

This assessment is based on a now-expired version of the achievement standard and may not accurately reflect the content and practice of external assessments developed for 2024 onwards.

**91946R**



**Mana Tohu Mātauranga o Aotearoa**  
New Zealand Qualifications Authority

## **Level 1 Mathematics and Statistics RAS 2023**

**91946 Interpret and apply mathematical and statistical  
information in context**

Credits: Five

# **PILOT ASSESSMENT**

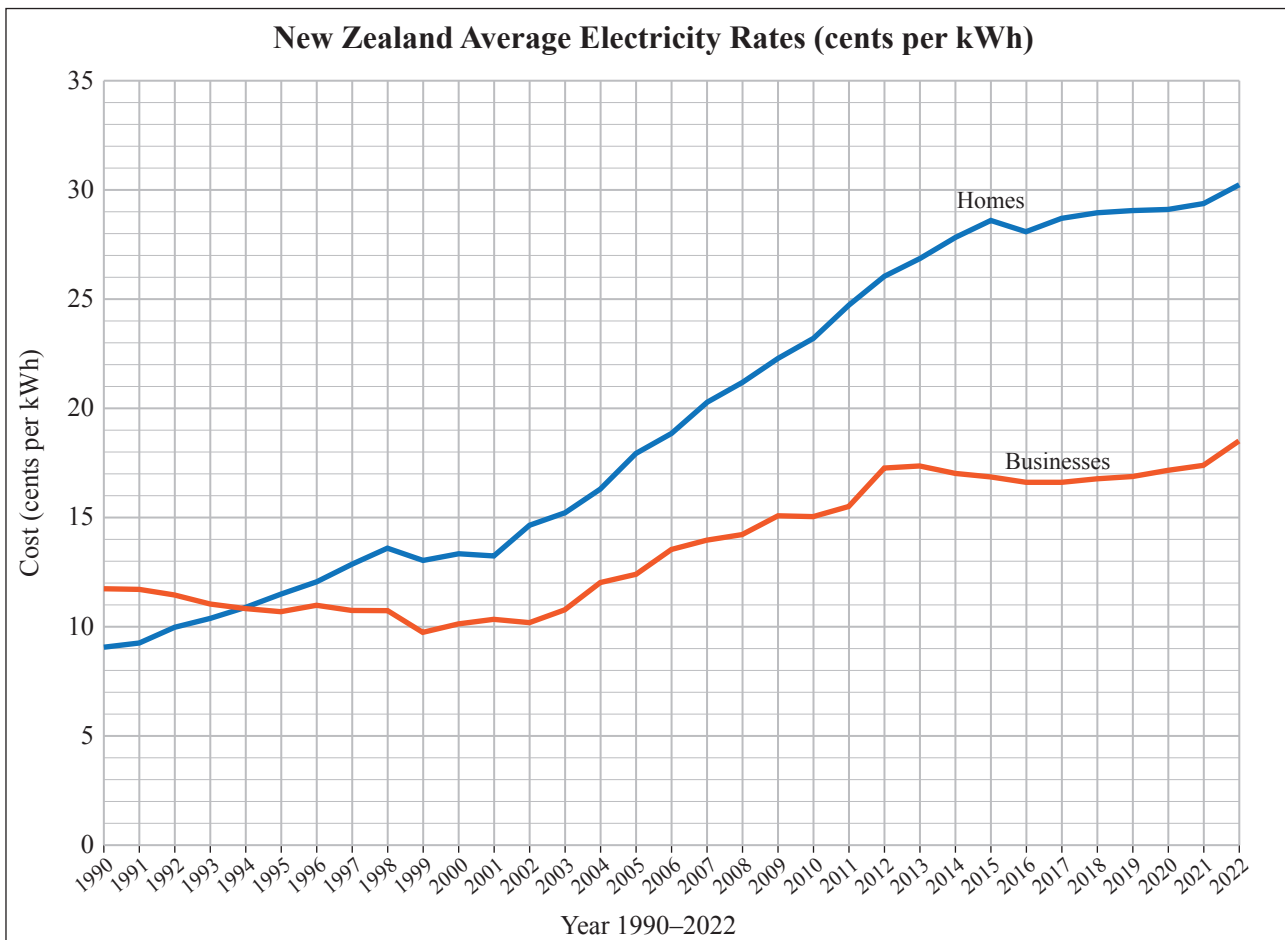
**RESOURCE BOOKLET**

Check that this booklet has pages 2–9 in the correct order and that none of these pages is blank.

## RESOURCE 1

### Definitions:

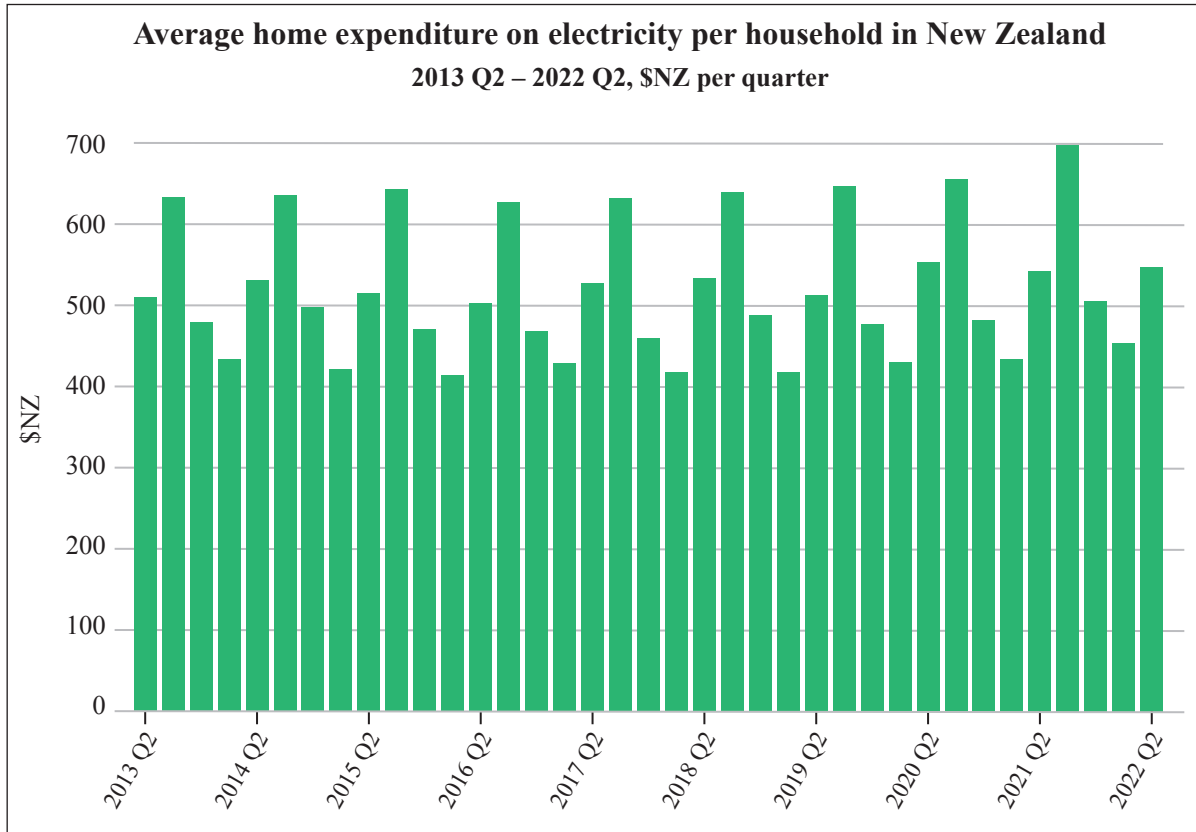
- A watt (W) is a unit of power, which is the rate at which energy is produced or consumed.
- A 100-watt light bulb needs a flow of 100 watts of electricity in order to work. A 60-watt light bulb needs a flow of only 60 watts to work.
- Since homes typically require thousands of watts to run, when talking about energy use, it is easier to use larger units like kilowatts (kW) (1000 watts) and megawatts (MW) (1000 kilowatts).
- An electricity bill will typically show how many kilowatt-hours a home consumes in a month.
- A watt-hour is a unit of measurement for energy. A kilowatt-hour means the energy consumption of a kilowatt of power for one hour.



## RESOURCE 2A

### Definitions:

- *Average home expenditure* means the average amount of money spent on electricity by householders.
- *Per quarter* means that a year is divided up into four quarters, i.e. Q1 is January, February, March; Q2 is April, May, June; Q3 is July, August, September; Q4 is October, November, December.



## RESOURCE 2B





| Year and Quarter | Average home <u>expenditure</u> on electricity per household in New Zealand (\$ NZ) | Average home <u>usage</u> of electricity per household in New Zealand (kw/hour) |
|------------------|---|---|
| 2013 Q2          | \$ 509.19   | 1824.44   |
| 2013 Q3          | \$ 633.41   | 2365.22   |
| 2013 Q4          | \$ 479.14   | 1698.49   |
| 2014 Q1          | \$ 432.32   | 1493.44   |
| 2014 Q2          | \$ 530.51   | 1855.38   |
| 2014 Q3          | \$ 634.55   | 2281.67   |
| 2014 Q4          | \$ 496.87   | 1721.30   |
| 2015 Q1          | \$ 420.96   | 1421.80   |
| 2015 Q2          | \$ 514.61   | 1826.33   |
| 2015 Q3          | \$ 643.84   | 2373.71   |
| 2015 Q4          | \$ 469.50   | 1663.69   |
| 2016 Q1          | \$ 413.69   | 1398.64   |
| 2016 Q2          | \$ 501.08   | 1730.51   |
| 2016 Q3          | \$ 626.66   | 2261.29   |
| 2016 Q4          | \$ 467.59   | 1622.89   |
| 2017 Q1          | \$ 428.16   | 1433.04   |
| 2017 Q2          | \$ 526.14   | 1818.70   |
| 2017 Q3          | \$ 630.94   | 2258.35   |
| 2017 Q4          | \$ 458.77   | 1570.13   |
| 2018 Q1          | \$ 417.19   | 1373.08   |
| 2018 Q2          | \$ 533.23   | 1829.83   |
| 2018 Q3          | \$ 639.25   | 2277.53   |
| 2018 Q4          | \$ 487.77   | 1670.15   |
| 2019 Q1          | \$ 416.66   | 1364.28   |
| 2019 Q2          | \$ 512.26   | 1742.73   |
| 2019 Q3          | \$ 646.67   | 2317.30   |
| 2019 Q4          | \$ 477.25   | 1638.26   |
| 2020 Q1          | \$ 429.27   | 1396.02   |
| 2020 Q2          | \$ 552.33   | 1881.30   |
| 2020 Q3          | \$ 654.53   | 2305.93   |
| 2020 Q4          | \$ 481.67   | 1631.05   |
| 2021 Q1          | \$ 432.26   | 1404.80   |
| 2021 Q2          | \$ 541.74   | 1798.79   |
| 2021 Q3          | \$ 695.83   | 2385.95   |
| 2021 Q4          | \$ 504.56   | 1654.05   |
| 2022 Q1          | \$ 452.14   | 1422.27   |
| 2022 Q2          | \$ 546.41   | 1736.39   |

Source: <https://figure.nz/chart/ivlqVxSXkRa9OnXL>

## RESOURCE 3

### Definitions:

- *Off-peak plan:* Some companies offer a power plan with a cheaper night rate but a higher day rate. Homes that mainly use power at night (usually after 9pm) will likely make savings on their power bills.
- *Customer rating:* Customers are asked to rate how satisfied they are with their energy supplier. They award a rating between 1 and 10. This rating is then averaged out between all of the customers. The higher the rating, the more satisfied the customers are.
- *Contract term:* Some energy companies insist that the customers have to sign up to a required time period and cannot change to a different company within that time period.
- *Open term:* This is when an energy company will allow their customers to swap to a different company at any time.

| Company         |            | Rhythm Energy   | Wired 4 Power   | Equator Energy   | Shout   |
|-----------------|------------|---|---|--|---|
| Customer rating |            |  6.4 |  3.7 |  7.9 |  8 |
| Contract term   |            | Open term   | 12 months   | Open term  | Open term   |
| Selling point   |            | Cheaper broadband rate  | \$50 credit   | 100% renewable energy  | \$100 credit  |
| Add-ons         |            | Broadband bundle  | Natural gas   | None   | None  |
| Anytime rate    |            | \$0.1988 / kWh  | \$0.2146 / kWh  | \$0.2028 / kWh   | \$0.1675 / kWh  |
| Off-peak plan   | Day rate   | \$0.2113 / kWh  | \$0.2240 / kWh  | \$0.2146 / kWh   | \$0.1675 / kWh  |
|                 | Night rate | \$0.1779 / kWh  | \$0.1685 / kWh  | \$0.1196 / kWh   | \$0.1675 / kWh  |
| Daily charge    |            | \$2.9900 / day  | \$2.3089 / day  | \$1.7502 / day   | \$2.5070 / day  |

Adapted from: <https://www.powercompare.co.nz>

## RESOURCE 4

### Definitions:

- A megawatt (MW) is 1 000 000 watts of power i.e. a thousand times larger than a kilowatt. Megawatts are typically used to describe power capacities on large scales, such as those of a power plant or the amount of energy required to power an entire city.
- A megawatt is not the largest measure of power. After megawatts come gigawatts (GW) which is equal to one billion watts (1 000 000 000 watts). Gigawatts are used to describe amounts of power such as those generated by entire nations.

### **New Zealand aims for 100% of its energy needs to be renewable energy by 2030**

Author **Michael Lustig, Anna Duquiatan**

Theme **Energy**

About 20% of New Zealand's nearly 10 GW of operating power generation capacity is comprised of gas- and coal-fired resources, but those will soon be replaced as the country aims toward a 2030 deadline for 100% renewable energy, using a variety of different methods.

New Zealand also has a net-zero emissions target by the year 2050.

The majority of New Zealand's existing generating capacity comes from hydro resources.

More than 75% of nearly 1.6 GW of capacity in the future will be generated by wind power.

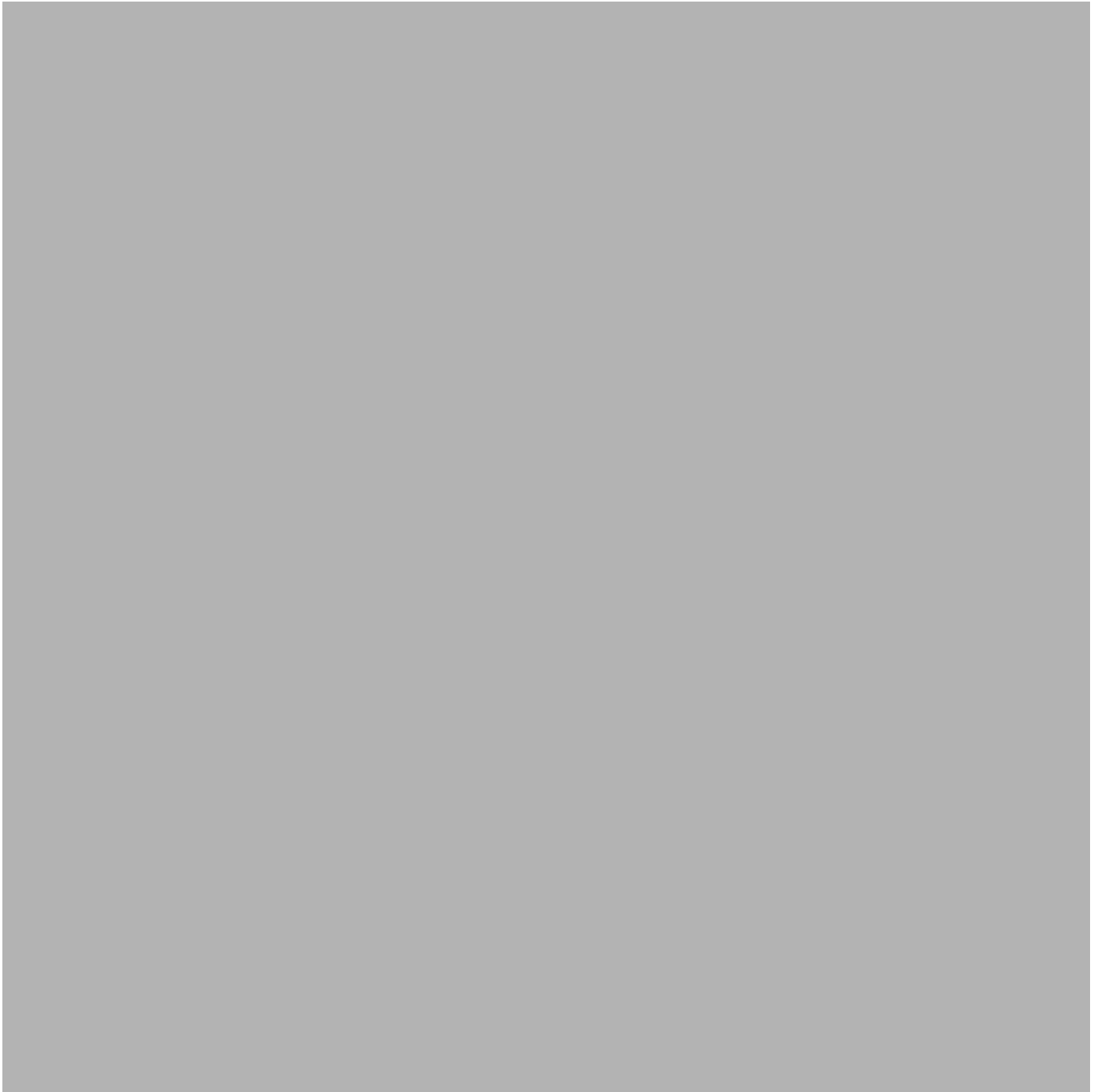
Genesis Energy Limited owns New Zealand's largest power plant, the Huntly complex.

The four-unit coal-fired Huntly Steam Power Plant began operating in the first half of the 1980s.

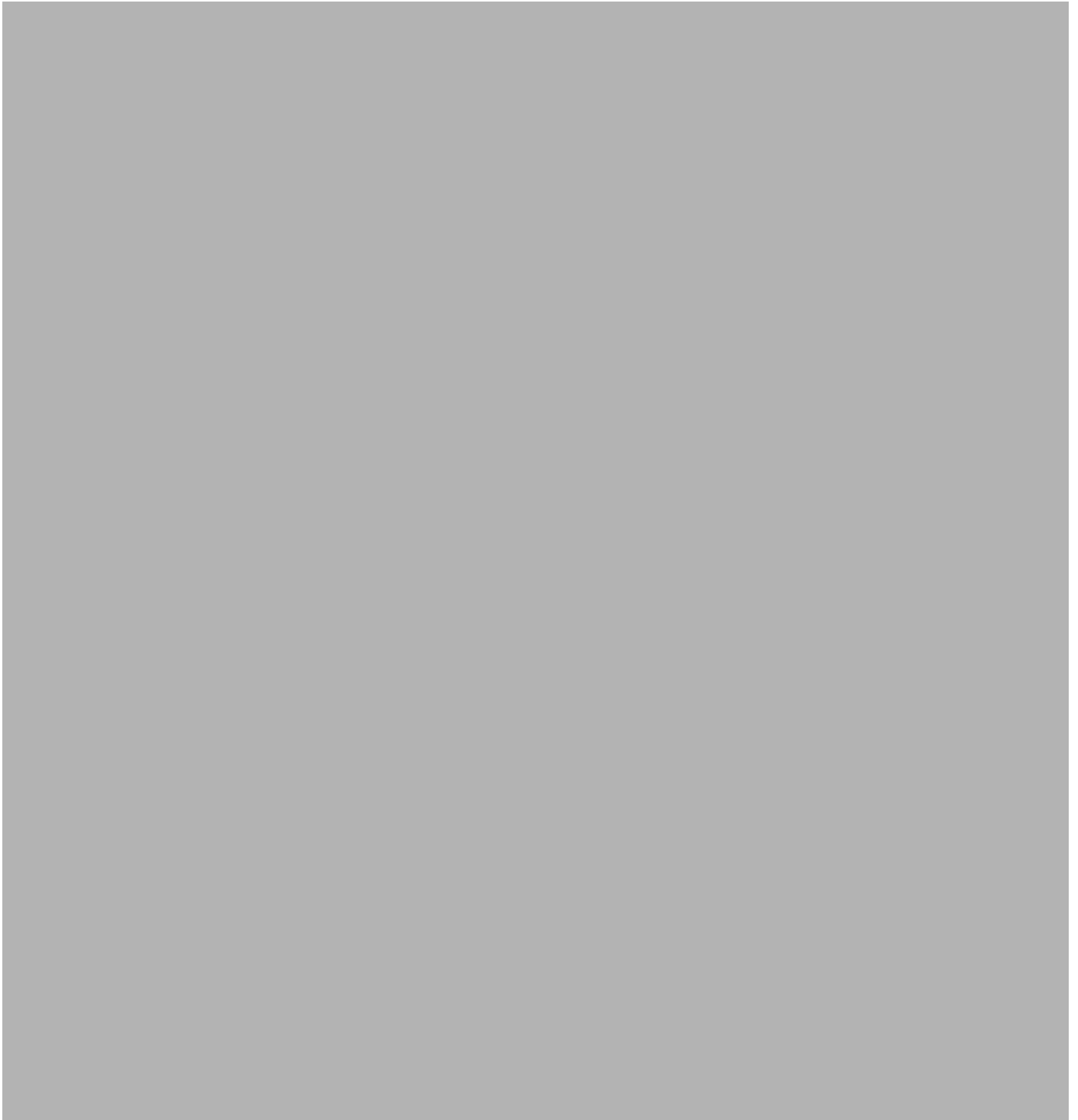
Two units, each with 250 MW, are currently operating and a third has been temporarily closed down, while a fourth has been retired.

These units can also run on natural gas.

Adapted from: <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/new-zealand-aims-for-100-renewables-portfolio-by-2030-69423542>

**RESOURCE 5A**

Adapted from: [www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/new-zealand-aims-for-100-renewables-portfolio-by-2030-69423542](http://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/new-zealand-aims-for-100-renewables-portfolio-by-2030-69423542)

**RESOURCE 5B**

Adapted from: [www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/new-zealand-aims-for-100-renewables-portfolio-by-2030-69423542](https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/new-zealand-aims-for-100-renewables-portfolio-by-2030-69423542)



## RESOURCE 6

### Electricity Primary Fuel Emissions

All types of electricity generation, including renewables, have some environmental impact such as greenhouse gas emissions associated with the construction, operation, distribution and transmission of renewable electricity.

However, what is not so impressive is that over 5 billion kilograms of CO<sub>2</sub> is still emitted from electricity generation in New Zealand each year.

The graph below shows the total emissions from the primary fuel source of thermal generation from coal, gas, geothermal (the form of energy conversion in which heat energy from within the Earth is captured and used), and CoGen (a very efficient technology to generate electricity and heat simultaneously).



Adapted from: <https://ecotricity.co.nz/the-truth-behind-new-zealand-s-electricity-emissions>



Source: Ministry for the Environment and EnergyLink (November 2017 electricity)





