Submission on
AEMC Draft Rule Determination
for
Real-time Data for Consumers

National Electricity Amendment (Real-time data for consumers) Rule 2025
National Energy Retail Amendment (Real-time data for consumers) Rule 2025

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Abstract

The author is broadly supportive of the draft rule determination on real-time data for consumers and emphasises the need and timeliness of universal availability of local real-time for NEM customers to support the renewable energy transition.

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1 Introduction

We would like to thank the Australian Energy Market Commission for the opportunity to make this submission on the "AEMC, Real-time data for Consumers, Draft rule determination, 11 September 2025' (DRD). The author would also like to thank Energy Consumers Australia for proposing this important rule change which will shape the NEM well beyond the renewable energy transition.

This submission has been produced from the point of view of a home owner who has installed, or is looking to install, a new solar, home battery and EV charging and V2H/V2G . This is seen as an investment in energy self sufficiency, set against the rising cost of energy from the electricity grid, and the drop in price of solar panels, home batteries and EVs.

The author looked at what real-time data features of a smart meter would be desirable to have for a NEM retail customer who wants to make the most of their CER; meeting there own requirements (self consumption, zero export, time-of-use tariffs, responding to wholesale pricing) and meeting the requirements from the NEM jurisdictions (Load Shedding, Solar Backstop, Flexible Exports, VPP Integration), and be able to independently determine and verify their NEM electrical energy bill.

In the following discussions, the term "customer" is used and should be considered equivalent to "consumer" but with the understanding that a retail customer with CER of the NEM can be both a consumer and producer of electrical energy.

2 Comments on DRD Summary

In the following, the notes refer to the paragraph within the DRD document summary.

It was identified that "embedding real-time data communications functionality" was a "low cost" option.[11]

The CBA[15] has been a key result from the rule determination process and has significantly shaped the discussion with its result.

The benefits to customers[29] are delivered as benefits to both individuals, and to the entire customer base through standardisation and portability.

There still appears to be some confusion in the discussion between remote/online real-time data and local (wired or wireless) real-time data.[30]. The benefits of a local real-time data communications protocol is mentioned[31] but is surrounded by other comments which are not relevant to local real-time data access.

The Assessment Criteria[33] should be included as the purpose for the definition of real-time time data and it's form. This will provide context to why the real-time data definition has been chosen.

3 General Comments

Section 2.5 A comments is made about other pathways to accessing real-time data.

For reasons of universality and equity, other pathways to access real-time data should be considered temporary during the smart meter upgrade transition period.

Section 2.5.1 The comment "Whilst the data itself is produced at no additional cost to customers, communicating the data can be costly" (to Retailers) is confusing as in the case of local direct real-time data access there is no additional ongoing cost required, other than the cost of a length of wire.

Free and accessible tools exist that provide customers with analysis and insights using local real-time data without requiring retailer services. (Eg. Home Assistant Energy Dashboard[1], MeterKloud[2])

Section 2.6 A common local real-time standard needs to be determined (eg. wireless or wired standard) so that a market for devices and services can be created that benefits customers. This exists in other electricity markets (eg. P1 port in the Netherlands).

Section 3 In addition to volts, current and phase angle there should also be measurements of **Total Energy In(kWh)**, **Total Energy Out(kWh)**. This data should coincide with the data reports to the retailer for billing purposes.

These measurements need to include a **timestamp** so that they can be associated with a specific billing period and customer tariff.

Section 3.1.3 In the case of local real-time data access, the smart meter is certainly able to push real-time data if enabled. Examples include data output over a serial connection and a Pulse LED. (An example for remote access is the MQTT protocol.)

Section 3.2 The discussion in this section needs to be explicit about whether it is referring to remote or local access. The security considerations are significantly different between these two cases. The real-time data procedures will be different for both. The elements required required to be specified in AEMO procedures will be different for both. The implementation of interoperability will be different for both.

Section 4.1.7 The text includes the statement "Raw real-time data itself is not valuable for consumers". Why have real-time data then? How does this meet the Assessment Criteria[3].

Real-time data coming from the meter needs to have value to the customer, it can and it should.

Section 5.2.3 This section needs to explicitly address access to local real-time data independently to remote access. Remote access should not be considered as a viable substitute for local or direct access for real-time data.[4]

[1] https://www.home-assistant.io/docs/energy/
[2] https://meterkloud.com/
[3] DRD Page.iv. para 33
[4] Submission to consultation paper: Paul Schulz, p. 5

4 The Purpose of Real-time data for Customers

The following section adds details to previous submission[5] and why real-time data is important to customers, in particular the types of questions that real-time data can answer. The need for real-time data can be slit up into three areas; Internal, Edge and External. Each of these needs to be addressed by the provision of real-time data.

4.1 Energy Management (Internal Requirement)

Data used:

- Instantaneous power report - import and export (kW)

Customer questions answered

- How much power am I using at this moment?
- When I turn on this appliance how much power does does it use?
- If I have Solar panels or batteries, am I maximising my self consumption?

4.2 Billing (Edge Requirement)

Data used:

- Total energy imported in each billing period (Total Energy In, in kWh)
- Total energy exported in each billing period (Total Energy Out, in kWh) (if CER is present)

Customer questions answered

- Can I confirm the details on my electricity bill if I know my tariff details (import and export electricity price during each billing period) use to create the bill?
- Can I independently compare my electricity bill with other retailers, when I know their tariffs?
- Is the data that I am using, the same data that my retailer is using to generate my bill?

4.3 Network Integration (External Requirement)

Data used:

- Instantaneous power report - import and export (kW)

Customer questions answered:

- Can I respond appropriately to network control signals when they are given? (eg. Load Shedding, Solar Backstop)
- Can I respond appropriately to price signals? (eg. High and Low pricing signals, negative export prices).

[5] Submission to consultation paper: Paul Schulz, p. 4

5 Other Existing sources of local real-time data for customers

It is worth noting that local real-time data for customers may already be available and in use. Any new source of real-time data should provide the equivalent capability.

LED Pulse signals on existing meters Some existing electricity meters emit a LED light pulse, typically 1000 pulses for 1kWh (or 1 pulse per kW). Summing the total number of pulses gives the total energy consumed, which is **verified to confirm with the increase in total energy used**, as indicated by the meters display, and read by meter readers. The instantaneous power usage can be calculated as an average, using either the time between pulses, or counting the number of pulses over a period (eg. 1 minute).

This form of real-time data is available from the "front of the meter box" and doesn't require access to household wiring and an electrician to install.

See Appendix A for an example of the resulting data.

Current Transformer (CT) Clamp A CT Clamp [6] is a device installed adjacent to the meter and provides electrical current measurements which can be used to calculate the power in or out of an installation. The device needs to be separately calibrated before it can give data that is similar to what a reading from the electricity meter would give. It also need to be installed "behind the meter box" and requires an electrician.

Secondary meters and other current measuring sensors The DRD mentions secondary meters[7] which are used to obtain the data required to control CER. With the introduction of dynamic exports and VPPs it may become essential that imported and exported power is accurately measured and reported, which should the role of the smart meter in the NEM. These also need to be installed "behind the meter box" with the additional expenses.

Appliance based real-time data Inexpensive smart plugs are available[8] making it possible for customers to obtain local real-time data for individual appliances in the home. With the services on an electrician, it is also possible to fit power meters to the hardwired household appliances (eg. oven, air-conditioning). Some products (eg. bettery inverters, EV chargers) come with their one power monitoring. If all of the appliances in a house are monitored, it would be possible to obtain the total energy use.

Compared to getting data directly from the smart-meter, this will be more expensive.

[6] Mentioned in DBD Section 2.5, Page 18
[7] DRD Section 2.6.2, Page 19-20
[8] https://www.athom.tech/blank-1/esphome-au-plug

6 Response to Discussion Questions

The following answers refer to **local** (wired or wireless) real-time data access from a smart meter.

	Description	Answer
Draft Determination		
1.	*Would our draft rule encourage consumers and energy service providers to access real-time data from smart meters? What is the benefit of this?* Yes - See previous discussion in Section 4 on the benefits of real time data to energy consumers.	Y
Progressively Embedded Functionality		
2.	*Should the min specs be changed to require all new meters installed from 2028 to be able to communicate real-time data both wirelessly and through a wired connection? Would changing the min specs increase benefits whilst imposing low costs to all consumers?* Yes - Regardless of the communication method enabled, all smart meters used for billing energy customers should support the same functionality. Local meter access should not be viewed as a service, but as an implemented feature. If implemented correctly, there would be minimal need to change the min spec, unless the character of the electricity network significantly changed.	Y
3.	*Do you agree with the costs the CBA estimates would be incurred to implement our draft rule? Would these costs decrease over time?* I cannot argue for or against the CBA findings, but they seem reasonable, and should be accepted. It is possible that mass production would allow this cost to come down, given that every dwelling on the NEM will require a smart meter and that this technology is already in use in other electricity networks.	Y
4.	*Our draft approach is to progressively enable consumers with new meters installed from 2028 to access real-time data at no charge. What is the benefit of enabling more consumers to access real-time data from smart meters, at not charge, sooner?* Australia is in the process of the renewable energy transition. Included in this is the promise from politicians and the industry of cheaper, greener electricity. The additional cost of a smart-meter has been imposed on the customers with generally no tangible benefit. Providing real-time data directly to the customer, at no charge, would provide a tangible benefit.	✓

5.	*What information would be useful for consumers to help them determine accessing real-time data is beneficial and if any charge to them, to upgrade the meter, is reasonable?* If supported by the rule change, the following information woudl be useful for customers to know: • There are tools available that can be used use to help you understand your energy use. (eg. In-home energy displays, Visualisation tools like MeterKloud[9]) • Ability to use the data in a home management system (eg. Home Assistant[10]) to monitor, control and automate household appliances. • Local real-time data is available from the meter as soon as you have it installed. • Every dwelling attached to the NEM, owned, rented or otherwise fitted with an electricity meter will have this feature. • This local real-time data functionality will be independent of the metering service provider, electricity retailer, or the energy plan that they are on. • It is possible to independently collect and use their real-time data to verify energy plans and compare with plans from other retailers.	✓
6.	*Would any other regulatory mechanism better enable all consumers to access real-time data from smart meters, at low cost to the market?* Unknown	-
Definition of Real-time data		
7.	*We propose a definition of real-time data and a requirement on AEMO's real-time data procedures. Would these provide industry with sufficient clarity on what real-time is, and how real-time data would be made accessible from smart meters?* Yes and No. It depends. Real-time data requirements a purpose that gives it meaning. If it is not able to meet this purpose (eg data is tool old) then it loses it's real-time meaning.[11] See discussion in the above section "The Purpose of Real-Time data". It is not sufficient to specify a technical requirement in terms of an update period and a definition of data to transmit.	✓
Retailers and Metering Coordinators		
8.	*Our draft rule would introduce a range of requirements on different parties to enable customers to access real-time data. Do you consider that our draft rule would support a good customer experience for customers requesting access?* Local real-time data should be available to the customer as soon as a smart meter has been installed and a retail customer is being billed. This should be a requirement on the metering coordinator and installer, and independent of retailers and other services. This will ensure that the customer gets the correct verifiable billing experience.	Y

Key: Y:Yes, N:No, ✓:Answered, -:Not Answered or Unknown

[9] https://meterkloud.com

[10] https://www.home-assistant.io

[11] Discussion in Submission to consultation paper: Paul Schulz Section 2.3, Page 5

7 Conclusion

The discussion and questions have been answered from the point of view of an retail energy customer of the NEM with CER, requiring local real-time data access from the meter.

The author broadly supports the Draft Rule Determination but requests that the intent of the rule change also be communicated together with the technical requirements, namely:

- Deliver good customer outcomes;
- Improve market efficiency;
- Encourage innovation and maintain flexibility; and
- Facilitate smooth implementation.

The author is happy to receive comments and questions about this submission.

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8 Abbreviations

CER Consumer Energy Resources

CBA Cost Benefit Analysis

NEM National Electricity Market

V2G Vehicle to Grid. Technology which allows energy stored in an EV to be exported to the electricity grid.

V2H Vehicle to Home. Technology which allows energy stored in an EV to

VPP Virtual Power Plant

9 Appendix A: Real-time Data from existing Non-Smart Meter

The following is an example of how an existing non-smart meter can be used to collect real-time energy usage data.

For more details see **Pulse for ESPHome** project page: https://github.com/PaulSchulz/pulse-for-esphome

The data recorded each minute is of the following form. This data will correlate with meter readings.

```
datetime_utc,datetime_local,total_watt_hours_in,total_watt_hours_out
2025-10-16 01:22:46,2025-10-16 11:52:46,34869,0
2025-10-16 01:23:00,2025-10-16 11:53:00,34872,0
2025-10-16 01:24:00,2025-10-16 11:54:00,34883,0
2025-10-16 01:25:00,2025-10-16 11:55:00,34894,0
2025-10-16 01:26:00,2025-10-16 11:56:00,34904,0
...
2025-10-17 05:09:00,2025-10-17 15:39:00,57749,0
2025-10-17 05:10:00,2025-10-17 15:40:00,57775,0
2025-10-17 05:11:00,2025-10-17 15:41:00,57799,0
2025-10-17 05:12:00,2025-10-17 15:42:00,57821,0
2025-10-17 05:13:00,2025-10-17 15:43:00,57844,0
```

As the data is recorded at the top of each minute, it can be used to generate historical bills on any existing retail tariffs.