smarter grid solutions

Optimising the value of energy storage, flexibility and response

Dr Laura Kane & Dr Rachael Taljaard

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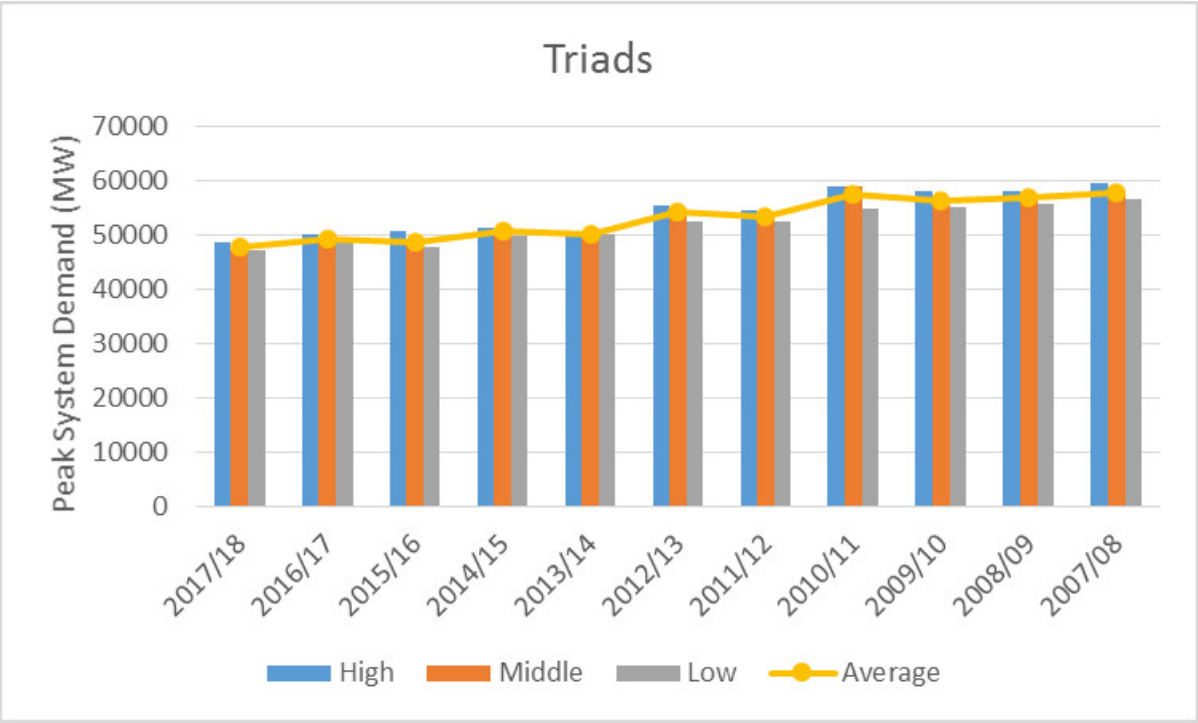
At the end of March, National Grid published the results for the 2017/18 triad periods. The triads are defined as the highest periods of demand on the transmission system, with at least 10 days between them. These figures are then used to calculate the Use of System charges for the transmission network, so it is in everyone's best interests to keep this demands low. This year's results, however, showed that these were the lowest triad demands for decades.



The low results for 2017/18 could be a result of a number of things:

- There is an increase in the number of parties providing demand response services, in particular, those which focus on reducing triad peaks.
- There is an increase in behind-the-meter generation or energy storage systems which results in a reduction in demand at the point of connection.

While it's not possible to determine the cause of these values at the moment, what we **can** comment on is that flexibility of the system is increasing, and now more than ever, participants in energy markets are looking to stack revenue streams and maximise income where possible by providing a range of services to the system operator.

There are also other reasons to consider behind-the-meter solutions. With the lack of new capacity available on the network, developers are keen to maximise the potential at existing sites and one common area of investigation is the potential of behind-the-meter energy storage connected to an existing renewable development.

Battery Storage Already Being Planned

In the USA, Bay State Wind have announced plans to develop a 55 MW/110 MWh energy storage solution alongside their 800 MW wind farm. The business model for the energy storage system is to work with the wind farm to overcome any winter reliability challenges and ensure energy is supplied when needed to keep winter peak energy prices down i.e. reduce high demand energy spikes. Given the large number of offshore developments in the UK, similar models could be explored to maximise the export and services provided by offshore wind farms.

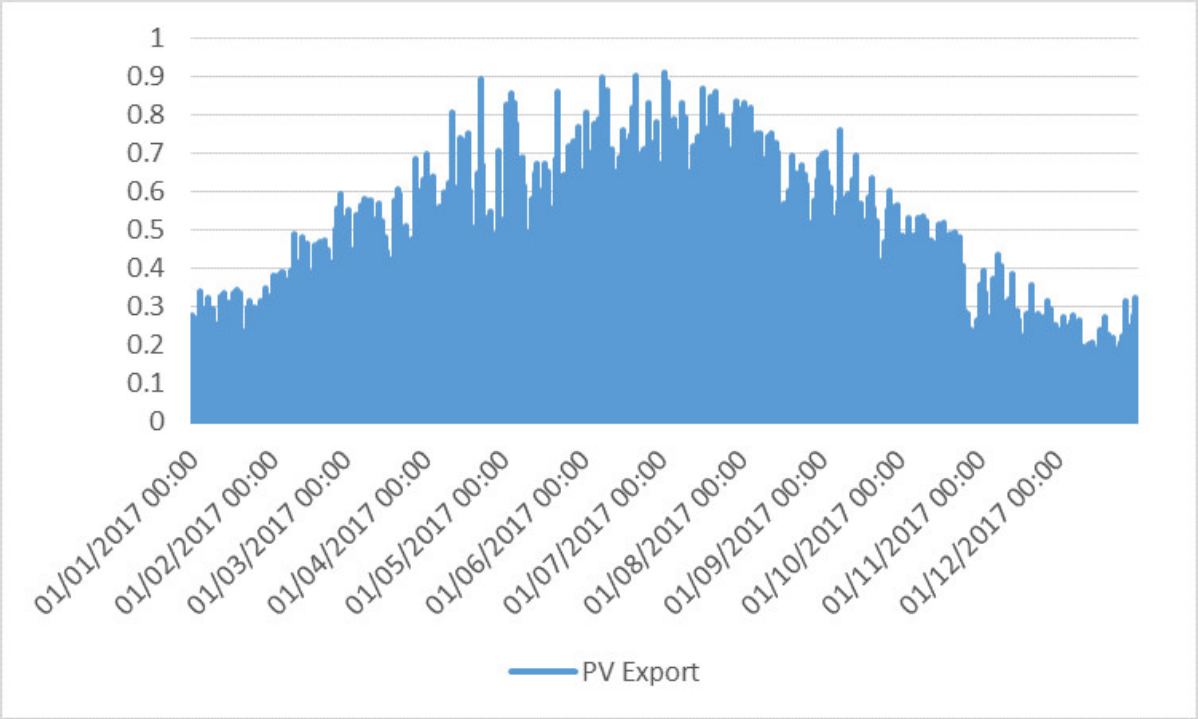
At the other end of the scale, behind the meter storage at a domestic scale could have an equally large impact on system demand should they be rolled out at scale across distribution networks. An example of this is the new project from Northern Powergrid, The Distributed Storage and Solar study, which will monitor 40 energy storage devices alongside 27 residential PV installations to test whether the battery can allow for more residential PV installations (by supporting local issues such as reverse power flow, or voltage rise). In this instance, the DNO is in control – deciding when the charging and discharging of the battery devices occurs however, if a local market could be created for energy services in the future then pricing can be used to indicate when the DNO requires certain types of support.

With the UK now encouraging and embracing a transition from Distribution Network Operator (DNO) to Distribution System Operator (DSO) there are opportunities for behind the meter energy storage to play a significant role. The transition to DSO will see the development of local and competitive markets and the network operators will play a bigger part in managing network flows, supply and demand. In order to achieve this, the DSOs must pick the most competitive option for balancing, constraint or bottleneck management.

Developers are realising there is a limit to the opportunities for storage in front of the meter. The value in the Fast Frequency Response programme is expected to drop, and the Enhanced Frequency Response programme is competitive, with the market underperforming so far. Developers are shifting their perspective to behind the meter and there are opportunities in energy arbitrage, optimisation of existing site exports/profiles, and local markets. As local markets develop energy storage can help to reduce the developer's exposure to high power prices and help to reduce network constraints.

Behind the meter storage also makes a lot of sense from a network

connection point of view. Many new distribution level connection applications are facing various network constraints, so it makes financial and technical sense to install energy storage in locations that already have a grid connection. This typically sees energy storage co-located with wind or PV generation. In some cases the grid connection may be oversized for the installed capacity of the generation. Introducing energy storage at an existing site also means that the export profile can be optimised. The classic annual PV profile, shown below, for example, can be smoothed over the course of the year by charging the battery when excess power is available, and exporting to the grid when it is not. The principle for energy arbitrage is similar, with the battery charging when the price of energy is cheap and discharging when it is higher.



Regardless of scale of deployment, energy storage can be optimised to maximise the value to the wider energy system. The type of optimisation and its aim will vary depending on the business model and ownership. For example, a developer owned storage solution can sign a contract to provide services to the Transmission System Operator during fixed periods, and these periods can be agreed in advance. Outside of these agreed periods, the developer is free to offer other services to other buyers e.g. supporting the local distribution network.

Combining behind the meter solutions with battery storage assets can

increase the potential for renewable generator sites. Developers don't have to rely on the DNO to provide a solution. Stand-alone solutions like ANM Element can co-ordinate assets behind the meter. Using optimisation algorithms, sites export can be maximised based on the available resources and to allow the site to offer more to the system – either be providing energy via a PPA, or offering services to the system operator. ANM Element can also be easily integrated into a wider Active Network Management (ANM) scheme.

Any progress that can be made today to better enable distributed generation to become a flexible, controllable, market participant will ease the transition of the energy system. The way to ensure this is through the installation of asset control, monitoring, and data management solutions. To further enhance DG, storage, and optimisation can be combined to boost the efficiencies of the site to meet service requirements or to generate the most energy possible for the system – at the lowest cost to the consumer.

Request a call back

About SGS

Smarter Grid Solutions (SGS) is a leading provider of distributed energy resource management system (DERMS) software with the company about to exceed 1.3GW of renewable generation, energy storage and flexible load under control through 2019. With offices in New York, Glasgow, and California, SGS is a global solutions provider to distribution utilities and distributed energy resource operators.

About ANM Strata

ANM Strata is Smarter Grid Solutions' world-leading enterprise solution for utilities and renewable generation operators. With its unique real-time control platform it delivers sub-second, precise control of renewable and other energy assets across a wide area from a centralized location.

About ANM Element

ANM Element is Smarter Grid Solutions' local control solution managing a smaller number of low carbon technologies in a local area in both local grid

connection management and behind-the-meter operating modes. ANM Element can also integrate seamlessly into an ANM Strata system for wider asset control.

Contacts

Laura Kane
Senior Consultant