Submission on
AEMC, Real-time data for consumers,
Consultation paper, 10 October 2024

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Abstract

This submission supports the intent of the proposed rule changes to the NER by ECA. We propose that customers can be best supported in their participation in the renewable energy transition by providing direct local real-time data access from the smart meter, rather than via remote data reading access methods being used by meter reading service providers.

Contents

1 Introduction

The author would like to thank the AEMC for providing the opportunity to comment on the "AEMC, Real-time data for consumers, Consultation paper"[AEM24].

Thanks also goes to Energy Consumers Australia for making the original NER Rule Change Request.[ECA24]

2 Submission Scope - Local Real-time Data Access

This submission would like to address the following issues:

- Customers of the NEM require real-time access to their electricity usage data in order to have control over their energy use.[ECA24, p.4-6]
- Currently, the real-time data from smart meters is not made universally available for customers.[ECA24, p.6-7]
- The proposed rule changes aim to address this with two access methods mentioned - local and remote. These different access technologies need to be dealt with separately. The proposed rule change by ECA and the EAMC Consultation Paper appears to mix the discussion between these access methods.

This submission respponds to the questions from the point of view of enabling local real-time data access to a customers energy usage.

Remote real-time access to customer usage data is also important to the functioning of the NEM (eg. for collecting billing information) but the focus on this technology has been to the detriment of technology which directly benefits the customer (local access). As in all things on the NEM, it is the customer that is paying for this.

The papers[ECA24][AEM24] also use the phrase "customers or their authorized representative" interchangeably with "energy consumer". In this paper "customer" refers to the owner of the property or their tenant, who is responsible for the electricity usage (and the bill) behind the meter, including CER.

Some of the questions are not relevant to the Local Access method. The following table summerizes the responses to questions.

	Question	Local	Remote
1.	**What are the benefits of improving access to real-time data?**		X
1.a)	What are the anticipated use cases of real-time data?		X
1.b)	What is the value of the benefits that flow to consumers?		X
2.	**What are the costs of improving access to real-time data?**	X	-
2.a)	What are the types of costs that would be incurred to improve access?	X	-
2.b)	What is the magnitude of these costs?	X	-
2.c)	Who would incur these costs?	X	-
2.d)	Do the benefits of improving access to real time data outweigh the costs?	X	-
3.	**Do metering parties have a competitive advantage?**	X	-
3.a)	Do you agree with the proponent that metering parties have a competitive advantage in providing services not related to their core functions of settlement, billing and maintenance?	-	-
3.b)	How would any competitive advantage impact the cost of new energy services to customers?	-	-
4.	**Do DNSPs need more than PQD to improve network planning and operation?**	-	-
4.a)	Do the benefits of improving DNSP access to real-time data outweigh the costs?	-	-
4.b)	What are the use cases for DNSPs and other network planners to have acess to real-time data other than advanced PQD?	-	-
5.	**Who should have a right to real-time data in the NER?**	X	X
5.a)	Should consumers, their authorised representatives or any other party, including DNSPs, have a right to access real-time data?	X	-
6.	**How should real-time-data be defined?**	X	-
6.a)	Do stakeholders agree with the proposed definition of real-time data and customer power data?	-	-
6.b)	What should be defined and/or further expanded in AEMO procedures?	-	-
6.c)	Should data be validated or not?	X	-
7.	**How should real-time data be accessed and shared?**	X	-
7.a)	Do parties, other than metering service providers, need to locally connect directly to the meter to access real-time data? If so, what changes are needed to enable this?	X	-
7.b)	Are there alternative data sharing arrangements that should be enabled by a rule change, if made?	X	-
8.	**Who should bear the costs of access real-time data?**	X	-
8.a)	Should all consumers bear the cost of accessing real-time data?	X	-
8.b)	What would be the benefits of a dispute resolution framework and how would it operate?	X	-
9.	**What changes would be required to ensure interoperability?**	X	-
9.a)	Would changes be minimum services specification requirements be the most effective way to ensure interoperability of real-time data.	X	-
9.b)	Would any other changes be required to facilitate interoperability, for example, changes through device standards.	X	-
10.	Do existing arrangemewnts sufficiently protect consumer privacy ..	X	-
10.a)	Would any additional consumer privacy and cyber security protections be required..	X	-
10.b)	Do you consider any other work programs could provide any additional protection..	X	-
11.	**What other changes would be required to enable real-time a data framework?**	X	-
11.a)	Would any other changes be required, for example to clarify data and storage arrangements or to implement relevant best practice features from other frameworks?	X	-
12.	**Do you agree with the proposed assessment criteria?**	X	-
12.a)	Are there additional criteria we should consider or criteria included here that are not relevant?	X	-

X : Question answered; - : No opinion/Implementation dependant/Not considered in this discussion

2.1 Background

Supporting the Renewable Energy Transition at the Smart Meter

Other than their appliances, customers usually only interact with their energy provider is through their electricity bills and their metering.

Smart meters enable electricity retailers to supply power with Time Of Use (ToU) tariffs, which increases the ability of customers to use cheaper, cleaner energy when they know that it is available.

Informing customers of this information in a timely manner (real-time) is essential for allowing thm to use their energy in the most efficient way. (eg. When renewables are available.)

One international example of a successful smart meter roll-out is in the Netherlands[AP19][HHdM11], where a consumer port was included in the smart meter specification[Lux21]. Originally designed for use with an in-home monitoring display, the consumer port is now increasingly being used as an input to home energy management systems.[1]

Consumer data port on Smart Meters

Consumer household smart meters in Australia are not currently required to have a locally accessible consumer port, or provide local access for consumer data.[ECA24, p.3]

Some of the issues around this:

- Some meters offer a pulsed output, or relay contact port, which provides counter pulses for the power used, but this is not sufficient for bi-directional operation;
- Energy retailers collect power usage for billing over 30 minute periods and make this available to their customers, usually on the next day, when the link for the customer between usage (cause) and cost (effect) has been broken;
- Customers can always implement energy monitoring hardware at their own expense. While this monitoring should agree with the results from the meter and the energy provider, it is measuring something different. Customers can't take their monitoring setup with them if they move, or expect that the same data will be available at a new residence. There is also currently no straight forward way for a renter to get this information making it difficult for them to participate in the renewable energy transition.

These issues are keeping useful and powerful information out of the hands of all ordinary consumers, and which has a negative effect on renewable energy transition. With this data it is possible for customers to justify making investments (eg. buying a home battery or EV). Having this data available over an extended period (eg. a calendar year) prior to any decision making would also allow seasonal variations to be taken into account. This implies that the sooner that this data is able to be collected by the consumer the better.

The need for this smart meter facility to be a general requirement in the NEM can seen even more when it is considered that:

- In-Home energy displays are already part of the various renewable energy rebate schemes;
- There is a niche Australian industry, focused on providing and installing and monitoring consumer energy;
- Amber Electric (a progressing Retail Energy Provider, providing access to the wholesale market prices) promotes its real-time energy usage App as its main differentiator. It is expected that more energy retailers will begin to offer the same facility if they don't already.
- Presently, smart meter characteristics and features cannot be specified by the end customer and are provided and installed as-is.
- If available, end customers may be able to pay an additional fee to have a smart meter consumer data port enabled when installed as an option, but this is not guaranteed.[ECA24, p.7]

[1] See: https://www.home-assistant.io/integrations/p1_monitor/ for an integration with Home Assistant.

2.2 Local Access Definition

Local access to meterind data is defined as being the ability to directly connect to the customer energy meter to receive energy usage data.

Some considerations:

- It is sufficient for the customer that access is read-only;
- The access method is not defined (eg. wired or wireless);
- The customer has physical access to their energy meter in the meter box;
- Simpler access methods will be more robust with less maintenance;
- Meter manufacturers need to implement and support any proposed access method.

2.3 Real-Time Definition

In this document the following functional definitions[2] are used:

Real-Time Value Data has real-time value if it contributes to decision making if delivered in a timely manner. Data delivered after a particular period loses this real-time value.

Real-Time Data Data with real-time value is called real-time data.

Data Collection Rate, Frequency, or Period The rate of which time-series data is collected (eg. samples per time period).

Real-Time Processing Decision making or data-processing based on real-time data.

Why use this definition?

By defining real-time value and real-time data in a functional way, it can be seen that **other real-time definitions that don't provide the same functionality are not-equivalent**.

[2] A functional definition defines something in terms of: How does the thing function? What does it do?

3 Response to Questions

3.1 Question 1

Question 1. What are the benefits of improving access to real-time data? (Local Access)

Assertion: Customer energy usage data at the meter is the property of the customer and is used by the energy provider to provide a service.

Answer: There are three benefits for having local access to real-time data.

Independent usage data for bill verification Unless arrangements are in place, there are no rules in the NER to enforce access for the customer or ensure rights to their data.

Non-smart accumulation meters, for the import and export can be read by the customer to determine electricity usage and make energy decisions to control their energy bill.

With legacy flat rate billing tariffs this was sufficient. With pre-determined time-of-use tariffs (eg. off-peak hot water heaters), meters with additional monitoring channels are required.In this case, meter data can still be displayed and used to compare and verify electricity bills.

High resolution[3] and time-stamped historical usage data is required by the energy customer to verify that they are being billed correctly. This can be obtained from a local real-time data port.

Usage data for energy management With access to real-time energy usage data, customers can verify the effect that their appliances have on their energy usage. Obtaining this data at the meter allows all the appliances in use to be monitored, regardless of their number or type, including energy generation and storage.

Responding to time varying energy tariffs The energy market has introducing time-varying tariffs via access to the wholesale electricity market.[4]

Without additional monitoring (which currently has to be separately installed by the customer, or provided by the Energy Retailer) customers cannot respond in a timely manner.

Relying on energy retailers to provide this data in a non-standardised way introduces the opportunity for anti-competitive behaviour and vendor lock-in.

Question 1.a) What are the anticipated use cases of real-time data?

Answer: Use cases for local real-time data access for the customer via the smart meter:

- In-home energy usage displays, which can display the entire energy use on a customer's installation, including appliances including CER;
  - Increased visibility for consumers on their electricity usage;
  - Self-education on how and when consumers use their appliances and consume energy.
  - Improved decision making, around energy usage in the home, leading to lower electricity bills.
  - Improved alignment with time varying electricity tariffs, when real-time energy pricing data is available.
- Data source for home automation
  - *(All of the use cases above for the In-home energy display);*
  - Remote home appliance monitoring and control; and
  - Enabling automated market/price responsive, decision making.
- Ability to compare retail energy plans

  Having suitably time stamped time series data (both usage and pricing) will allow retail tariffs to be compared, both after the fact (by recording historical data) and as energy is consumed.

Question 1.b) What is the value of the benefits that flow to consumers ?

[3] With a minimum condition of data updates corresponding to the billing period. eg. 5min or 30min.
[4] Amber Electric wholesale market energy pricing.

Answer: With a local source of real-time meter data:

- Customers have access to the same data that their energy retailer is using to produce their bill.

  Value: Invaluable (Unavailable in any other independent way)

- Customers have confidence that they can switch to a more risky retail plan (eg. exposing themselves to wholesale market fluctuations) knowing that they are monitoring their consumption, can time shift their energy usage, reduce their load when required, and use more energy when it is cheap.

  Value: Industry media suggest savings of up to 50% are possible by shifting to off peak energy use .[5]

  Value: Lower carbon emissions, more renewable energy use, less fossil fuel/non-renewable use.

3.2 Question 2

Question 2. What are the costs of improving access to real-time data? (Local Access)

What are the costs of improving access to real-time data via local access?

Answer: The cost of improving real-time access via local access to the the smart meter needs to take the following into account:

- NEM customers are already paying for their smart meters via a contribution included in the Default Market Offer (DMO)[Net24].
- Functionality needs to be added to smart meters used in the NEM with the inclusion of a local data access port. This functionality is already provided in smart meter models provided in other electricity networks.[Lux21]
- Delaying, deferring or denying the inclusion of this functionality in the smart meter rollout cross the NEM will increase the cost to NEM customers, either:
  - when smart meters are required to be retrofitted fitted with this functionality; or
  - site monitoring is installed by the customer to independently obtain real-time usage data.

Question 2.a) Local Access What are the types of costs that would be incurred to improve access?

Answer: There are several categories of costs come to mindwhen implementing local access to real-time energy usage data.

1. Engineering and Supply costs;
2. Standardisation and Regulation cost; and
3. Installation and Maintenance costs.

Note: Once a smart meter is installed, none of these costs are ongoing, subscription based or maintenance related. This approach should be maintained, and will ensure that smart meter costs are not treated as a profit source.

4. Inclusion in ongoing and periodic technology refresh program.

Question 2.b) Local Access What is the magnitude of these costs?

Answer: Compared to the existing costs, as an increase, is can be reasonable assumed that the costs incurred would be:

1. The increase in the existing meter supply cost should be minimal. There are manufacturers that provide local data port functionality in existing meters. There is no additional configuration required if the functionality is standardised.
2. Similar cost to any other regulatory rule change to the NER.

[5] SA Power Networks have published a breakdown of a typical electrical bill based on the Default Market Offer[Net24]. Moving energy usage to off-peak and shoulder periods will reduce the tariff, and moving to a wholesale price based retailer, will further reduce the price paid for electricity.

3. This would be the same cost, or less, to add a requested feature into the existing smart meters. This would be an initial one-off cost.
4. This would be part of an ongoing technology assessment program for the NEM.

Question 2.c) Local Access Who would incur these costs?

Answer: The NEM customer is the party that will incur these costs either directly or through higher energy prices.

Customers are currently paying for smart meters in their energy bills as part of the Default Market Offer (DMO) (0.9% in 2023-24)[Net24].

Question 2.d) Local Access Do the benefits of improving access to real time data outweigh the costs?

Answer: Yes.

- There is currently no standard local real-time data access from the smart meter for customers.
- This functionality is essential for electricity customers to make full use of their own energy infrastructure.
- Not providing this functionality in a standard way at the meter will cause customers to either:
  - go without[6]; or
  - separately implement their own monitoring infrastructure at their own expense.
- Customers with access to this data can effectively compare retail energy plans.[7]

3.3 Question 3

Question 3. Local Access Do metering parties currently have a competitive advantage?

Answer: Possibly.

- Providing local real-time energy usage data at the meter will not give metering parties any additional competitive advantage.
- With regards to electricity usage data, the competitive (anti-competitive) advantage is with the retail energy providers over energy customers.

  Examples of this include, but are not limited to:
  - Demand plans - where customers are penalised with a high power bill, after a possibly single high usage event during the billing period, regardless of the total amount of energy used.
  - Plans with 30min wholesale based billing periods, with NEM settlement occuring over 5 minute intervals.
  - Data only becoming available to customers after NEM settlement has occured (an over 24 hour delay).
  - Complex time dependent tariffs, making it difficult to compare energy retailers.

3.4 Question 4

(No related comments.)

3.5 Question 5

Question 5.) Local Access Who should have a right to real-time data in the NER?

Answer: Energy customers should have the right to access their own energy usage data, and this should be included as a mandatory right in the NER, via a local real-time data port, available directly from the smart meter.

[6] and not have access to the benefits.
[7] The real-time data need to provide the level of detail to be useful

Question 5.a) Local Access Should consumers, their authorised representatives or any other party, including DNSPs, have a right to access real-time data?

Answer: No other parties, unless explicitly authorised by the customer, should be allowed to access the local customer data port. No party should be allowed to deny access to this data port.

Question 5.) Remote Access Who should have a right to real-time data in the NER?

Answer: Other parties, including DNSPs do not necessarily require individual customer data, when aggregated and/or anonymised data is sufficient for their operations.

3.6 Question 6

Question 6. Local Access How should real-time data be defined?

Answer: See Section 2.3 for the functional definition of real-time data used in this submission. To summerise:

> Real-time data is data with real-time value. Data has real-time value if it contributes to decision making if delivered in a timely manner, within a particular time period. Data delivered after this period is not able to be used in decision making and no longer has real-time value.

The value of this definition is that it does not make a specific reference to a data collection frequency or period. An example of how this would apply to the NER is that if decisions are being made by a customer (import and export) to respond to network signals (eg. price, availability of renewable energy) then the data needs to be made available before the decision time.

Question 6.c) Local Access Should data be validated or not?

Answer: The real-time data collected buy the customer at the meter should enable the customer to produce an identical bill to what they receive from their energy retailer. Any discrepancy needs to have a valid explanation (eg. Customer has received a government rebate, the customer plan has changed at some point.)

Any variation that is not suitable explained can be reported (to an ombudsman).

3.7 Question 7

Question 7. Local Access How should real-time data be accessed and shared?

Answer: There are no additional requirements for how locally accessed data can be accessed, other than mentioned in Question 5.

- Energy customers should have the right to access their own energy usage data.
- No other parties, unless explicitly authorised by the customer, should be allowed to access the local customer data port.
- No party should be allowed to deny access to this data port.

There is no additional requirement for data sharing from local access. Customers should be able to store and share their own data as they see fit. There should be no rules denying customers these rights.

Question 7.a). Local Access Do parties, other than metering service providers, need to locally connect directly to the meter to access real-time data? If so, what changes are needed to enable this?

Answer: Yes.

- Customers need to have access to real-time data directly from the smart-meter via a locally accessible (read-only) data port.
- Customers need to have a guaranteed right to real-time data from the smart-meter in the NER.

Question 7.b). Local Access Are there alternative data sharing arrangements that should be enabled by a rule change, if made?

Answer: No.

If customers have the right to access their own usage data directly from the meter via local data port, then there are no alternative, or any, data sharing arrangements that need to be enabled with rule changes for the customer.

3.8 Question 8

Question 8. Local Access Who should bear the costs of accessing real-time data?

Answer:

Question 8.a) Local Access Should all consumers bear the cost of accessing real-time data?

Answer: For local access to the real-time data from the meter:

- all consumers will bear this cost through the cost of supplying their smart meter (although governments may take up to opportunity to subsidise this); and
- This cost is already included in energy plans via the smart meter provision in the Default Market Offer.[Net24]

Question 8.b) Local Access What would be the benefits of a dispute resolution framework and how should it operate?

Answer: If the dispute involved billing, real-time data captured directly from the meter by the customer can be compared with the billing data (possibly facilitated by an energy obudsman).

Prior to smart meters, this the process would be for the customer to do their own meter readings.

3.9 Question 9

Question 9. Local Access What changes would be required to ensure interoperability?

Answer: To add a user assessable data port on a smart-meter:

- A standard interface for reat-time data from smart meters would need to be adopted.
- There are international standards already in place and being used.
- Int implementation of multiple standards may be possible, provided that the same data is being provided to the customer and that any standard used is readily accessible to consumers and industry alike (Eg. Patent and royalty free.)

Question 9.a) Local Access Would changes to the minimum services specification requirements be the most effective way to ensure interoperability of real-time data?

Answer: For local access to real time data a device standard change is required, rather than a service specification.

Question 9.b) Local Access Would any other changes be required to facilitate interoperability, for example, changes through device standards?

Answer: Yes. The specification for smart meters needs to be changed to include a local data access port standard.

3.10 Question 10

Question 10. Local Access Do existing arrangements sufficiently protect consumer privacy and maintain cyber security for any real-time data framework?

Answer: For local data from the smart meter, existing arrangements and NER restrict access by customers if they aren't given access during installation, while allowing energy providers to collect it.

This needs to change to allow customers access to their own data without restriction.

Question 10.a) Local Access Would any additional consumer privacy and cyber security protections be required if a real-time data framework were implemented?

Answer: Consumers should have the following rights:

- guarantied access to real-time energy consumption data produced by their smart meter.
- all rights reserved for the use of this data (and where other parties cannot remove these right or impose restrictions on how this data is used).

Question 10.b) Local Access Do you consider other work programs could provide any additional protection required, such as the Roadmap for CER Cyber Security?

Answer: No. None are required if these changes are implemented in the smart meter rollout.

3.11 Question 11

Question 11. Local Access What other changes would be required to enable a real-time data framework?

Answer:

Question 11.a) Local Access Would any other changes be required, for example to clarify data and storage arrangements or to implement relevant best practice features from other frameworks?

Answer: It would be useful, as well a standard for a local real-time data port on the smart meter, to have a reference implementation for local access.

A reference implementation that used free[8] and open hardware and software would provide certainty that the implementation is accessible and fit-for-purpose.

Consideration should also be given to other smart meter rollouts that have implemented a local data port.[9]

3.12 Question 12

Question 12. Local Access Do you agree with the proposed assessment criteria?

Of the four assessment criteria, the "Outcomes for consumers" is the most significant for local access.

There is a risk that the benefits for customers will not be realised if the criteria of "Innovatiom and flexability" and "Principles of market efficiency" are used to argue that Local Access should not be implemented in favour of Remote Access, if it is seen as an either-or decision.

Question 12.a) Local Access Are there additional criteria we should consider or criteria included here that are not relevant?

Answer: There is also the criteria of "Timeliness". While this could classed as part of an "Implementation consideration" or "Market Efficiency", standardised Local Access should be seen as a requirement for the renewable energy transition. Any delay in its implementation will make it more expensive to implent (retrofit) in the long term.

[8] As in "free to use", not as in "free beer"

[9] For example, the implementation of the P1 Data Port in the Netherlands.

4 Comments and Questions?

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

He can be contacted at mailto:[redacted].

5 Appendix: Technologies Mentioned

5.1 The Netherlands Smart Meter P1 Consumer Port

A review of the Netherlands experience with their Smart Meter roll-out can be found in [AP19][HHdM11], where the architecture of their smart-meter design is discussed and P1 port is mentioned[HHdM11, p.277].

The specification from a smart meter manufacturer of the P1 Consumer port is available here [Lux21]

5.2 Access to Wholesale Electricity Market (Amber Electric)

Amber Electric is an energy retailer that passes though real-time wholesale electricity prices.

Website: https://www.amber.com.au

5.3 Home Assistant

Home Assistant is free and open-source software for home automation designed to be an Internet of things ecosystem-independent integration platform and central control system for smart home devices, with a focus on local control and privacy.

See: https://www.home-assistant.io/

6 Appendix: Acronyms

AEMC Australian Energy Market Commission

AEMO Australian Energy Market Operator

CER Consumer Energy Resources

DMO Default Market Offer

DNSP Distributed Network Service Provider

ESB Energy Security Board

ToU Time of Use (Tariff)

VPP Virtual Power Plant

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