PowerOn Technologies Limited

Submission to RP6 Draft Determination

Executive Summary

"Three innovations will help us deliver greater flexibility – interconnection, storage, and demand flexibility – which have the potential to displace part of the need for new generating capacity, save money for businesses and domestic consumers and help the UK meet its climate reduction targets. The saving could be as large as £8 billion a year by 2030."1

Distributed energy storage has the potential to address several issues at the core of RP6; security of supply for Worst Served Customers, diminishing returns from investment in rural networks, understanding how network assets can be managed in a smarter way and what customers should be asked to pay.

NIE Networks suggested 2.8% of their RP6 'Investing for the Future' allowance be spent on Energy Storage Facilitation Literature Review. NIAUR reduced this to 0% because it wasn't clear how customers would benefit or how it would be evaluated. PowerOn are seeking [redacted]

Why PowerOn want to run a pilot

''Storage facilities placed .. at the consumer could alleviate the pressure on the grid, increasing the stability of the supply and demand at the point of …consumption. "[2]

According to leading commentators energy storage technology has been voted by the industry as one of the top ten transformative technologies in the utility space. This is because it may prove to deliver a range of benefits and solutions to networks, such as being able to soak up and store electricity at times of high supply from renewables, shave off the peak demand levels by supporting 'in-situ' consumption and assist further by releasing the energy back into the grid to support voltage and/or frequency issues.

Equally importantly it could help stimulate the electricity market, as measured by enhanced reliability and lower consumption costs for customers along with opportunities for DNOs to reduce 'cost to serve' energy storage customers.

[1] Lord Andrew Adonis, Chair, The National Infrastructure Commission

[2] EU COMMISSION STAFF WORKING DOCUMENT Energy storage – the role of electricity, Brussels, 1.2.2017 SWD(2017) 61 final

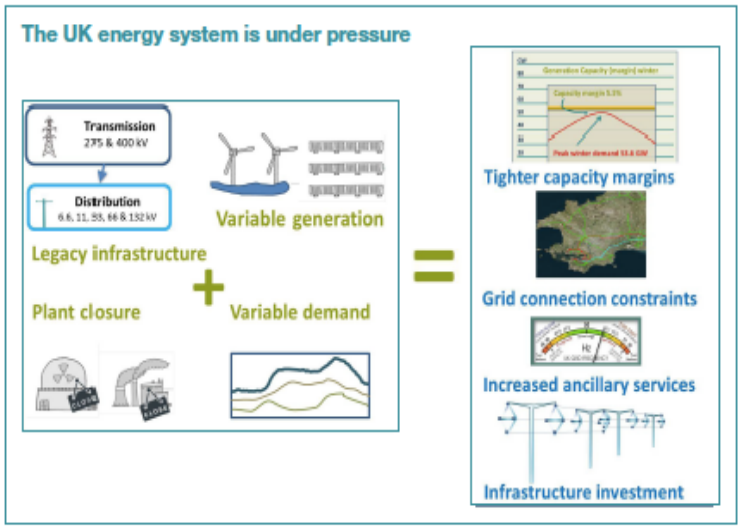
We in PowerOn Technologies Limited know from direct, personal experience that NIE Networks has indeed a pivotal role in terms of 'keeping the lights on' and that the effectiveness and efficiency of NIE Networks are key to domestic consumers, along with industrial and commercial customers.

We also believe that Worst Served[3] customers deserve more. They deserve a more resilient domestic power supply, a smarter system that enables capital expenditure on rural networks to be targeted based on robust data and allows domestic customers to collectively access the sources of economic value in the market that to date have been reserved for large, corporate players.

We believe that distributed energy storage 'behind the meter' will help to keep the lights on, improve the efficiency and effectiveness of power networks in Northern Ireland because

1. It can be a key component in providing flexibility and supporting renewable energy integration in the energy system
2. It could participate effectively in electricity markets
3. It could provide demand response services in areas right across Northern Ireland more effectively than other providers
4. As an enabler of higher amounts of variable renewable energy sources, could contribute to energy security and decarbonisation of the electricity system and of other economic sectors such as social housing
5. The cost-efficient use of decentralised storage and its integration into the system should be investigated in a rigorous, customer-led manner by the regulatory framework

Figure 1 Pressure Factors Regen SW Energy Storage Pg. 7



We also believe, however, that the Northern Ireland network is an ideal test-bed to deploy a meaningful, rigorously evaluated, domestic energy storage pilot with customer benefits at its heart.

Recent research by Regen SW[4] describes the UK system as under pressure. The factors they identify in the graphic at Figure 1 are applicable in NI, to an even greater degree in many cases.

[3] NIE Networks 'Investing for the Future' RP6 Business Plan, p. 113
[4] Regen SW 'Energy Storage – Towards a commercial model' – 2nd Edition

- Northern Ireland system and network operators have acquired domain-leading expertise in managing very high levels of variability on an 'old-style' network.

- Our local universities have secured a strong position in the relevant research fields, along with substantial funding.

- Our enterprise development agencies have created collaborative networks among indigenous suppliers along the potential supply chain.

These components can be brought together for a valid, insightful pilot with actual customer benefit. The RP6 Determination is an ideal vehicle to facilitate such a pilot.

PowerOn Technologies Ltd want to [redacted]

It has been noted in the NIAUR Draft Determination that expenditure on innovation by GB DNOs is higher than NIE Networks, on average. It goes on to suggest that " In general, the trials should be sufficient to inform future application. It should address the generic technology (as opposed to the specific type tested)".[redacted]

Field Trial/User Acceptance

PowerOn Technologies Limited is a wholly owned subsidiary of MCG Services Limited and they have been working closely with University of Ulster (UU) Centre for Sustainable Technologies (CST) on a series of experiments or tests.

Test 1 Underway: Prototype in UU CST Terrace Street 'test houses' to confirm basic technology and economics. This has been carried out by UU, with funding from MCG and innovation grant assistance from Invest NI.

Test 2: 'User Acceptance' product field test [redacted]

This project will test [redacted].

Such a trial would provide clear, quantifiable evidence in the form of performance, profile and network impact along with quantitative and qualitative customer experience feedback.

[5] MCG edited extract from NIAUR Draft Determination

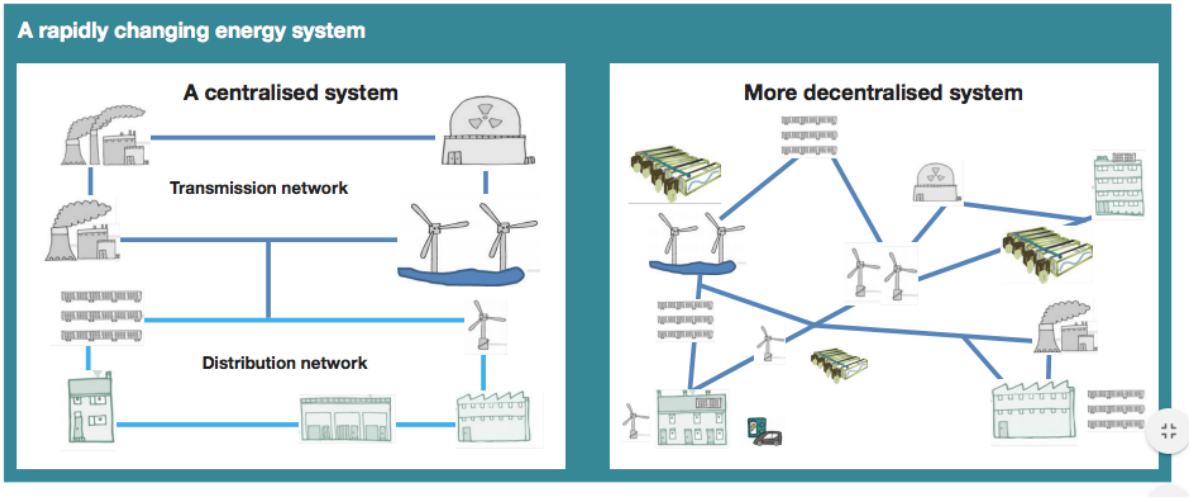


Figure 2 Regen SW Energy Storage 2nd Edition P. 6

Locational Value

Energy storage can be sited at three different levels: behind the meter (on the consumer's premises), at the distribution (network) level, or at the transmission (grid) level. Energy storage deployed at all levels on the electricity system can add value, however customer-sited, behind-the-meter energy storage can technically provide the largest number of services to the electricity grid and critically, greatest value to the individual consumer. Furthermore, customer-sited storage can provide perhaps the most important energy storage service of all: backup power. It is crucial to analyse how economics change depending on where energy storage is deployed on the grid.

This requires a field trial to quantify the benefits that storage can bring to consumers in different locations.

The early stages are structured as a series of tests. The aim is to validate the technology, the market, customer assumptions and slowly build promoter and stakeholder confidence. It is anticipated that each test could result in iterations of model, technology and stakeholder configurations.

Cost Benefit Analysis/Stacked Services

The current system and market arrangements can create value for customers and the system, but leaves significant value untapped. Field trials are necessary to establish how using batteries for a primary application and also using them to provide multiple, stacked services can create additional value for all electricity system stakeholders.

[redacted]

Customer Led

Alternative Approaches to Domestic Energy Storage Network Innovation

In some North European jurisdictions, an 'early adopter' incentive model has been deployed.

German PV Model

In Germany a 30% grant payment for domestic energy storage was introduced to encourage uptake. Storage systems were being fitted as "standard" for 41 per cent of new PV installations in 2015[6], with 4.4 kWh systems selling at between € 5,500-7000.

The subsidy scheme is now in its second round. The first programme ran until the end of 2015 and was a grant of 30%. Since 2016 the program has continued, with the grant being reduced step by step until the end of the programme at the end of 2018. Currently the grant sits at 19%; from July it will be reduced to 16%.

There are several elements to the programme which are proving problematic. The subsidy is coupled with a loan from the public KfW Bank. Customers must take a credit facility for the whole storage system and then claim the subsidy. As a result, you pay back a part of the subsidy in interest payments on the total credit provided. Many people prefer to just pay for the system outright rather than take on personal credit with interest payments.

There are also many regional subsidy programs that are different from region to region.

There is a view in Germany that the perfect subsidy would be a certain percentage of the storage system cost that works without credit and with minimal bureaucracy. There should be also a requirement for supporting grid-friendly charging behaviour. If not, storage if installed in large numbers, can cause problems for local grids. This would be a strong negative for its acceptance by stakeholders and could impact on all electricity bills.

Swedish Model

In Sweden, a $5,000 subsidy for households installing domestic energy storage has recently been announced[7]. This approach encourages 'early adopters' but there are no indications of any mechanism for understanding the impacts on networks, sub-groups of potential customers with needs or the impact on markets.

OFGEM RIIO Ideas

A recent Utility Week article reviewed OFGEM thinking in this area. One proposition is to adjust the innovation component of the RIIO price control to allow DNOs to "prime the pump" for a limited time before market-based deployment for storage takes over. The

[6] KIW Development Bank data – Energy Post July 2016

Ofgem position appears to be “We don’t think network companies need to own or operate storage, because it might stifle development of competition in the market.”[8]

If not now, when?

Domestic energy storage today could be an “early move” for some stakeholders and participants in the value chain and a “wait” for others. RP6 presents an opportunity to shape a nascent market and allow a strategy and policy to be developed on an ‘evidence-based’ approach that ensures delivery for domestic customers. This can be measured by safety, reliability and availability, a benign impact on our environment and customer experience.

[8] Utility Week, 10-16 February 2017, “All talk and no action”