INTELLIHUB GROUP

SUBMISSION TO CONSULTATION ON AMENDMENT OF THE MARKET ANCILLARY SERVICES SPECIFICATION

DER COMPONENT ONLY

Smart Meters: Creating value and system security for Australia

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By the end of this year, every new Intellihub smart meter installed, including at residential sites, will be capable of providing measurement facilities for FCAS fast raise and lower services by default.

Advanced digital meters, or smart meters, are the most cost efficient, reliable, and fit-for-purpose solution to enable VPPs consisting of small-scale DER to participate in the contingency FCAS markets. Use of the revenue meter for FCAS measurements both avoids the need for a costly additional meter and avoids the need for complex arrangements to infer the behaviour of small-scale DER under a contingency event.

Intellihub will be introducing the next generation of smart meter later this year to be used across all standard residential and small-business installations. One of the key benefits of this new smart meter is that it is capable of the high-speed measurements required for FCAS validation. While detailed test results are not yet available, we are confident that the new meter will either meet or come very close to meeting the measurement requirements under the current MASS.

There are material issues with both options proposed in the consultation paper. Retaining the current MASS means cost and duplication making small-scale DER VPPs financially unviable. The proposed DER MASS is a complex and onerous arrangement, likely with negative impacts on market efficiency. There is a simple solution that eliminates these issues: use the revenue meter.

We have proposed an alternative to the two options put forward in the consultation paper, encouraging, but not mandating, the use of the revenue meter for FCAS measurements. We believe this proposal is consistent with the NEO and will be effective in remove existing barriers for the participation of small-scale DER in FCAS markets.

In summary, we propose:

- Creating a set of measurement requirements which apply to small-scale DER sites, baselined from 3.6 (a) of the current MASS, with only a minor relaxation in requirements;

- Delaying the finalisation of these measurement requirements by a matter of months to allow the capabilities of upcoming revenue meters to be fully understood;
- Encouraging FACS measurements to be taken at the NMI level rather than the device level, and
- Consider how the long-term accuracy of measurements will be assured.

Please reach out to me should you have any queries on our submission.

Regards,

Robert Lo Giudice
Manager Metering Coordinator and Regulatory Affairs
Intellihub

Who we are

The Intellihub Group (Intellihub) is an Australian and New Zealand based utility services company focussed on electricity, gas and water metering services. With over one million advanced digital meters under management, we are a leading provider of electricity smart meter services in Australia. We are currently deploying advanced digital meters to residential and business customers in most states and territories in Australia. We partner with electricity retailers, distributors, and other energy sector participants to utilise smart metering technology to deliver data and services that improve the affordability, reliability, and security of the electricity sector.

Intellihub is an AEMO accredited Metering Coordinator (MC), Metering Provider (MP), and Metering Data Provider (MDP).

Background

This submission considers the DER MASS review component of the consultation only.

Intellihub recognises the significant value embedded in the ever-increasing number of small-scale DER systems installed across the NEM, especially when their response is aggregated and coordinated through a VPP. DER VPPs may play an increasingly important role in contributing to system security by participating in the NEM market ancillary services, particularly FCAS.

Intellihub recognises the barriers that the current (v6.0) MASS creates for the participation of VPPs comprised of small scale DER in the MASS fast raise and fast lower service. Chiefly these barriers pertain to the requirements for high-speed measurement facilities at each participating fast raise and lower site. The currently available means for meeting this requirement are impractical and cost prohibitive in the context of small DER sites.

In the MASS consultation paper, AEMO has proposed two options:

1. Leave the current measurement requirements unchanged (“do nothing”)
2. Embed the measurement requirements which were tested in the VPP demonstrations:
    a. Permit measurement resolution of less than or equal to 1 second (with conditions), relaxed from 50 milliseconds, and
    b. Permit the measurements to be captured at the controllable device (with conditions), rather than at the NMI.

Intellihub proposes an alternative option for consideration, which encourages the use of revenue meters for measurement per the MASS requirements, thereby reducing cost and duplication. This option will more closely align with the National Electricity Objective than the two options proposed in the consultation paper.

Overview

Advanced digital meters, performing the dual role of the revenue meter for the NMI, could provide the required measurement facilities for the fast raise and fast lower service. Leveraging the revenue meter for this capability is the most efficient means for measurement and validation of a response to a contingency event.

The capabilities of advanced digital meters are often overlooked, particularly when seeking an innovative solution, as they are thought of simply as a means to produce a bill for the energy consumer. While for the most part, these meters are used to measure energy consumption in 30-minute and 5 minute intervals for billing purposes, these meters have capabilities *far* exceeding this simple use case. A standard residential digital meter of the current generation measures approximately 50 different parameters with calibrated high accuracy and updates these typically 10 times per second.

A key driver for the Power of Choice reform, which commenced in 2017, was to enable innovation in the metering space. In line with this objective, Intellihub will be introducing its next generation of advanced digital meters this year. This next generation metering platform will have capabilities well beyond current generation meters. One of the design goals for this new metering platform is to come as close as possible to meeting the performance requirements for measurement facilities as per the current MASS without burdening the meter with additional cost. Advancements in technology have made this possible.

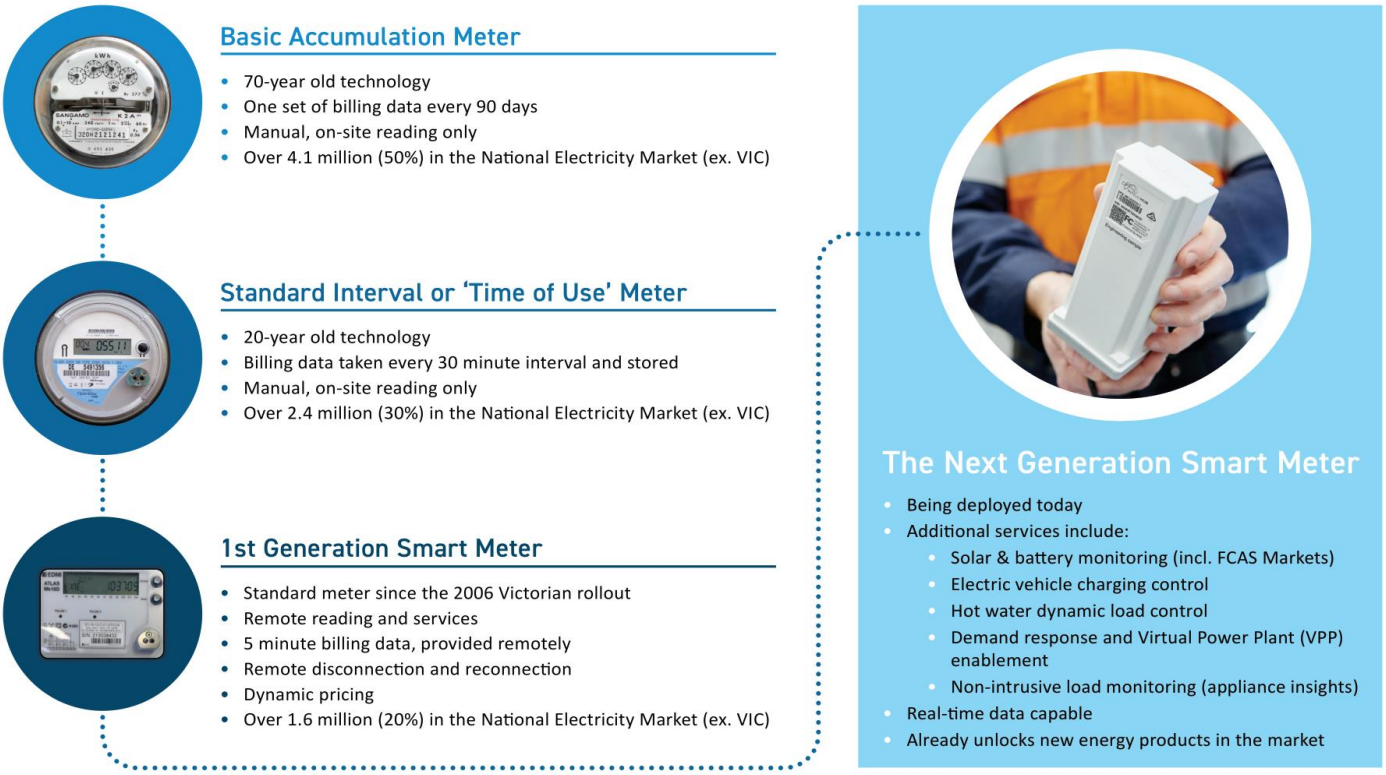

Figure 1: Generations of Electricity Meters

We set this goal with small scale DER in mind, to give the best possible performance at a cost compatible with VPPs. While accuracy and performance testing of our next generation meter against the MASS requirements is not yet available, we are confident in either meeting, or coming very close to meeting, the requirements in section 3.6 of the current MASS. Every new residential meter we install from the end of 2021 will have this capability as standard – it will not be an additional extra nor a special request.

Issues with the Proposals

The current MASS effectively requires an additional high-speed meter to be installed at each participating site. The cost of this high-speed metering solution typically exceeds any revenue expected to be produced over the lifetime of a small-scale DER installation, rendering it unviable to participate in the FCAS markets. This specification was originally written with large generators in mind and is unsuitable in the context of VPPs consisting of small DER. Amendments are required to consider this use case and ensure viability of these types of VPPs.

The DER MASS proposed in the consultation paper relies on specific models of DER in the VPP to have consistent and well understood behaviour in response to a contingency event, such that direct measurement can be avoided. While this approach has merit in principle, there are drawbacks, including:

- The necessary limitation on the ability of VPP providers to mix different DER types, makes and models. This introduces an artificial market limitation and will hinder the efficient propagation of VPPs and therefore the value provided to the NEM.
- The requirement for costly frequency injection testing for each type, make and model of DER to characterise the behaviour under contingency conditions. There is a further complexity here when managing different variants of the same device, such as differing hardware and/or firmware revisions – some of which will be deployed while the device is in service. Such updates may change the response of the device under contingency conditions, possibly inadvertently. Will each firmware update of each variant need to undergo frequency injection testing? Will each VPP operator be required to maintain a record of every DER and what characteristic response it had at any point in time?
- The proposal fails to entirely eliminate the need for high-speed meters, imposing additional cost and asset management burden on VPP operators.
- The 1 second measurements interval is unlikely to be fast enough to support an efficient ancillary services market.

Our Alternative Proposal

We have put forward an alternative proposal, described below, with the goal of reducing cost and duplication by using the capabilities of revenue advanced digital meters. Our proposal takes the measurement requirements in the current MASS as a starting point and permits a small relaxation in some of the characteristics described in 3.6 (a) when the site is considered a small-scale DER site. We

have not attempted to define a small-scale DER site however, we believe that a reduction from the 1MW limit proposed in the consultation paper may have merit, to limit any impact of the relaxed measurement requirements.

We consider this a pragmatic approach, setting the measurement specification to get the best possible performance from the revenue meter, without triggering significant cost for participants. We believe that this proposal is preferable to the two proposals described in the consultation paper, as our proposal better balances the practicality and cost of complying with the need for efficient operation of the ancillary services markets and is ultimately better aligned with the NEO.

Measurement Performance Requirements

Intellihub's upcoming metering platform has high-speed measurement capabilities considerably exceeding the current generation of meters. At the time of submission, lab testing results are not yet available, however we anticipate these meters will either meet, or come close to meeting the measurement requirements in section 3.6(a) of the current MASS. These meters will be ready for deployment before the end of 2021.

We would be pleased to discuss the capabilities of these upcoming meters in detail with AEMO.

Given the significant cost advantages of using the residential revenue meter to provide FCAS measurement, we believe there is a strong case for setting the measurement requirements at the level which upcoming revenue meters can meet. We believe that the benefits in removing the barriers liming VPPs from participating in FCAS markets will outweighed by any minor trade-off in measurement capability.

We propose delaying the finalisation of the DER MASS measurement requirements until the capabilities of upcoming revenue meters are better understood. We expect the lab testing activity will be completed in a matter of months.

Measurement Location

While many of the initial VPP pilots have generally been carried out with a single controllable device at each site, often a battery, this configuration is unlikely to prevail. Going forward, it will be much more common for multiple devices at a single NMI to participate. Orchestration between these devices will take place such that the optimal device or combination of devices is used to respond to any given contingency event.

The best location to measure the response to a contingency event of a site with multiple devices is at the aggregate or net point, or in other words at the NMI. Measuring at the NMI level makes FCAS validation of sites with multiple responding devices possible and is desirable to support a broad range of use cases.

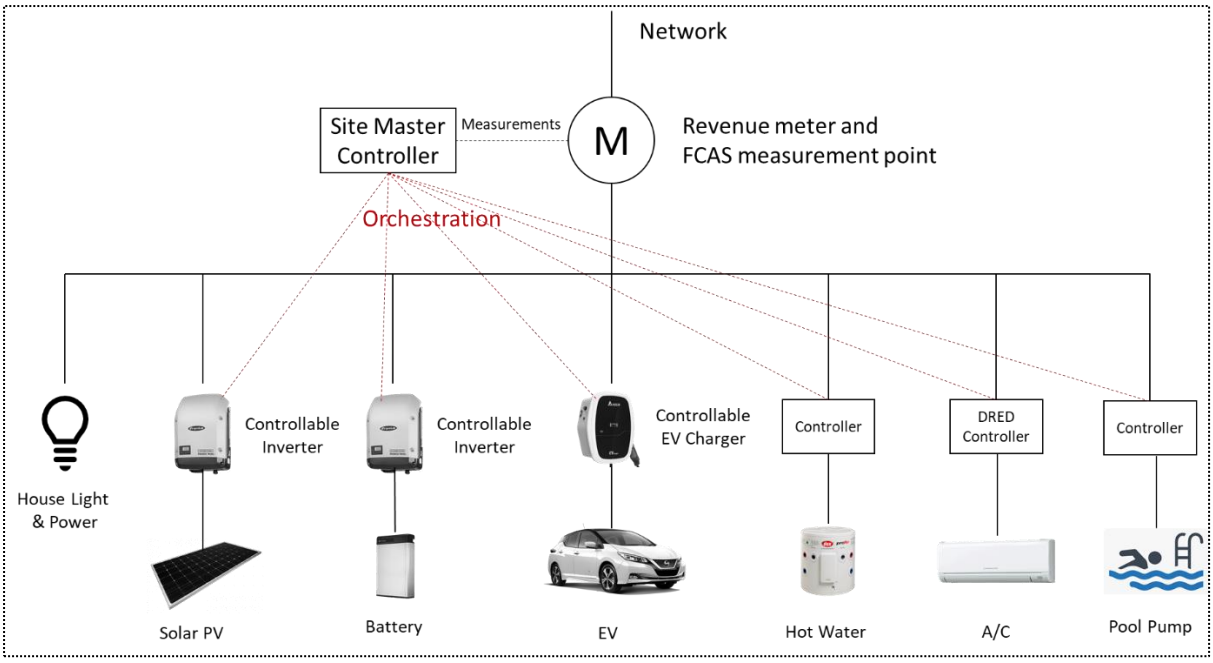

Figure 2: FCAS Measurement at the NMI permits orchestration of multiple devices

We recognise that measurement at the NMI level is not always preferable for the site owner or VPP operator, particularly for homogenous VPP configurations with a single device.

We propose that the current MASS requirement where the measurement point is defined as the NMI is retained, however we do not oppose exceptions for small DER where this is deemed appropriate.

Measurement Quality Assurance

The proposed DER MASS does not consider quality assurance of the measurement data, in other words, how the accuracy of the measurement data is guaranteed over the lifetime of the DER installation. We believe that this issue warrants consideration.

Currently Metering Providers, including Intellihub, have asset management plans and calibration sampling processes for their fleet of meters in place as required by chapter 7 of the NER. These plans are carefully designed, reviewed, and approved by AEMO to ensure the long-term accuracy of the data that underpins the NEM settlements process. The accuracy of meter fleets are monitored over their lifetime and replacements are automatically triggered if accuracy falls outside allowable limits.

A considerable advantage of using revenue meters to capture measurement data for FCAS validation is that the long-term accuracy of these measurements are assured. This assurance comes for 'free' through these existing asset management plans.

An additional benefit of the measurements being provided by the accredited Metering Provider, with no financial interest in how the VPP responded to a contingency event, is that an additional layer of probity and integrity is added to the ancillary services market.

We recommend that AEMO consider how the long-term accuracy of FCAS measurement data will be assured.

Response to Consultation Questions

> *1. Which option for the ongoing measurement requirements for DER described in Section 2.3 do you want AEMO to implement and why? Should any other options be considered?*

Neither. We have proposed an alternative option which we believe is preferable to both options proposed in section 2.3.

> *2. Which option do you think is more consistent with the NEO, and why?*

Neither are consistent with the NEO. We have proposed an alternative option which we believe is consistent with the NEO. Our alternate proposal eliminates the need for inefficient duplication of measurement equipment [the *price* consideration of the NEO] without compromising the reliability and security of the national electricity system, nor introducing distortions in the ancillary services market.

> *3. Should AEMO consider any principles other than those described in Section 2.4 to guide its assessment?*

In addition to the principles described in section 2.4, AEMO should consider how the long-term accuracy of FCAS measurements at small DER sites will be assured.

> *4. What is the difference in implementation costs, such as updating the communication links or installing additional equipment, for capturing data at a resolution of either 50 ms or 1 second for every NMI for different VPP facility types? Do you consider the cost difference to be prohibitive for participating in the Contingency FCAS markets? Please provide examples or analysis if possible.*

If the revenue meter is used to capture FCAS measurement data as per our proposal, there will be negligible implementation cost to the VPP.

> *5. Do you think that either of the options presented will result in more or less competition in the Contingency FCAS markets?*

Both options presented create barriers to competition.

If the current MASS is retained, the cost and impracticality of installing secondary high-speed meters will stifle competition, as the addressable market will be too small to support significant competition.

If the VPP demonstration measurement requirements are adopted, significant barriers for VPPs wishing to use a mix of technologies and vendors will be introduced, again artificially restraining the market size and competition.

There are strong indications that the 'bring your own battery' VPP model will be attractive for both the VPP operator and energy consumers. Current VPP fleets which consist of 100% a single model of device are common in the demonstration phase, however any long term framework will need to support VPPs having a diverse mix of makes / models of equipment. Under the proposed option 2,

where each individual DER variant is required to be tested and characterised, building a 'bring your own battery' style VPP would be prohibitively expensive and therefore competition will be supressed. Market distortion may also occur, with single vendor VPPs becoming dominant, and those DER owners not having a system from a specific vendor find themselves locked out and missing out on value.

We believe that our proposed alternate option will result in healthy competition in the contingency FCAS markets.

> *6. Are there any technical risks that you envisage if the Option 2 measurement requirements are allowed? How material do you consider those risks and how could they be efficiently mitigated?*

Assurance of measurement data quality. Assurance that the behaviour of all DER in a VPP matches the behaviour as during the frequency injection test.

> *7. Does the sampling rate of one second rather than 50 ms for Fast Contingency FCAS under Option 2 and the determination of the FCAS delivery at the inverter/controllable device level create market distortion or negatively impact the FCAS markets?*

We believe a 1 second sampling rate may be too slow to validate the response of each DER installation and may distort the FCAS market.

> *8. If Option 2 was adopted, should the changes to the measurement requirements of the MASS be limited to small-scale DER (under 1 MW per NMI), or should a different threshold apply, such as 5MW? For example, what do you see as the risks and benefits of expanding these measurement requirements to other FCAS providers and in what circumstances might that be appropriate?*

We believe changes in the measurement requirements should be limited to small-scale DER, however we don't have a view on the definition of small-scale DER. The limit should be balanced to maximise the efficiency of the market: low enough to ensure that the negative impact on the market of any relaxed requirements in the DER MASS is limited, but high enough to reduce the barrier to entry for the majority of VPPs consisting of small-DER.