and South Wairarapa Districts

6.1 What is Climate Change

According to the UNFCCC[7], Climate Change means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

6.1.1 Atmosphere composition

Earth's atmosphere is made up of nitrogen (78%), oxygen (21%), and a small percentage of greenhouse gases, such as carbon dioxide and methane.

6.1.2 Greenhouse effect

Greenhouse gases trap warmth from the sun and make life on Earth possible. Without the influence of the greenhouse effect on our planet, the average surface temperature would be -18°C (average temperature on Earth with the greenhouse effect is 15°C).

Source: NIWA, https://www.niwa.co.nz/our-science/climate/information-and-resources/clivar/greenhouse
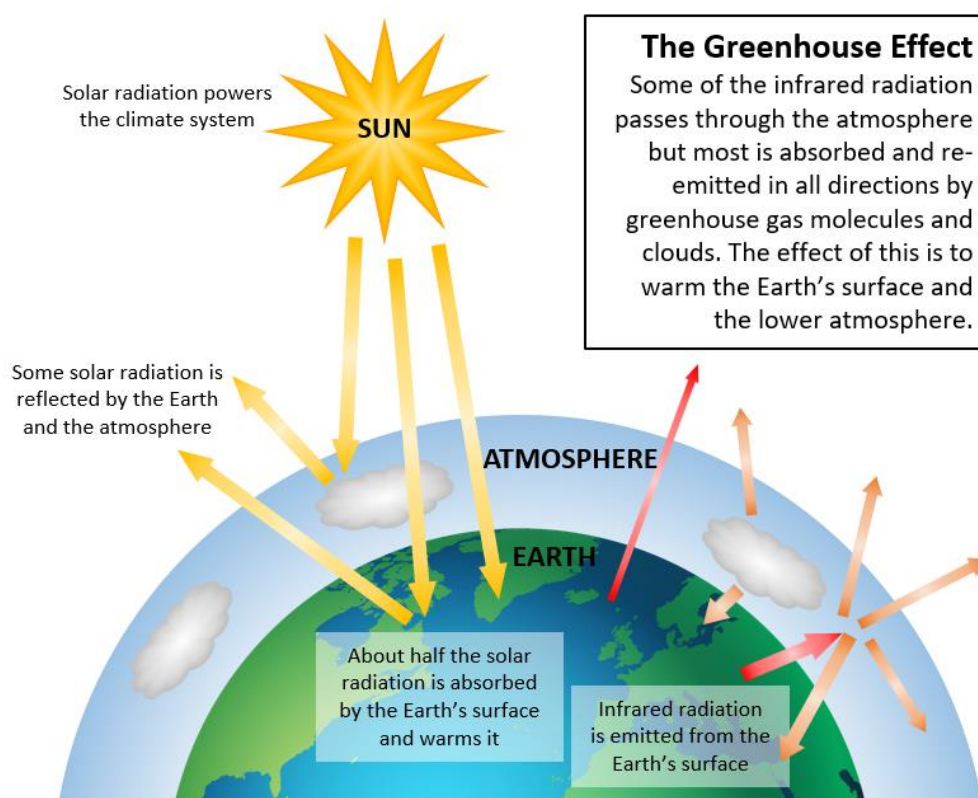
Figure 30: The greenhouse effect

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[7] United Nation Framework Convention on Climate Change

6.1.3   What causes Climate Change?

The greenhouse gas (CO_2, CH_4 and N_2O) concentration in the atmosphere has been raising quickly since the last 150 years (since the industrial revolution) because of fossil fuels burning, deforestation, etc. The temperature is correlated to the greenhouse gas concentration as shown in the graphs below.
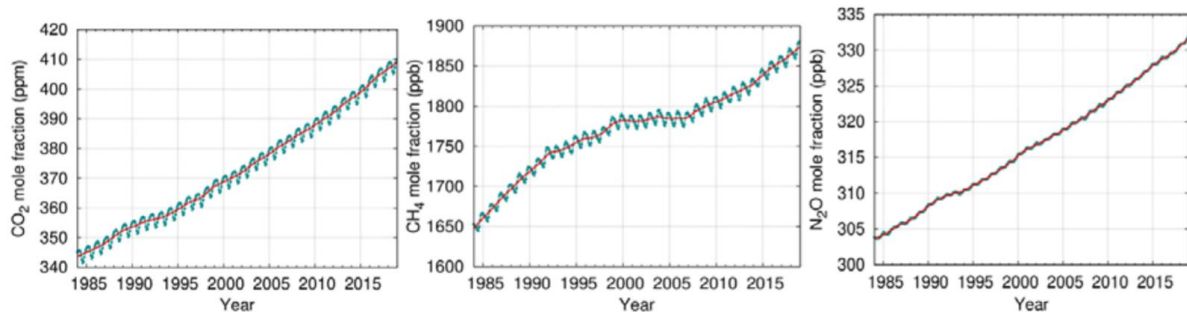
Source: WMO Provisional Statement on the State of the Global Climate in 2019, World Meteorological Organization, 2019

Figure 31: Concentration (ppm) in Carbon dioxide, Methane and Nitrous oxide from 1984 to 2018.
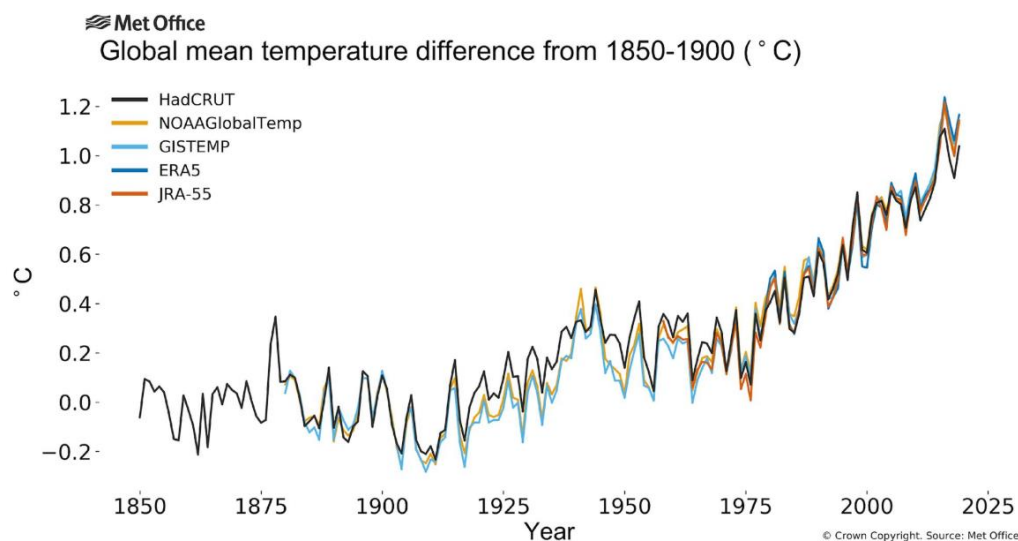
Source: WMO Provisional Statement on the State of the Global Climate in 2019, World Meteorological Organization, 2019

Figure 32: Global annual mean temperature difference pre-industrial conditions (1850-1900, °C)

Not only are temperatures rising but the whole climate is changing as seen by: increase in the extreme weather events (e.g. storm, drought), melt of the ice pack, sea level rise, ocean acidification, etc.

The next section will expose the likely impacts of the Climate Change, especially on Wairarapa.

6.2   Likely impacts of the Climate Change
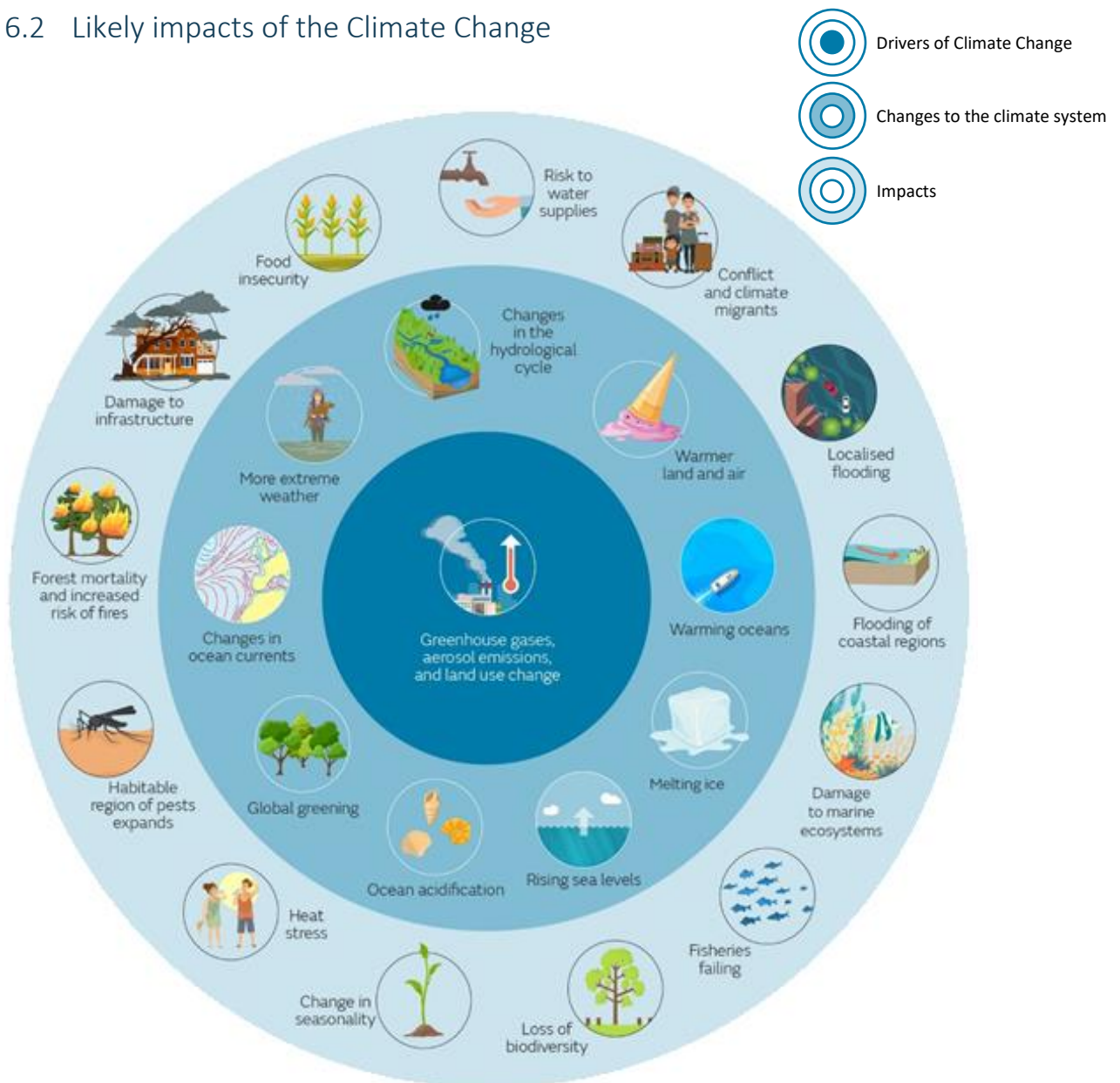
Source: Metoffice, https://www.metoffice.gov.uk/weather/learn-about/climate-and-climate-change/climate-change/effects-of-climate-change

Figure 33: Illustration of some of the drivers of Climate Change and impacts they could have on the climate system

6.3 Likely Climate Change impacts for Wairarapa[8]

6.3.1 Projections

These figures below are projected changes relative to 1986 – 2005 levels. The values provided capture the range across all scenarios ranging from low to high greenhouse gases concentration (high efforts to reduce our emissions to low or no effort).

The values are based on scenario estimates and should not be taken as definitive.

Temperature in 2090

- Spring: +0.6°C to +2.7°C
- Summer: +0.7°C to +3.1°C
- Autumn: +0.7°C to +3.1°C
- Winter: +0.7°C to +3.2°C

Rainfall in 2090

- Spring: -3% to +2%
- Summer: -1% to +8%
- Autumn: 0 to +3%
- Winter: -7% to +1 %
- No significant change in the frequency of extreme rainy days

Wind in 2090

- +2% to +3% of extremely windy days

Storms

- Increase in storm intensity, local wind extremes and thunderstorms
- No increase of the frequency of storms

Sea-level rise

- +26 cm since early 20th Century (+2.23 mm/year)

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[8] Source: Climate change projections for the Wellington and Wairarapa region, MfE

6.3.2   What does it mean?

Coastal hazards

Increased risk to coastal roads and infrastructure from coastal erosion and inundation, increased storminess and sea-level rise.

Local Government NZ estimates $2.7 billion of council roading, water, and building infrastructure are at risk from 0.5 metres of sea level rise, and that increases to $14.1 billion with 3 metres of sea level rise, and LGNZ says those are probably conservative estimates.

Heavy rain

Increased risk to surface flooding. River flooding may also become more frequent and more intense.

Erosion and landslides

Increased risk to erosion and landslides.

Droughts

More frequent droughts are likely to lead to water shortages, increased demand for irrigation and increased risk of wild fires.

Agriculture

Warmer temperatures, a longer growing season and fewer frosts could provide opportunities to grow new crops. Farmers might benefit from faster growth of pasture and better crop growing conditions. However, these benefits may be limited by negative effects of climate change such as prolonged drought, water shortages and greater frequency and intensity of storms.

Biosecurity

Climate change could lead to changes in pests and diseases over time. A likely increase in weed species and subtropical pests and diseases could require new pest management approaches. Biodiversity may be threatened by changing temperature and rainfall patterns, and sea level rise.

Biodiversity

Biodiversity is suffering from Climate Change due to the rate of change. It is very fast compared to historic change species have experienced.

Ocean acidification

Because the ocean absorbs a huge quantity of CO_2 released in the atmosphere, it becomes more and more acidic. This affects negatively all the marine species, especially seashells.

7 Greenhouse gas inventory

7.1 Wairarapa Combined District

Carbon emissions for the Wairarapa Combined districts have been measured using the Global Protocol for Community Scale Greenhouse Gas Emissions Inventory (GPC). The method includes emissions from stationary energy, transportation, waste, industry (IPPU), agriculture and forestry sectors. This work has been done by AECOM, commissioned by Greater Wellington Regional Council.

7.1.1 Summary

Figure 34 summarises the rate of change in emissions and top contributors to emissions for different sectors.
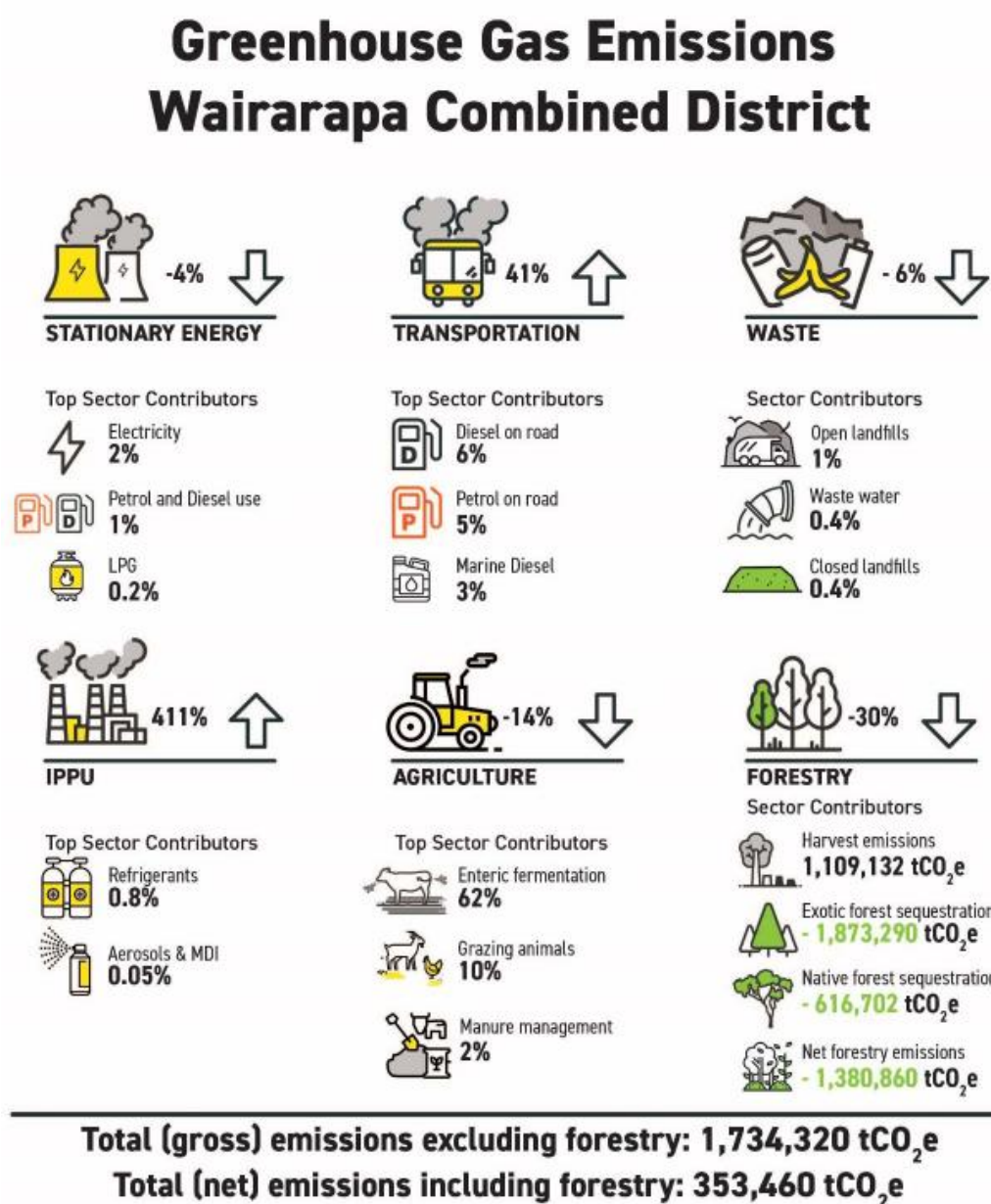
Source: Wairarapa Combined District Greenhouse Gas Inventory, AECOM, 2020

Figure 34: Summary of change in emissions from 2001 to 2019 including top contributors to total gross emissions from each sector in 2019

7.1.2 2018/19 Wairarapa Combined District inventory

Sector	tCO$_2$e	% Gross	% Sector
Stationary Energy			
Electricity Consumption	31,928	1.8%	53.8%
Electricity T&D Loss	2,622	0.2%	4.4%
Natural Gas	-	0.0%	0.0%
Natural Gas T&D Loss	-	0.0%	0.0%
LPG	3,130	0.2%	5.3%
Stationary Petrol & Diesel Use	20,159	1.2%	34.0%
Coal	718	0.0%	1.2%
Biofuel / Wood	737	0.0%	1.2%
Total:	59,293	3.4%	100%
Transportation			
Petrol	91,514	5.3%	33.7%
Diesel	105,330	6.1%	38.8%
Rail Emissions	696	0.0%	0.3%
Bus (Electric)	9	0.0%	0.0%
Jet Kerosene	23,367	1.3%	8.6%
Av Gas	51	0.0%	0.0%
Marine Diesel	47,294	2.7%	17.4%
Light Fuel Oil	3,018	0.2%	1.1%
LPG	232	0.0%	0.1%
Total:	271,511	15.7%	100%
Waste			
Solid Waste Disposal	32,665	1.9%	81.8%
Wastewater	7,285	0.4%	18.2%
Total	39,950	2.3%	100%
IPPU			
Industrial Emissions	14,219	0.8%	100.0%
Total	14,219	0.8%	100%
Agriculture			
Agriculture	1,349,348	77.8%	100%
Total	1,349,348	77.8%	100%
Forestry			
Exotic Forest Sequestration	-1,873,290	N/A	N/A
Native Forest Sequestration	-616,702	N/A	N/A
Harvest Emissions	1,109,132	N/A	N/A
Total	-1,380,860	N/A	100%

Total Emissions	tCO$_2$e
Total (net) incl. forestry	353,460
Total (gross) excl. forestry	1,734,320

Source: Wairarapa Combined District Greenhouse Gas Inventory, AECOM, 2020

Table 14: Summary of Wairarapa Combined District's gross emissions split by sector and associated sub-categories

In 2018/19 reporting year, the Wairarapa Combined District emitted gross 1,734,320 tCO$_2$e and net 353,460 tCO$_2$e.

The biggest sector is agriculture (77.8%), followed by transport (15.7%). Stationary energy (3.4%), Waste (2.3%) and Industry (0.8%) are minor sources of emissions in Wairarapa.

Biogenic Methane (Included in gross emissions)		
Biofuel	19	t CH$_4$
Biodiesel	-	t CH$_4$
Landfill Gas	961	t CH$_4$
Wastewater Treatment	187	t CH$_4$
Enteric fermentation	31,813	t CH$_4$
Manure Management	992	t CH$_4$
Total biogenic CH$_4$	33,972	t CH$_4$

Source: Wairarapa Combined District Greenhouse Gas Inventory, AECOM, 2020

Table 15: Biogenic Methane emitted in 2018/19

Table 15 state the biogenic methane emissions. The Wairarapa Combined District emitted 33,972 tons of Biogenic Methane in 2018/19. The importance of Biogenic Methane is highlighted in NZ's Climate Change Response (Zero Carbon) Amendment Act. The Act includes targets to reduce Biogenic CH$_4$ between 24 percent and 47 percent below 2017 levels by 2050, and 10 percent reduction below 2017 levels by 2030.

7.1.3 Changes in emissions inventory, 2001 to 2019
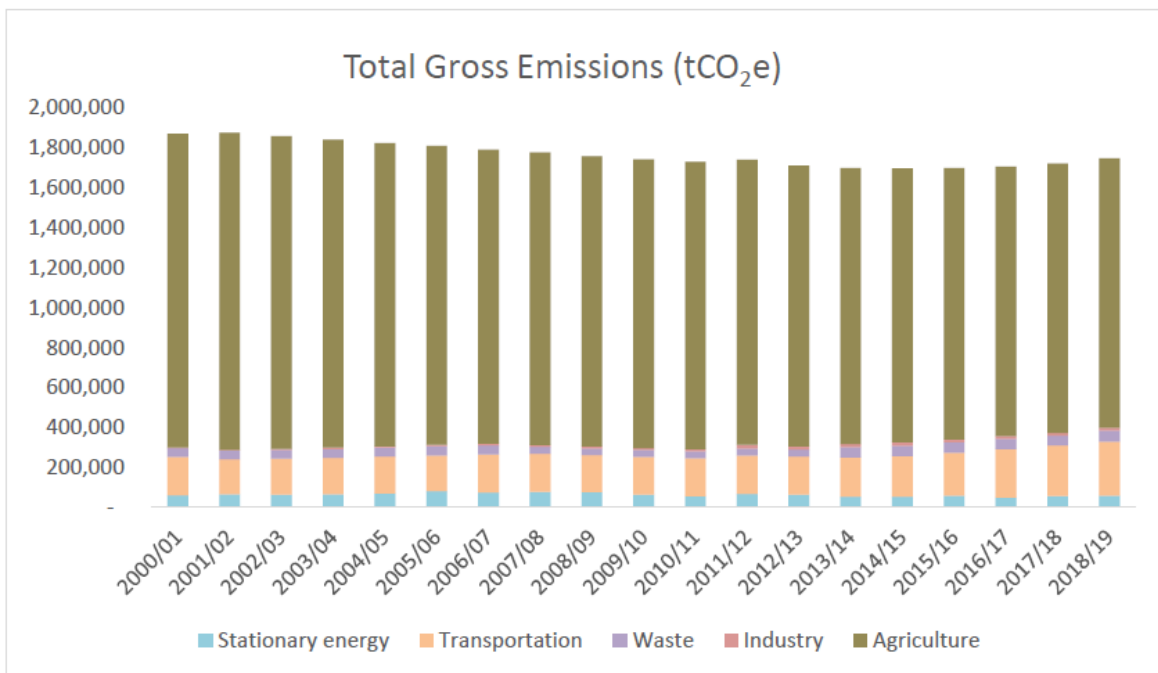
Source: Wairarapa Combined District Greenhouse Gas Inventory, AECOM, 2020

Figure 35: Gross emissions per year (excluding forestry) from 2001 to 2019

Total gross emissions fell by 7%, from 1,871,095 tCO$_2$e in 2001 to 1,734,320 tCO$_2$e in 2019. Reductions in emissions from stationary energy, waste and agriculture are responsible for the fall in total gross emissions. As the area's population has risen (by 22%, from 39,090 to 47,590) and per capita gross emissions have reduced by 24% from 47.9 tCO$_2$e in 2001 to 36.4 tCO$_2$e in 2019.

Figure 36: Gross emissions and net emissions (tCO₂e) — chart showing annual emissions from 2000/01 to 2018/19 with categories: Stationary energy, Transportation, Waste, Industry, Agriculture, Forestry, and Total Emissions (net) incl. forestry.
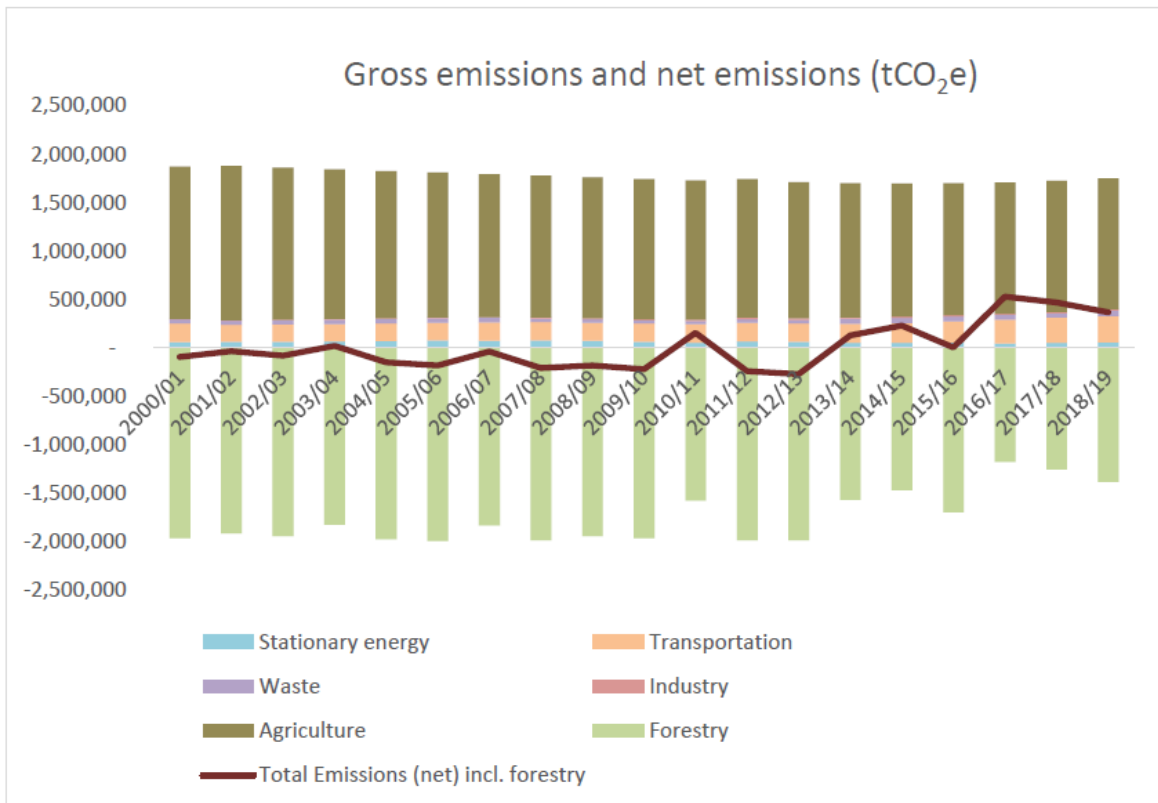
Source: Wairarapa Combined District Greenhouse Gas Inventory, AECOM, 2020

Figure 36: Annual emissions showing gross and net emissions (including forestry) from 2001 to 2019

Figure 36 shows the impact of sequestration in the forestry sector on reducing net emissions. Net forestry sequestration reduced by 30% between 2001 and 2019 causing net emissions to increase from net-negative total emissions (-91,460 tCO$_2$e in 2001) to net-positive emissions (353,460 tCO$_2$e in 2019).

Wairarapa
Emissions change over time 2001 – 2019

2001   2019

$ ↑ GDP growth 42%

👤   ↑ Population growth 22%

GHG TOTAL   ↓ Total (Gross) GHG Emissions -7%

GHG 👤   ↓ GHG Emissions ratio to Capita -24%

GHG $ ↓ GHG Emissions ratio to GDP -35%
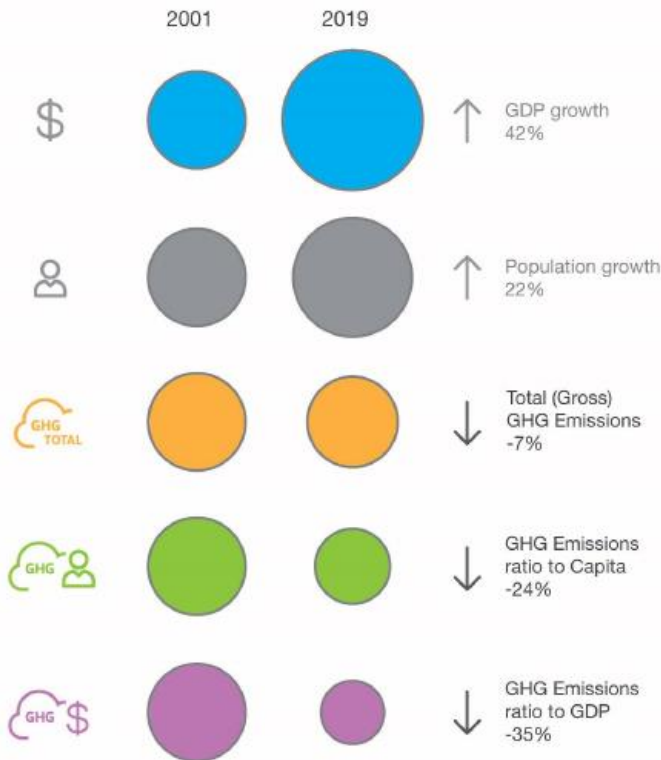
Decoupling GDP Growth from GHG Emissions

Source: Wairarapa Combined District Greenhouse Gas Inventory, AECOM, 2020

Figure 37: Change in total gross emissions compared to other metrics of interest

Figure 37 shows the change in gross emissions when compared to changes in other metrics of interest between 2001 and 2019. Total gross emissions have reduced by 7%, against the backdrop of a 22% growth in population within the Wairarapa. Per capita emissions have fallen roughly in line with the rise in population observed (by 24%).

When emissions grow less rapidly than Gross Domestic Product (GDP) as a measure of income then this process is known as decoupling. The term decoupling is an expression of the desire to mitigate emissions without harming economic wellbeing. The changes in emissions and GDP illustrated in Figure 37 suggest at a high-level decoupling has occurred in the last two decades. GDP was 42% higher in 2019 than in 2001 while emissions per unit of GDP declined by 35%.

The exact drivers for the decoupling of emissions from GDP are difficult to pinpoint. New policies, for restructuring the way to meet demand for energy, food, transport and housing will all contribute. In this case, both direct local actions including reducing the emissions from landfill gas and indirect national trends e.g. reduction of emissions from electricity generation will have contributed to the trends noted.

7.2 Carterton District Council

The Table 16, Table 17, Table 18, Table 20 and Table 19 are the summary on the greenhouse gas inventory made for CDC in 2018. For further information, refer to the greenhouse gas inventory reports.

	Scope	t CO_2e - 2018
CORPORATE SERVICES		**14.22**
Electricity – Other	Scope 2	*2.99*
Transport and distribution losses	Scope 3	*0.23*
Transport – Diesel	Scope 1	*0*
Transport – Petrol	Scope 1	*7.5*
Transport – Flights	Scope 3	*0.6*
Waste	Scope 3	*2.9*
Refrigerant	Scope 1	*0*
COMMUNITY SERVICES		**60.81**
Electricity – Other	Scope 2	*56.53*
Transport and distribution losses	Scope 3	*4.28*
OPERATIONS		**109.39**
Electricity – Other	Scope 2	*2.93*
Electricity – Street lights	Scope 2	*62.52*
Transport and distribution losses	Scope 3	*4.96*
Transport – Diesel	Scope 1	*30.82*
Transport – Petrol	Scope 1	*8.16*
WATER		**517.28**
Transport – Diesel	Scope 1	*47.82*
Transport – Petrol	Scope 1	*0*
Water supply	Scope 3	*21.64*
Wastewater treatment	Scope 3	*447.82*
PARKS AND RESERVES		**63.42**
Electricity – Other	Scope 2	*12.17*
Transport and distribution losses	Scope 3	*0.92*
Transport – Diesel	Scope 1	*42.09*
Transport – Petrol	Scope 1	*0.74*
Green waste	Scope 3	*7.5*
REGULATORY		**12.00**
Transport – Diesel	Scope 1	*6.52*
Transport – Petrol	Scope 1	*5.48*
GROSS EMISSIONS		**777.12**

Table 16: Emissions by business units

	t CO_2e – 2018
Scope 1	149.13
Scope 2	137.14
Scope 3	490.85
GROSS EMISSIONS	**777.12**

Table 17: Emissions by scopes[9]

	t CO_2e – 2018
ELECTRICITY	**147.52**
Streetlights	*62.52*
Other	*74.62*
Transport and distribution losses	*10.39*
TRANSPORT	**149.73**
Petrol	*21.88*
Diesel	*127.25*
Flights	*0.6*
WASTEWATER	**447.82**
WATER SUPPLY	**21.64**
WASTE	**10.40**
REFRIGERANT	**0.00**
GROSS EMISSIONS	**777.12**

Table 18: Emissions by sources

	t CO_2e - 2018
GROSS EMISSIONS	**777.12**
Sequestration (forests)	-7,249.34
Harvest emissions	0
TOTAL	-7,249.34
NET EMISSIONS	**-6,472.22**

Table 19: Forestry

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[9] Scope 1 emissions are direct emissions from owned or controlled sources. Scope 2 emissions are indirect emissions from the generation of purchased energy. Scope 3 emissions are all indirect emissions not included in scope 2

	2018
Gross emissions per FTE (t CO$_2$e) 2018: 59.8 FTE	13.00
Gross emissions per capita (kg CO$_2$e) 2018: 9,201	84.5

Table 20: Emissions per FTE and per head of population

7.3 South Wairarapa District Council

The Table 21, Table 22, Table 23, Table 25 and Table 24 are the summary on the greenhouse gas inventory made for SWDC in 2018. For further information, refer to the greenhouse gas inventory reports.

	Scope	t CO_2e – 2018
CORPORATE SERVICES		**34.29**
Electricity – Other	Scope 2	*5.32*
Transport and distribution losses	Scope 3	*0.40*
Transport – Diesel	Scope 1	*7.35*
Transport – Petrol	Scope 1	*16.56*
Transport – Flights	Scope 3	*1.93*
Waste	Scope 3	*2.73*
Refrigerant	Scope 1	*0*
COMMUNITY SERVICES		**20.03**
Electricity – Other	Scope 2	*18.62*
Transport and distribution losses	Scope 3	*1.41*
OPERATIONS		**53.67**
Electricity – Other	Scope 2	*0.32*
Electricity – Street lights	Scope 2	*29.59*
Transport and distribution losses	Scope 3	*2.27*
Transport – Diesel	Scope 1	*7.64*
Transport – Petrol	Scope 1	*13.86*
WATER		**613.1**
Water supply	Scope 3	*46.04*
Wastewater treatment	Scope 3	*567.07*
PARKS AND RESERVES		**30.10**
Electricity – Other	Scope 2	*25.49*
Transport and distribution losses	Scope 3	*1.93*
Transport – Diesel	Scope 1	*0*
Transport – Petrol	Scope 1	*2.67*
REGULATORY		**12.91**
Transport – Diesel	Scope 1	*11.48*
Transport – Petrol	Scope 1	*1.43*
GROSS EMISSIONS		**764.10**

Table 21: Emissions by business units

	t CO_2e – 2018
Scope 1	60.99
Scope 2	79.34
Scope 3	623.77
GROSS EMISSIONS	**764.10**

Table 22: Emissions by scopes[9]

	t CO_2e – 2018
ELECTRICITY	85.35
Streetlights	*29.59*
Other	*49.75*
Transport and distribution losses	*6.01*
TRANSPORT	62.92
Petrol	*34.52*
Diesel	*26.47*
Flights	*1.93*
WASTEWATER	567.07
WATER SUPPLY	46.04
WASTE	2.73
REFRIGERANT	0.00
GROSS EMISSIONS	**764.10**

Table 23: Emissions by sources

	t CO_2e – 2018
GROSS EMISSIONS	**764.10**
Sequestration (forests)	*-2,513.47*
Harvest emissions	*4,950.74*
TOTAL	2,437.27
NET EMISSIONS	**3,201.37**

Table 24: Forestry

	2018
Gross emissions per FTE (t CO$_2$e) 2018: 41 FTE	18.64
Gross emission per capita (kg CO$_2$e) 2018: 10,569	72.30

Table 25: Emissions per FTE and per head of population

8 Targets

8.1 International targets – Paris Agreement

The Paris Agreement was adopted by Parties under the United Nations Framework Convention on Climate Change (UNFCCC) on 12 December 2015. It commits all countries to take action on climate change. New Zealand ratified the Paris Agreement on 4 October 2016.

The purpose of the Paris Agreement is to:

- keep the global average temperature well below 2°C above pre-industrial levels, while pursuing efforts to limit the temperature increase to 1.5°C
- strengthen the ability of countries to deal with the impacts of climate change
- make sure that financial flows support the development of low-carbon and climate-resilient economies.

By ratifying the agreement New Zealand commits to having an emissions reduction target and regularly updating it. Ratification also commits us to:

- continue to regularly report on our emissions and how we're tracking towards meeting our target
- continue to provide financial support to assist developing countries' mitigation and adaptation efforts
- plan for adaptation.

8.2 National targets – Climate Change Response (Zero Carbon) Amendment Act

The Climate Change Response (Zero Carbon) Amendment Act sets a greenhouse gas reduction targets and require that:

- net accounting emissions of greenhouse gases in a calendar year, other than biogenic methane, are zero by the calendar year beginning on 1 January 2050 and for each subsequent calendar year; and
- emissions of biogenic methane[10] in a calendar year:
  - are 10% less than 2017 emissions[11] by the calendar year beginning on 1 January 2030; and
  - are 24% to 47% less than 2017 emissions by the calendar year beginning on 1 January 2050 and for each subsequent calendar year.

The 2050 target will be met if emissions reductions meet or exceed those required by the target.

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[10] Methane produced from biological sources (plant and animal).

[11] 2017 emissions mean the emissions of biogenic methane for the calendar year beginning on 1 January 2017.

8.3 Councils' targets

Carterton and South Wairarapa District Councils aimed to set up greenhouse gas emissions targets in order to comply to Climate Change Response (Zero Carbon) Amendment Act and to the Paris agreement.

The targets must be ambitious but also, achievable and realistic. Being small councils, we have to be aware of our limits.

During the period 2020 – 2030, Carterton and South Wairarapa District Councils aim to:

- Reduce their gross greenhouse gas emissions,
- Increase the reservoirs, therefore the amount of greenhouse gas sequestered every year,
- Reduce biogenic methane[12] by 10% below 2017 levels.

To be able to be able to achieve these targets, the councils set up an action plan that is exposed in the following part of the strategy. The actions are intended for:

- the councils,
- the community
- the businesses.

The greenhouse gas inventories will allow the councils to keep track and record of their emissions and make sure the councils are in the right direction.

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[12] Biogenic methane is produced from biological (plant and animal) sources.

9   Action plan

9.1   Summary

	One-year Raise awareness and start reducing the emissions	**Three-year** Strengthen the engagement towards Climate Change and keep reducing the emissions	**Ten-year** Achieve and go beyond our targets
1. Councils: lead by example			
1. Council's activities	1-1.1.1. Measure and report on council's emissions 1-1.1.2. Work with Greater Wellington Regional Council and other Territorial Authorities 1-1.1.3. Insert Climate Change and sustainability in the tenders 1-1.1.4. Implement a Carbon Reduction Policy 1-1.1.5. Input Climate Change in the new Spatial Plan	1-1.1.1. Ongoing 1-1.1.2. Ongoing 3-1.1.1. Update the Ruamāhanga Strategy 3-1.1.2. Review the contracts to insert Climate Change and sustainability 3-1.1.3. Implement a Low Carbon Events policy 3-1.1.4. Input Climate Change in the Risk Management Strategy	1-1.1.1. Ongoing 1-1.1.2. Ongoing 1-1.1.3. Ongoing 3-1.1.1. Ongoing 3-1.1.2. Ongoing
2. Optimise the fleet vehicles	1-1.2.1. Consider other options than combustion engine vehicle 1-1.2.2. Adopt fuel-efficient driving techniques 1-1.2.3. Lead a fleet review	1-1.2.1. Ongoing 1-1.2.2. Ongoing 3-1.2.1. Update the fleet according to the results of the fleet review	1-1.2.1. Ongoing 1-1.2.2. Ongoing 3-1.2.1. Ongoing 10-1.2.1. Lead a strong fleet vehicle transition to EV
3. Reduce energy consumption	1-1.3.1. Adopt an energy saving behaviour 1-1.3.2. Use LED technology (including streetlights) 1-1.3.3. Lead a building efficiency assessment	1-1.3.1. Ongoing 1-1.3.2. Ongoing 3-1.3.1. Liaise with the company in charge of the service for heat pump to reduce energy consumption	1-1.3.1. Ongoing 1-1.3.2. Ongoing 10-1.3.1. Renovate the buildings to reach a very low energy consumption (including the swimming pools)

	One-year Raise awareness and start reducing the emissions	**Three-year** Strengthen the engagement towards Climate Change and keep reducing the emissions	**Ten-year** Achieve and go beyond our targets
1. Councils: lead by example			
4. Reduce the use of non-renewable energy	1-1.4.1. Buy electricity from a company that uses 100% renewable energy	3-1.4.1. Develop photovoltaic	3-1.4.1. Ongoing
5. Reduce water consumption, therefore wastewater	1-1.5.1. Reduce reticulated water leaks 1-1.5.2. Use water saving technologies 1-1.5.3. Reduce storm water and ground water in the sewers	1-1.5.1. Ongoing 1-1.5.2. Ongoing 1-1.5.3. Ongoing 3-1.5.1. Increase the rainwater collection	1-1.5.1. Ongoing 1-1.5.2. Ongoing 1-1.5.3. Ongoing 3-1.5.1. Ongoing
6. Reduce solid waste	1-1.6.1. Compost 1-1.6.2. Recycle 1-1.6.3. Optimise the IT (especially paper prints)	1-1.6.1. Ongoing 1-1.6.2. Ongoing 1-1.6.3. Ongoing	1-1.6.1. Ongoing 1-1.6.2. Ongoing 1-1.6.3. Ongoing
7. Increase the carbon reservoirs	1-1.7.1. Preserve our forests 1-1.7.2. Lead a land assessment to increase tree planting and wetland restoration	1-1.7.1. 3-1.7.1. Increase afforestation according to the results of the land assessment 3-1.7.2. Restore wetlands according to the results of the land assessment	1-1.7.1. Ongoing 3-1.7.1. Ongoing 3-1.7.2. Ongoing
8. Communicate and educate	1-1.8.1. Engage the staff in the carbon footprint reduction 1-1.8.2. Keep the council's members and staff informed	1-1.8.1. Ongoing 1-1.8.2. Ongoing	1-1.8.1. Ongoing 1-1.8.2. Ongoing

	One-year Raise awareness and start reducing the emissions	**Three-year** Strengthen the engagement towards Climate Change and keep reducing the emissions	**Ten-year** Achieve and go beyond our targets
2. Community and businesses: support low carbon behaviours and circular economy			
1. Reduce the use of combustion engine vehicles	1-2.1.1. Promote alternatives to combustion engine vehicles (public transport, bicycle, carpooling) 1-2.1.2. Promote fuel-efficient driving techniques 1-2.1.3. Develop bike lanes by supporting the Five Towns Trail Trust 1-2.1.4. Promote EV and e-bikes with EECA Low Emissions Contestable Fund	1-2.1.1. Ongoing 1-2.1.2. Ongoing 1-2.1.3. Ongoing	1-2.1.1. Ongoing 1-2.1.2. Ongoing 1-2.1.3. Ongoing 10-2.1.1. Create a long-term bike hire between the five towns 10-2.1.2. Create carpool carparks
2. Promote healthy homes	1-2.2.1. Promote an energy saving behaviour	1-2.2.1. Ongoing 3-2.2.1. Promote healthy homes and buildings for ratepayers and businesses 3-2.2.2. Promote renewable energies for ratepayers and businesses 3-2.2.3. Review the building consent requirements in order to have healthier homes	1-2.2.1. Ongoing 10-2.2.1. Renovate the community flats
3. Promote local food and locally made goods and services	1-2.3.1. Promote locally produced food, goods and services	1-2.3.1. Ongoing	1-2.3.1. Ongoing
4. Reduce solid waste	Solid waste emits methane which is a strong greenhouse gas (1 ton of methane has the same effect on the climate as 28 tons of carbon dioxide). It is why reducing solid waste is very important (especially food waste). The solid waste reduction strategy is managed by the Regional Zero Waste Advisor; therefore, the actions are not developed in this strategy.		
5. Increase the carbon reservoirs	1-2.5.1. Promote forest preservation and afforestation	1-2.5.1. Ongoing	1-2.5.1. Ongoing

	One-year Raise awareness and start reducing the emissions	Three-year Strengthen the engagement towards Climate Change and keep reducing the emissions	Ten-year Achieve and go beyond our targets
2. Community and businesses: support low carbon behaviours and circular economy			
6. Engage the community and businesses in the carbon footprint reduction	1-2.6.1. Coordinate the Climate Change week / Conservation week 1-2.6.2. Hold a Climate Change stall at local events 1-2.6.3. Educate the children to Climate Change with Enviroschools and school holiday programmes 1-2.6.4. Watch for new scientific publications, laws, rules to keep the community informed	1-2.6.1. Ongoing 1-2.6.2. Ongoing 1-2.6.3. Ongoing 1-2.6.4. Ongoing 3-2.6.1. Organise the Climate Change biennial	1-2.6.1. Ongoing 1-2.6.2. Ongoing 1-2.6.3. Ongoing 1-2.6.4. Ongoing 3-2.6.1. Ongoing

Table 26: Summary of the action plan

9.2 One-year action plan – Raise awareness and start reducing the emissions

9.2.1 Councils: lead by example

1- One-year action plan – Raise awareness and start reducing the emissions	
1-1. Councils: lead by example	
1-1.1. Council's activities	
1-1.1.1. Measure and report on council's emissions	
Description	South Wairarapa District Council and Carterton District Council measure their own emission and report them yearly. This action aims to understand our emissions in order to reduce them.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2018 – ongoing
Key Performance Indicator	One inventory and report published each year.

1- One-year action plan – Raise awareness and start reducing the emissions	
1-1. Councils: lead by example	
1-1.1. Council's activities	
1-1.1.2. Work with Greater Wellington Regional Council and other Territorial Authorities	
Description	The Climate Change Advisor works in relation: - with Greater Wellington Regional Council (Wellington Regional Climate Change Working Party, Wellington Regional Electric Vehicles Working Party) - with other TA through the Local Government Climate Change Group. This action aims to get the support, experience and feedback from others and be more efficient in our way to work and to reduce our emissions.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2019 – ongoing
Key Performance Indicator	Attendance to meetings and support to other TA

1- One-year action plan – Raise awareness and start reducing the emissions	
1-1. Councils: lead by example	
1-1.1. Council's activities	
1-1.1.3. Insert Climate Change and sustainability in the tenders	
Description	All the new tenders will have a Climate Change and sustainability clause. The way the applicants answer these clauses will help to choose the successful applicant (amongst other clauses). This action aims to reduce the council's footprint. The council wants to make sure its contractors try to reduce their emissions and are respectful of the environment.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2020 – ongoing
Key Performance Indicator	All the new tenders will have a Climate Change and sustainability clause.

1- One-year action plan – Raise awareness and start reducing the emissions	
1-1. Councils: lead by example	
1-1.1. Council's activities	
1-1.1.4. Implement a Carbon Reduction Policy	
Description	An internal Carbon Reduction Policy will be implemented in 2020 to reduce the carbon footprint of all the employees in their everyday tasks. Also, all the other policies will be reviewed to add a Climate Change component when relevant. This action aims to include Climate Change in every project, decision (e.g. buying furniture) and report (e.g. Council meetings, committees).
Project management	Climate Change Advisor – Mélanie Barthe Policy Managers
Time frame	2020
Key Performance Indicator	The internal Carbon Reduction Policy is written and used by 2020. The other policies are reviewed and approved by 2020.

1- One-year action plan – Raise awareness and start reducing the emissions	
1-1. Councils: lead by example	
1-1.1. Council's activities	
1-1.1.5. Input Climate Change in the new Spatial Plan	
Description	The Spatial Plan (South Wairarapa District Council) is currently under review. This plan helps to prepare for the growth of the district for the next 30 years. This action aims to take Climate Change into account in the district's development.
Project management	Climate Change Advisor – Mélanie Barthe Planning managers
Time frame	2020
Key Performance Indicator	Attendance to meetings with the planners and advices given by the Climate Change Advisor. Climate Change section in the future Spatial Plan.

Optimise the fleet vehicles

1- One-year action plan – Raise awareness and start reducing the emissions	
1-1. Councils: lead by example	
1-1.2. Optimise the fleet vehicles	
1-1.2.1. Consider other options than combustion engine vehicle	
Description	The Climate Change Advisor will promote different alternatives to the car such as public transport, carpooling, bicycle or walking. The use of these options should come first, and the combustion engine vehicle shouldn't be used unless other alternatives available. This action aims to gather everyone's engagement in the councils to significantly reduce the transport's emissions.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2019 – ongoing
Key Performance Indicator	Council's employees are aware about the other options available to reduce the use of car. The transport's emissions decrease.

1- One-year action plan – Raise awareness and start reducing the emissions	
1-1. Councils: lead by example	
1-1.2. Optimise the fleet vehicles	
1-1.2.2. Adopt fuel-efficient driving techniques	
Description	Fuel-efficient driving techniques will be promoted to the council's fleet vehicle users. Indeed, these techniques can decrease the fuel consumption, thus the greenhouse gas emissions. Adopting fuel-efficient driving techniques also increase road safety. This action aims to gather everyone's engagement in the councils to significantly reduce the transport's emissions.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2019 – ongoing
Key Performance Indicator	Council's employees are aware about fuel-efficient driving techniques and they use them. The transport's emissions decrease.

1- One-year action plan – Raise awareness and start reducing the emissions	
1-1. Councils: lead by example	
1-1.2. Optimise the fleet vehicles	
1-1.2.3. Lead a fleet review	
Description	A fleet review will be held by the councils in order to have a better understanding of our transports. We want to make sure that our fleet (type of vehicles and numbers) is appropriate. This action aims to optimise our fleet in order to answer our needs in a better way.
Project management	Climate Change Advisor – Mélanie Barthe Fleet managers
Time frame	2020
Key Performance Indicator	Report on the results of the fleet review.

Reduce energy consumption

1- One-year action plan – Raise awareness and start reducing the emissions	
1-1. Councils: lead by example	
1-1.3. Reduce energy consumption	
1-1.3.1. Adopt an energy saving behaviour	
Description	Energy saving behaviour will be promoted to the council's employees. Indeed, this behaviour can decrease the electricity consumption, thus the greenhouse gas emissions. This action aims to gather everyone's engagement in the council's to significantly reduce the stationary's emissions.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2019 – ongoing
Key Performance Indicator	Council's employees are aware about energy saving behaviour and they adopt it. The energy use decrease (in the offices).

1- One-year action plan – Raise awareness and start reducing the emissions	
1-1. Councils: lead by example	
1-1.3. Reduce energy consumption	
1-1.3.2. Use LED technology (including streetlights)	
Description	In 2018 and 2019, the councils transitioned the streetlights from traditional to LED technology, which allowed to reduce the electricity use by over 20% in Carterton (2018 figures). The councils are currently transitioning the inside lighting to LED. This action aims to reduce our electricity consumption, thus our emissions.
Project management	Climate Change Advisor – Mélanie Barthe Operation managers Amenity managers
Time frame	2018 – ongoing
Key Performance Indicator	The numbers of Led lights increase until 100% of the lights are LED and the emissions decrease.

1- One-year action plan – Raise awareness and start reducing the emissions
1-1. Councils: lead by example
1-1.3. Reduce energy consumption

1-1.3.3. Lead a building efficiency assessment

Description	In order to know which buildings will need to be focused on, a building efficiency assessment needs to be done. This assessment will help us find out how our buildings might rate in terms of energy performance, and what it would take to enhance it.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2020
Key Performance Indicator	The assessment is done, and a report is written.

Reduce the use of non-renewable energy

1- One-year action plan – Raise awareness and start reducing the emissions
1-1. Councils: lead by example
1-1.4. Reduce the use of non-renewable energy

1-1.4.1. Buy electricity from a company that uses 100% renewable energy

Description	In order to reduce the greenhouse gas emitted by the stationary energy consumed, the councils will switch from a power company that uses non renewable energies (such as gas, coal and petrol) to a company that uses 100% renewable energies (such as wind, solar, hydro and geothermal energies).
Project management	Finance teams
Time frame	2019
Key Performance Indicator	The power company supplying the councils uses 100% renewable energies.

1- One-year action plan – Raise awareness and start reducing the emissions

1-1. Councils: lead by example
1-1.5. Reduce water consumption, therefore wastewater

1-1.5.1. Reduce reticulated water leaks	
Description	Leaks on reticulated water can represent a huge percentage of the water produced. This means that water is being treated to drinkable standards and this water is lost before to go to consumer. Water and energy used to treat it are being used without purpose. Therefore, the councils lead leak detection campaign and fix the leaks found. Also, the councils communicate to ratepayers about leaks and how to find them (water meter reading) in order to fix them. This action aims to reduce water losses therefore, resources usage (energy and water).
Project management	Operation managers
Time frame	Ongoing
Key Performance Indicator	The amount of water losses goes down.

1- One-year action plan – Raise awareness and start reducing the emissions

1-1. Councils: lead by example
1-1.5. Reduce water consumption, therefore wastewater

1-1.5.2. Use water saving technologies	
Description	Each time the council need to replace a device using water (irrigation, toilets, shower, tap), the council will take the option of using water saving technology (if possible). This action aims to reduce the water usage therefore, the energy usage to treat water.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2020 - ongoing
Key Performance Indicator	The water consumption goes down and the water saving technologies are always an option in the choices for new devices.

1- One-year action plan – Raise awareness and start reducing the emissions	
1-1. Councils: lead by example	
1-1.5. Reduce water consumption, therefore wastewater	
1-1.5.3. Reduce storm water and ground water in the sewers	
Description	Wastewater Treatment Plants use a huge amount of power. Also, wastewater produces a lot of greenhouse gas (biogenic methane). That is why reducing the amount of wastewater is a great way to reduce greenhouse gas emissions. The councils are working in reducing the amount of storm water and ground water in the sewers in order to reduce the amount of wastewater ending in the Wastewater Treatment Plants.
Project management	Operation managers
Time frame	Ongoing
Key Performance Indicator	Old and defective sewers are being replaced by new pipes.

Reduce waste

1- One-year action plan – Raise awareness and start reducing the emissions	
1-1. Councils: lead by example	
1-1.6. Reduce solid waste	
1-1.6.1. Compost	
Description	Kitchen caddies are available in the kitchens in order to reduce the organic waste going to landfill and then the methane emissions. We communicate to the staff about compost and engage them in using the kitchen caddies provided.
Project management	Climate Change Advisor – Mélanie Barthe Regional Zero Waste advisor – Jo Dean
Time frame	2019 – ongoing
Key Performance Indicator	Every kitchen has a caddy that is emptied in a compost bin.

1- One-year action plan – Raise awareness and start reducing the emissions	
1-1. Councils: lead by example	
1-1.6. Reduce solid waste	
1-1.6.2. Recycle	
Description	Recycling stations are implemented in the offices in order to reduce the waste going to landfill and then the methane emissions. We communicate to the staff about recycling and engage them in using the stations provided.
Project management	Climate Change Advisor – Mélanie Barthe Regional Zero Waste advisor – Jo Dean
Time frame	2019 – ongoing
Key Performance Indicator	Staff knows about recycling and uses the recycling stations.

1- One-year action plan – Raise awareness and start reducing the emissions
1-1. Councils: lead by example
1-1.6. Reduce solid waste
1-1.6.3. Optimise the IT (especially paper prints)

Description	The Climate Change Advisor in collaboration with the IT Managers will track the prints. The figures will be published regularly in order to empower employees in paper use reduction. This action aims to reduce the prints, therefore the emissions related to them.
Project management	Climate Change Advisor – Mélanie Barthe IT Managers
Time frame	2019 – ongoing
Key Performance Indicator	The prints number goes down.

Increase the carbon reservoirs

1- One-year action plan – Raise awareness and start reducing the emissions
1-1. Councils: lead by example
1-1.7. Increase the carbon reservoirs
1-1.7.1. Preserve our forests

Description	The councils will preserve all the forests they own and won't deforest unless there is no other choice. The forests are a great asset allowing the council to stock the greenhouse gas emitted.
Project management	Climate Change Advisor – Mélanie Barthe Parks and Reserves managers
Time frame	2019 – ongoing
Key Performance Indicator	The surface of forest owned is stable and if deforestation a report is done to prove the purpose of it.

1- One-year action plan – Raise awareness and start reducing the emissions
1-1. Councils: lead by example
1-1.7. Increase the carbon reservoirs
1-1.7.2. Lead a land assessment to increase tree planting and wetland restoration

Description	A land assessment will be done in order to identify where the councils could plant trees or restore wetlands. Forests and wetlands are great carbon reservoirs and can help the councils in absorbing/sequestering their emissions.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2020
Key Performance Indicator	The land assessment is done.

1- One-year action plan – Raise awareness and start reducing the emissions	
1-1. Councils: lead by example	
1-1.8. Communicate and educate	
1-1.8.1. Engage the staff in the carbon footprint reduction	
Description	The Climate Change Advisor leads communication campaign to engage all the staff from the Councils in the carbon footprint reduction. The Climate Change Advisor can use tools like Climate Change Week, emails, competitions in order to keep a constant but not boring communication.
Project management	Climate Change Advisor – Mélanie Barthe Communication managers
Time frame	2019 – ongoing
Key Performance Indicator	The staff is engaged in the carbon footprint reduction and act to reduce their emissions.

1- One-year action plan – Raise awareness and start reducing the emissions	
1-1. Councils: lead by example	
1-1.8. Communicate and educate	
1-1.8.2. Keep the Council's members and staff informed	
Description	The Climate Change Advisor will make sure the Councils' members and staff are aware of the results of her work (especially the results of the greenhouse gas inventory and the Ruamāhanga Strategy). The Climate Change Advisor will enquire about the Councils' member opinion before to validate and finalise reports (especially for the targets and action plan). Also, Climate Change will be set as a separate component of the Annual Plans and Long-Term Plans. Each paper that goes to council meetings will have a Climate Change component.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2019 – ongoing
Key Performance Indicator	The Councils' members and staff are well informed about the actions of the Climate Change Advisor.

9.2.2 Community and businesses: support low carbon behaviours and circular economy

Reduce the use of combustion engine vehicles

1- One-year action plan – Raise awareness and start reducing the emissions	
1-2. Community and businesses: support low carbon behaviours and circular economy	
1-2.1. Reduce the use of combustion engine vehicles	
1-2.1.1. Promote alternatives to combustion engine vehicles (public transport, bicycle, carpooling)	
Description	The council promote alternatives to combustion engine vehicles (public transport, bicycle, carpooling) in order to engage the community in the car usage reduction therefore, the fuel usage and greenhouse emissions from the community.
Project management	Climate Change Advisor – Mélanie Barthe Communication managers
Time frame	2019 – ongoing
Key Performance Indicator	The community and businesses use alternatives to combustion engine vehicles more and more.

1- One-year action plan – Raise awareness and start reducing the emissions	
1-2. Community and businesses: support low carbon behaviours and circular economy	
1-2.1. Reduce the use of combustion engine vehicles	
1-2.1.2. Promote fuel-efficient driving techniques	
Description	Fuel-efficient driving techniques will be promoted to the community. Indeed, these techniques can decrease the fuel consumption, thus the greenhouse gas emissions. Adopting fuel-efficient driving techniques also increase road safety. This action aims to gather the community's engagement and reduce the transport's emissions.
Project management	Climate Change Advisor – Mélanie Barthe Communication managers
Time frame	2019 – ongoing
Key Performance Indicator	The community is aware of the fuel-efficient driving techniques.

1- One-year action plan – Raise awareness and start reducing the emissions	
1-2. Community and businesses: support low carbon behaviours and circular economy	
1-2.1. Reduce the use of combustion engine vehicles	
1-2.1.3. Develop bike lanes by supporting the Five Towns Trail Trust	
Description	The Climate Change Advisor support the Five Towns Trails Trust in order to create a bicycle link between the towns in Wairarapa (Featherston, Martinborough, Greytown, Carterton and Masterton).
Project management	Climate Change Advisor – Mélanie Barthe Regional Trails and Cycling Coordinator
Time frame	2019 – ongoing
Key Performance Indicator	The Climate Change Advisor is in contact with the Five Towns Trails Trust and supports it until the success of the project.

1- One-year action plan – Raise awareness and start reducing the emissions	
1-2. Community and businesses: support low carbon behaviours and circular economy	
1-2.1. Reduce the use of combustion engine vehicles	
1-2.1.4. Promote EV and e-bikes with EECA Low Emissions Contestable Fund	
Description	The councils apply for the EECA Low Emissions Contestable Fund in order to install electric vehicles fast chargers and support more people to switch from internal combustion engine vehicle to e-bikes. This action aims to support promote EV and e-bike rather than combustion engine vehicles.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2020
Key Performance Indicator	An application is done in February 2020 (approvals provided late July 2020).

Promote healthy homes

1- One-year action plan – Raise awareness and start reducing the emissions	
1-2. Community and businesses: support low carbon behaviours and circular economy	
1-2.2. Promote healthy homes	
1-2.2.1. Promote an energy saving behaviour	
Description	Energy saving behaviour will be promoted to the community. Indeed, this behaviour can decrease the electricity consumption, thus the greenhouse gas emissions. This action aims to gather the community's engagement and reduce the stationary's emissions.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2019 – ongoing
Key Performance Indicator	The community is aware of the energy saving behaviour.

Promote local food and locally made goods and services

1- One-year action plan – Raise awareness and start reducing the emissions	
1-2. Community and businesses: support low carbon behaviours and circular economy	
1-2.3. Promote local food and locally made goods and services	
1-2.3.1. Promote locally produced food, goods and services	
Description	The councils promote locally produced food, goods and services in order to reduce the emissions made by transport. The councils will also promote home grown fruits and vegetables.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2019 – ongoing
Key Performance Indicator	The community and businesses are aware of alternatives such as farmers market and choose to consume wisely.

Increase the carbon reservoirs

1- One-year action plan – Raise awareness and start reducing the emissions	
1-2. Community and businesses: support low carbon behaviours and circular economy	
1-2.5. Increase the carbon reservoirs	
1-2.5.1. Promote forest preservation and afforestation	
Description	Council will explain to the community and businesses the importance of preserving the forests and planting trees. We will promote government funding such as One Billion Trees Programme.
Project management	Climate Change Advisor – Mélanie Barthe Communication managers
Time frame	2019 – ongoing
Key Performance Indicator	The community is aware of the benefice of the forests, protect them and plant trees.

Engage the community and businesses in the carbon footprint reduction

1- One-year action plan – Raise awareness and start reducing the emissions	
1-2. Community and businesses: support low carbon behaviours and circular economy	
1-2.6. Engage the community and businesses in the carbon footprint reduction	
1-2.6.1. Coordinate the Climate Change week / Conservation week	
Description	Once a year a Climate Change week and Conservation week is held. The councils will use this opportunity to intensively communicate about Climate Change. Eventually, the councils will be able to organise an event during this week.
Project management	Climate Change Advisor – Mélanie Barthe Communication managers
Time frame	2019 – ongoing
Key Performance Indicator	Communication campaigns are held once a year during Climate Change week or Conservation week.

1- One-year action plan – Raise awareness and start reducing the emissions	
1-2. Community and businesses: support low carbon behaviours and circular economy	
1-2.6. Engage the community and businesses in the carbon footprint reduction	
1-2.6.2. Hold a Climate Change stall at local events	
Description	Climate Change Advisor will hold a Climate Change stall at suitable local events. This action aims to increase the awareness of the community towards Climate Change and how to mitigate it.
Project management	Climate Change Advisor – Mélanie Barthe Communication managers
Time frame	2020 – ongoing
Key Performance Indicator	The community's awareness towards climate change increases as well as its engagement.

1- One-year action plan – Raise awareness and start reducing the emissions	
1-2. Community and businesses: support low carbon behaviours and circular economy	
1-2.6. Engage the community and businesses in the carbon footprint reduction	
1-2.6.3. Educate the children to Climate Change with Enviroschools and school holiday programmes	
Description	The councils are engaged with Enviroschools and hold actions with the children. The Climate Change Advisor also uses the opportunity of school holiday programmes to educate the children to Climate Change. This action aims to raise awareness from a young age. Also, it has been proven that the children are great messengers when they come back home and speak to their families and friends.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2020 – ongoing
Key Performance Indicator	The councils are engaged with Enviroschools and actions / programmes are being held with the children.

1- One-year action plan – Raise awareness and start reducing the emissions	
1-2. Community and businesses: support low carbon behaviours and circular economy	
1-2.6. Engage the community and businesses in the carbon footprint reduction	
1-2.6.4. Watch for new scientific publications, laws, rules to keep the community informed	
Description	The Climate Change Advisor stays in tune with Climate Change publications in order to popularise them and communicate them to the community and businesses. This action aims to keep the community well informed with the latest data available.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2019 – ongoing
Key Performance Indicator	The community is well informed about Climate Change and everyone is able to understand it.

9.3 Three-year action plan – Strengthen the engagement towards Climate Change and keep reducing the emissions

9.3.1 Councils: lead by example

Council's activities

3- Three-year action plan – Strengthen the engagement towards Climate Change and keep reducing the emissions	
3-1. Councils: lead by example	
3-1.1. Council's activities	
3-1.1.1. Update the Ruamāhanga Strategy	
Description	The Ruamāhanga Strategy will be updated every three years in order to follow up in the actions already done and set up another set of actions. This action also aims to keep the context and greenhouse gas inventories up to date.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	Every 3 years (starting 2023)
Key Performance Indicator	The Ruamāhanga Strategy is kept updated.

3- Three-year action plan – Strengthen the engagement towards Climate Change and keep reducing the emissions	
3-1. Councils: lead by example	
3-1.1. Council's activities	
3-1.1.2. Review the contracts to insert Climate Change and sustainability	
Description	All the contracts will be reviewed in order to take Climate Change into account. Sustainability clauses will be inserted. These clauses will be monitored to make sure the contractors are respecting them. This action aims to reduce the council's footprint. The council wants to make sure its contractors try to reduce their emissions and are respectful of the environment.
Project management	Climate Change Advisor – Mélanie Barthe Contracts managers
Time frame	2021 – ongoing
Key Performance Indicator	Sustainability clauses are inserted in the current contracts.

3- Three-year action plan – Strengthen the engagement towards Climate Change and keep reducing the emissions

3-1. Councils: lead by example

3-1.1. Council's activities

3-1.1.3. Implement a Low Carbon Events policy

Description	In order to reduce the carbon footprint of the events organised by the councils, a policy will be implemented. This policy will be developed with the events managers of the councils to make sure that is suitable and that the managers will be able to use it in an appropriate way.
Project management	Climate Change Advisor – Mélanie Barthe Event managers
Time frame	2021
Key Performance Indicator	The Policy will be written and used by 2021

3- Three-year action plan – Strengthen the engagement towards Climate Change and keep reducing the emissions

3-1. Councils: lead by example

3-1.1. Council's activities

3-1.1.4. Input Climate Change in the Risk Management Strategy

Description	The Risk Management strategy will be updated in order to mention the risks generated by Climate Change and the risks that may increase the greenhouse gas emissions (e.g. fires).
Project management	Climate Change Advisor – Mélanie Barthe Operations managers
Time frame	2021
Key Performance Indicator	The Risk Management strategy is updated by 2021.

Optimise the fleet vehicles

3- Three-year action plan – Strengthen the engagement towards Climate Change and keep reducing the emissions

3-1. Councils: lead by example

3-1.2. Optimise the fleet vehicles

3-1.2.1. Update the fleet according to the results of the fleet review

Description	The fleet vehicle will be update according to the results of the fleet review. Where possible, low carbon vehicle will be preferred (EVs, e-bike, etc). This action aims to significantly reduce the emissions coming from transport.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2021 – ongoing
Key Performance Indicator	The fleet vehicle is being updated. The emissions coming from transport are decreasing.

Reduce energy consumption

3- Three-year action plan – Strengthen the engagement towards Climate Change and keep reducing the emissions	
3-1. Councils: lead by example	
3-1.3. Reduce energy consumption	
3-1.3.1. Liaise with the company in charge of the service for heat pump to reduce energy consumption	
Description	The Climate Change Advisor will liaise with the company in charge of the heat pumps to see how the councils can reduce their energy consumption. The councils will implement these results in order to reduce their stationary emissions.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2021
Key Performance Indicator	Climate Change liaise with the refrigeration company and implement the results of this liaison.

Reduce the use of non-renewable energy

3- Three-year action plan – Strengthen the engagement towards Climate Change and keep reducing the emissions	
3-1. Councils: lead by example	
3-1.4. Reduce the use of non-renewable energy	
3-1.4.1. Develop photovoltaic	
Description	The Climate Change Advisor will study the feasibility of photovoltaic on the councils' buildings and other assets (streetlights). When possible, the councils will transition from grid power to photovoltaic. This action aims to reduce the stationary emissions.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2021 – ongoing
Key Performance Indicator	The Climate Change Advisor identifies sites to install photovoltaic and panels are being installed when possible.

Reduce water consumption

3- Three-year action plan – Strengthen the engagement towards Climate Change and keep reducing the emissions	
3-1. Councils: lead by example	
3-1.5. Reduce water consumption, therefore wastewater	
3-1.5.1. Increase the rainwater collection	
Description	Water treatment is a large part of the greenhouse gas emissions. In order to reduce the water consumption, the councils will install water tank to collect rainwater on their premises where possible. This water can be used in the toilets for instance.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2021 – ongoing
Key Performance Indicator	Water tanks are being installed where possible.

3- Three-year action plan – Strengthen the engagement towards Climate Change and keep reducing the emissions	
3-1. Councils: lead by example	
3-1.7. Increase the carbon reservoirs	
3-1.7.1. Increase afforestation according to the results of the land assessment	
Description	According to the results of the land assessment, trees will be planted on suitable location in order to increase carbon reservoirs. The plantating could be a community or school project.
Project management	Climate Change Advisor – Mélanie Barthe Parks and Reserves managers
Time frame	2021 – ongoing
Key Performance Indicator	The surface of the forests increases as well as the carbon sequestration.

3- Three-year action plan – Strengthen the engagement towards Climate Change and keep reducing the emissions	
3-1. Councils: lead by example	
3-1.7. Increase the carbon reservoirs	
3-1.7.2. Restore wetlands according to the results of the land assessment	
Description	According to the results of the land assessment, suitable wetlands will be restored in order to increase carbon reservoirs. The restoration could be a community or school project.
Project management	Climate Change Advisor – Mélanie Barthe Parks and Reserves managers
Time frame	2021 – ongoing
Key Performance Indicator	Wetlands are being restored and carbon sequestration increases.

9.3.2 Community and businesses: support low carbon behaviours and circular economy

Promote healthy homes

3- Three-year action plan – Strengthen the engagement towards Climate Change and keep reducing the emissions	
3-2. Community and businesses: support low carbon behaviours and circular economy	
3-2.2. Promote healthy homes	
3-2.2.1. Promote healthy homes and buildings for ratepayers and businesses	
Description	Climate Change Advisor in collaboration with appropriate stakeholders will develop two flyers to promote healthy homes and buildings. The first flyer will be intended to ratepayers and the second to businesses. This action aims to engage the community and businesses into reducing their emissions through healthy homes and buildings.
Project management	Climate Change Advisor – Mélanie Barthe Communication managers
Time frame	2021
Key Performance Indicator	The flyers are done and widely known by the community and businesses.

3- Three-year action plan – Strengthen the engagement towards Climate Change and keep reducing the emissions	
3-2. Community and businesses: support low carbon behaviours and circular economy	
3-2.2. Promote healthy homes	
3-2.2.2. Promote renewable energies for ratepayers and businesses	
Description	Climate Change Advisor in collaboration with appropriate stakeholders will develop two flyers to promote renewable energies. The first flyer will be intended to ratepayers and the second to businesses. This action aims to engage the community and businesses into reducing their emissions by preferring renewable energies.
Project management	Climate Change Advisor – Mélanie Barthe Communication managers
Time frame	2021
Key Performance Indicator	The flyers are done and widely known by the community and businesses.

3- Three-year action plan – Strengthen the engagement towards Climate Change and keep reducing the emissions	
3-2. Community and businesses: support low carbon behaviours and circular economy	
3-2.2. Promote healthy homes	
3-2.2.3. Review the building consent requirements in order to have healthier homes	
Description	If possible, healthy home requirements (such as good insulation, double glazing, etc) will be implemented in the building consents. This action aims to develop healthy homes in the districts.
Project management	Climate Change Advisor – Mélanie Barthe Building managers
Time frame	2022
Key Performance Indicator	The building consent requirements have been reviewed.

Engage the community and businesses in the carbon footprint reduction

3- Three-year action plan – Strengthen the engagement towards Climate Change and keep reducing the emissions	
3-2. Community and businesses: support low carbon behaviours and circular economy	
3-2.6. Engage the community and businesses in the carbon footprint reduction	
3-2.6.1. Organise the Climate Change biennial	
Description	The Climate Change Advisor will organise the Climate Change biennial in collaboration with appropriate stakeholders. This event aims to increase the awareness, understanding and engagement of Climate Change by the community.
Project management	Climate Change Advisor – Mélanie Barthe Communication managers
Time frame	2021 – ongoing
Key Performance Indicator	The first biennial is held in 2021.

9.4 Ten-year action plan – Achieve and go beyond our targets

9.4.1 Councils: lead by example

Optimise the fleet vehicles

10- Ten-year action plan – Achieve and go beyond our targets	
10-1. Councils: lead by example	
10-1.2. Optimise the fleet vehicles	
10-1.2.1. Lead a strong fleet vehicle transition to electric vehicles	
Description	Following the action *3-1.2.1. Update the fleet according to the results of the fleet review*, the councils may lead a stronger transition to EVs in order to significantly reduce their emissions.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2030

Reduce energy consumption

10- Ten-year action plan – Achieve and go beyond our targets	
10-1. Councils: lead by example	
10-1.3. Reduce energy consumption	
10-1.3.1. Renovate the buildings to reach a very low energy consumption (including swimming pools)	
Description	Following the action *1-1.3.3. Lead a building efficiency assessment*, the councils may lead a strong building renovation campaign in order to reach a very low energy consumption.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2030

9.4.2 Community and businesses: support low carbon behaviours and circular economy

Reduce the use of combustion engine vehicles

10- Ten-year action plan – Achieve and go beyond our targets	
10-2. Community and businesses: support low carbon behaviours and circular economy	
10-2.1. Reduce the use of combustion engine vehicles	
10-2.1.1. Create a long-term bike hire between the five towns	
Description	Alongside with the action *1-2.1.3. Develop bike lanes by supporting the Five Towns Trail Trust*, the councils may create a long-term bike hire facility in order to support the usage of the bike lanes between the five towns therefore, to reduce the emissions.
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2030

10- Ten-year action plan – Achieve and go beyond our targets	
10-2. Community and businesses: support low carbon behaviours and circular economy	
10-2.1. Reduce the use of combustion engine vehicles	
10-2.1.2. Create carpool carparks	
Description	The councils may create carparks dedicated to car-poolers (especially in Featherston where people commute to Wellington).
Project management	Climate Change Advisor – Mélanie Barthe
Time frame	2030

Promote healthy homes

10- Ten-year action plan – Achieve and go beyond our targets	
10-2. Community and businesses: support low carbon behaviours and circular economy	
10-2.2. Promote healthy homes	
10-2.2.1. Renovate the community flats	
Description	The council may lead a strong building renovation campaign in order to reach a very low energy consumption for the community flats.
Project management	Amenity managers
Time frame	2030

10 Conclusion

By writing this ambitious strategy and action plan, Carterton District Council and South Wairarapa District Council are compliant to:

- the Paris Agreement,
- the Climate Change Response (Zero Carbon) Amendment Act,
- the New Zealand Local Government Leaders' Climate Change Declaration.

Indeed, the councils:

- Wrote a Climate Change Strategy in order to reduce their greenhouse gas emissions,
- Committed to regularly report on their greenhouse gas emissions,
- Set up carbon reduction 2030 targets that are compliant to the Climate Change Response (Zero Carbon) Amendment Act:
    - Reduce gross greenhouse gas emissions,
    - Increase the reservoirs, therefore the amount of greenhouse gas sequestered every year,
    - Reduce biogenic methane by 10% below 2017 levels.

This strategy is due for review in 2023.

11 Contacts and workgroups

In the process of writing this strategy, the Climate Change Advisor met with the following persons in order to have a feedback and input to the document:

- 8th of October 2019: Greg Hoskins, Director of Hoskins Energy Systems
- 8th of October 2019 and 22nd of January 2020: Resilient Carterton
- 10th of December 2019: Ra Smith, environmental consultant for Kahungunu ki Wairarapa
- 11th of December 2019: Warren Gray, senior analyst at Ministry for the Environment and Carterton Resident
- 12th and 18th of December 2019: Stuart Orme, Manager Land Use, Carbon and Consultancy and Michelle McCabe, Carbon and Land Use Specialist from Forest 360
- 19th of December 2019: Presentation to Mayor Alex Beijen, Councillor Brian Jephson, Harry Wilson (CEO) and Jennie Mitchell (Group Manager Corporate Services)
- 23rd of December 2019: Reuben Raihania Tipoki, Chair of the Māori Standing Committee (SWDC)
- 24th of December 2019: Allan Hogg, Martinborough Business Association
- 15th of January 2020: Presentation to Mayor Greg Lang, Councillor Russel Keys, Jane Davis (CEO) and Carolyn McKenzie (Community Services Manager)
- 29th of January 2020: Workshop with the mayors, the councillors, the CEO and the managers from both councils

In addition to these meetings, the Climate Change Advisor is also part of:

- the Wellington Region Climate Change Working Group
- the Wellington Region Electric Vehicle Working Group
- the Local Government Climate Change Working Group
- The Enviroschools Climate Change Group

12 References

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