Consultation on the Australian Energy Market Commission Directions Paper:

Review of the Regulatory Framework for Metering Services

Enphase Energy Aust. Pty Ltd. Submission

Project	AEMC Metering Framework Response – October 2021
File name	AEMC Metering Framework V1.02 210921
Revision	V1.02
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Date	15/10/2021

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1.0 Introduction

Enphase Energy would like to thank the Australian Energy Market Commission (AEMC) for the opportunity to provide feedback on the review of the regulatory framework for metering services.

Australia is a recognised leader in the adoption of DER, which has accelerated the change of Australia's energy mix, towards a renewable energy future. Support of the Renewable energy industry for over 20 years, has seen a transition from what was once considered a curiosity, to a commercially viable generation platform for Australia.

Renewable energy sources help meet part of, or in some regions exceed, energy demand. Consequently, grid stability issues have now emerged when favourable sun and wind conditions combine with low energy demand. When household consumption is low, the power exported to the grid can change rapidly according to weather conditions, resulting in a dynamic energy source. With the load base changing, this now presents challenges to grid stability and the provision of generation capacity via the NEM or locally.

With grid stability now the focal point of the expansion of renewable energy on the NEM, services such as frequency response and control are critical to the success of DER. The widespread deployment of DER now opens the opportunity for its participation in grid stability, by supplying near real-time voltage, frequency, and power factor readings.

Although work is progressing on adopting technology standards and protocols, such as IEEE 2030.5, OpenADR, CSIP-AUS etc., it will be some time before these can be fully implemented. Enphase firmly believes that grid services, such as grid stability and dynamic connection agreements can be achieved within a much shorter timeframe with existing technology, so that DER is able to meet grid requirements on the residential scale without the lengthy standards implementation processes. The controllability of DER and the utility metering requirements around this should be considered by the AEMC.

Enphase is actively involved with grid services globally as well as in Australia through our dedicated grid services team. With the release of Ensemble[1], gird services participation is a key area of interest for our company. Enphase has maintained an active presence in the DER regulation industry, with many of its employees' active members of Standards Australia committees and the clean energy council workshops and distrusted energy directorate.

The roll out of smart meters in states outside of Victoria and South Australia has largely been driven by DER installations and the need for smart utility metering that measure both import and export. Enphase believes the biggest challenge to improving metering framework is around the visibility of utility metering data and the availability of that data being incorporated into DER devices.

[1] Enphase Ensemble™ is Enphase Energy's latest grid agnostic energy system that combines all elements of PV generation, energy storage and Enpower advanced gateway functions in the one system with IEEE 2030.5 compatibility. Refer Appendix C.1

2.0 Enphase response for relevant sections to DER and utility metering

The main question that relates to Enphase Energy on the metering framework paper is question 4(b): “Are there any other options that you consider would better align incentives?”

When considering the best way to implement metering regulation framework with new and existing DER, there are two main pathways to consider:

1. DER meters could be used as the utility smart meter where the utility smart meter does not yet exist. However, this could be difficult to achieve as OEMs would need to register to become a meter supplier and provide 4G cellular backup communications. Therefore, due to the difficulties with barriers to entry and other underlying factors this method may not be a feasible solution.

2. Access to real time reading data from the existing utility smart meter for the OEM’s DER devices, so they do not require an additional meter to be installed on site. This could be done via SunSpec/Modbus TCP/IP or even IEEE230.5 interfacing, which most DER systems are compatible with.

Although all sites should be fitted with smart metering, when the site has an existing smart utility meter, then the data from that meter could be integrated into the DER interface via ModBus TCP/IP, SunSpec, or any other standardised communication protocols. This would reduce the overall cost of DER and smart metering for energy consumers. This will also avoid meter providers flipping CT’s or crossing over phases on the OEM’s DER meter when installing utility smart metering. This results in metering errors for the DER OEM and multiple trips back to site for the installer, hence additional cost of the DER system.

DER OEM’s becoming the utility meter may not be a realistic outcome, but as a minimum the DER meter should be able to see what the utility meter is reading, so they can perform key requirements such as FCAS and grid stability services. If we expect DER to behave in a predictable, productive, and helpful way, it needs to be able to read the same data that the utility meter is reading.

Other Key considerations

- The accessibility and visibility into utility metering data at the point of connection will help ensure the voltage range is within legal supply limits and grid stability, as well as export limits are maintained, as per the original grid connection agreement.

- Utility and DER metering should be capable of class 0.5 energy metering to ensure the accuracy and resolution of the meter is acceptable for use in Australia.

- Utility meters often do not have the capability to interlink with other behind the meter devices or energy management systems. DER metering does allow this integration which has many advantages of controlling behind the meter loads and battery storage systems.

- DNSP's should be given access to voltage and frequency data at a minimum, to ensure they have visibility of any grid stability and voltage range issues. This will allow DNSP's to quickly resolve customer voltage complaints and ensure the grid stability at the point of use to the consumer.

A.1 About Enphase Energy

Enphase Australia Pty Ltd is a member company of Enphase Energy, Inc. based in Silicon Valley, California, USA.

Enphase is a provider of energy management hardware and software solutions. It is engaged in designing, developing, manufacturing, and selling microinverter systems for the solar photovoltaic and battery storage industry. Enphase invented semiconductor-based microinverters in 2008 to convert direct current (DC) electricity to alternating current (AC) electricity directly at the PV module (solar panel). Enphase is now the world's largest manufacturer of microinverters.

Enphase is now the residential market leader in the USA with ~52% of all systems (2021).

In Australia, Enphase is based in Melbourne with staff located in all mainland states. Enphase runs an online technical support centre in Melbourne linked into other global Enphase CS centres to provide 24/7 support. Enphase New Zealand is the global hardware design and testing hub for Enphase employing over 90 Engineers and technicians in Christchurch.

An Enphase AC coupled microinverter system differs from the classic DC coupled string inverter systems found in most installations. An Enphase PV system uses multiple panel level "AC Microinverters" parts rather than a single central DC inverter: Enphase microinverters at each solar panel, an Envoy gateway and Enlighten cloud-based software. For storage, an Enphase battery system can be installed to complete a single platform for PV generation and battery storage with full remote access and functions.

Enphase microinverters provide power conversion at the individual solar module level by a digital architecture that incorporates custom application specific integrated circuits (ASIC), specialized power electronics devices, and an embedded software subsystem. Envoy bi-directional communications gateway collects and sends data to Enlighten software. Enlighten cloud-based software provides the capabilities to remotely monitor, manage, and maintain an individual system or a fleet of systems.

AC coupled Enphase systems provide significant safety advantages over classic DC coupled systems. Rather than running dangerous high DC voltages (up to 1000 Volts) to a remote inverter that requires special protection from DC arcs that can lead to fire, Enphase directly converts low voltage DC to normal AC right at the panel. This eliminates troublesome DC Isolators that introduce safety and reliability concerns.

Enphase invented the rapid shutdown system that is now mandatory in the USA. This system enables first responders to shut the entire system from one switch in a meter board so they can conduct search and rescue safely without fear of contact from high voltage DC from an unstable roof.

B.1 Enphase Energy Australian Engineering and Technical Support

Andrew Mitchell – Product Line Manager

With 13 years of experience in the solar industry Andrew has managed projects and products that have delivered pioneering solutions from 300W portable power packs to multi megawatt micro grid solutions. His work throughout the APAC region has given allowed him to develop perspective from all stakeholders such as consumers, installers, designers, manufacturers, and network operators.

David Minchin: Standards & Homologation Engineer

"David is based in Adelaide and has over 35 years of experience in solar/storage/remote power systems in commercial, project management and engineering roles. He provides standards support and product homologation for Enphase Energy in the Asia/Pacific region. He is an active member of EL005 Storage, EL042 Alternative Energy and EL064 Microgrid Standards committees. Most recently David was engaged to formulate the test reports in the new AS/NZS4777.2 standard for new requirements including the VDRT test that is the subject of this consultation. Prior work includes managing Clean Energy Regulator (CER) inspections across Australia and engagement to perform CER special analysis."

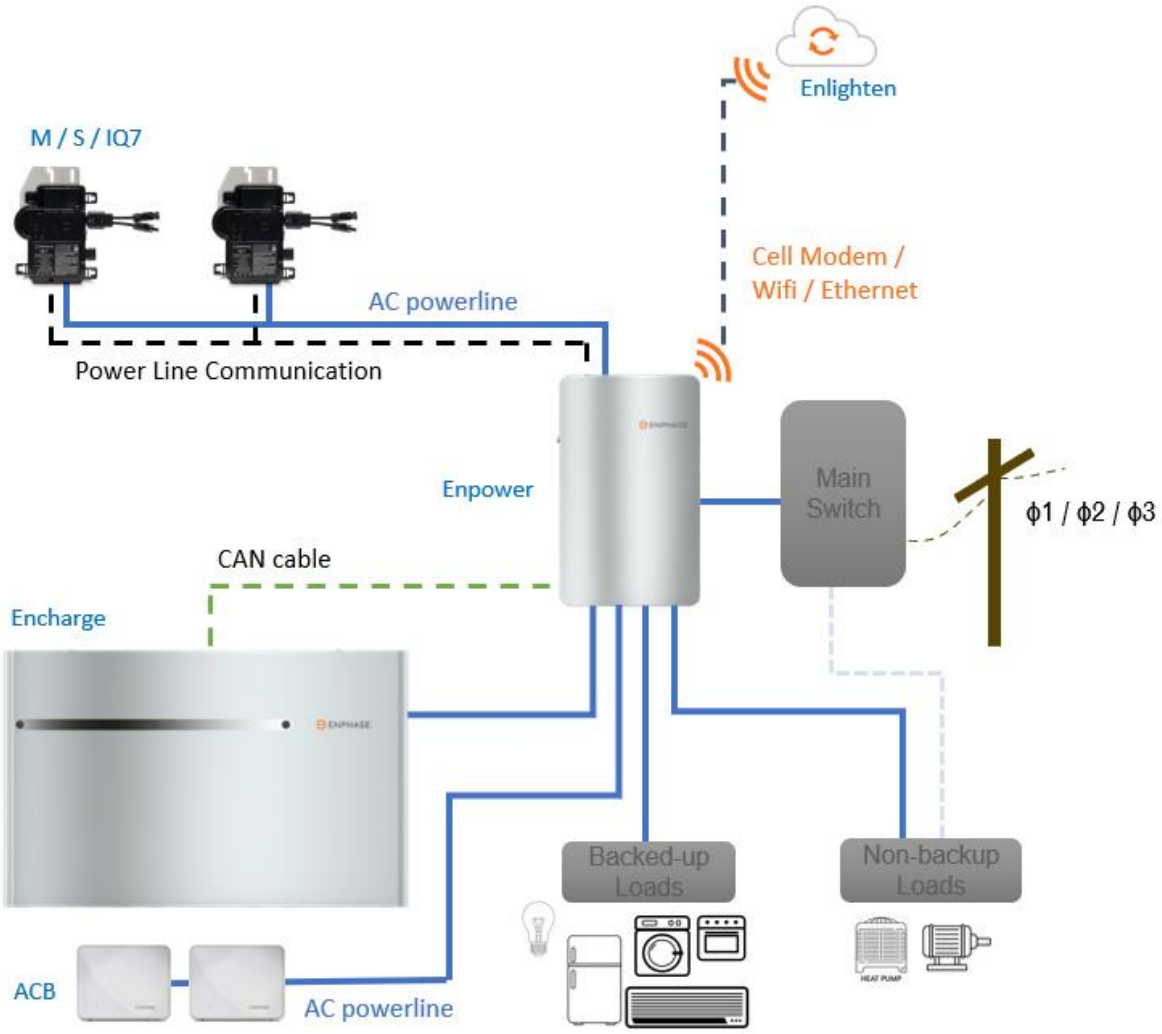
Ryan Turner: Field Applications Engineering Manager, APAC

"Ryan leads a team of engineers who provide pre and post installation support for all Enphase projects in the APAC region. He is a fully accredited CEC design engineer. Ryan specialises in supporting the larger, more complex commercial and industrial projects, as well as storage integration. Ryan is at the forefront of the Distributed Energy Resources industry, as an active member of the Standards Australia EL-062 Smart grids committee, as well as multiple CEC committees including the distributed energy directive, inverter working group and energy storage working group. Ryan has a master's degree in renewable energy as well as 5 years' experience in the Australian solar industry. Prior to Solar Ryan gained 5 years' experience working within the building energy and sustainability sector."

Wilf Johnston: General Manager, APAC

"Wilf has worked in the Australian solar industry for over 13 years, beginning with leadership of the engineering and commercial project team with SunPower Corporation, then later as the General Manager of Energy Matters and Flex. At Flex he introduced an innovative IOT platform focused on delivering energy insights and control to end customers. Wilf holds degrees in Engineering and Commerce from the University of Western Australia and has been a key contributor to industry associations including the Smart Energy Council. At the Clean Energy Council, Wilf was a founding member of both the Utility Solar Directorate and the Distributed Energy Leadership Forum, which provides policy direction to the organisation."

C.1 Enphase Ensemble™ Smart DER System



Enphase Ensemble™ is a complete DER system that combines PV generation, Battery storage, load scheduling and grid integration for small to medium size premises.

Central to the Enphase Ensemble™ is the Enpower™ Smart switch that sits between the grid and all DER consolidating all interconnection equipment into a single enclosure. This includes all control, switching, internet interface and metering of all connected ports on a single integrated platform. Enpower connects to the Enphase Enlighten cloud. Various API interfaces are available.

Enpower can also function as a microgrid interconnection device (MID) by automatically detecting and seamlessly transitioning the DER system from grid power to backup power in the event of a grid failure. This streamlines grid independent capabilities of PV and storage installations by providing a consistent, pre-wired solution for all applications.