

# Technical Note:

## Residual Supply Mix (RSM) for electricity

### Introduction

BraveTrace has, as one of its core objectives, the goal of increasing information and understanding around the way electricity is generated and used in New Zealand. A critically important part of this objective is ensuring that all electricity production attributes are properly accounted for, and that the consumption of all energy users has the correct emissions factor attributed to it.

This consumption emissions factor will become an increasingly big part of the decision to use, or not use, grid-supplied electricity. It is a key input into many investment decisions, so it is important that these emissions factors are accurate, and that all emissions are recognised across the national energy system.

As more and more parties partake in active renewable energy purchasing<sup>1</sup> to reduce their operational emissions, the risk increases that premium, low-carbon energy production is double-counted in the determination of consumption emissions factors. Double-counting in this way underestimates the volume of energy from thermal generation, and reduces the incentive for energy users to make behavioural changes or financial investments that would further reduce emissions.

To this end, it is important that we make sure that generation attributes explicitly bought and sold are not also included in any emissions factors for grid-supplied electricity. The only mechanism that currently exists that can make sure this happens is the BraveTrace Residual Supply Mix, or RSM.

The RSM describes the nature of the electricity used by energy consumers who do not purchase attributes directly, either through purchase of New Zealand Energy Certificates

---

<sup>1</sup> Renewable energy purchasing, via NZECS certificate or other means, revolves around the explicit purchase of generation attributes, assigning these attributes to the usage of a particular energy consumer.

(NZ-ECs) or otherwise and is a key part of how greenhouse gas emissions are accounted for in Aotearoa New Zealand.

In addition to publishing an annual RSM, BraveTrace is now trialling the publication of a monthly RSM, to improve the accuracy of market-based reporting for those parties not explicitly purchasing energy attributes.

## **The RSM and greenhouse gas reporting**

Reporting standards refer to two methods for reporting the greenhouse gas emissions of consumed electricity – the location-based and market-based.

### **1) Location-based emissions calculation method**

A location-based method reflects the average emissions intensity of grids on which energy consumption occurs (using mostly grid-average emission factor data).

The location-based emissions factor can be provided by:

- National Supply Factor (NSF): the emissions factor of the National Supply Mix – the total mix of electricity generation supplying New Zealand's domestic demand, provided by the NZECS.
- The grid-average emissions factor, provided by the Ministry for the Environment.

### **2) Market-based emissions calculation method**

A market-based method derives emission factors from contractual instruments. These include any type of contract between two parties for the sale and purchase of energy bundled with attributes about the energy generation, or for unbundled attribute claims.

For those not explicitly purchasing attributes via contractual instrument, the only market-based emissions factor available in New Zealand is the Residual Supply Factor, the emissions factor of the Residual Supply Mix, as provided by BraveTrace.

BraveTrace publishes the RSM, adjusting the calculation of the NSM/NSF to account for known attribute transfers. For more detail, see the NZECS RSM methodology document.<sup>2</sup>

---

<sup>2</sup> [https://www.certifiedenergy.co.nz/files/ugd/971926\\_865f0d93466d467ba500bc9142a00905.pdf](https://www.certifiedenergy.co.nz/files/ugd/971926_865f0d93466d467ba500bc9142a00905.pdf)

The official RSM/RSF is currently published based on the production year, which runs from April 1 to March 31, intended to match the New Zealand company and personal financial year. The trial of the monthly RSM/RSF is also now underway, to improve the accuracy of market-based reporting for parties.

## Monthly RSM

The trial of monthly RSM values is designed to provide emissions factors that are more recently available, and therefore more closely reflect the make-up of electricity generated in that period.

Use of the Monthly RSM values by a reporting entity will ensure that they are taking ownership for emissions more closely aligned to their actual contribution than otherwise. Finally, there is the potential for monthly RSM values to provide greater incentive for beneficial behaviour change, as they will assign higher emissions values to consumption that took place in periods of higher emissions intensity.

The second purpose for trialling a monthly RSM is to understand challenges in acquiring accurate and complete data in a timely fashion. For the purposes of creating the monthly RSM, we recognise that the volumes redeemed in many cases will be based on preliminary consumption volumes, and as such will be subject to change over time.

## FAQs

### **1) Why are there differences between NSM/NSF figures published by BraveTrace and MFE?**

The difference between the BraveTrace NSM/NSF and that published by the Ministry for the Environment will be due to differing assumptions. These include plant heat rates, fuel ratios for dual fuel plants, differing data sources and varied publishing periods.

For these reasons, we would expect some minor variance between our published NSM/NSF figures and those published by MFE.

The RSF will always be higher than the NSF, with the difference between the two based on the increasing levels of explicit attribute purchase. Factors such as increased use of fossil fuels will affect the NSF, wherever it is published, and therefore also the RSF.

## **2) What is the carbon accounting significance of the RSM?**

According to the GHG Protocol Scope 2 Guidance<sup>3</sup>, *“companies with any operations in markets providing product or supplier-specific data in the form of contractual instruments shall report scope 2 emissions in two ways and label each result according to the method: one based on the location-based method, and one based on the market-based method. This is also termed “dual reporting.”*

Dual reporting looks at what is going on at a country level (termed location-based) and what an organisation is doing voluntarily through contractual instruments such as NZ-ECs (market-based).

In addition, the GHG Protocol Scope 2 Guidance has several quality criteria that are required to use any contractual instrument in the market-based method. One of these requires that *“an adjusted, residual mix characterizing the GHG intensity of unclaimed or publicly shared electricity shall be made available for consumer scope 2 calculations, or its absence shall be disclosed by the reporting entity.”*

Both NZ-ECs and the RSM are compliant market-based reporting methods. While contractual instruments such as NZ-ECs reflect individual corporate choice for renewable energy, the RSM reflects the overall market choice. The existence of an up-to-date RSM will improve the accuracy of the emissions allocation within the New Zealand market.

The guidance also states that *“companies shall use the most accurate and appropriate emission factors listed in the emission factor hierarchy for each method.”*

## **3) Are all energy attribute purchases recorded on the NZECS registry?**

There are some PPAs that are currently not registered within the NZECS, therefore cannot be accounted for within the RSM. This raises questions around double

---

<sup>3</sup> [https://ghgprotocol.org/scope\\_2\\_guidance](https://ghgprotocol.org/scope_2_guidance)

counting, and therefore ownership claims, of these renewable attributes as there has been no subsequent removal from the emissions factor claimed by others in their emissions inventories.

The GHG Protocol Scope 2 Guidance requires the use of the RSM for market-based reporting. Additionally, the RE100 Technical Criteria<sup>4</sup> states the following:

*“At a minimum, RE100 defines renewable electricity consumption as the ability to make unique claims on the use of renewable electricity generation and its attributes. RE100 members must be able to demonstrate that they have an exclusive claim to use of unique renewable electricity generation to meet all its reported renewable electricity usage. Typically, this means ownership of the generation attributes (e.g. energy attribute certificates [EAC]) associated with the generation.”*

#### **4) What is not included in the RSM calculation?**

- Residential roof-top solar
- Some PPA's
- For more detail on what's not included in the monthly RSM, review the NZECS RSM methodology document.<sup>5</sup>

#### **5) Why would the monthly RSM figures change?**

On publication of each monthly RSM, the previous monthly RSM values get re-calculated and can sometimes change slightly. Currently, this is captured by maintaining a previous version of monthly figures within the spreadsheet underlying the dashboard. The dashboard reflects the most recent and accurate values.

Reasons for changing monthly RSM values include:

- Addition of new generation
- Redemption of NZ-ECs for newly registered Energy Users
- Redemption of NZ-ECs for the actual consumption volume of an Energy User
- Process error

---

<sup>4</sup> [https://www.there100.org/sites/re100/files/2021-04/RE100%20Technical%20Criteria%20\\_March%202021.pdf](https://www.there100.org/sites/re100/files/2021-04/RE100%20Technical%20Criteria%20_March%202021.pdf)

<sup>5</sup> [https://www.certifiedenergy.co.nz/files/ugd/971926\\_865f0d93466d467ba500bc9142a00905.pdf](https://www.certifiedenergy.co.nz/files/ugd/971926_865f0d93466d467ba500bc9142a00905.pdf)



While the underlying data does change as new data becomes available, the values are not intended to be 'true' values, rather an 'indication' of renewable certification and will improve over time.