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Decision on the 2017 Electricity Distribution Innovation Roll-out Mechanism

Final decision

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Overview:

The Innovation Roll-out Mechanism's (IRM) purpose is to facilitate the roll-out of a Proven Innovation that meet certain requirements into business as usual. This document sets out our decision on the applications received to the first RIIO-ED1 IRM window that opened in May 2017.

We have decided to award £8.01 million IRM funding to SP Energy Networks (SPEN) following our positive assessment of the Integrated Network Constraint Management for Dumfries and Galloway application against the requirements in the IRM licence condition. We have decided to reject SPEN's two other applications for IRM funding as we consider that these are not Proven Innovations as defined in the IRM licence condition. This document sets out the reasons for our decisions.

Context

Ofgem is the Office of Gas and Electricity Markets, which regulates the electricity and gas industries in Great Britain. Our principal duty is to protect the interests of existing and future gas and electricity consumers.

One way in which we protect the interests of consumers is by regulating the network companies through price controls. We set price controls to specify the services and level of performance the network companies must provide, and to restrict the amount of money the network companies can recover from consumers through network charges.

The energy system is undergoing rapid and significant change. Consequently, network-related costs could increase significantly from connecting large volumes of generation, as well as managing the impacts of new low carbon technologies operating on the network. We think it is in consumers' interests that the network companies respond creatively to the challenges posed by these changes.

New approaches could deliver more efficient and timely services needed by network customers and lessen the cost impact on consumers. This might be achieved, for example, by adopting new technology, different operational practices and novel commercial arrangements.

To encourage the companies to play a full role in exploring opportunities we put innovation at the forefront of the price control RIIO (Revenue = Incentives + Innovation + Outputs) framework. This framework was introduced for gas distribution companies (RIIO-GD1) and electricity transmission companies (RIIO-T1) in 2013 and for electricity distribution companies (RIIO-ED1) in 2015.

One of the innovation components of RIIO is the Innovation Rollout Mechanism (IRM). The purpose of the IRM is to facilitate the roll-out of Proven Innovations that meet certain requirements into business as usual.

An electricity distribution network licensee can propose to make use of the IRM in any of the two application windows available during the RIIO-ED1 price control. The first window opened in May 2017; the second window will open in May 2019. This document sets out our decision on the applications received in the first RIIO-ED1 IRM window.

Associated documents

Strategy decision for RIIO-ED1- Overview
RIIO-ED1 Final determinations for the slow-track electricity distribution companies- Overview
SP Distribution Plc- Special Conditions Consolidated-Current Version
Assessment of benefits from the rollout of proven innovations through the Innovation Roll-out Mechanism (IRM)
Consultation on submissions to the RIIO-ED1 Innovation Roll-out Mechanism window

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Executive Summary

The Innovation Roll-out Mechanism (IRM) is part of a suite of innovation mechanisms in the RIIO price control. The IRM's purpose is to facilitate the roll-out of a Proven Innovation[1] that meet certain requirements into business as usual.

This document sets out our decision on the applications received to the first RIIO-ED1 IRM window that opened in May 2017.

Applications to the first IRM window

We received one application from UK Power Networks (UKPN) and three applications from Scottish Power Energy Networks (SPEN) in the first RIIO-ED1 IRM window, with a total value of £79 million (2012/13 prices).

UKPN initially applied for IRM funding to deploy monitoring and control devices on the low voltage network in their London Power Networks, Eastern Power Networks and South Eastern Power Networks licence areas. They have subsequently decided to withdraw their application from the IRM and deliver the project within their existing price control allowances. We support UKPN's decision as we think this approach represents the best value for their customers.

As UKPN has withdrawn its application, this document only covers the IRM applications received from SP Energy Networks (SPEN).

Our decision

We have decided to award £8.01 million IRM funding to SPEN following our positive assessment of the Integrated Network Constraint Management for Dumfries and Galloway application against the requirements in the IRM licence condition. We have decided to reject the ESSM and HOSS applications for IRM funding as we consider that these are not Proven Innovations as defined in the IRM licence condition.

Summary of our assessment of SPEN's IRM applications

Integrated Network Constraint Management for Dumfries and Galloway
SPEN applied for £9.1 million to roll out an Integrated Network Constraint Management scheme in part of its Scottish Power Distribution (SPD) licence area that is subject to transmission constraints. Constraints are limiting exports from 90MW of distributed generation (DG) connected in Dumfries and Galloway and it is extending connection dates for more than 200MW of DG seeking to connect.

The Integrated Network Constraint Management scheme involves replacing an existing load management scheme (LMS) with an active network management (ANM)

[1] Definitions of a "Roll-out" and a "Proven Innovation" are set out in paragraph 3D.24 of Charge Restriction Condition 3D: The Innovation Roll-out Mechanism in the electricity distribution licence.

system. The ANM scheme will manage the constraint in a more refined way than LMS, resulting in less curtailment of DG, and facilitating timely connection dates.

We consider that the proposed scheme is a Proven Innovation as defined in the IRM licence condition. In our view, the ANM application meets the IRM eligibility criteria. GB electricity consumers will benefit from the roll-out, as it will enable increased export capacity for DG that will contribute to more low carbon generation. SPEN is not specifically funded under its RIIO-ED1 settlement for this ANM scheme, nor will SPEN receive direct financial benefits from rolling it out during the current price control.

During the assessment of its application, SPEN reduced its IRM funding request from £9.1 million to £8.01 million.

Having positively assessed SPEN's application against the IRM criteria, we have decided to award IRM funding to SPEN for the roll-out of its Integrated Network Constraint management for Dumfries and Galloway.

Holistic Overhead Lines Survey Strategy (HOSS)
SPEN's second application is for £20.4 million to roll out a new approach to inspecting and managing its overhead line infrastructure in its SPD and SP Manweb (SPM) licence areas. The HOSS roll-out will involve digital mapping (Light Detection and Ranging (LiDAR)) of its entire network, risk-based analytics, and non-destructive pole testing.

In response to our information request, several DNOs have told us that they have adopted LiDAR and data analytics to varying degrees as part of their overhead network management activity. At least one DNO has implemented a roll-out of LiDAR to survey its full overhead network as part of its RIIO-ED1 settlement.

In light of steps taken by other DNOs to deploy LiDAR and data analytics under their RIIO-ED1 allowances, we think that SPEN's HOSS application is not distinctive from an Ordinary Business Arrangement. Therefore, we think the HOSS application is outside the scope of a Proven Innovation as defined in the IRM licence condition.

Enhanced secondary substation monitoring (ESSM)
SPEN's third application is for £16.45 million to roll out enhanced monitoring devices into 52% of its large (>=200kVA) secondary substations across its SPD and SPM licence areas during RIIO-ED1 period (until 2023). SPEN expect that improved monitoring of the low voltage networks will benefit electricity consumers as it will assist in the efficient use of existing assets, and release latent network capacity for connections.

SPEN currently has funding in its RIIO-ED1 business plan to install enhanced monitoring devices into 12% of its large secondary substations. These are similar in functionality and purpose to the unit it is proposing to install under its IRM application. Given the similarity, we think SPEN's ESSM application is not distinctive

from an Ordinary Business Arrangement[2], and therefore is outside the scope of the definition of a Proven Innovation in the IRM licence condition.

[2] A definition of an Ordinary Business Arrangement is set out in the paragraph 3D.24 of Charge Restriction Condition 3D: The Innovation Roll-out Mechanism in the electricity distribution licence.

1. Introduction

Chapter Summary

This chapter outlines some background information on the role of innovation within the RIIO price control framework, the purpose of the Innovation Roll-out Mechanism and the requirements that applications must meet to be awarded IRM funding.

1.1. The energy system is undergoing rapid and significant change. An increasing number of small intermittent generators connected to the distribution network are generating electricity. An increasing number of low carbon technologies utilising the network, such as electric vehicles and heat pumps, are also presenting new network challenges. To adapt the electricity network to these changes, network-related costs could increase significantly from the current level.

1.2. We think it is in consumers' interests that the network companies respond creatively to the challenges posed by these changes. New approaches could deliver services needed by network customers more efficiently and lessen the cost impact on consumers. This might be achieved, for example, by developing and adopting new technology, different operational practices and novel commercial arrangements.

1.3. Encouraging the network companies to innovate in providing network services and outputs is a key element of the RIIO model. Several features of the price control framework are intended to bring about more innovation by network companies. These include:

- The 'totex' approach, which equalises the incentives between capital and operational expenditure meaning that there are no undue incentives towards investing in capital expenditure.
- An output-based approach, which gives the network companies greater flexibility during the price control to identify suitable and cost effective solutions.

1.4. In addition to the generic features of the price control framework, we also introduced a specific innovation stimulus package. These are intended to encourage a culture change within the businesses that run the gas and electricity networks in Great Britain (GB). One such stimulus in RIIO is the Innovation Rollout Mechanism (IRM).

Innovation Roll-out Mechanism

1.5. The purpose of the IRM is to assist a network owner to roll out a Proven Innovation into business as usual for the benefit of GB electricity consumers. However, only when such a roll-out cannot be financed under other mechanisms in the price control or does not give commercial benefits accruing to the network owner during RIIO-ED1.

IRM requirements

1.6. To award IRM funding the Authority must be satisfied that the application relates to a Proven Innovation, and it also meets the IRM eligibility criteria set out in Charge Restriction Condition 3D (The Innovation Rollout Mechanism) of the electricity distribution licence. To be eligible the Authority must be satisfied that the IRM funding request:

- will deliver carbon benefits or any wider environmental benefits
- will provide long-term value for money for electricity consumers
- will not enable the licensee to receive commercial benefits from the roll-out within the remainder of the price control period (for instance, if the roll-out of a Proven Innovation will lead to cost savings (including benefits from other incentives) equal to or greater than its implementation costs within the price control period), and
- will only be used to fund the roll-out of a Proven Innovation.

IRM arrangements in RIIO-ED1

1.7. There are two windows within the RIIO-ED1 price control when an electricity distribution network licensee can propose an adjustment to IRM values (set at zero at 1 April 2015). The first window opened in May 2017; the second window will open in May 2019.

2. Assessment of applications

Chapter Summary

This chapter summarises our assessment of the three IRM proposals we received from SPEN.

Applications to the first window of the IRM

2.1. We received one application from UK Power Networks (UKPN) and three applications from SP Energy Networks (SPEN) during the first RIIO-ED1 IRM window, with a total value of £79 million (2012/13 prices).

2.2. UKPN initially applied for IRM funding to deploy monitoring and control devices on the low voltage network in their London Power Networks, Eastern Power Networks and South Eastern Power Networks licence areas. They have subsequently decided to withdraw their application from the IRM and deliver the project within their existing price control allowances. UKPN are confident that the project will deliver clear benefits to customers by helping UKPN to manage the network challenges arising from the increasing number of low carbon technologies utilising the network such as electric vehicles and heat pumps.

2.3. We support UKPN's decision to deliver this project within their existing RIIO-ED1 price control allowances. We think this approach represents the best value for their customers, while enabling UKPN to gain visibility and control of their network, particularly in the context of potential network impacts and uncertainty associated with low carbon technologies.

2.4. As UKPN has withdrawn its application, this decision letter only covers the IRM applications received from SP Energy Networks (SPEN).

Assessment approach

2.5. To assess the applications we have reviewed each IRM application against the requirements of the Charge Restriction Condition 3D (The Innovation Rollout Mechanism) of SPD's and SPM's electricity distribution licences. We have also considered the responses to our open letter consultation on the applications within the first IRM window of the RIIO-ED1 price control. Only three responses made relevant representations on SPEN's IRM applications. These were from Energy North West Limited, Northern Power Grid, and British Gas.

2.6. We have also taken into consideration responses received from the DNOs to an information request we issued relating to the types of technologies included in the IRM applications. Finally, our assessment is informed by supplementary information provided by SPEN in response to our specific queries on each of the applications.

2.7. All of the non-confidential responses to the open letter consultation are available on our website.

Integrated Network Constraints Management in Dumfries and Galloway

Overview of IRM application

2.8. SPEN has applied for £9.1 million (2012/13 prices) to roll out an Integrated Network Constraints Management scheme in its SPD licence area. The scheme will help manage transmission network constraints in Dumfries and Galloway by installing an active network management (ANM) scheme to manage the exports from distributed generation on SPEN's network. Currently, 90MW of distributed generation are connected in Dumfries and Galloway, and more than 200MW of additional distributed generation are contracted to connect.

2.9. In 2016 the System Operator (SO) and SP Transmission assessed several transmission level options for addressing the transmission constraint in Dumfries and Galloway. SP Transmission is currently developing the most economic solution – an upgrade of a single 132kV circuit between Kendoon and Tongland with a double circuit – to be in service in 2024[3]. The transmission project will add capacity in Dumfries and Galloway, which will relieve transmission constraints for a few years. However, the SO's assessment of the transmission solution anticipates that transmission constraints will re-occur by 2028 and constraint management, and non-build commercial solutions will be required.

2.10. At present, there is an existing load management scheme (LMS) that protects against transmission constraints in Dumfries and Galloway by disconnecting distributed generation when there is a transmission fault or a transmission constraint. However, the LMS frequently disconnects more distributed generation than is necessary to avoid transmission constraints and it is also acting as a barrier to the connection of more distributed generation.

2.11. SPEN propose to replace the LMS with an enduring ANM scheme that will help manage transmission constraint in a significantly more refined way, lessening the impact on distributed generation. The ANM scheme will result in less curtailment of existing distributed generation, as well as facilitating the connection of additional distributed generation wanting to connect under the ANM scheme, ahead of the transmission reinforcement and in the longer term.

2.12. The ANM scheme will monitor the transmission and distribution network in real time to calculate the actual capacity of the network at any moment. It will reduce constraints by directly interacting with distributed generation to ramp down exports during times of system constraints. It will do this is a more targeted and intelligent way than the current LMS by continuously calculating the minimum volume of distributed generation needed to be constrained to manage the

[3] SP energy networks web resource on Kendoon and Tongland reinforcement project

fault/constraint (a value that will constantly vary depending on local demand and generation levels).

2.13. SPEN do not have funding in its RIIO-ED1 settlement to roll-out the ANM scheme involved in the Integrated Network Constraint Management scheme for Dumfries and Galloway. In the absence of IRM funding for the project, SPEN say it would not proceed with the project until later in the next price control as it does not financially benefit SPEN to fund its roll-out, even though it will provide wider environmental benefits and better meet its customers' requirements. SPEN has also clarified that while it is currently offering ANM and other flexible connections as part of its price control, these are significantly smaller in terms of scale and complexity compared to the Dumfries and Galloway scheme i.e. typically these are local solutions to deal with local issues.

2.14. SPEN highlights that ANM has been successfully trialled under several DNO innovation projects. Most relevant is SPEN's Accelerating Renewable Connections[4] Low Carbon Network funded project that commenced in January 2013. It trialled technical and commercial solutions to accelerate the time to connect distributed generation that would otherwise be held off whilst awaiting the completion of transmission system reinforcement works. SPEN published the closedown report in March 2017 documenting that ANM has been successfully trialled.

Stakeholder's views

2.15. Stakeholders responses to the open letter consultation highlighted several general points in relation to all the IRM applications as summarised below.

2.16. Northern Power Grid (NPg) expects all of the applications to the first window of the RIIO-ED1 IRM will contribute to benefits in terms of carbon reductions. However, it notes that this is predicated on the network innovation roll-outs facilitating increased uptake of low carbon technologies by third parties and investors. As a result, the contribution of IRM projects to carbon emission reductions is uncertain and beyond control of the licensees. Nonetheless, NPg thinks that the upward trend in low carbon generation and domestic uptake of low carbon technologies suggests there is reasonable likelihood the roll-outs will facilitate carbon emission reductions. Importantly, roll-outs will ensure that customers plans to utilise low carbon technologies or build distributed generation will be unhindered by network issues.

2.17. Electricity North West Limited (ENWL) emphasises that IRM funding for any of the applications is only justifiable if the roll-out isn't funded by incentives in the licensee's price control settlement, and the timing is well justified. In its view, the

[4] Accelerating Renewable Connections Project Closedown Report

assessment of applications will need to confirm timing and likely realisation of the claimed benefits.

2.18. British Gas (BG) generally noted that there was insufficient information in the redacted submissions published alongside the open letter consultation for stakeholders to fully assess the suitability of the applications against criteria in CRC 3D. In particular, it says further information is needed about the extent of benefits, as well as funding already provided in the RIIO-ED1 settlement.

2.19. BG also considers that requests for additional IRM funding should be considered in the context of licensee surpluses, particularly if there are significant forecasts of underspend.

2.20. In respect of SPEN's application for the Integrated Network Constraint Management scheme, stakeholders made the following points.

2.21. NPg expects that the roll-out wouldn't confer significant commercial benefits to licensees. However, it suggested a financial benefit for the licensee in respect of the ANM scheme in Dumfries and Galloway is the additional distribution use of system charges.

2.22. NPg also thought the timing of the proposed roll-outs looks reasonable as most are preparatory for the early part of next distribution price control, when it is expected that the tipping point will occur in the area of domestic low carbon technologies uptake. It noted that a delay in rolling out the integrated ANM scheme until the next price control would mean that consumers will miss out on the projected benefit occurring ahead of the transmission reinforcement being in service.

2.23. NPg also highlighted some concerns it has about rolling out the Integrated ANM scheme through the IRM. This is because the costs associated with managing transmission constraints are normally borne by generation customers or by the transmission system operator. It queried whether it is appropriate that SPD's demand customers are paying to alleviate a transmission problem, via a socialised charge through IRM. It also said that consideration is needed on whether the IRM project would benefit other parties who might have already been funded to resolve this issue. NPg stated that the financial treatment of the project needs to ensure that the correct customer group pays and customers do not pay twice.

2.24. BG highlighted a similar concern that further clarity is needed on the impact of projects on pre-agreed outputs and performance. It is concerned that SPEN's integrated ANM scheme for Dumfries and Galloway could contribute to the delivery of outputs by SP Transmission. Nonetheless, BG reiterated that it supports the roll out of 'whole-system' solutions that are expected to deliver long-term benefits to consumers more efficiently.

Our assessment

Is the IRM proposal a Proven Innovation and distinct from an Ordinary Business Arrangement?

2.25. SPEN highlights that ANM has been successfully trialled under several DNO innovation projects. Most relevant is SPEN's Accelerating Renewable Connections (ARC) Low Carbon Network funded project that commenced in January 2013. It trialled technical and commercial solutions to accelerate the time to connect distributed generation that would otherwise be held off whilst awaiting the completion of transmission system reinforcement works. SPEN published the closedown report in March 2017 documenting that ANM has been successfully trialled.

2.26. The ANM scheme that SPEN plans to roll out will dynamically manage multiple transmission constraints across 11 Grid Supply Points, interacting with both the transmission licensee and the SO. The scheme will monitor in real time both the transmission and distribution networks and reduce power exports from distributed generation to a more granular and targeted level than under the LMS. The inclusion of the transmission and distribution network across a large geographic area means that there are a large number of possible constraint scenarios and actions available to the ANM scheme. The scheme will combine a dynamic model with an intertrip post-fault protection functionality into a single ANM control, and will have the flexibility to determine the method by which generators are reduced/disconnected.

2.27. We requested information from all the DNOs about ANM schemes in operation to get a view on Ordinary Business Arrangements in this area. From the information we have reviewed, we have ascertained there are numerous ANM schemes in operation on GB's distribution networks. Some use relatively simple devices to limit exports from a small number of distributed generators when a network circuit is reaching an agreed limit. Some larger, multi-customer schemes release non-firm capacity (pre-fault) and utilise fast generator tripping to avoid overloading the remaining circuit in the event of an inadvertent circuit fault. For larger, multi-customer schemes, some DNOs are also utilising sophisticated ANM control systems that monitor distribution network constraints and allocate the available capacity to distributed generation in a more refined manner.

2.28. Although existing ANM schemes in operation on the GB's distribution networks vary in type and scale, we think that SPEN's proposed ANM scheme is different from these for several reasons. SPEN's ANM scheme will manage transmission constraints whereas existing ANM schemes manage constraints on the distribution network.[5] SPEN's ANM scheme is also distinct because of the complexity caused by the scale of interactions between the transmission and

[5] Distribution network ANM schemes that interact with the transmission system are emerging. However, we consider these to be outside of Ordinary Business Arrangements as defined by the IRM licence, because they are funded using RIIO innovation funding mechanisms.

distribution networks and the various parties involved. Lastly, it is novel because of the functional flexibility of the ANM control system.

2.29. **We consider the Integrated Network Constraint Management scheme is sufficiently innovative compared to other ANM schemes operating on the GB distribution network at present and therefore, constitutes a Proven Innovation.**

Carbon benefits and/or wider environmental benefits

2.30. SPEN's application estimates that the Integrated Network Constraint Management scheme in the Dumfries and Galloway area will contribute to a reduction in CO_2 emissions of 522,000 tonnes by 2031. The scheme will reduce emissions by enabling more renewable distributed generation that will displace some fossil fuel generation.

2.31. We note that the carbon benefit of the roll-out is largely dependent on new distributed generation connecting under the scheme. SPEN's analysis assumes that only distributed generation that will be constrained by less than 5% of its generation potential under the ANM scheme will connect i.e. 68MW of 200MW contracted for connection in the area. We think the assumption on the amount of distributed generation connecting under the scheme is reasonable. **Therefore, we are satisfied that the roll out of the scheme is likely to deliver carbon benefits.**

Long-term value for money for consumers

2.32. In total SPEN estimate the scheme will have net benefits[6] of approximately £9 million (2012/13 prices) for GB electricity consumers. The consumer benefit mostly comprises fewer CO_2 emissions, as well as a reduction in system balancing costs. Around one third of the net benefits from the roll-out are expected to occur ahead of the Dumfries and Galloway transmission reinforcement in 2024.

2.33. SPEN estimates the net benefits of the ANM scheme by comparing it to a baseline scenario in which it proceeds with the Integrated Network Constraint Management for Dumfries & Galloway at the end of RIIO-ED2 i.e. in 2031. SPEN's rationale for the baseline timing is that, without IRM funding, it cannot proceed with the scheme before RIIO-ED2 because it is not funded under its existing price control allowances. In its view, the optimal timing for the scheme, if delayed until RIIO-ED2, is at the end of the price control period. This is because transmission constraints will be alleviated temporarily after the transmission reinforcement is in service in 2024. However, the ANM scheme will be needed to efficiently manage

[6] The scheme forecasts to deliver £38.4m in gross benefits. Details of the gross benefits are in section 4.3.1 of SPEN's IRM submission available here.

transmission constraints in Dumfries and Galloway when these re-occur from 2028 onwards.

2.34. We think SPEN's modelling could have been more robust if it had also considered the potential for deploying other options ahead of RIIO-ED2 to help reduce the impacts of the transmission constraint on distributed generation connection customers. We are not convinced that a 'do nothing' baseline is entirely credible. We note that distribution network owners are offering alternative flexible connection arrangements, are accountable for meeting connection customers' requirements and are obligated to develop and maintain an efficient, coordinated and economical system of electricity distribution. While the available alternatives might not be as effective as the Integrated Network Constraint Management scheme, the options might offer some improvement on the existing LMS scheme and be a more suitable point of comparison than a 'do nothing' baseline.

2.35. **Overall we are satisfied that SPEN's net benefit modelling gives reasonable confidence that rolling out the ANM scheme is in the long-term interests of GB consumers.** We note that delaying the ANM scheme until RIIO-ED2 would significantly reduce the net benefits that can be achieved from alleviating the transmission constraint ahead of the transmission reinforcement project.

2.36. SPEN has proposed the following key performance indicators to monitor how the ANM scheme gives benefits to GB electricity consumers. These are the:

- relative constraint level of the existing (90MW) distributed generators under ANM compared to LMS;
- MW volume of new distributed generation that connects to the ANM; and
- level of curtailment that is applied to new ANM-connected distributed generation.

2.37. We consider the key performance indicators are satisfactory measures to quantify the effectiveness of the project and compare the actual benefits it brings to the expected benefits outlined in the application.

Will SPEN benefit commercially from the roll-out during RIIO-ED1?

2.38. The purpose of the integrated ANM scheme is to manage transmission constraints and lessen the impact on distributed generation, and to facilitate a wider environmental benefit.

2.39. SPD, as licensee, has not received specific price control funding for delivering the ANM project in Dumfries and Galloway. We consider that this project is relevant to obligations and outputs that SPD is required to deliver under the RIIO-ED1 settlement. As part of RIIO-ED1, SPD is required to engage with connection stakeholders and respond to their needs. SPD is also obligated to develop and maintain an efficient, coordinated and economical system of

electricity distribution. We think this project will help SPD better meet its obligations through innovative means. The scheme will facilitate new connections of distributed generation, and SPD will be able to charge connection customers for sole use elements of the new connections, as well as use of system network charges as it would normally. **Therefore, we are satisfied that SPEN will not, materially financially benefit from the roll-out, or gain commercial benefits that exceed the roll-out costs during the RIIO-ED1 price control period.**

2.40. We are also satisfied that that the roll-out will complement the transmission reinforcement project that the SO assessed as the most economic option for the transmission network in Dumfries and Galloway. SPEN's ANM scheme is distinct from the transmission project and will not contribute to outputs that SP Transmission is accountable for in its RIIO-T1 price control settlement.

Efficient cost assessment

2.41. We have reviewed two major elements of SPEN's project costs for rolling out the Integrated Network Constraint Management scheme. These are the ANM central controller and a 'Dumfries and Galloway Smart Zone Team' to implement and operate the scheme.

2.42. The ANM central controller, comprising both hardware and software, is the single largest cost element of the project. As specified in SPEN's IRM application, the central controller has the capability to be rolled-out across the whole of SPD's licence area for unlimited MW/number of sites. However, the central controller for SPD's licence area is more expensive than a controller specified to solely manage an ANM scheme in Dumfries and Galloway. We sought further justification from SPEN on the cost efficiency of specifying a licence area controller.

2.43. SPEN notes that in parts of its SPD network that are transmission-constrained all distributed generation applications, regardless of size, must progress through the SO's Statement of Work process. It also highlights that transmission constraints are very prevalent in its licence area because the 132kV network is designated a transmission voltage. In addition, there are a large number of grid supply points in its SPD licence area compared to most other DNOs. The combination of these factors increase both the volume and complexity of integrating the commercial and technical interfaces between distribution, transmission and the SO. A central controller will better allow SPD to deliver quicker and more efficient connection solutions than incremental area specific applications.

2.44. SPEN says that it expects the option of a central controller to be a more cost effective solution for its customers than an area specific ANM controller. SPEN has identified four other areas in its SPD network, in addition to Dumfries and Galloway, where rolling out ANM during RIIO-ED1 will likely give benefits.

Compared to an incremental MW bundle approach[7] for these areas, SPEN say that a central ANM controller will achieve a breakeven position if all the existing LMS generation (345MW) and 152MW (or 20%) of the contracted generation connect via ANM.

2.45. On balance, we think there is a reasonable likelihood that the amount of distributed generation connecting in transmission constrained parts of SPD's network via ANM will meet or exceed the level required to achieve the breakeven position. **Accordingly, we are satisfied that the central ANM controller is a flexible and future proof solution for future applications, and the incremental spend is economic and an efficient cost of the project.** SPEN has said it will report the key performance indicators for all future schemes in using this central ANM controller.

2.46. Another significant project cost element we have reviewed is the Dumfries and Galloway Smart Zone Team, which SPEN plans to establish to implement and operate the Integrated Network Constraint Management scheme. We had two areas of concern:

- the potential overlap with funded connections activity, and
- the efficiency of the team costs.

2.47. SPEN provided further detail on the work programme of the Dumfries and Galloway Smart Zone Team. SPEN notes it will need to proactively engage customers about the scheme operation. There is also significant additional resources to manage the new interfaces with several parties' systems in real time, as well as requiring additional expertise to design, establish and operate the scheme in Dumfries and Galloway.

2.48. SPEN has confirmed that the Smart Zone Team's activities on the Dumfries and Galloway ANM scheme are over and above its normal connections activities and there is no duplication in its IRM funding request with its RIIO-ED1 settlement.

2.49. We also had some concerns about the efficiency of the costs requested for establishing and running the team, which are similar to SPEN' staff costs on its Dunbar ARC innovation trial. We anticipate that learning from that trial project might be expected to produce some productivity savings. SPEN has explained that its team costs are on par with the Dunbar ARC scheme, noting that people with a similar level of skill and expertise are required and that there is not any clear unit cost efficiency in this area. SPEN also explained that any productivity saving in comparison to the Dunbar ARC trial is offset by the additional complexity involved in the Dumfries and Galloway project.

[7] The alternative to procuring a licence area ANM controller is a software licence on an incremental MW approach, which is scalable in 50MW bundles.

2.50. Northern Power Grid raised a question about the appropriateness of rolling out the Integrated ANM scheme using IRM funding. This is because the costs associated with managing transmission constraints are normally borne by generation customers or by the transmission system operator.

2.51. We sought additional justification from SPEN on its proposed allocation of the different elements in its project costs, and those for which it is seeking IRM funding. As a result, SPEN identified some costs included in the IRM funding request that it considers are better categorised as sole use connection elements. Accordingly, SPEN reduced its IRM funding request by £1.09m and will recover this amount directly from the distributed generators that will connect under the ANM.

2.52. **Having reviewed this aspect, we are satisfied with SPEN's assurance that it has applied the current connection charging principles as they see fit for the connection of distributed generators via the Dumfries and Galloway ANM scheme.** We note that the industry is considering the treatment of ANM costs more generally through the Open Networks project. For the avoidance of doubt, our assessment of SPEN's IRM application is not prejudicing any policy decisions we may make in future in relation to charging arrangements for ANM schemes.

2.53. **Having reviewed the main cost elements of the funding requested, and the assurances provided by SPEN, we are satisfied that the £8.01 million (2012/13 prices) IRM funding request to roll out the Integrated Network Constraint Management scheme in Dumfries and Galloway is reasonable and efficient.**

Our decision

2.54. Having positively assessed SPEN's application against the IRM criteria, we have decided to award £8.01 million of IRM funding to SPEN for the roll out of its Integrated Network Constraint management for Dumfries and Galloway. We think it is positive that a distribution network operator is contributing to addressing wider network constraints, where it has identified an efficient whole-of-system solution to do so that offers long-term value for money for consumers.

2.55. We expect all DNOs to be proactive in building innovative approaches into their business as usual options where these will benefit consumers and better meet customer requirements.[8] In our view, this is consistent with network owners' obligations to respond to the needs of connection customers and duty under the

[8] We recently set out our expectations for network owners to manage network constraints at the most efficient point on the system, with proper consideration of the relative costs and congestion management potential of actions across transmission and distribution. See Unlocking the capacity of the electricity networks and Upgrading our Energy System: Smart Systems and Flexibility Plan – summary of responses and response from the government and Ofgem.

Electricity Act 1989 to manage their networks in a coordinated, efficient and economical manner.

Holistic Overhead line Survey Strategy

Overview of SPEN's IRM application

2.56. SPEN's second application is for a total of £20.4 million (2012/13 prices) to roll out a new approach to inspecting and managing its overhead line (OHL) infrastructure in its SPD and SPM licence areas. The Holistic Overhead line Survey Strategy (HOSS) roll-out will involve digital mapping (using Light Detection and Ranging (LiDAR)) of its entire network, adopting risk-based analytics in their inspection policies, as well as non-destructive pole testing.

2.57. SPEN propose that HOSS will transform its current inspection practices, which are based on foot patrols and gathering data manually for OHL asset condition and vegetation management programmes separately.

2.58. SPEN say that adopting various technologies holistically will change its way of working around OHL inspections; moving to a strategy with asset data and data analytics at its core. SPEN expect the roll-out will lead to significant changes in existing business process, and after a period of several years learning to optimise management techniques, will lead to benefits for SPEN's customers.

2.59. SPEN argue that if the project is not awarded IRM funding, it will be possible to deploy the new technologies on a case-by-case basis, but this will risk missing the full set of benefits provided by a coordinated strategy.

Stakeholder responses

2.60. Electricity North West notes that SPEN's customers have already paid to fund an effective and legally compliant OHL inspection regime for RIIO-ED1 and is concerned about the extent to which IRM funding for the HOSS application would represent double recovery of costs. It questions why the price control efficiency incentive is not enough for SPEN to deploy HOSS under its RIIO-ED1 funding if the HOSS proposal genuinely offers costs reductions and additional benefits.

2.61. British Gas thought that the roll-out could reasonably be expected to be implemented as part of business as usual. It thinks that that a transition to digital solutions should be treated as normal improvement in business as usual practice and therefore it questions whether the application is eligible for IRM funding.

Our assessment

Is the IRM proposal a proven innovation and distinct from an ordinary business arrangement?

2.62. As part of assessing whether or not the IRM applications are innovative and distinct from ordinary business arrangements, we asked all the electricity DNOs

about the extent to which they have introduced any of the technologies into their business and the impacts this has had.

2.63. In response to this information request, several DNOs have told us that they have adopted LiDAR technology and data analytics into business as usual to varying degrees as part of their overhead network management practices.

2.64. Some DNOs have targeted the introduction to specific areas. However, there is also evidence that at least one DNO has implemented a wide roll-out of LiDAR to survey its full overhead network following initial trials, and an assessment of the costs and benefits. It has funded the deployment under its RIIO-ED1 settlement.

2.65. The DNO also noted that adopting the technology is changing the company's overall approach to inspecting and managing its overhead line network and is resulting in significant changes to its processes, procedures and resourcing. For example, it has reduced its line inspection frequency from one in four years to one in eight years. Additionally the company has told us that adopting LiDAR has meant it is now better able to negotiate much more targeted vegetation management contracts and audit these more effectively.

2.66. In light of the steps taken by other DNOs in applying LiDAR and data analytics to OHL inspection and asset management practices under their existing RIIO-ED1 allowances, we think that SPEN's HOSS application is not sufficiently distinct from ordinary business arrangements as defined in the IRM licence condition and therefore, does not relate to a Proven Innovation.

2.67. We note that in its HOSS application SPEN intends to roll-out LiDAR across its entire network where possible using a variety of transport modes. Although the geographical ambition of SPEN's proposal is large, we do not consider that the scale of ambition for the roll-out, relative to the level of deployment adopted by other distribution networks in the UK, qualifies the proposal as a Proven Innovation as defined by the IRM licence condition.

2.68. In our view, the digital wood pole testing in SPEN's HOSS application is not dependent on LiDAR surveys for its implementation and therefore it is a discrete roll-out of network equipment. However, we note that by itself, the roll-out of digital wood pole testing will not meet the requirement for the requested IRM funding to constitute a material amount as specified in the licence condition

Our decision

2.69. Based on our assessment of the HOSS application against the IRM licence condition requirements, we consider it to be outside the scope of a Proven Innovation. Therefore, we have decided to reject the HOSS application for IRM funding.

Enhanced Secondary Substation Monitoring

Overview of SPEN's IRM application

2.70. SPEN's third application is for £16.45 million (2012/13 prices) to deploy enhanced monitoring devices into 52% of its large (>=200kVA) secondary substations in its SPD and SPM licence areas.

2.71. SPEN considers that existing approaches to low voltage network monitoring such as maximum demand indicators (MDI) are increasingly inadequate for effective network management. This is because the uptake of low carbon technologies, along with changing customer consumption patterns are influencing load profiles. In addition, high density clustering of technologies will lead to rapid, localised load increases.

2.72. To manage these challenges, SPEN says increased network monitoring is necessary to identify appropriate responses to networks approaching design limits. These could include 'smart' solutions that provide incremental network capacity more quickly than traditional network reinforcement. However, such solutions will require additional monitoring to observe and in some cases manage performance.

2.73. SPEN's IRM proposal involves replacing existing MDIs with enhanced monitoring devices to record and transmit voltage and current measurements every 10 minutes to a central database. SPEN expect that improved monitoring of the utilisation and performance of the low voltage network will benefit electricity consumers as it will provide greater certainty about secondary network loadings and operation, assist in the efficient use of existing assets, release latent network capacity for new low carbon technologies, and allow SPEN to deliver cost effective network operation.

2.74. SPEN highlight the added functionality of an 'open-platform' operating system for their monitors that will enable a range of third party developers to design applications. Thus, providing enhanced functionality and future proofing of any monitors installed.

2.75. SPEN note in its IRM application that the IRM funding will significantly extend its existing programme in its RIIO-ED1 business plan to install enhanced secondary substation monitoring.

Stakeholder responses

2.76. British Gas (BG) considers that a variety of network management solutions that featured in licensees' price control business plans now typically constitute business as usual practice. It notes that SPEN's justification for the enhanced monitoring is based in part on SPEN seeing an increased need for it compared to the volumes it has in its RIIO-ED1 business plan.

2.77. BG says that a key component of RIIO is the latitude given to network owners to manage expenditure allowances, and in return, the licensees hold the commensurate risk. In BG's view an increase in volumes for solutions that now typically constitute business as usual should be considered to fall within the risk and reward exposure of the network licensees. As a result, BG thinks that a provision of allowances for volumes outside of mechanisms specifically designed for that purpose does not represent an appropriate balance of risk and reward between consumers and network operators.

Our assessment

Is the IRM proposal a proven innovation and distinct from an ordinary business arrangement?

2.78. The added functionality of an 'open-platform' operating system is innovative. However, we noted that the extensibility of this software to third party developers is currently being trialled as part of an ongoing Network Innovation Competition project[9]. The results of these trials are expected to become available by 2020. As such, this added functionality is still under trial and therefore outside the scope of a Proven Innovation.

2.79. As highlighted by SPEN in its application, it currently has funding in its RIIO-ED1 business plan to install enhanced monitoring devices into 12% of its large secondary substations. These are similar in functionality and purpose to the unit it is proposing to install under its IRM application. Given the similarity, we think SPEN's ESSM application is not distinctive from an ordinary business arrangement.

Our decision

2.80. Based on our assessment of the ESSM application against the IRM licence condition requirements, we consider it to be outside the scope of a Proven Innovation. Therefore, we have decided to reject the ESSM application for IRM funding.

[9] Open-LV project is funded under the Network Innovation Competition (NIC) 2016. Details available here

3. Next steps

Chapter Summary

This chapter explains how we will implement our decision to award funding for the Integrated Network Constraint Management scheme.

Our decision

3.1. We have assessed that SPEN's IRM application for the Integrated Network Constraint Management scheme meets the requirements of the IRM licence condition. We have also assessed that the requested IRM funding is the efficient cost of rolling out the ANM scheme. Therefore we have decided to award £8.01 million (2012/13 prices) IRM funding for the project.

Funding

3.2. To implement we will adjust SPD's allowed expenditure under RIIO-ED1 as set out in the table below.

£m (2012/13 prices)	2018/19	2019/20	2020/21	2021/22	2022/23
IRM values	3.06	3.06	0.63	0.63	0.63

Outputs

3.3. The ANM roll-out is expected to deliver long-term value for money to GB electricity consumers by facilitating an increase in power exports from distributed generation connected to parts of SPEN's SPD network that are transmission constrained. To monitor the benefits arising from the roll-out of its integrated ANM scheme, SPEN will report on the following key performance indicators:

- Relative constraint level of the existing distributed generators under ANM compared to LMS;
- An addition in the MW volume of new distributed generation that connects to the ANM scheme; and
- Level of curtailment that is applied to new ANM-connected distributed generation.

3.4. SPEN will report on the above measurements for all integrated ANM schemes it rolls out during the RIIO-ED1 price control period in its SPD area using the central controller.

3.5. If SPD does not deliver on the outputs that it has proposed, we will consider what action is appropriate in the interest of electricity consumers.

Next steps

Price control financial model annual iteration process

3.6. The IRM is an input to the RIIO-ED1 price control financial model that adjusts licensees' annual revenues each year over the price control period. Allowed revenues are updated annually for licensee's performance, the outputs it delivers achieves, as well as additional funding being made available under mechanisms such as the IRM.

3.7. The Authority will issue a direction to adjust SPD's base revenue by 30 November 2017. The arrangements for determining revised values, determining the value of the "MOD" term, and for carrying out the annual iteration process are in the special conditions of SPD's licence and in the Price Control Financial Handbook[10]. The price control financial model and Handbook form part of SPD's licence.

[10] Latest price control financial handbooks for RIIO Network Operator licensees.