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Environmental Health Intelligence New Zealand
Rapu Mātauranga Hauora mo te Taiao – Aotearoa

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Energy consumption by fuel type and sector

This factsheet presents information about the energy consumption patterns in Aotearoa New Zealand, with analysis by fuel type and energy consuming sector. These findings come from statistics published by the Ministry of Business, Innovation & Employment (MBIE).

In 2021, New Zealand consumed 0.7% more energy than in 2020 – but 6.6% less than in 2019. Restrictions on travel and economic activity in response to the Delta coronavirus variant may have hampered consumption returning to pre-COVID-19 levels.

The industrial sector consumed its lowest quantity of energy in ten years.

The amount of energy used per capita sector decreased compared with 1990, reflecting more sustainable or efficient uses of energy.

Oil was the primary fuel type used in New Zealand between 1990 and 2021, with as much energy consumed as oil as in all other forms combined in 2021, mostly in the domestic transport sector.

1 petajoule (PJ)	30,000 cars
contains enough energy in regular petrol to drive	for a year
New Zealand consumed 541.9 PJ in 2021...	*...enough to power 16,257,000 cars.*

Source: MBIE 2020, 2022

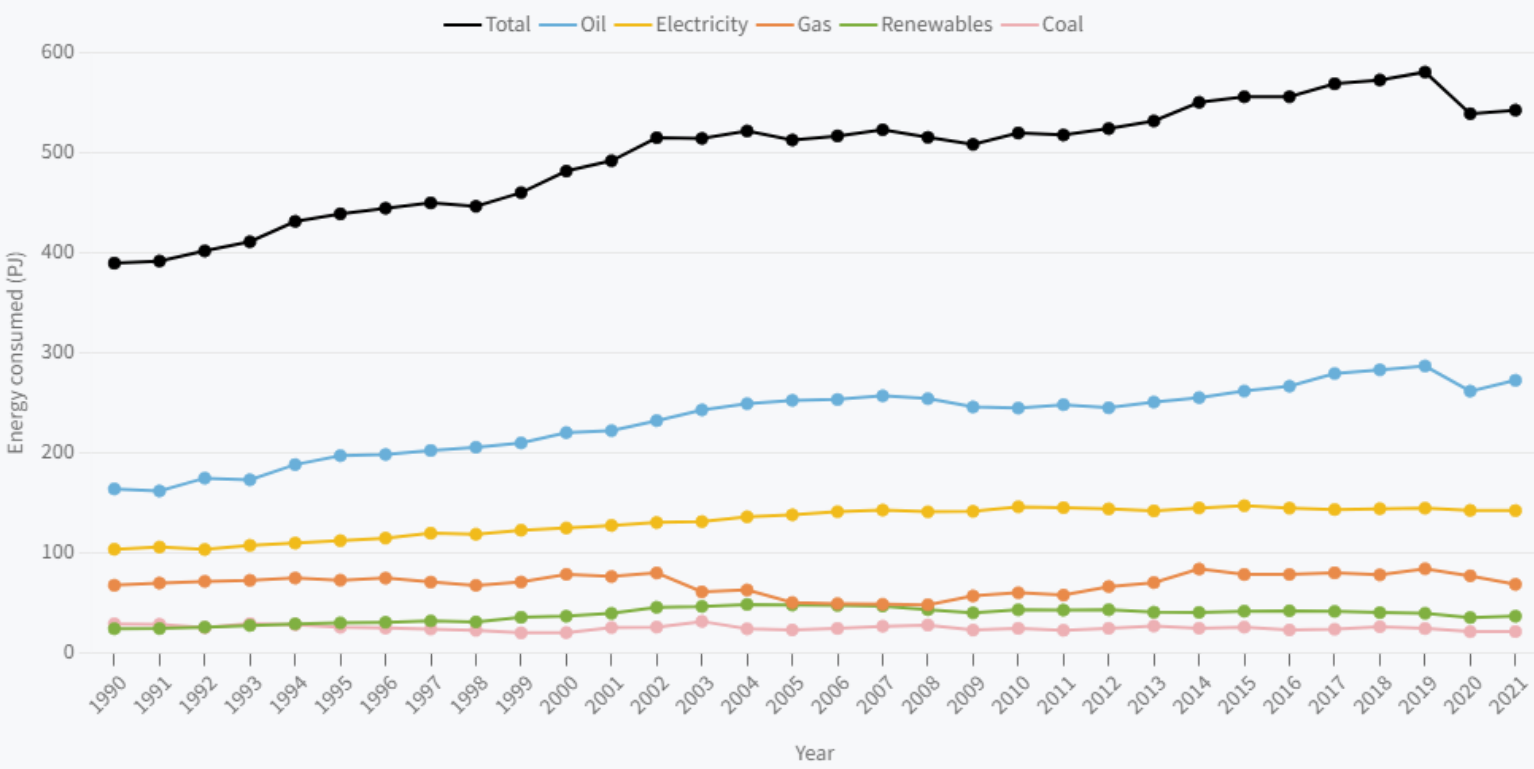
Emissions produced by the energy sector can affect health

The burning of fossil fuels (such as oil, gas, and coal) produces harmful emissions of gases and particulate matter, negatively affecting air quality and health. Furthermore, these emissions contribute to climate change, which itself impacts public health in various ways (WHO 2013). In 2018, the energy sector contributed 40.5% to New Zealand's greenhouse gas emissions, mainly through transport activities (MfE 2021).

Energy consumption remained lower than pre-COVID levels

New Zealand consumed 541.9 PJ of energy in 2021 (Figure 1), a slight (0.7%) increase over 2020. Energy consumption did not recover to the pre-COVID 'business as usual' levels of 2019. This is mainly due to reductions in gas and coal use in 2021 compared to 2020. Oil consumption recovered somewhat but was still at its lowest level since 2016.

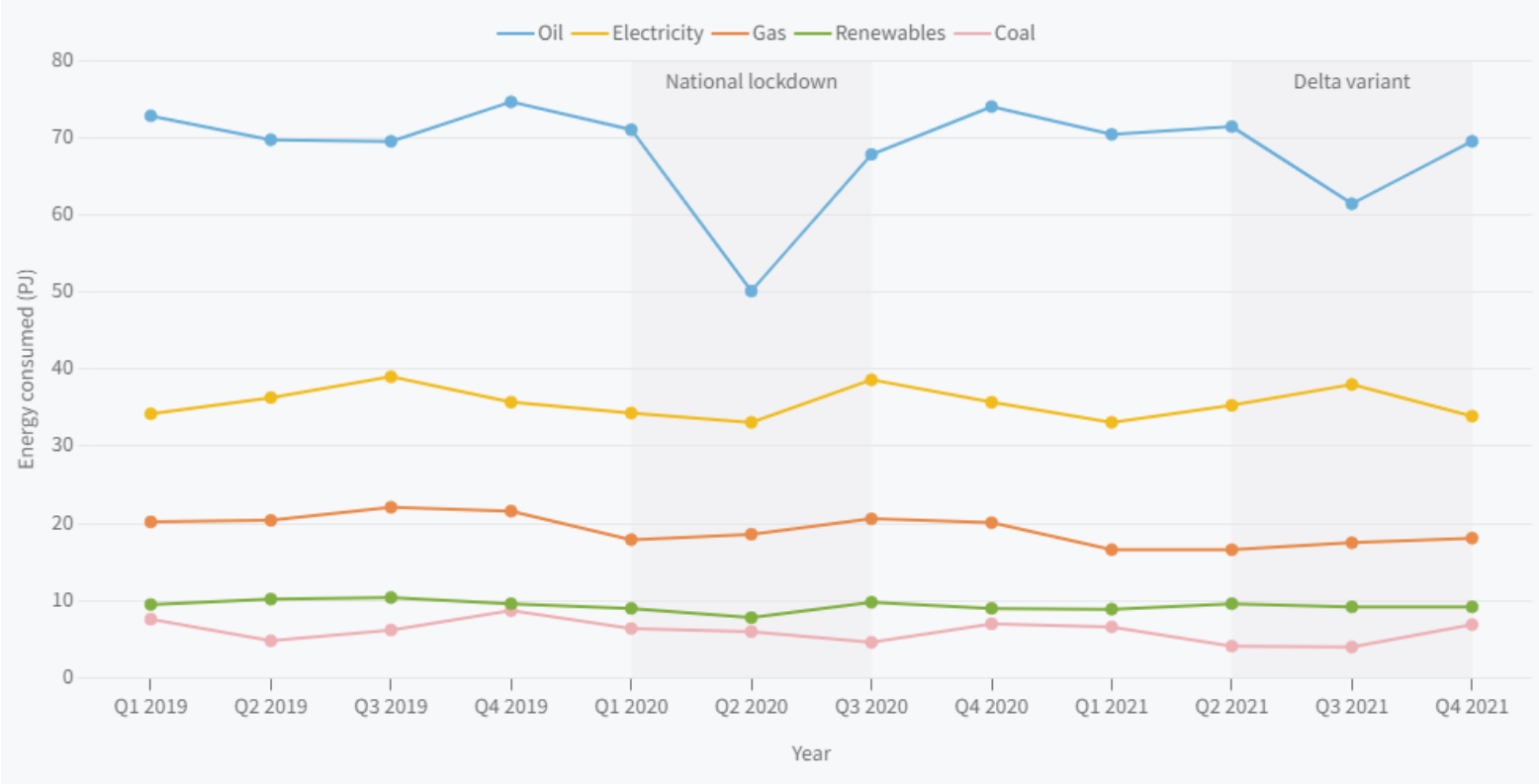
Figure 1 Total energy consumption (PJ), by fuel type, 1990–2021



Source: MBIE 2022

While the use of oil dropped sharply in the second quarter of 2020 (i.e., during the national COVID-19 lockdown), it recovered to 2019 levels later that same year (Figure 2). The dip in the third quarter of 2021 is likely due to travel restrictions introduced in mid-August to limit the spread of the Delta variant of COVID-19 (MBIE 2022).

Figure 2 Total energy consumption (PJ), by fuel type, 2019–2021 (by quarter)



Source: MBIE 2022

Oil remains the primary fuel type used in New Zealand

Oil was the primary fuel type used in New Zealand in 2021, as it has been since 1990 . That year, 272.3 PJ of oil was consumed, just over half (50.2%) of the country's total consumption (Table 1).

The amount of oil used per capita increased from 48.1 PJ per million in 1990 to 53.2 PJ per million in 2021. However, the per capita consumption for all other fuel types decreased – or in the case of renewables, were no different. Total energy consumption per capita also decreased slightly for all fuels except oil. A decrease in per capita usage would indicate that energy is being used more efficiently, i.e. less energy is required for the same output.

Table 1 Total energy consumption (PJ) by fuel type, 1990 and 2021

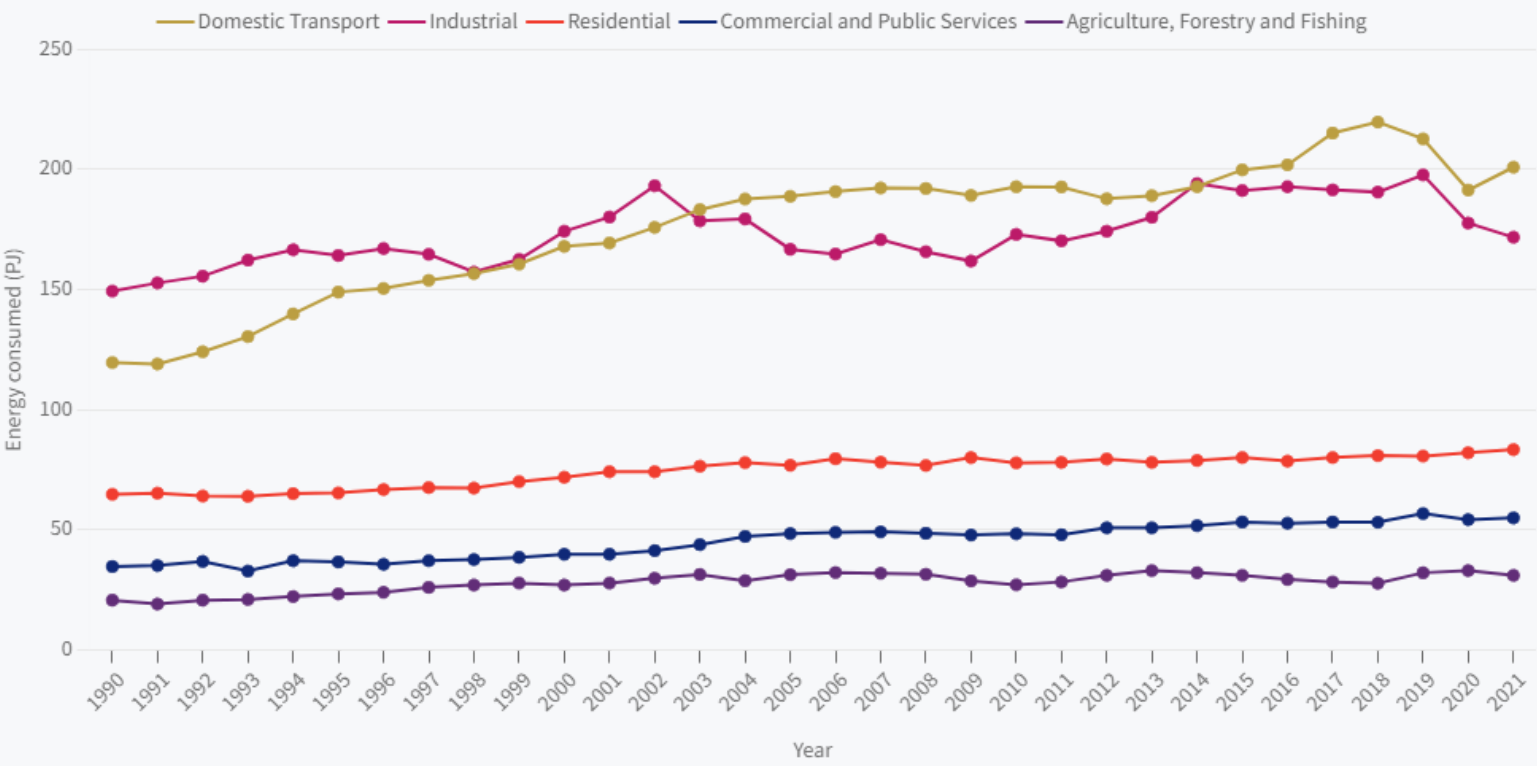
Fuel type	1990			2021		
	Energy used (PJ)	% of total	PJ used per million people	Energy used (PJ)	% of total	PJ used per million people
Oil	163.9	42.1%	48.1	272.3	50.2%	53.3
Electricity	103.7	26.6%	30.4	142.4	26.3%	27.9
Gas	67.8	17.4%	19.9	68.7	12.7%	13.4
Renewables	24.4	6.3%	7.2	36.9	6.8%	7.2
Coal	29.3	7.5%	8.6	21.6	4.0%	4.2
Total	**389.2**		**114.1**	**541.9**		**106.0**

Source: MBIE 2022

The domestic transport and industrial sectors once again dominated the energy consumption landscape

Some restrictions on travel and economic activity continued into 2021, particularly in response to the Delta COVID-19 variant. This is likely to be why industrial and transport-related energy use did not return to pre-pandemic levels (Figure 3). Despite this, these two sectors comprise two-thirds of the total consumption figure. The domestic transport sector consumed 37.2% (200.8 PJ) of the total energy consumed in 2021, while the industrial sector consumed 31.8% (171.7 PJ).

Figure 3 Total energy consumption (PJ), by sector, 1990–2021



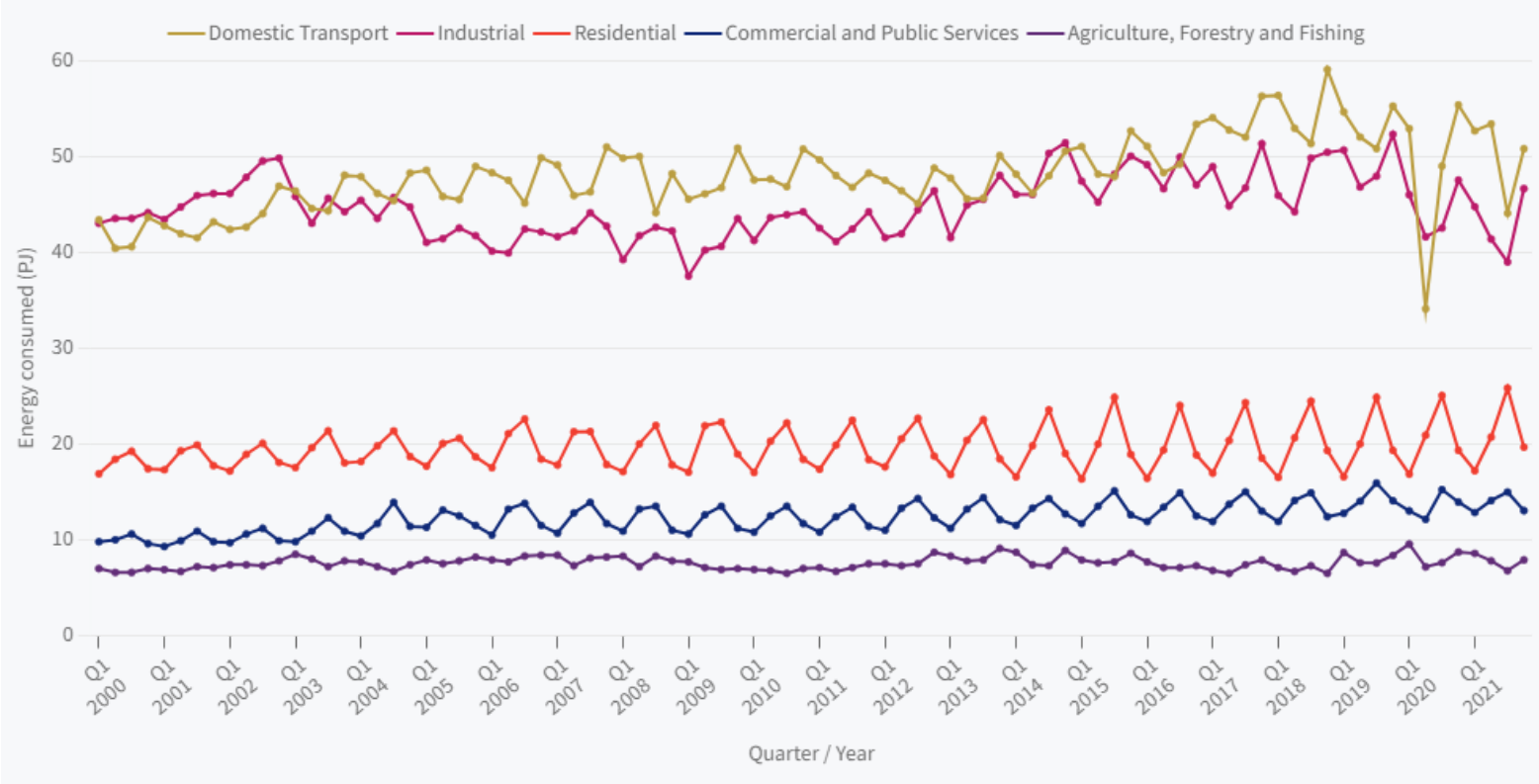
Source: MBIE 2022

Figure 4 shows the quarterly energy consumption by sector. The impacts of the first national COVID-19 lockdown and Delta variant restrictions are particularly noticeable in the transport and industrial sectors.

Peaks and troughs in the residential sector align with changes in season, with high consumption in quarter three reflecting increased use of power for heating and light during colder periods. While the annual nadir (usually Q1 or rarely Q4) has risen by just 21% since 1990, the peak power consumption during Q3 has risen by 42% – this is roughly in line with population growth over that period.

A similar pattern is evident in the commercial and public services sector, presumably driven by the same demand.

Figure 4 Total energy consumption (PJ) by sector, 2000–2021 (by quarter)



Source: MBIE 2022

A 67.9% increase in energy use within the domestic transport sector since 1990

Energy consumption within the domestic transport sector increased by 67.9% between 1990 and 2021. Energy use per capita also increased within this sector, showing that the increased consumption cannot be explained by population growth alone (Table 2). Meanwhile, per capita energy usage decreased in the industrial and residential sectors, likely driven by more energy-efficient designs and more sustainable methods of energy use.

Table 2 Total energy consumption (PJ), by sector, 1990 and 2021

Sector	1990			2021		
	Energy used (PJ)	% of total	PJ used per million people	Energy used (PJ)	% of total	PJ used per million people
Domestic transport	119.6	30.7%	35.1	200.8	37.1%	39.3
Industrial	149.3	38.4%	43.8	171.7	31.7%	33.6
Residential	64.8	16.6%	19.0	83.4	15.4%	16.3
Commercial & public services	34.8	8.9%	10.2	55.0	10.1%	10.8
Agriculture, forestry & fishing	20.8	5.3%	6.1	31.1	5.7%	6.1
Total	**389.2**		**114.1**	**541.9**		**106.0**

Source: MBIE 2022

Oil remains the dominant fuel type in the domestic transport sector

As in previous years, almost all energy in the most-consuming sector – the domestic transport sector – came from burning fossil fuels (e.g., diesel or petrol) (Figure 5). While electric vehicles have begun to proliferate (see 'Number of motor vehicles'), as of 2021, just 0.2% of the sector's fuel needs were filled by electricity.

This dependency on oil produces harmful emissions and greenhouse gases affecting air quality, the climate and public health.

Figure 5 Total energy consumption (PJ), by sector and fuel type, 2021

Note: Due to rounding, the sum of the fuel types shown on these charts may not match the totals presented in Table 2 above.

Source: MBIE 2022

Dashboard - Climate change

Data for this indicator

This indicator analyses the most recent issue of the 'Energy in New Zealand' annual report and the associated data tables published by the Ministry of Business, Innovation and Employment in August 2022. The statistics presented here reflect the 'direct use' of energy, i.e., energy is recorded based on what form it was consumed in by the end-user. Energy transformed from one form to another is not counted, e.g. wind power used to generate electricity would be recorded against the electricity total once the electricity was used.

For descriptive information about the data, see the Metadata Sheet.

Note on the re-classification of energy:

Since the publication of the 2021 edition of the 'Energy in New Zealand' report, the Ministry of Business, Innovation and Employment (MBIE) has altered how the use of petrol and diesel (i.e. 'oil') in recreational watercraft is classified. In earlier years, this was counted towards the domestic transport sector. In the 2022 edition, this use has been assigned to the residential sector instead, with the change being retroactive for all years back to 1990. The consequence is that, while the figures for the total oil consumption are unchanged, the statistics for the oil consumption by sector have changed significantly. Consequently, this factsheet is not comparable to previous publications by EHINZ.

In the 2021 report and associated data tables, the residential sector was stated to have consumed 65.7 PJ in total during 2020. The 2022 figures report that the sector consumed 83.4 PJ in 2020 – an increase of roughly 26.9%, with the difference solely attributable to the reassigned oil use. The domestic transport sector's figures are correspondingly lower, with a decline of 8.9% (from 207.8 PJ to 191.3 PJ) for the 2020 data point between reports.

For further information on the rationale for the change, readers should consult 'Offroad liquid fuel insights' (EECA, 2021) or contact MBIE directly.

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Previous factsheet(s):

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Citation

Environmental Health Intelligence NZ, 2023. *Energy consumption by fuel type and sector.* Wellington: Environmental Health Intelligence NZ, Massey University.

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