

Enphase Energy Response to the OFGEM Connections end-to-end review of the regulatory framework Consultation (Themes 6 – ‘Minor connections’ only)

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Introduction to Enphase Energy and our UK activities

Enphase Energy is a U.S.-based manufacturer specialized in microinverters, AC-coupled battery storage, and EV charging equipment. We have a global presence and hold a significant market share in the residential solar PV sector in both France and the Netherlands. Our growing UK customer base includes several hundred installers in the residential and small commercial & industrial PV sector. These typically fall into the ‘minor connections’ category under Theme 6.

Notably, Octopus Energy Services has selected Enphase as their preferred product. As a result, there is a high volume of grid connection applications for residential systems to all UK mainland DNOs. We are aware that Octopus have prepared their own response to this OFGEM consultation.

Enphase products

Enphase microinverters differ from conventional string inverters. Rather than having a single inverter converting DC from a string of PV modules into AC, each individual PV module has its own microinverter, converting to 230 V AC immediately at the PV module. The microinverters may be directly attached to the PV module itself, or mounted on the array structure directly behind the module. They are interconnected with an AC bus cable which is then connected to the PV system’s point of connection. Microinverters can offer safety and performance advantages over string inverter solutions, enabling PV installers to offer additional value to their customers.

Enphase storage products are AC-coupled to complement the microinverter solution. This means each storage unit incorporates its own bi-directional inverter equipment to enable charging and discharging of the battery from an AC supply. An installation that incorporates both Enphase microinverters and storage includes control equipment to enable the overall system to operate as a complete solution. This allows participation in dynamic tariffs and virtual power plant schemes and ensures the full installation meets the latest G100 import and export limitation requirements.

Our system architecture dictates that any grid connection application includes a quantity of microinverters and, where storage is included, a quantity of AC-coupled battery units to determine the total installed generation capacity. Systems are installed in both single and three phase settings and in systems ranging from as few as one or two microinverters up to several hundred or more.

This product scalability dictates that when installed in smaller quantities, devices must be G98 compliant, whereas, when installed in larger quantities, the identical hardware must also be G99 compliant.

As a manufacturer we want to ensure that grid connection applications using our products remain straightforward for Enphase installers and easily support the deployment of LCT onto the UK electricity network. We believe that for ‘minor connections’, at no time should inconsistencies or unnecessary complexities in the grid connection process generate a reason for an installer to choose an alternative product or need to seek additional guidance from manufacturer to assist or intervene with grid connection approvals.

Response to Consultation

Enphase can offer opinions across many of the themes raised in the consultation document however based on the activities of Enphase installers, our focus is ‘Themes 6 – Minor connections’.

Issues: Question 6a – Do you agree with the issues we have identified? Are there any other issues under this theme that we should consider? Please provide data and evidence to support your views if possible.

Enphase fully agrees with the identified issues, particularly the lack of transparency and consistency between DNO processes, which is a major concern for us. Enphase installers frequently consult us regarding inconsistencies between neighbouring DNOs concerning what receives auto-approval versus what requires detailed assessment by a network planner. Through these discussions we try to educate DNOs about our products and how our system architecture differs from the string inverters they are more accustomed to. This can be successful when talking directly to individual network planners but on the whole DNOs have been unresponsive when we have offered any wider training or support that may help them accelerate the application process and reduce questions when handling an application using Enphase products.

We have identified several related areas under this theme that we would like to see considered, primarily related to the Connect Direct Portal. Enphase welcomes the development of the Connect Direct portal and immediately recognizes the advantages of the platform. However, our customers have encountered several challenges:

1. **Lack of clarity regarding auto-approvals:** From our work with installers across the UK, we observe that different auto-approval rules are applied by different DNOs. These rules are far from transparent for both manufacturers and installers. Ideally, these rules should be consistent across all UK DNOs to ensure uniformity. If this is not possible, the differing rules should be published in Connect Direct for each DNO. Perhaps this should be at the point where the MPAN is entered, and relevant DNO details can then be made visible to the applicant so expectations around what can be auto-approved can be set. This may give the applicant the opportunity to adjust the application to fall under the particular DNO’s auto-approval policy, rather than potentially being slightly over a threshold and unknowingly resulting in a lengthier application process.

2. **Defining products to suit the market:** As a manufacturer, we strive to develop products based around these thresholds in different markets to ease the grid connection process and maximize end-customer value. It is crucial that these values are published and have some longevity to allow manufacturers to refine our products and work with installers and DNOs to minimize workloads and speed up LCT deployment.
3. **Difficulties with online application form:** For solar PV grid connection applications, the Connect Direct platform has been structured around conventional string inverter technologies. It does not lend itself to applications using microinverter technologies like ours, resulting in an unnecessarily cumbersome application process compared to conventional string inverter products, particularly for larger systems. We often see that Enphase installers resort to the original email-based PDF application form approach because it allows more freedom to simplistically populate the form. Not using Connect Direct slows the process, reduces the likelihood of auto-approvals, and results in missing or incorrect information on the PDF application form. We find this limiting for products like ours. It potentially slows the adoption of novel PV and AC-coupled storage products that can offer the system owner advantages. We see installers choosing to use alternative products simply because they are confused about how to perform a grid connection application using our products via Connect Direct.
4. **ENA listings for inverters:** Product listings on Connect Direct are taken directly from the ENA Type Test Register. While this is logical, the ENA has insisted that our products are listed in a confusing manner for installers, with different G98 and G99 listings for the same hardware, where the G99 listing is for a multiple of microinverters and therefore listed with an unexpected power level compared to the rating of the microinverter hardware itself. This has resulted in a lack of clarity about which products to select in Connect Direct when preparing an application, particularly now that the installer no longer defines whether it is a G98 or G99 application. Consequently, either installers choose to drop our product in favour of one that works better in the application form or they contact Enphase Technical Support for guidance, creating additional technical support workload. Perhaps now, when the same hardware is listed and approved for both G98 and G99, there should be only a single line item in the Type Test Register for that piece of hardware rather than two different line items for the different compliance requirements. This also applies to requirements for Northern Ireland, where there are yet more line items. This would make for a shorter list of products to select from and a simpler process for the installer to follow.
5. **ENA listings for standalone export limitation devices:** The ENA listings require separate entries for single and three-phase export limitation devices, rather than allowing a single piece of hardware to be identified as suitable for both applications. This creates additional, unnecessary line items in the Type Test Register. Again, installers are prone to select the wrong line item and then have difficulty with an application as a result. This adjustment would be a simple improvement to reduce the number of line items the installer needs to choose from.
6. **AC versus DC coupling of storage products:** Due to AC coupled battery products increasing the installed generation capacity at the site, we have encountered DNOs actively encouraging customers to use competitor's DC coupled products purely

because they prefer to avoid the use of AC coupled units as part of an application. Often this is done based on misinformation and a lack of understanding of our system architecture. Our proposal for manufacturers to be able to provide training to DNO network planners could overcome this.

7. **Power limitation compliance clarification:** There is a lack of formal guidance for manufacturers around how to manage compliance of products with regard to power limitation (as opposed to export limitation). It is possible for Enphase to software limit both our microinverter and storage products so they operate at a reduced maximum power level. This value would be set by the installer at commissioning, similar to an export limit. This approach ‘may’ allow for a reduced installed generation capacity to be considered for a particular site and allow installations to proceed that would otherwise had the grid connection application rejected, require down-sizing, or necessitated reinforcement works. For manufacturers, the compliance requirements in this area require clarification. The latest products can be set via software to operate at any maximum power level (within the capabilities of the hardware). DNOs have suggested we have ENA register listings at defined kVA increments, but for a product which can be set to operate at any maximum power level, this appears to be a limitation that reduces the value of a product designed to maximise the utility of the available grid connection capacity. Enphase would like compliance requirements in this area to be clarified and to have the flexibility to operate within defined ranges rather than at specific maximum power levels.
8. **EV charging point listing:** We have recently added our EV Charging point to the Type Test Register. As a manufacturer, it remains unclear whether this is a mandatory or voluntary requirement. We support it becoming mandatory. Additionally, it would be sensible to include a requirement for evidence of UK Smart Charging Regulations compliance to be provided with the listing. Currently, it is not clear what documentation is requested to support the product submission for EV charging points.

Proposals: Question 6b – What are your views on our proposals designed to address these issues? Are there other proposals you consider would achieve the intended outcomes?

Enphase support all proposals, including proposal 6e to encourage alignment from all DNOs on a common auto-approval threshold. The suggested value of 5 kW per phase, perhaps in combination with an export limit of 20 A would be helpful to the industry. If consensus cannot be reached, then at worst these limits must be made transparent for the applicant and published in Connect Direct.

For proposal 6b, to help minimise inconsistencies between DNOs we would encourage more open discourse between equipment manufacturers and DNOs to help them better understand the products being installed. We observe that a lack of familiarity in the technologies used, not only slows the application process due to the need for many questions (which often exposes the DNO’s lack of technical understanding of the product) but also creates inconsistencies where one DNO has developed a stronger understanding than others and then treats applications differently as a result. As already mentioned, we often intervene to support an installer in a direct discussion with an individual network planner. Following some discussion issues are typically resolved and installations go ahead however it would be

more efficient to be able to offer some level of training to groups of DNO network planners to increase their understanding of the products and how they apply to different installation scenarios. This manufacturer training could even be CPD accredited for the network planners.

Anything else: Question 6c – Do you have views on how poor performance could be addressed under these proposals to ensure the smallest scale customers are protected and LCT roll out is supported?

For proposal 6f, we believe part of the reason installers fail to submit grid connection notifications/applications is because they struggle to follow the administrative process to formulate the submission and lack training/education on the topic. They also don't fully understand the impact on their customer if they fail to follow the correct grid connection process.

We find installers respond well to online training for topics such as this. There are third party companies who offer training in this area, however the content comes from their experience of submitting applications, rather than from those assessing them. We believe training should be made available to installers, facilitated by the ENA, where actual network planners share their experience and help increase the quality and accuracy of notifications/applications, also to highlight impact on the network and the system owner of a new system not being correctly registered with the DNO. Perhaps a mixture of real time webinars that installers can attend or pre-recorded content (consider how the HMRC supports individuals with self-assessment training content). Perhaps this could be done in conjunction with the MCS Foundation within their Skills and Education initiative.

Further to this, and specifically for residential scale applications it may be very helpful for installers to have access to example electrical schematics that include all the information that the DNO require. We see many poor quality diagrams or very generic diagrams that fail to provide the correct information – this is of an issue for larger commercial & industrial scale systems where a full system design is generally created.

Contacts at Enphase

If you would like to have further discussions the key contact people at Enphase UK for this subject are:

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