

RIIO-2 sector specific methodology consultation

Response on behalf of the University of Manchester School of Electrical and Electronic Engineering

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General

This response relates directly to the Impact the innovation funding mechanisms have had on the University research sector and the very large positive benefits achieved. These benefits accrue directly to consumers in improved network efficiency and indirectly in promoting the growth and retention of key knowledge and skills in energy networks in the industry and in the institutions required to provide the future workforce for the industry at graduate and postgraduate level. Often the network company funding through the innovation mechanisms has been highly leveraged with money from supply chain companies and UKRI (and its predecessors) to fund larger collaborative projects that retain a close industry link.

The innovation funding mechanisms included in RIIO 1 have generally been effective in allowing the licensees to invest in a range of projects from large NIC funded projects to individual PhD projects. The small-scale projects funded under NIA can be particularly helpful to the continued close collaboration between network companies and Universities because they allow work in relatively niche and/or speculative areas that might not otherwise be considered in larger projects.

It is considered essential to the long-term welfare of the industry as a whole, including the University departments focused on the range of issues important to the running of the networks today and the energy system transition that sufficient funding is available to the network companies for them to fully participate in and lead innovation. There is a particular need to provide long-term continuity in funding to allow for the timescales required to acquire the knowledge, skills and reputation to attract world-class researchers. The lifecycle of individual projects is up to four years and programmes of work often require timescales similar to or longer than that of the regulatory review. Work being proposed now will span across RIIO-1 and RIIO-2. Uncertainty regarding the future of NIA is already having a dampening effect on the ability to plan at a critical time in the industry. A timely indication of (or ideally a decision on) the direction innovation funding of is therefore required.

Response to specific questions

CSQ44

Do you agree with our proposals to encourage more innovation as BAU?

In general, any encouragement to spend on innovation is welcomed; however, it is understandable that a commercial company will tend to focus on increasing returns in a short to medium term and will tend to keep IPR to itself particularly where it provides a competitive advantage. In a regulated but regionally and functionally segmented industry such as in the UK, there need to be incentives on

longer term and industry wide projects to avoid unnecessary duplication and ensure the outcomes advantage the industry and consumers as a whole.

CSQ45

Do you agree with our proposals to remove the IRM for RIIO-2?

It is inevitable that some innovation expenditure will not ultimately make it to BAU, and some innovations provide such positive financial or other advantages within a regulatory period that they will be adopted anyway. However, there are some innovations, particularly those associated with energy system transition (EST) to a Zero Carbon future that may need additional funding within RIIO-2. It is difficult or impossible to anticipate which innovations will require this funding with any accuracy at this stage. A funding mechanism or reopener may well be required for these investment projects.

CSQ46

Do you agree with our proposals to introduce a new network innovation funding pot, in place of NIC, that will have a sharper focus on strategic EST challenges?

EST certainly presents some significant challenges that will become acute in the RIIO-2 period, so specific funding to address these challenges is welcome and necessary. This however should not be to the exclusion of projects that are not focussed on EST but, never the less, contribute to the efficiency and economy of the networks during transition. Any replacement to NIC should incorporate the necessary flexibility to fund projects with a strong justification irrespective of their nature, although an expectation that EST is the priority is necessary at this stage.

CSQ47

Do you have any views on our proposals for raising innovation funds?

Many projects will bridge the divide between ESO and ETO so raising funds from both system charges and BSUoS as appropriate is sensible. It is important that co-operation between the SO and TOs is encouraged where collaborative work is to the benefit of consumers as much of the EST work is. Concerns about cross subsidy must not prevent this collaboration.

CSQ48

Do you think there is a continued need for the NIA within RIIO-2?

Yes, NIA funding is a critical catalyst for driving projects of direct benefit to the industry and consumers that are intermediate between the large NIC funded projects and short term (within regulatory period) focused and company specific investments made as BAU. Without the NIA, licensees would have insufficient incentive to invest in the kind of longer-term collaborative, open project that forms a very significant part of the direct contact they have with academic institutions.

An important aspect is the ability of regulated companies to recover the investment in the time and costs of the network utility engineers required to engage properly with innovation and the research that underpins it. The NIA is therefore a direct investment in the graduate and post-doctoral staff required to make the network companies capable of adopting innovation as well as the institutions and individuals providing a pipeline of these employees in the future. To this extent, the NIA directly addresses the workforce skills challenge posed in paragraph 1.24 of the consultation. The direct contact between practising engineers and academics particularly on collaborative projects involving

several companies and institutions provides great value and helps in the recruitment, retention and development of skills in the wider industry. This is in addition to the direct consumer benefits of the successful projects.

The NIA funding mechanism has shown itself to be effective in allowing smaller more speculative projects to be pursued that are unlikely to find a direct return in a single regulatory period and so would not gain support in a totex environment. It also tends to encourage network company participation in projects involving for example supply chain companies where benefits accrue both inside and outside the organisation so strict cost benefit analysis is difficult.

Although some NIA funded projects have been the result of co-operation between network companies, it has been seen by some companies that individual projects can provide a higher return. Consideration therefore needs to be given to the detail of the funding mechanism to ensure that co-operation between companies, publication of results and sharing of IPR is encouraged.

The breadth of the innovation funded by the NIA is one of its fundamental strengths, NIC inevitably requires the picking of winners and BAU investment requires a high level of certainty in the return, whereas the NIA mechanism allows projects to start small and develop or die as the knowledge increases. There are several examples of NIA funded projects that have evolved into successful NIC bids. Additionally NIA funding from an industrial partner demonstrating the direct relevance of the work to industry is an important factor in obtaining co-funding from UKRI and other sources. NIA funding is particularly useful for leveraging CASE Studentships which are part UKRI and part industry funded allowing these studentships to do very industrially relevant work requiring hardware and facilities which otherwise isn't funded under UKRI mechanisms.

It can be argued that doctoral training and the maintenance of expertise in higher education is the responsibility of UKRI, however the consumer funded NIA is a powerful way of focussing this effort to the benefit of consumers. This benefit accrues in terms of both the knowledge itself and the people with the knowledge being directly employed by the companies.

Providing some innovation funding outside the control of the network companies may be attractive, but it is essential not to break the link between genuine need perceived best by the companies themselves and the direction of innovation that the NIA provides. There may be cases of innovation that benefit consumers at the expense of the network companies that they would not pursue under the NIA, but the funding of these cases should be separately considered and does not undermine the benefits of the NIA.

A good illustration of the advantages of the NIA funding model is the development of the underlying knowledge and expertise required to introduce alternative insulating liquids to large transmission transformers. The initial consideration that drove this research was a concern over the supply and sustainability of mineral insulating oil, although this was an industry wide issue and it would have been possible to follow rather than lead in this area, it was still determined to have potential benefits for consumers in the longer term. The initial quite small project started research that formed the basis for attracting funding from three other utilities also using NIA funding, as well as liquid manufacturers, transformer manufacturers and solid insulation manufacturers. This evolved into the Transformer Research Consortium that has also been behind significant advances in the transformer condition assessment techniques that directly support gathering the information required for the monetised risk approach proposed in this consultation amongst other outputs. The research on alternative liquids allowed the utility to invest in transformers using a low fire synthetic ester in a new London substation enabling a compact design, meeting local planning requirements.

This development would not have been possible without the basic NIA funded research which did not have this outcome as a deliverable initially. This innovation has greatly benefited the UK company that manufactures the liquid, as in a conservative industry many companies both in the UK and the world are prepared to follow a successful implementation even though they would not have the confidence to be first adopters. That confidence to innovate is born out of the kind of technical understanding and knowledge that the NIA can effectively promote.

During the course of this work and including some other NIA funded projects at the same university, 10 PhD students successfully completed and are now working for either network companies or suppliers, some directly involved with innovation and regulatory review. Two further PhDs are working as post-doctoral researchers ensuring continuity of the knowledge base at the university. This is a long-term investment in skills that has continuity with previous innovation funding providing a career base for many technical, managerial and academic staff working in the industry today.

A particular issue that could be addressed in the review of innovation funding is the provision of information about networks that is necessary for some projects that may need to come from more than one network company. In the past, this has proven difficult because of confidentiality rules regarding data provided for example to the electricity transmission owner by distribution companies but is required to effectively model the system. Innovation funding should encourage a high level of co-operation between companies.

In paragraph 8.41 There is a proposal to reform the NIA to focus on EST related projects. Although additional funding for such projects would be welcome, much of the strength and benefit of the NIA mechanism comes from its breadth and depth of projects. This should not be diluted. Central direction of innovation themes under the NIA is likely to cause valuable but niche projects related to the core business of the network companies efficient operation of the existing system to be suppressed.

CSQ49

If we were to retain the NIA, what measures could be introduced to better track the benefits delivered?

It is correctly stated in the consultation that it is hard to centrally track the benefits over the long term of a large number of diverse projects. One of the strengths of the NIA funding mechanism is that projects have to pass a network company's internal investment governance procedures, and this provides a level of rigour and oversight that would be hard and inefficient to replicate. Ensuring that the results of NIA funded projects are made publicly available will continue to allow wider scrutiny and beneficial use of the knowledge gained. It is believed that the oversight and tracking of individual projects is adequate using the existing framework, but if it is required for regulatory justification purposes then a more centralised approach for highlighting successful projects could be adopted. The costs of this additional justification would need to be factored into the NIA framework.

Increasing or even requiring third party involvement with NIA funded innovation would certainly increase the level of oversight, and could be beneficial in ensuring the results are widely disseminated and adopted.

CSQ 50

Do you agree with our proposals for electricity distribution companies prior to the commencement of RIIO-ED2?

Co-operation between network companies is vital to the delivery of many innovation projects particularly those associated with EST. It is therefore necessary that the innovation framework allows for the initiation and completion of joint projects across the RIIO-ET2 and RIIO-ED2 timescales.