Retail Load - Issues Paper

Introduction

The purpose of this paper is to facilitate discussions with Jurisdictions and the Technical Working Group (TWG) on the detailed design elements for the calculation of retail load. Following the SCO Reference Group and TWG meetings, a more detailed technical working paper will be developed. The technical working papers and draft final design document will be available for public consultation in mid-June.

High level design

The high level design document outlines the proposed approach to determine a retailer's load based on:

- Wholesale purchases from AEMO, plus
- Non-market embedded generation and behind the meter generation e.g. rooftop solar PV.
- If the Commonwealth Government decides to exempt EITE activities that load will be deducted from the retailer's load at the specified intensity.
- Load associated with voluntary green programs such as GreenPower will need to be reported so that additional allocations can be made by the retailer in the registry.

Detailed design elements for TWG input

TWG input is sought on a number of elements that will add detail to the high level design:

1. Specification of wholesale purchases and treatment of losses.
2. Treatment of non-market embedded generation.
3. Estimation of rooftop solar PV.
4. Treatment of batteries.
5. Metering data revisions.
6. Alignment of NGERS and generation volumes.
7. GreenPower and related schemes.

Issues for consultation

1. Specification of wholesale purchases and treatment of losses

AEMO calculates a retailer's wholesale pool purchases on the following basis:

$$\text{Pool Purchases} = \text{Metered Energy} * \text{DLF} * \text{TLF} * \text{RRP}$$

Where,

DLF = Distribution Loss Factor

TLF = Intra-regional Transmission Loss Factor (also known as Marginal Loss Factor (MLF))

RRP = Regional Reference or Pool Price

AEMO's settlements statements specify wholesale load as Metered Energy * DLF and then apply the TLF adjusted price (TLF * RRP) to calculate the total pool purchases. This definition of wholesale load excludes transmission losses and is sometimes referred to as **Energy at the TNI** (Transmission Node Identifier). A retailer's obligation under the RET schemes is determined on this basis.

Another definition of load that is widely used is **Energy at the Node** which is calculated as Metered Energy * DLF * TLF. This definition of load is used by participants to manage their exposure to pool prices and to determine the volume of contracts required for hedging purposes.

Although the RET scheme places the compliance obligation on a retailer's energy at the TNI there is an argument that the emissions obligation of the Guarantee should use a different definition, namely energy at the node. The reason for this is that the Guarantee aims to have all generation volumes and their associated emissions be fully assigned to retailers i.e. the emissions registry should be fully cleared with no unallocated volumes.

To the extent that there are differences between total generation volumes and total retail volumes this needs to be resolved through scaling of loads so they match. Clearly, it is desirable to minimise the degree of scaling so that participants have greater certainty of the positions and obligations they are managing throughout the year.

The use of energy at the node minimises the difference between generation volumes (defined as Metered /Sent Out Generation * MLF) and retail volumes. There will still be a small residual difference due to differences between static and actual loss factors and metering errors which will require a scaling of retail volumes so they match generation volumes.

Questions for the TWG:

- Which definition of wholesale purchases and which treatment of losses is most appropriate for the Guarantee - energy at the TNI or energy at the Node?
- How should differences between generation volumes and retail volumes be addressed?

2. Treatment of non-market embedded generation

A non-market embedded generator is a generator whose entire output is purchased by a local retailer or customer at its connection point and consequently is not settled through the Pool. Instead the impact of embedded generation is to reduce the pool purchases of a retailer or market customer.

Given that some forms of embedded generation create emissions whilst renewable embedded generation may allow a retailer to reduce emissions it is logical to incorporate embedded generation into the design of the Guarantee.

Local retailers already have arrangements with embedded generators to purchase their energy and have access to their metering data. However, this information is not currently available to AEMO so consideration needs to be given to how embedded generation can be incorporated into the design whilst preserving its verifiability and ensuring the balancing of volumes.

Under the RET scheme embedded generation volumes are independently verified at the time of compliance and added to a retailers' pool purchases to determine its liability. In concept, a similar approach can be adopted for determination of a retailer's emissions intensity with added complexity since emissions associated with embedded generator output would need to be determined.

Once approach could involve:

- Each embedded generator would need its emissions to be determined preferably through the NGERS process.

- At the time of compliance a retailer would calculate the metered energy for each of its embedded generators grossed up to the TNI or node by the relevant loss factors.
- The metered amounts would be subject to independent verification.
- A retailer's total wholesale purchases and total emissions from the registry would be adjusted by the amount of embedded generation emissions and volumes to determine its overall emissions intensity.

Questions for the TWG:

- How should non-market embedded generation be included in the Guarantee emissions mechanism?
- How should its metering data and emissions be verified?
- Should embedded generation meter readings be sent to AEMO?
- Should embedded generation be incorporated into the emissions registry process or handled separately at the time of compliance?

3. Estimation of rooftop solar PV

As for other forms of low-emissions embedded generation, the inclusion of rooftop PV would offer retailers an additional way to reduce the emissions intensity of their customer load.

Rooftop PV is encouraged through the Small-Scale Renewable Energy Scheme (SRES), which provides up-front support (unlike the Large Scale Renewable Energy Target, when certificates are created over time).

Unlike most other forms of embedded generation, rooftop PV generation is not directly measured and would need to be estimated. Whilst meters are capable of measuring both the imports of energy from the grid (E channel) and the exports to the grid (B channel) these are first subject to netting of solar generation against consumption. Although solar feed in tariffs are applied to the B channel exports these amounts have already been reduced by netting against consumption and so only represent a proportion of the solar generation at the property.

The RET scheme relies on a retailer to estimate its solar generation in determining its liability and this is subject to independent audit. Given that rooftop solar PV is already the largest generator in the NEM and is projected to continue to grow there may be an argument for a more prescriptive approach which could include consideration of new metering arrangements (e.g. gross metering) or an agreed and standardised methodology (a deemed generation approach, for example, based on sampling of meters).

As with the inclusion of embedded generation it would seem to be most feasible to add rooftop solar PV onto the emissions intensity calculation at the time of compliance.

Questions for the TWG:

- How should rooftop solar PV be included in the Guarantee emissions mechanism?
- How should it be estimated or measured and what audit/verification is required?
- Should rooftop solar PV be incorporated into the emissions registry process or handled separately at the time of compliance?

4. Treatment of batteries

Whilst batteries are a relatively new feature of the NEM they present some emerging challenges to the way that we think about consumption and generation. From an emissions point of view a battery (or a pumped storage facility) is a source of net consumption due to losses incurred in charging/discharging (or energy consumed in pumping). Hence, it would seem appropriate that only emissions associated with net consumption should be subject to the obligation.

For a grid-scale battery or pumped storage facility this means that the emissions registry should allow for the netting of generation against load such that only the net load is considered for compliance purposes in the scheme.

For small-scale behind the meter batteries the current netting arrangements already leads to the right outcome such that the net of charging and discharging adds to consumption. However, the challenge will be in separating out the solar generation if a battery is installed. With the current net metering arrangements in place the focus will need to be on peeling off the solar consumption leaving the net battery consumption as part of the overall household consumption.

Questions for the TWG:

- How should grid-scale batteries be treated in the emissions registry?
- How should net battery consumption at a household level be measured if at all?
- What changes might be required to the estimation of solar generation if batteries are also present behind the meter?

5. Metering data revisions

A retailer's metering data is subject to 20 and 30 week revisions to allow for quarterly read basic meter readings to be incorporated into a retailer's pool purchases. Depending on when compliance is assessed this may mean that the retailer's pool purchases continue to change after the emissions intensity has been calculated.

The RET scheme faces this issue as compliance is assessed in February. The RET addresses the issue by incorporating revisions from the previous compliance year into the current compliance year's assessment of volumes.

However, there is an additional challenge in the Guarantee which aims for all generation volumes to be allocated to retail volumes in the current year. Hence, there may be an argument for the Guarantee to have a later compliance date to allow more revisions to flow through and to allow NGERS emissions data to be available.

Questions for the TWG:

- How should metering revisions be addressed?
- Does the revisions cycle affect the date at which compliance is assessed?

6. Alignment of NGERS and generation volumes

NGERS is the source of authoritative data on scope 1 generation emissions and is a key input into the Guarantee emissions obligation. However, there are some differences and gaps with what is required to manage the Guarantee emissions scheme. Specifically these are:

- Generation volumes recorded in NGERS are “as generated” i.e. before in-station load. The Guarantee is likely to use a different definition of volumes which means that calculated generation intensities will be higher which may lead to confusion. Inclusion of the Guarantee definition of volumes in NGERS reporting would address this.
- The coverage of NGERS needs to be extended so that all generators and embedded generators are individually reported. Some large market generators like Yarwun and Longford are not reported separately in NGERS.

Questions for the TWG:

- What changes can be made to NGERS reporting requirements to simplify the operation of the Guarantee?

7. GreenPower and related schemes

The GreenPower scheme provides an accreditation and reporting mechanism that allows consumers to contribute to investment in renewable generation which is *in addition* to the regulatory requirements imposed on retailers e.g. a 100% accredited GreenPower scheme requires that one LGC (Large-scale Generating Certificate) is surrendered for each MWh of retail load consumed in addition to the mandated renewable power percentage.

As the RET winds downs towards 2030 the Guarantee emissions scheme should allow for GreenPower (and other similar and voluntary schemes) to make an *additional* contribution to lower emissions. This would require:

- Certification of GreenPower and voluntary products e.g. a zero emissions product or a defined low emissions intensity product.
- Verification of metered load provided under each of the certified products.
- An explicit assignment by the retailer of the required emissions intensity generation to match the certified products e.g. an allocation of wind generation to meet a zero emissions product.

Mechanically this could be achieved post the registry assignment process i.e. once a retailer has assigned all of its generation volumes to all of its retails volumes it would then carve out the portion of its load that has the GreenPower obligation and fully assign the required generation against that load. This would then be excluded from determination of the retailer’s overall emissions intensity to meet the Guarantee obligation. This would have the effect of quarantining the low emissions generation and would raise the overall average intensity for the balance of the retailer’s load.

Questions for the TWG:

- How should GreenPower and other related schemes be incorporated into the emissions scheme?

Interdependencies with other elements of the Guarantee

- Definition of volumes – impacts design of Emissions Registry.
- Potential changes to NGERS required to make Guarantee more workable.