

Centre for Sustainable Technologies

Ulster University

Response to UREGNI RP6 Draft Determination

Context

“We will see as much innovation in the next eight years as we’ve seen in the last 25”.

Dr Mike Howard, President and CEO of the Electric Power Research Institute (EPRI), 2015

Power systems around the world are undergoing fundamental change. The traditional centralised model, designed around a one-way flow of energy from large generation plants to end users via power networks is being disrupted by the rapid rise of consumer-owned, distributed energy resources (DER) such as rooftop solar PV, domestic battery systems and demand response technology. The common characteristic of most DER is that it is owned by consumers, and located ‘behind the meter’ in homes or business premises.

The energy sector in Northern Ireland has seen important changes over the last two decades, including market liberalisation, integration with the all-island SEM, and the uptake of renewable energy sources. Nevertheless, options and benefits for consumers have so far been limited. The energy system is still largely driven from the perspective of supply-side actors. Consumers (both domestic and commercial) have so far been viewed as passive. While possibilities for larger commercial and industrial consumers have started to develop, market engagement is not possible for most NI residential and SME consumers. ‘Consumer Empowerment’ and ‘Prosumer’ have become buzzwords in energy policy because the wide-scale deployment of DER presents an opportunity to make consumers active market participants, and to put the consumer at the heart of the energy system. However, for NI consumers to fully realise the benefits of what has been termed ‘the democratisation of energy’, a radical change in our approach to innovation is required.

In order to deliver for NI consumers, we believe that innovation, particularly in the future role of DER, should be at the heart of NIEN’s business plan. Continuing with a traditional ‘poles and lines’ approach in which consumer participation is categorised as a parallel rather than a central component of network planning not only means that consumers will miss out on new income streams, but the failure to tap into demand-side resources also means that the NI energy system will miss out on significant potential for flexibility, system efficiency and sustainability.

Much DER technology is not experimental but proven. In networks in GB, Europe, Australia, and the United States consumer-owned assets, in particular distributed energy storage, are already reducing the need for reinforcement, dealing with network congestion and managing the variability of renewable energy resources. The NI network has to serve a largely dispersed, rural population. The locational value of decentralised management assets like consumer-owned storage is potentially huge. However it will require a significant programme of R&D to accurately assess the costs and benefits of DER.

The final determination on RP6 will set the course for network investment until 2024. NIEN must urgently begin to assess through field trials and demonstrations the value of technological and commercial innovations that are already empowering consumers in other jurisdictions. During the period of RP6 NIEN must be able to respond to new advances that will certainly emerge. Without a fundamental reappraisal of innovation we believe that there is a significant risk that NI consumers will end up paying for an outdated and uneconomical network, and that they will not realise the benefits of the technologies and commercial innovations that are already bringing benefits to consumers elsewhere.

RP6 'Investing in the Future'

Annex O of the draft determination (DD) refers to the £10,480 million proposed by NIEN for its 'Investing in the Future' plan; this figure is reduced to £7,260 by UREGNI in the DD. Our main observation is that the £1 million per year that this allows for R&D projects over the period of RP6 is wholly inadequate, especially at this time of intense technological innovation.

While this level of funding may have fitted the relatively steady pace of grid evolution of the past, it is inappropriate today. The impact of innovation (and the disruption which follows) is unpredictable. The unique challenges faced in the NI power system will require rigorous analysis of data generated through network-connected trials and demonstrations. The point of funding R&D projects is to identify those technologies that can deliver the greatest benefits.

We believe that the level of funding for NIEN's 'Investing in the Future' plan should be completely reassessed and a new annual R&D investment allowance should be calculated to allow the development of an NI programme of innovation. This figure should be commensurate with the level of innovation investment currently available in GB.

Assessment of R&D Objectives

We feel that the approach to field trials and demonstration projects in Section 4.46 of Annex O is too prescriptive. Many R&D projects fail to deliver expected outcomes and it is not possible to fully quantify costs and benefits before a trial; indeed this is the whole point of a trial. This however does not mean that R&D projects should not be based on a reasonable expectation of success, or that trials should not have SMART objectives (Specific, Measurable, Attainable, Relevant, Timebound).

Despite having good trial design and objectives it should be remembered that failure is not a mark of inefficiency – a negative result is still a result, which in the context of grid innovation in NI could prevent money being wasted on technologies or systems which seemed likely to be beneficial and may have worked elsewhere, but turn out to be inappropriate here.

Network Innovation in GB - The RIIO Model

RIIO (Revenue equals Incentives plus Innovation plus Outputs) is the model used by Ofgem to set revenue/price controls for electricity (and gas) networks in GB. RIIO is similar to RP6 in that it is a cost-based model for ex-ante regulation of network revenues and prices. However RIIO is more focused on the outputs that networks deliver (rather than just cost inputs) and provides strong incentives for innovation.

In addition to the outputs-focussed incentive mechanisms built into the RIIO model, Ofgem also offers funding specifically for innovation through the Low Carbon Networks Fund (LCNF) and the Network Innovation Competition (NIC). These schemes provide an additional £150 million for network innovation each year.

In addition to the significant innovation funding, BEIS and Ofgem have recently issued a joint 'call for evidence', seeking stakeholder views on how to facilitate a transition to a smarter, more resilient and more flexible energy system. This addresses issues such as regulatory or other barriers to the deployment of storage; how price signals can be improved in order to provide better signals for system flexibility; issues associated with increasing penetration of smart appliances and demand side response technologies; and the role of new entities such as Distribution System Operators in system and network operation.

We recommend that the results of this call should inform an NI programme for innovation.

We also urge UREGNI to consider a similar call for evidence in NI, particularly in the context of the transition of NIEN from DNO to DSO.

Incentivising Innovation

In the absence of NIC and LCNF, DfE should consider how further funding for innovation could be leveraged, including;

- Whether the Barnett Formula creates consequential in NI which could replicate NIC and LCNF funding in GB
- The potential for the use of Financial Transactions Capital to incentivise third party investment in innovation
- Seeking State Aid rules derogation for investment in a programme of network innovation
- Engaging with business-led funding through, for example, Invest NI and Innovate UK

In addition to a level of innovation funding commensurate with GB, we suggest that UREGNI should consider an uplift on NIEN's rate of return on innovative pilot schemes which are assessed ex post as delivering clear benefits to consumers (uplift should not be applied to schemes, or those elements of schemes, which deliver benefits solely to NIEN or third parties). This practice has been successfully adopted in other jurisdictions, for example in Italy, where network operators are allowed an additional 2% on capex for innovation.

Further to this we suggest that UREGNI should consider extending the uplift to capex for successful innovation trials which are rolled out across the network. For example, if a demonstrator scheme

showed that some form of aggregated, consumer-owned DER was cheaper than a planned grid reinforcement using a conventional 'lines and poles' approach, and delivered clear benefits to consumers, then the uplift should be applied to all subsequent capex on the innovative solution.

Risks of failure to innovate

NI has a relatively small industrial base. Baseload demand is largely dependent on fewer than 20 companies which are categorised as Large Energy Users (LEUs). Baseload consumers like these LEUs bear a disproportionately high burden of the cost of the NI network.

Advances in technology and the reduction in the costs of off-grid solutions like solar PV and battery storage have led to the threat of grid defection in networks elsewhere, for example in the US. We believe that there is a real risk of LEU grid defection during the period of RP6. Given the small number of baseload consumers here, we believe that this could rapidly result in a vicious circle of increasing fixed grid costs leading to further LEU defection.

The impact of an ever-declining ratepayer base would be most keenly felt by domestic consumers, particularly the very high number of NI domestic consumers in, or at risk of fuel poverty. We therefore believe that a programme of innovation, based on DER, and which incentivises consumers (particularly LEUs) to become active participants in energy markets is urgently required.

Current Innovation Projects

In the last 18 months UU has secured over £8 million in research funding for distributed energy storage. It is noteworthy that this figure is more than was allocated to NIEN in the DD for its 'Investing in the Future' plan for all network R&D for the entire period of RP6. UU is seeking to leverage these funds to generate further R&D and innovation capacity in this area.

We are currently engaged in a number of 'shovel-ready' joint academic/industry partnerships through Invest NI which urgently need to get network-connected trials underway, including domestic energy storage and district energy schemes. Real-world data from these trials will be used to assess the relative costs and benefits of DER through PhD-level research.

Notwithstanding our call for a reassessment of innovation funding for RP6, we believe that these trials must be urgently progressed in order to address the lack of network innovation studies in NI.

In order to generate synergies and maximise the benefits of innovation expenditure, we would urge that NIEN should align its R&D as closely as possible with UU's distributed energy storage research programme, and work being carried out by other research organisations and third parties (including Invest NI-funded businesses, energy retailers and SONI).

Summary

- In order to address the current lack of innovation projects in NI, existing 'shovel ready' R&D projects should be expedited immediately
- The level of investment in innovation outlined in RP6 is inadequate and should be replaced with a new programme of network innovation, funded at a similar level to innovation in GB
- A programme of network innovation should co-ordinate the R&D work of NIEN, research groups, Invest NI, start-up companies, existing utilities and SONI
- In addition to an expansion of funding in 'Investing in the Future', UREGNI should consider allowing an uplift on innovation capex
- UREGNI should consider extending this uplift to innovative solutions which displace conventional capex
- DfE should examine how government funding for network innovation might be accessed
- R&D schemes (trials, etc) should be outcomes-focussed, rather than costs-focussed
- Innovation outcomes in NI should be focussed on two key groups, LEUs and the fuel poor
- The approach to trials and demonstrations should be less prescriptive – it must be expected that some will fail
- There is a risk of grid defection by LEUs during the period of RP6
- DER provides the opportunity to put consumers at the heart of the energy system