



ANNUAL RESIDUAL SUPPLY MIX (RSM)

For Aotearoa New Zealand

PY24 (1 April 2023 to 31 March 2024)

Published June 2024

CONTENTS

Words from the CEO.....	1
Explaining the Residual Supply Mix for electricity certification.....	2
PY24 Annual Residual Supply Mix.....	2
TABLE 1: ANNUAL RESIDUAL SUPPLY MIX RESULTS.....	3
FIGURE 1: ANNUAL RESIDUAL SUPPLY FACTOR.....	4
NZECS Composition.....	4
FIGURE 2: BRAVETRACE NETWORK GROWTH.....	5
Certification Trends.....	5
TABLE 2: CERTIFICATION GENERATION FUEL MIX.....	5
FIGURE 3: CERTIFICATE GENERATION FUEL MIX.....	6
Multiple sources of generation and emissions data.....	6
Monthly Residual Supply Mix.....	7
FIGURE 4: MONTHLY RESIDUAL SUPPLY FACTOR.....	8
TABLE 3: MONTHLY RESIDUAL SUPPLY FACTOR.....	8
Monthly RSM – calculation methodology.....	9

Words from the CEO

Shaun Goldsbury

BraveTrace, Chief Executive Officer



We are excited to announce significant growth in the volume of New Zealand Energy Certificates (NZ-ECs) traded this year, with redeemed volumes up 41% on the previous year!

We had 1.78 million certificates redeemed on our system during PY24, up from 1.26 million in PY23. The growth was largely driven by the registration of 10 new renewable production devices, mainly from new wind and solar generation. Wind and solar combined now make up nearly 20% of our total certificate volumes. The number of energy users in the BraveTrace network has also grown to 307, up from 212 last year. It is great to see the increasing number of energy users realising the value of redeeming certificates to reduce their scope 2 emissions and support renewable generation here in Aotearoa New Zealand.

Not only does an increase in certification volumes support the energy transition by enabling new renewable generation possibilities, it also increases the carbon intensity of emissions factors for non-certifying organisations. In practical terms, the growth in certification volumes has continued to widen the gap between the National Supply Mix (NSM) and the Residual Supply Mix (RSM). We now see a more carbon intensive RSM, which is 4.46% higher than the NSM. The gap between the two has widened from 3.14% the previous year. As these figures continue to diverge, non-certifying organisations face higher reported scope 2 emissions.

BraveTrace welcomes all compliant certification into the RSM calculations in order to further increase the gap between the RSM and NSM. We are actively working to bring other users into the calculation to further incentivise renewable energy procurement.

We'd like to thank the whole BraveTrace network for working with us towards our shared purpose of accelerating the renewable energy transition.

Residual Supply Mix for electricity certification

At BraveTrace, we strive to increase public understanding of the attributes and characteristics of energy purchased and consumed in New Zealand.

To this end, we ensure that energy purchases tracked through our system are not also claimed by non-participating energy users. The mechanism by which we do this is called the Residual Supply Mix, or RSM.

The RSM describes the nature of the electricity received by energy consumers who do not purchase NZ-ECs directly from suppliers. It is a key part of how greenhouse gas emissions are accounted for in New Zealand. It is important that all explicit transfers of energy attributes are tracked on the RSM to ensure no double-counting occurs. BraveTrace seeks to include all contractual market-based instruments into the RSM so that non-certifying parties face more carbon intensive emissions factors.

Parties wishing to report on the emissions intensity of consumed electricity can now rely on either the RSM, or the specific information contained within NZ-ECs provided to them by their supplier. These are both market-based emissions factors, in line with requirements for dual reporting as laid out by the [Greenhouse Gas Protocol](#).

It is important to utilise the Residual Supply Factor (RSF), in order to recognise the growing amount of explicit energy attribute purchase taking place in the New Zealand electricity market.

PY24 Annual Residual Supply Mix

The annual RSM has now been calculated for PY24 (1 April 2023 to 31 March 2024). This was the fifth year in which NZ-ECs were transacted in New Zealand, and the difference of the RSM from the National Supply Mix (NSM) continues to grow in line with growth in the number of transacted NZ-ECs. The table below compares the RSM figures between the Production Years 2019/20 – 2023/24.

TABLE 1: ANNUAL RESIDUAL SUPPLY MIX RESULTS

NZECs PRODUCTION YEAR	2019/20	2020/21	2021/22	2022/23	2023/24
National electricity generated (MWh)	42,273,518	41,490,913	41,881,730	41,519,448	41,862,459
Total volume NZ-ECs transacted	51,577	228,741	734,700	1,265,475	1,785,921
National Supply Factor (kg co2-e/MWh)	99.16	124.00	108.83	67.50	74.63
Residual Supply Factor (kg co2-e/MWh)	99.28	124.69	110.77	69.62	77.95
Difference (%)	0.12%	0.56%	1.77%	3.14%	4.46%

National Supply Mix (NSM): the total mix of electricity generation supplying New Zealand's domestic demand.

National Supply Factor (NSF): the emissions factor of the National Supply Mix.

Residual Supply Mix (RSM): the mix of electricity generation minus the volume of NZ-ECs redeemed.

Residual supply Factor (RSF): the emissions factor of the Residual Supply Mix.

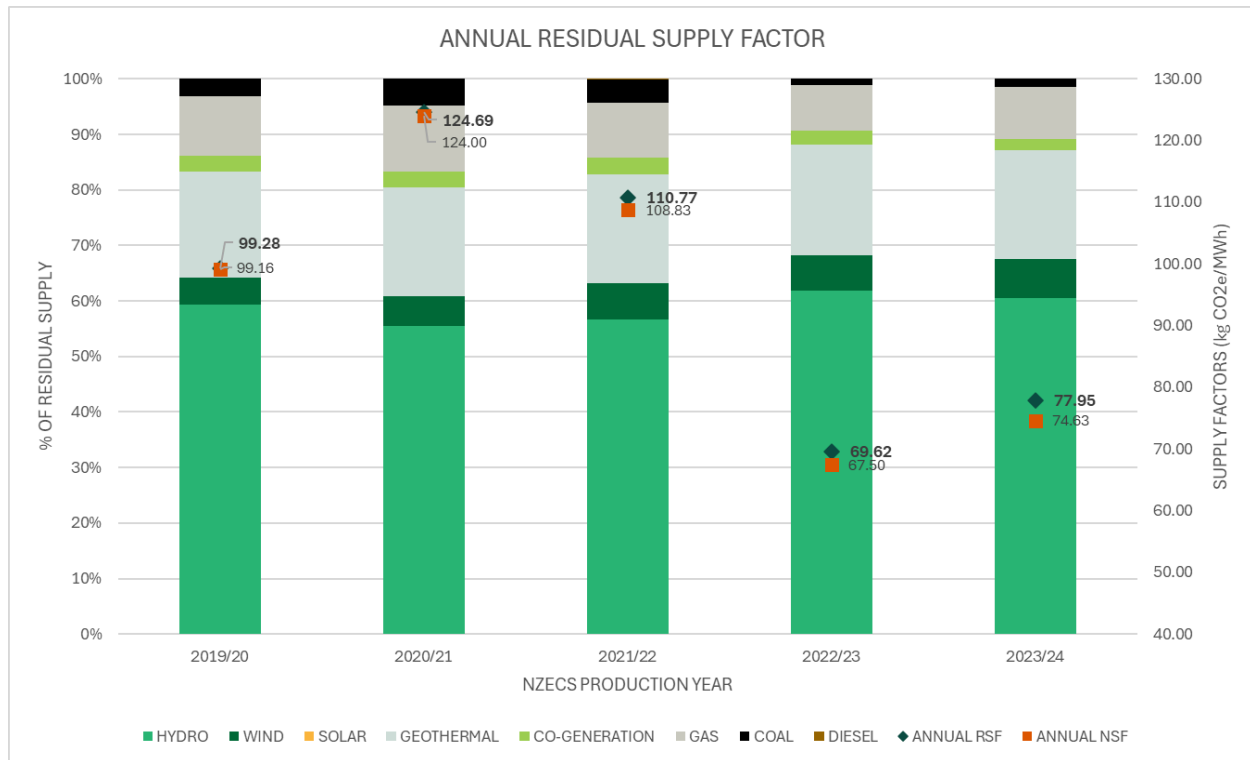
Electricity emissions for the PY24, although higher than last year, are still down significantly from previous years with a National Supply Factor (NSF) of 74.63 kg/MWh. Strong renewable generation has helped to keep the carbon intensity of the system down compared to previous years. The NSF should be used as a location-based emissions factor, as part of dual reporting requirements.

NZ-EC's increased in popularity again in PY24, resulting in a Residual Supply Factor (RSF) that is 4.46% more carbon intensive than the NSF (up from 3.14% last year), to 77.95 kg co2-e/MWh. The RSF should be used as the market-based emissions factor, as part of dual reporting, and reflects the emissions associated with grid-supplied electricity minus the volume of NZ-ECs redeemed.

PY24 also saw a slight increase in the national electricity generation. This appears to be an increase in demand partly driven by increased irrigation and electrification.

The graph below shows electricity generation by type for each of the last five Production Years.

FIGURE 1: ANNUAL RESIDUAL SUPPLY FACTOR



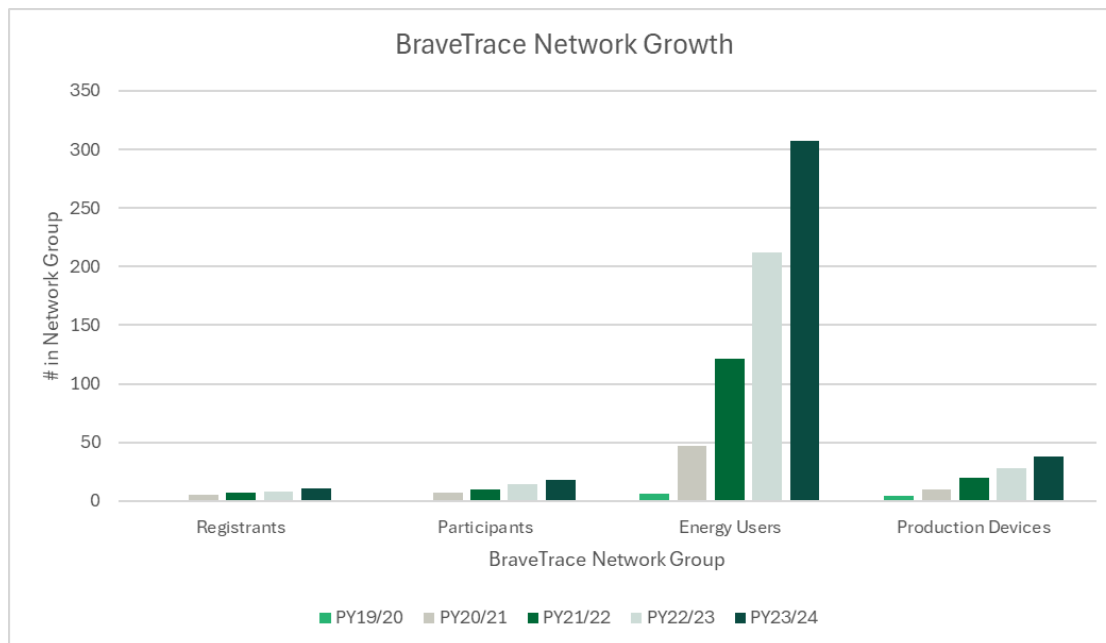
*Co-generation is an energy efficient technology in which heat and electricity are by-products of the process. However, its primary functionality is not to produce electricity. Thermal generation uses heat produced by burning coal, diesel or natural gas as fuel to produce electricity. Cogeneration is a subset of thermal generation.

NZECs Composition

The underlying driver for the increasing divergence of the RSM from the NSM is the continual growth of the BraveTrace Network. The divergence is shown in Figure 1 above as the increasing difference between the Annual RSF ◆ and the Annual NSF ■.

Each year we have seen an increase in each Network group: Participants, Energy Users, Registrants and their Production Devices. The growth in Energy Users is significant as it shows an increased awareness and desire of Energy Users to reduce their emissions and use energy sustainably. Energy Users can use NZ-ECs to meet leading international best practice, corporate goals, value chain responsibility or mandatory climate-related disclosures, or to simply strive to make a difference. To learn more about our BraveTrace Network, [click here](#). If you want to become a part of our Network, you can email us at enquiries@bravetrace.co.nz

FIGURE 2: BRAVETRACE NETWORK GROWTH



Certification Trends

TABLE 2: CERTIFICATION GENERATION FUEL MIX

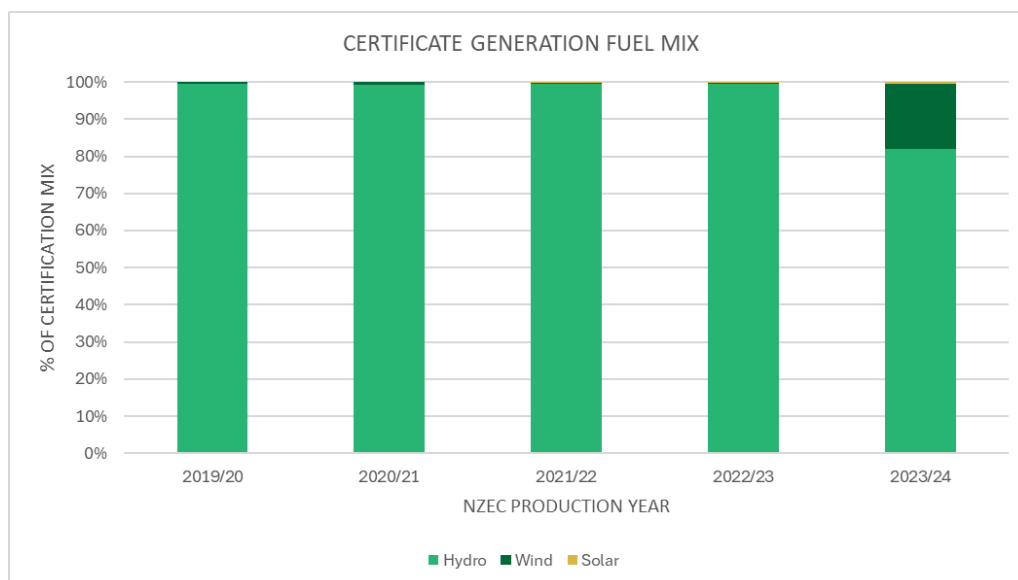
NZECs PRODUCTION YEAR	2019/20	2020/21	2021/22	2022/23	2023/24
Hydro	51,295	227,046	730,580	1,258,465	1,462,297
Wind	282	1,448	2,048	4,570	314,318
Solar	0	247	2,072	2,440	9,306
Total	51,577	228,741	734,700	1,265,475	1,785,921

In PY24 we've seen a significant increase in supply and demand for Wind and Solar NZ-ECs. For the first four years of the NZECS, 99% of the NZ-ECs redeemed were issued from Hydro generation. In the latest year, Hydro has dropped to just under 82%, with Wind soaring to almost 18%, and Solar reaching to just over 0.5%.

The change in generation mix is largely due to more Wind and Solar Production Devices being registered in the NZECS, as well as an increased interest in devices that meet the RE100's technical criteria of fifteen year commissioning or re-powering date limit.

Hydro and older Wind Production Devices will remain an option for NZ-ECs for PY25 (1 April 2024 to 31 March 2025). They remain an important base for the renewable energy makeup of New Zealand, and therefore support towards them still holds considerable value. Energy Users that specifically want to adhere to newer generation and RE100 are easily able to do so through the NZECS, through communication with their Participant to source NZ-ECs from devices that meet their requirements.

FIGURE 3: CERTIFICATE GENERATION FUEL MIX



Multiple sources of generation and emissions data

The NZECS provides a source of emissions information that is adjusted for all market-based claims, however we recognise the existence of other sources of similar data. Both Transpower and MBIE publish information on grid generation and emissions, and MfE provides emissions factors for grid-supplied electricity.

In 2022, BraveTrace (previously Certified Energy) performed an initial evaluation of different data sources and their variance, published below. Initial conclusions are that while there are some variances, the primary source of variance is availability of information, with behind-the-meter generation and consumption contained within MBIE data-sets.

[Variance note](#) – 2021/22 Production Year (published June 2022)

Monthly Residual Supply Mix

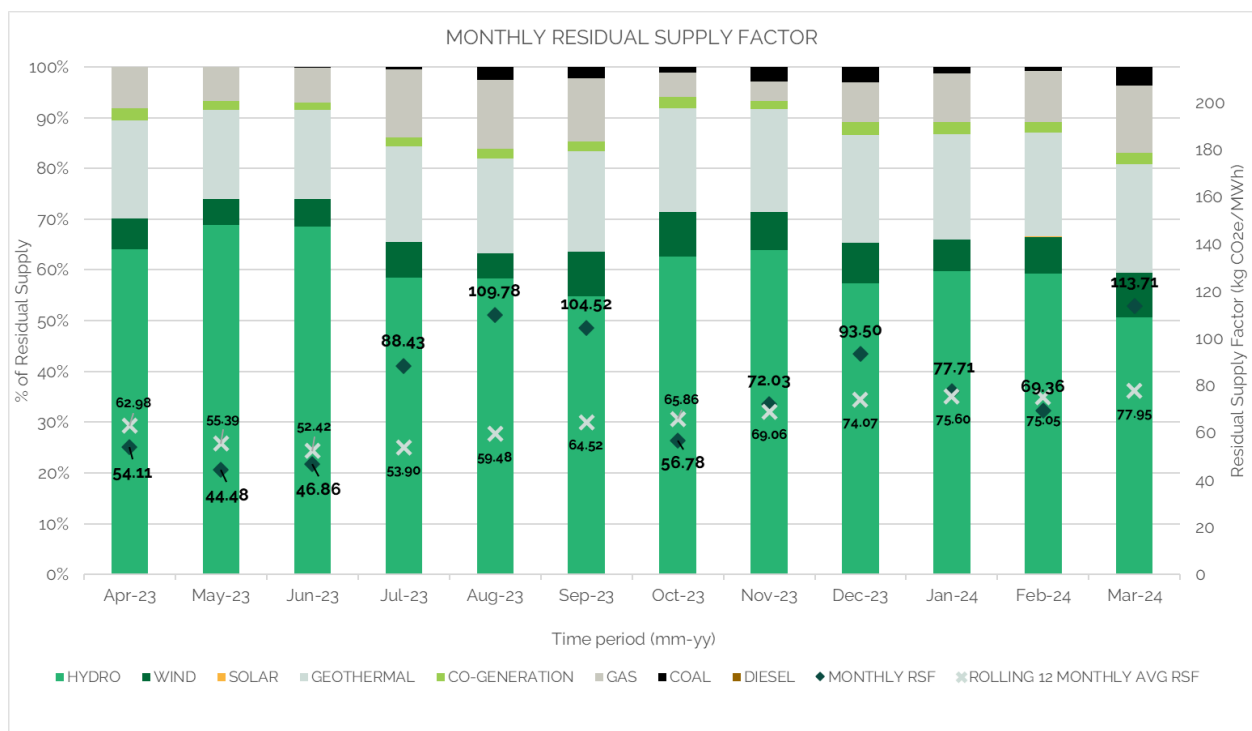
In addition to the annual RSM calculation shown above, BraveTrace has trialled the development and publication of a monthly RSM throughout all the Production Years. These monthly figures have now been updated with final end of year NZ-EC transaction volumes for months within previous production years. Monthly figures within PY25 (1 April 2024 – 31 March 2025) are subject to change and will be finalised at the end of the production year.

The interactive chart below shows the RSM for each month starting from 1 April 2020. This chart will be updated each month with the RSM data of the preceding month.

Further development of Residual Supply Mix data is planned, and feedback from stakeholders and system users is welcomed.

Read a [blog](#) article on the intent behind the monthly RSM.

FIGURE 4: MONTHLY RESIDUAL SUPPLY FACTOR



*Rolling 12 month average values are inclusive of the month of display.

TABLE 3: MONTHLY RESIDUAL SUPPLY FACTOR

TIME PERIOD	MONTHLY RSF (kg CO ₂ e/MWh)	ROLLING 12 MONTHLY AVG RSF (kg CO ₂ e/MWh)
Apr-23	54.11	62.98
May-23	44.48	55.39
Jun-23	46.86	52.42
Jul-23	88.43	53.90
Aug-23	109.78	59.48
Sep-23	104.52	64.52
Oct-23	56.78	65.86
Nov-23	72.03	69.06
Dec-23	93.50	74.07
Jan-24	77.71	75.60
Feb-24	69.36	75.05
Mar-24	113.71	77.95

Monthly RSM – calculation methodology

The Monthly RSM is calculated using the same basic approach as the annual RSM – building up a model of supply by adding up generation and emissions data from each of the generation facilities in New Zealand, and adjusting for the volume of NZ-ECs redeemed within that month.

The method is highly transparent, and easy to improve over time, as we will seek to improve individual assumptions in order to improve the accuracy of the output figures.

The calculation of the underlying National Supply Mix is performed by EnergyLink to our specifications, and incorporates transaction data produced and held within the NZECS Registry. For this reason, these national supply factors will vary slightly from numbers produced by the Ministry of Business, Innovation and Employment (MBIE), due to differences in underlying inputs and assumptions.

A description of the methodology taken is provided here: [NZECS Residual Supply Mix methodology](#) – approach review and detail (Prepared Dec 2019, current for 2021/22 calculation). This document also discusses potential approaches to improving the RSM methodology.



Additionally, further information can be found within the [RSM technical note](#).

To learn more about BraveTrace, [click here](#). If you have any questions or want to join the BraveTrace Network, you can email us at enquiries@bravetrace.co.nz.