

**OFGEM LOW CARBON NETWORK FUND
PROJECT PROGRESS REPORT
DECEMBER 2014**

ACCELERATING RENEWABLE CONNECTIONS

Version: **1.0**

Produced by: **Euan Norris – Senior Project Manager**

Approved by: **David Campbell – Future Networks Manager**

SP ENERGY NETWORKS
ACCELERATING RENEWABLE CONNECTIONS (ARC)
REPORTING PERIOD JUNE 2014 – DECEMBER 2014

1. EXECUTIVE SUMMARY

1.1 PROJECT PROGRESS HIGHLIGHTS

Following on from our previous report in June, the ARC project team have continued to make significant progress delivering the objectives of the Accelerating Renewable Connections (ARC) LCNF project over the course of 2014. A number of the key deliverables to date are highlighted below;

- **Delivery of the First Actively Managed Customer Connection** – The end of December 2014 will see our first generator connected to the Distribution Network under an Active Network Management Solution. This follows an initial meeting held with the customer at The Royal Highland Show held in June 2014, attended as part of our Stakeholder Engagement strategy. The original offer provided to the customer to obtain a firm connection solution rendered the project uneconomic however under ARC we have delivered a managed connection in a shorter time period at a cost that permits the customer to realise the benefit of the generation project for his business.

A second project is scheduled to connect, currently under construction, by end Q1 2015.

- **Delivery of ARC Commercial Agreements** – During the period we have issued two commercial agreements under the ARC project one of which requires interaction with GB System Operator NGET. Again by having in place a commercial mechanism that satisfies, the DNO, GB System Operator and SP Transmission, not to mention the generator for whom the connection agreement must be bankable, the ARC project team have enabled the connection of an additional generation unit (1.6MW Wind Farm), by end Q1 of 2015 that would otherwise, under NGET's existing contractual and connection policy arrangements, have been delayed in connecting until 2021 at the earliest.
- **Identification of Community Energy Project** – Our previous report highlighted our concern to date in identifying a community based generation scheme that would satisfy our requirement to complete Successful Reward Criteria (9.6). However over the reporting period we are pleased to inform that we are currently working with Community Energy Scotland and a local housing association with links to the trial area to facilitate the connection of around 2.2MW of PV to be sited on existing housing stock.
- **Active Network Management Into Business As Usual** – At the December SP Energy Networks Executive Team Meeting, the ARC project team presented on the ARC project progress to date and made a recommendation to the Executive Team that key elements of the ARC trial could be extended beyond the ARC trial area and take the form of a Business As Usual offering. Over the course of the next 6-months the ARC team will work alongside existing delivery teams within SP Energy Networks to develop our ANM offering and identify those areas of the network where its application would be appropriate. It is hoped that we would be in a position to announce those areas by July 2015, which would realise Active Network Management into Business As Usual a full 18-months ahead of the project completion date.

1.2 KEY RISKS IDENTIFIED

1.2.1 COMMUNITY BASED GENERATION SCHEMES – Following on from our previous report whereby we raised our concern that to date we had been unable to identify a suitable Community Based Generation Scheme to take forward as part of the project. We are pleased to inform that during the last reporting period we have now identified a community generation scheme that will enable SP Distribution to fulfil its project deliverable under Successful Reward Criteria (9.6). This scheme involves working with both Community Energy Scotland and a local housing association operating within the trial area and who are seeking to connect around 2.2MW of new PV installations on their existing housing stock. Under Business As Usual methodologies, this type of development would be restricted due to existing network constraints at both a distribution and transmission voltage level.

To date we have enabled the connection of around 1MW of generation to proceed by building on the techniques developed as part of our revised design policy review, a key deliverable under the ARC project. For the remainder we are working closely with University of Strathclyde to challenge existing design policy that will prove that as network operators we can decouple any link between the connection of PV and Wind Generation and alleviate any considered network constraint.

1.2.2 AGREEMENT TO INSTALL ACTIVE NETWORK MANAGEMENT TO EXISTING GENERATOR – Our June report highlighted that we had reached agreement with an existing generator within the trial area to retrofit Active Network Management control to their site in order to manage generation output during an N-1 constraint, which specifically related to Successful Reward Criteria (9.4). In addition, the developer responsible for the development and operation of this site has also agreed to contribute to the costs associated with the installation of the required equipment. At the time of the last report we had hoped to have ANM control by September 2014.

Unfortunately to date we have been unable to complete this part of the project. This has been primarily due to the inability of the Wind Turbine supplier of the site to engage effectively and provide and install the equipment required to interface with the new ANM control equipment proposed for the wind farm being trailed through the ARC project.

We have further meetings planned with Senior Executives from the Wind Turbine supplier to address those problems that have been experienced to date and hope to provide a positive update on this issue as part of our next update scheduled for June 2015.

Should we fail to reach a positive outcome then we have already begun to give consideration to what alternative Successful Reward Criteria (SRC) deliverable could be undertaken to replace the existing SRC (9.4), however we will consider this in due course once we have exhausted all endeavours with the problematic Wind Turbine supplier of the site.

1.3 LEARNING OUTCOMES ACHIEVED

1.3.1 KEY LEARNING OUTCOMES DELIVERED IN THE PERIOD – During the period we have continued to deliver learning from our project activity internally rather than produce significant learning which we can share with other stakeholders. Our internal stakeholder engagement has been aimed at understanding issues in bringing the project into Business As Usual.

This will continue as we develop policy and guidelines to take the project from a LCNF trial into a Business As Usual Offering.

However, having now undertaken a significant amount of work in delivering two connections and having undertaken a lot of interaction with Developers, GB System Operators National Grid and transmission owner SP Transmission, to develop our two-staged connection offer, we plan to hold a Learning Event towards the spring of 2015 to provide the DNO community with the learning developed from the ARC project to date.

1.3.2 SP ENERGY NETWORKS APPROACH TO CAPTURING LEARNING – Our approach to capturing learning largely remains the same to that documented in our June 2014 report whereby we continue to document our activity as the project progresses. This ensures that the project learning is adequately understood by firstly the ARC project team and thereafter fully evaluated and challenged where necessary. Secondly we have developed a Stakeholder Engagement map that identifies to which stakeholders learning or process improvements will be relevant before taking the final step to publish and furnish those stakeholders with the appropriate learning tools.

In respect of capturing and disseminating learning, activity has been not limited to the project deliverables themselves but designed to inform and accelerate the transition from a pilot project into Business As Usual policy. To that end we have delivered a number of models during 2014 that firstly identify key process steps and required activity to make ANM a Business As Usual reality but more importantly identify who within the existing business will own and operate this process going forward. This was built upon during our recent presentation to the SP Energy Networks Executive Team at the start of December that focused upon taking the learning from the ARC project to date to deliver key elements into a Business As Usual offering by July 2015, nearly 18-months ahead of the completion date of the project.

1.3.3 THIRD PARTY ACTIVITIES

1.3.3.1 Low Carbon Networks Conference – October 2014 – Our attendance at this year's conference held in Aberdeen provided us with the opportunity to present on our activity associated with the development of commercial mechanisms under ARC and the work carried out to facilitate the connection of the Community Generation Scheme, and it was pleasing to note that our work in this area was referenced by the OFGEM representative at the conference when delivering his closing remarks to conclude the conference.

1.3.3.2 UK Renewables – November 2014 – As part of the promotion of the ARC project, SP Energy Networks again attended this year's UK Renewables conference in Manchester as an exhibitor, the only UK DNO to do so. This provided the opportunity for members of the ARC project team to interface with a variety of existing and those developers considering a connection within our licenced distribution franchise areas. Our attendance at this event was again well received by the generator community and we received positive feedback for our proposed approach under ARC in respect of the LIFO Principles of Access and proposed new network solution to enable embedded generation to connect in the face of transmission constraints.

1.3.3.3 2015 Planned Activity – Building on the success of our stakeholder engagement activity during 2014 we have developed a detailed plan for 2015 of which is summarised below;

- 1. ARC Stakeholder Forum – January 2015** – We will host our third stakeholder forum in January where we seek to build on the progress of the project to date and work with stakeholders to develop the principle of offering embedded generation connections on a non-firm connection agreement. Thereafter we will again plan to hold quarterly Stakeholder Forums to inform our developer community on the progress of the ARC project.
- 2. Low Carbon Scotland – February 2015** – This, a new event for the ARC team to exhibit at, will bring together delegates from across the public sector in Scotland and focus upon how Scotland meets its ambitions for a reduction in carbon emissions and create a sustainable energy future from renewable energy sources. The event will enable the ARC team to demonstrate what we are doing as a network operator to facilitate a greater penetration of renewable generation onto the network and enable us to interact with local and central government officials.
- 3. Attendance at Scottish Renewables Conference – March 2015** – We have secured both an exhibitors stand and speaking slots at next year's Annual Scottish Renewables Conference. This will provide the opportunity to again reach a wide variety of industry stakeholders to raise further awareness of the ARC project and update on progress to date as well gain the views of interested parties on the development and rollout of the Active Network Management connection offering.
- 4. Royal Highland Show 2015 – June 2015** – We hope to attend this event again next year. Following on from the success of our attendance at last year's event we have engaged on a number of different fronts with members of the Agricultural and Land Owner community. Again this relationship may give rise to attending further agricultural events to be held throughout the year that are held within the trial area. This event predominately attended by those from the rural and agricultural community presents the greatest opportunity to engage with those developers that are likely to benefit from the rollout of Active Network Management and facilitate the connection of renewable generation and indeed the event attracted in excess of 175,000 visitors last year.
- 5. Dissemination Event – 2015** – Over the course of 2015 we plan to hold an ARC dissemination event. Further information will be provided once we confirm our position but it is likely to take place during the spring of 2015.

2. PROJECT MANAGER'S REPORT

2.1. PROJECT OVERVIEW

As we reach the half-way point of the ARC project, I am delighted to report on the progress that has been made to date. From the very start of the project the team have developed ARC as a foundation for transitioning Active Network Management into a Business As Usual offering, which we consider will mark the true success of the project.

I am therefore delighted to report that at the start of December the SP Energy Networks Executive Team endorsed the recommendation of the ARC project delivery team to implement key elements of the ARC project into a Business As Usual offering towards the summer of 2015, a full 18-month's ahead of the scheduled project completion date.

Over the first half of 2015, the ARC project team will work alongside those departments identified to lead the delivery of Active Network Management connection solutions into a Business As Usual offering, and who have been given the target of announcing those zones beyond the existing trial area that will be eligible for Active Network Management deployment by summer 2015.

Our second highlight from the reporting period is the delivery of our first Actively Managed Generation project on the 11kV network. The project, an 80kW PV array, was originally provided with a connection offer that required the installation of a long overhead line at a cost of around £160k to realise a firm generation connection and mitigate a voltage rise constraint within the locality of the proposed connection. This original offer, provided in early 2014, rendered the project uneconomic. However, as a consequence of the ARC project, we have been able to revisit this connection and connect the customer on a non-firm Actively Managed basis that both enabled the project to proceed and has been delivered at a fraction of the original cost estimate.

In addition, we are also working to complete our second connection within the trial area that will be connected under an Actively Managed Connection arrangement. The project, a 1.6MW wind farm, would in the absence of Active Network Management, not realise connection until 2021 at the earliest as a consequence of constraints, not on the distribution network, but on the impact of distributed generation on the transmission network. Working in collaboration with GB system operator National Grid, we have been finalising our two-stage connection agreement that will be completed before the end of the year with a view to completing the connection on site by March 2015.

Our previous progress report in June enabled us to raise our concern at the difficulty that had been experienced to date in identifying a suitable community generation scheme. However I am delighted to inform that during the reporting period we have already commenced work with a local housing association and who are seeking to connect around 2.2MW of PV generation on their existing housing stock. Working with this social landlord we have already used learning from the project to enable around 1MW to be installed which shall commence during February 2015 and will be working to implement local management and local demand matching at those sites where we have calculated that a known constraint exists.

2.2. PROGRESS IN THE CURRENT REPORTING PERIOD

Work Package 1 (Empowering Customers)

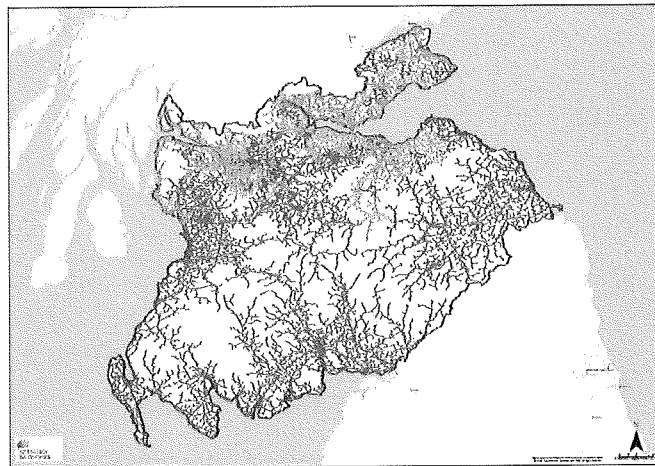
1.1 Establishing a Stakeholder Forum

A highlight of the project to date has been the engagement from the generation developer community and the support shown for the team in delivering Active Network Management connection solutions. Having held a number of stakeholder events during the course of 2014, this process will continue with our first meeting of 2015 scheduled to be held in Edinburgh on the 13th January.

In addition to the quarterly stakeholder events we have developed a regular ARC project newsletter that is distributed to all Stakeholders that have signed up to be part of the ARC Stakeholder community.

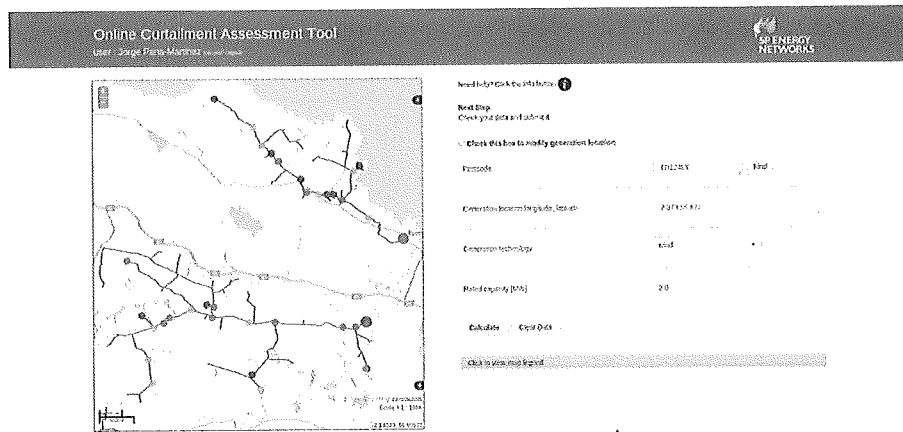
1.2 Publication of a more Frequent Refreshed Network Data and Network Heat Maps with Additional Information on Smart Connection Options

During the reporting period, the connections business published its latest heat maps to provide developers with greater visibility of network constraint. Mapping also included for the first time a coordinated view which took into account known transmission affected areas that are delaying connection for embedded generation to dates from 2019 onwards. Part of the success of the ARC project will be enabling connections within those areas currently classified as red that have been deemed to be constrained to a point where no network capacity exists to realise a firm generation connection.



Coordinated Heat Map (Distribution & Transmission)

The reporting period has seen the development of the Online Curtailment Analysis Tool (OCAT) in partnership with project partner Smarter Grid Solutions (SGS). The tool has been designed specifically to give developers a reliable indication of the energy export volumes for 'managed' connections within the ARC trial area. The tool has been designed to give developers seeking a connection within a constrained network early visibility of curtailment events using the latest network models and network monitoring data captured daily. The system will also take into account the contracted position of other generator within the LIFO stack as and when they are contracted.



Screenshot of OCAT

The system shall be web hosted and provide instantaneous results around expected levels of constraint. The OCAT has also been designed to provide an expandable architecture to allow SP Energy Networks to develop the tool beyond the ARC project and will be integrated with our current GIS system.

Live demonstration has been successfully received at recent ARC stakeholder events and conference events such as LCNI 2014. It is envisaged that continuing into 2015, the system shall be developed further and that the OCAT tool will be available for the trial area during 2015.

1.3 Viability Studies

Communication has been maintained throughout the reporting period with many renewable generators seeking connection in a cost effective and timely manner. Early communication mainly through stakeholder engagement has allowed the ARC team to work closely with a number of our customers prior any formal applications being made.

Throughout the period we have continued to provide renewable generators with curtailment studies as a means of identifying levels of anticipated constraint. Moving into 2015, we expect the levels of analysis to increase as we see more customers come forward and results of data monitoring become available.

After engagement at the Royal Highland Show 2014, the team commenced work with a local landowner who was seeking to match a new demand with a proposed embedded generation scheme. However, traditional design mythologies would have required ~1.2km of new medium voltage infrastructure to be built to accommodate the generator. Through early engagement and active problem solving the ARC team have successfully developed the necessary commercial and technical solution to allow the generator to connect behind the new local demand connection, whilst putting failsafe measures in place for times when generation is larger than local demand. Commissioning of the connection is anticipated Dec 2014.

Work Package 2 (Connections Design)

Following on from our June update, the ARC project team have continued to work to identify the necessary changes in policy and process to facilitate 'Active Network Design'. Continued work has taken place looking at smart interventions and how such techniques can be integrated with existing design methodologies and policy.

These changes have also been developed in alignment with learning from other network operators who face similar challenges around Active Network Management policy and process change. Participation in the ENA Active Network Management working group, chaired by SP Energy Networks, has been identified as a key mechanism in which commonality in design methodologies can be achieved.

As we prepare to deliver our RIIO-ED1 program, Active Network Management is recognised as a key enabling technology in facilitating the acceleration of embedded generation connecting to the distribution system. In addition Active Network Management will facilitate further roll out of findings achieved as part of our Flexible Networks LCNF project in respect of Dynamic Rating of Transformers and realisation of 20% headroom in additional capacity from our existing network asset base.

2.1 Design Policies

The ARC project team have worked with a number of internal stakeholders to identify and review relevant process improvements to facilitate 'Active Network Design'. Both technical and commercial policies have been reviewed and necessary changes identified to facilitate such change.

Current methodology used in determining if a generator can connect to the system is based upon the worst case scenario of minimum system demand combined with maximum generator output occurring at the same time. Consideration is given to thermal limits, voltage bandwidths, voltage step, reverse power flow limits, alternative operating arrangements and fault level limits.

Using passive design rules, if any one of the above factors is breached, then either reinforcement or an alternative connection solution must be found. The adoption of 'Active Network Design' seeks to permit the accelerated connection of embedded generation against both distribution and transmission constraints.

Work thus far has highlighted a requirement to review, create or modify the following technical and commercial policies to facilitate the connection of embedded generation on an actively managed arrangement;

SPEN 'Managed' or 'Non-Firm' Connection Agreement:

To facilitate 'Active Network Design' the current connection agreement does not provide the network operator with the flexibility to dynamically regulate the output of the generator against a known network constraint. Historically, the network operator has only been able to manually curtail or turn down the power generation plant during time of abnormal network operating conditions or for wider transmission problems.

The principle of 'Active Network Design' is to accelerate the connection of the generation plant onto the system ahead of local or wider reinforcements being complete. This can be undertaken under temporary or enduring arrangements.

Therefore, a mechanism must be included within connection agreement to allow the network operator to autonomously constrain the output all generating plant connecting to a constrained system, governed by LIFO principles of access.

SPEN Transmission Statement of Works Guidance Policy:

Within the ARC trial area, all three enabled Grid Supply Points (GSP's) are deemed to be subject to wider transmission constraint. The result of which means any new generation seeking to connect must be subject to transmission impact assessment

by the national system operator and transmission operator. Throughout the reporting period, members of the ARC team have been directly involved in review of guidance documentation which governs the statement of works process within SP Energy Networks.

Enhanced Statement of Works:

For generators seeking to connect within a known transmission constrained network, a Statement of Works (SoW) application to the system operator is typically required for each generator wishing to connect. The SoW will normally identify any system reinforcement of both local and wider transmission assets to accommodate the generation plant on a 'firm' basis. Within the ARC trail area it is identified that these reinforcement works carry a substantial cost with timescales to connect ~ 2021.

During the last reporting period, we have been directly engaged with National Grid in its System Operator roll to work towards a solution to permit the connection of embedded generation ahead of wider system reinforcement. The solution is to connection the distributed generation using the principles of 'Active Network Design' until transmission reinforcements are complete.

The first connection agreement including a staged Statement of Works was signed-off and issued to the first generator during December 2014. It is anticipated that this generator will be commissioned within the Active Network Management scheme by end of Q1 2015.

Distributed Generation Connection Requirements:

This document specifies the company requirements in respect of the technical requirements for the connection of new distributed generation plant to the SP Distribution and SP Manweb distribution network.

Working alongside the system design manager and issuing authority, the project team propose to make enduring changes to this policy to allow for the connection of embedded generation on an actively managed arrangement. Within this document, topics include ANM methodologies, system design principles, protection interface, control and monitoring and testing and commissioning.

It is envisaged that this document, once signed-off by the relevant authority, shall be used by all system designers when applying 'Active Network Design' to a new generation connection offer.

System Integration Policy:

During the last reporting period, the ARC team have worked closely in coordination with other network operators and internal stakeholders (Real Time Systems & Corporate IT) to understand best practise principles for the integration of the Active Network Management scheme. Many of the key points have centred on IT network security, system resilience, Active Network Management system failsafe's and operation maintenance procedures.

2.2 Network Visibility

The transition from a passive to active distribution network places an ever greater demand for network data. Historically, measurement information was collected from source circuit breakers rather than collected deeper into the system. The ARC project set out to establish new design assumptions utilising existing data sources

coupled with learning from other LCNF projects to establish tools for improved network visibility without the need for extensive network monitoring.

Strathclyde University under the guidance of the ARC project team delivered during the reporting period a technical report on "Distributed Generation on 11kV Voltage Constrained Feeders". The interim report developed analytical methods for connecting multiple embedded generators under an Active Network Management scheme against 11kV voltage rise constraints. The data used for modelling purposes was based on data collected under a previous LCNF Tier 2 project Flexible Networks.

It is intended to develop the techniques identified within the report for application within the ARC trial area and beyond under Business As Usual design policy. The ARC team are currently working with customers seeking to connect under an actively managed voltage rise constraint and it is hoped that outcomes of the report can be validated as the project develops.

The ARC project is also working with a local housing association that have recently been successful in a bid to the 'Scottish Local Energy Challenge Fund', whereby the customer is seeking to connect ~750 (2.2MW) photovoltaic arrays and 250 (1MW) heat batteries. The project has allowed the project team at ARC to consider what techniques to deploy in order to better understand the network impact, both at distribution and transmission.

Using cluster analysis techniques we have been able to map the address list of properties with proposed PV and Heat Batteries, against network constraint. A comprehensive top down review has allowed the network operator and customer to clearly map areas of concern due to the penetration clustering of new demand and generation. During the reporting period, substations and circuits flagged as congested have been fitted with LV monitoring to capture times series data to help validate or disprove design assumptions.

Using P222 settlements data we are also using the techniques developed through Western Power Distribution's (WPD) LV Templates project to further understand network performance for substations and LV feeders deemed to be constrained. We intend to validate the learning from LV Templates using the monitoring data we collect to facilitate future design assumptions without the need for wide scale monitoring.

2.3 Planning Tools

A key deliverable of ARC has been the requirement to develop new planning techniques for system planners when assessing smart interventions. Traditional methodologies typically rely on an assessment based on minimum demand against maximum generation, regardless of generation technology. The principles of 'Active Network Design' attempt to release network capacity during times when system demand is neither at minimum nor generation at maximum output.

Over the reporting period we have successfully developed an Online Curtailment Analysis Tool (OCAT), specifically targeted at new generation customers seeking feasibility information prior to making a full application, details of which can be found within Work package 1.

Using the same techniques, we are also developing a layer for system planner's which integrates the learning from OCAT and turns it into a BAU design tool. Using legacy and new network data sources, improved network model extraction via our Geographical Information System (GIS) and data cleansing techniques, we aim to develop a BAU curtailment analysis tool available for design teams beyond ARC.

We have also commenced work looking at the enhancement of SPEN's design tools for LV network design for high density G83 PV penetration. This work expands on work previously carried out by SPEN around LV phase balancing within Anglesey. We also are working with the learning taken from WPD Suburban PV Impact and SSEPD LV Network Modelling and Analysis Environment Projects. The work seeks to provide SPEN design engineers with an enhanced suite of tools to facilitate the connection of G83 PV whilst minimising the need for system reinforcement.

Work Package 3 (Network Enablers)

3.1 Design and Evaluation of Enablers

Prior to the end of the current year, the ARC project team will be holding internal learning events with the project team undertaking the Flexible Networks LCNF project to consider how the techniques and learning developed through Flexible Networks can be integrated with the roll out of Active Network Management to further enhance the availability of capacity for those seeking access to our network.

Evaluation of the enabling technology is anticipated to start throughout 2015 as we commence the connection and commissioning of several embedded generators under the ANM scheme. Learning around early system evaluation is also being documented through participation in the ENA ANM working group and attendance at DNO dissemination events around Active Network Management technology.

3.2 Telecoms Platform for Communicating across the Trail Network

As we see a greater penetration of projects seeking to connect under an Actively Managed Connection, we are now being faced with the requirement to consider a number of Telecom solutions to facilitate connection as a consequence of various geographical constraints. To that end we are seeking to roll out a 4G GPRS solution to enable comms to be installed for the generator seeking to connect by end Q1 2015. This will provide valuable learning on the suitability and reliability of this type of comms for consideration in future projects as opposed to the preferred choice of using fibre telecom infrastructure where possible and economic to deploy.

3.3 ANM Platform for Managing Generators

We are now in the position whereby we have enabled the three Grid Supply Points within the trial area where Active Network Management is to be deployed.

3.4 Substation Environment

As reported in June 2014, we have completed a number of audits at various Grid and Primary substations within the trial area to consider the existing equipment installed and document compatibility with the propose Active Network Management equipment and infrastructure.

Work Package 4 (Network Connections Trials)

4.1 Management of Exporting Distribution Networks

The engagement with National Grid (NGET) to date has been positive to develop a commercial and technical solution that enables the connection of embedded generation under a Grid Supply Point that is considered to be constrained. In addition, through our engagement with NGET to date, as part of the ARC project we are also beginning to consider how Actively Managed Generators connected to the

distribution network can interface with existing generation units currently part of the Balancing Mechanism that NGET issue with instruction to alter generation output to ensure GB System Balancing.

4.2 Active Management of Generation around Constraints

As we issue our first connection agreement to facilitate the connection of embedded generation, this will allow us realise and quantify the benefit of our two-stage commercial agreement to enable connection of embedded generation behind a transmission constraint.

4.3 Community Level Connections

As highlighted earlier in the report we are delighted that we have been able to identify an appropriate Community Level project to deliver as part of the ARC deliverables.

Work Package 5 (Project Evaluation)

At this stage of the project no work has commenced on this Work Package.

Work Package 6 (Knowledge Transfer)

6.1 Knowledge Import

The project continues to engage with other DNOs on lessons from relevant LCNF projects. UKPN updated the ARC team on project Flexible Plug and Play.

A Stakeholder forum and Community Workshop have been held in the trial area, both in Edinburgh. A report detailing the discussion and conclusion from the Stakeholder events are available online. Key learning from the Stakeholder event was:

1. The Online Curtailment Analysis Tool is wanted urgently by Developers. The ARC team have prioritised the delivery of this tool accordingly. The tool will be delivered to the trial area by summer 2015 and work is already underway to consider how this could be rolled out across the remainder of our license area.
2. Developers want to be on Firm connection. Two-stage commercial agreements have been drawn up with NGET to accelerate connection onto the Distribution Network (stage one); and trigger wider Transmission reinforcement so a Firm connection will be given once reinforcement works are complete.
3. Developers accept that renewable generation projects that have planning permission should leap frog those who are perceived to be 'hogging' grid capacity. Active Network Management Connection offers are only sent out to projects with planning permission. Project specific milestones are required and embedded within the Connection agreement. Failure to meet project milestones allows the network capacity to be reallocated to alternative projects that are able to use it.

6.2 Knowledge Export

We continue to use a multi-media approach to disseminate information: website, blog, Facebook page and Twitter are all used. However, word of mouth has been the most successful dissemination tool which is attributable to the regular Stakeholder Events that we have held. Conferences have also been used to target a

wider much audience. The project team have attended: LCNI conference 14 – 16 Oct, European Utility Week 5 Nov, Renewables UK 11 – 13 Nov and iGreenGrid 4th Dec. It is of note that SP Energy Networks were the only DNO to exhibit at Renewables UK conference and no effort was made by the Trade Body to exploit the presence of a DNO when Grid Connection is a major issue for their membership.

6.3 Business As Usual

As highlighted earlier in the report we are delighted that we have had agreement from our Executive Team to accelerate elements of ARC into the business throughout 2015, ahead of the project completion date of December 2016.

3. BUSINESS CASE UPDATE

The Business Case remains as per our original submission with no events or developments taking place in industry over the first year of the project that would adversely affect the delivery of the ARC project.

4. PROGRESS AGAINST BUDGET

Activity	Project Budget at Dec 2014 £k	Actual Project at Dec 2014 £k	Variance £k	Comments
Labour	2,247.0	567.2	(1,679.8)	Our labour requirements continue to be efficient and we have been able to deliver the project at a reduced labour costs to date
Equipment	1,175.0	660.0	(515.0)	We continue to deploy the ANM equipment in line with the requirements of the project and those developers timeframes for delivery of their connection. We have also purchased equipment that whilst has been delivered this year will not be invoiced until January 2015.
Contractors	1,633.0	557.2	(1,075.8)	We have accelerated part of our programme in some areas in-line with stakeholder feedback and all partners continue to contribute to the project in line with the Project Direction
IT	906.0	43.0	(863.0)	2015 will see a significant increase in spend associated with IT. This will support the delivery of the Online Curtailment Assessment Tool.
Travel & Expenses	17.0	21.9	4.94	Travel is slightly ahead of forecast spend due to increased stakeholder engagement activity within the trial area and attending various events
Contingency & Others	275.0	31.1	(243.9)	This reflects costs associated with the delivery of increased stakeholder engagement activity throughout the project ¹⁶
Total	6,253.0	1,880.5	4,372.6	

5. BANK ACCOUNT

A copy of the ARC bank statement detailing the transactions of the Project Bank Account to date is attached and included within Appendix A (Confidential Submission)

6. SUCCESSFUL DELIVERY REWARD CRITERIA (SDRC)

Criterion (9.1) Project Budget – We remain on track to deliver the objectives and deliverables of the Accelerating Renewable Connections project within the existing budget provision as set out within our Tier 2 Full Submission documentation.

Criterion (9.2) Project Timeline Delivery – We remain confident that we will deliver the entire project within the Project Timeline as agreed within the Project Direction documentation.

Criterion (9.3) Demonstration of alternative solutions as detailed in case study 1 – As intimated throughout the report, by Q1 2015, we will have delivered two connections that will be managed via Active Network Management control. This will allow us to demonstrate and report on learning from the delivery of an alternative solution to connection currently not available under business as usual methodologies and commercial offerings.

Criterion (9.4) Demonstration of alternative solutions as detailed in Case Studies 2,3 and 4 – In line with our previous report, we remain confident that we will deliver an Active Network Management system and alternative connection arrangements as detailed in either case studies 2, 3 and 4. This view is supported by the level of engagement and developers seeking to connect within the trial area.

Criterion (9.5) Creation of community energy generation scheme & model for community level generation – We have now embarked on the delivery of the community energy generation scheme identified over the second half of 2015.

Criterion (9.6) Demonstration of top-down Active Network Management – We have completed the delivery of the three enabling units as the three Grid Supply Points identified and have now engaged with a number of developers in each GSP zone who are actively seeking an alternative connection for their generation projects.

Criterion (9.7) Detailed publication and dissemination of learning from project – We continue to make significant progress in capturing the learning from our project to date. During 2015 we will hold a network dissemination event.

Criterion (9.8) Improved Generation Experience – To date we have surveyed a number of existing generation developers to gain their views on the current arrangements for connecting to the distribution networks. With regard to those customers seeking to connect to the distribution network within the trial area but are being prevented as a consequence of transmission constraints, we are seeing that the average time to connect will be at least 5-years from the time of connection application with costs forecast in the order of £20m. For those generators seeking to connect at lower voltage levels, voltage rise remains the main cause of network constraint. Again this is giving rise to costs per MW being significantly higher than would otherwise be expected. This provides a baseline for improving the overall experience for generators seeking to connect to our network.

7. LEARNING OUTCOMES

The Stakeholder forum continues to grow in attendance with 50 people attending the June event. A newsletter was used for the October date since project progress has been mainly focused on Business As Usual issues. The next Stakeholder forum is scheduled for 13th Jan 15.

The project team continues to prioritise progress into business as usual and we have highlighted as part of this report that the SP Energy Networks Executive Team have

endorsed our recommendation to deliver elements of the ARC project into a Business As Usual offering by mid-2015 for pre-selected areas of our network.

8. INTELLECTUAL PROPERTY RIGHT (IPR)

The project is not funding the development of any technology which should create foreground IPR. All partners have accepted the LCNF default IPR arrangements.

9. RISK MANAGEMENT

The project risks table below has been updated with developments and any risks identified as part of the project activity to date. Similar to our last report we consider that the project management approach we have taken has mitigated any perceived risks from materialising.

Risk	WP	Risk Description	P	C	PR	Mitigation	Action
1	WP 1.3	Developers unwilling to trial new commercial and connection arrangements	1	3	3	Targeted Stakeholder Engagement with developers ensuring benefits of ANM are understood	Identify key stakeholders within trial area Hold one-to-one meetings with all developers seeking to connect within the trial area
	WP 1.2	Dynamic network constraints and volume of data leads to IT issues	1	3	3	Ensure network planning tools and data requirements meet the needs of the network planners	Review of existing Network Modelling data and production of up to date network data
2	WP 2.1	The Development of new tools and processes for connection design involves complexity and time/cost risk	2	2	4	SPD has engaged technology partners to develop up to date tools and processes for connections design	Deploy internal IT support and resources where possible and transfer learning from external technology partners into the business
	WP 2.2	Increased visibility of network may have an impact on the available network headroom	2	1	2	Traditional design headroom has been conservative	Utilise learning gained from Flexible Networks project on headroom available
	WP 2.3	Integrating existing data sources and tools is not successful due to incompatibility	2	1	2	SPD will engage technical experts to conduct integration of data and tools into a single streamlined solution	Expand on previous IFI trials
3	WP 3.2	There are communication issues with telecoms platform meaning that some areas cannot be covered by ANM	3	2	6	SPD will carry out site surveys and specify telecoms that will meet the requirements of the trial area	Use of existing communication technology under Business As Usual
4	WP 4.1	Failure to establish SPD/NGET process and policy	2	2	4	Robust engagement with NGET.	Key deliverable – maintain dialogue with NGET to reach agreement on commercial interface and policy for mgt of GSP constraint
	WP 4.2	Procurement of technology and software tools to facilitate trials could defer project deliverables	1	3	3	Alignment with Business As Usual policy on selection of technology providers	BaU
5	WP 5.2	Network evaluation finds that generation triggers cannot be categorised	1	3	3	Academic partner to carry out analysis and report	Work with key stakeholders
6	WP 6.1	Knowledge Import from other projects	1	1	1	Assignment of dedicated resource to import learning from existing LCNF projects	Appointment of Knowledge Transfer Lead
	WP 6.2	Knowledge Dissemination	1	1	1	Delivery of knowledge sharing events	Identification of key stakeholders Regular engagement with UK DNOs Regular review, update of ARC website Use of various media resource to capture and impart learning
	WP 6.3	PNDC Demonstration of technology	1	2	2	Selected technology does not function as specified	Robust assessment of new technology used to constrain or facilitate embedded generation


10. CONSISTENCY WITH FULL SUBMISSION

We confirm that the project is being undertaken in accordance with the full submission.

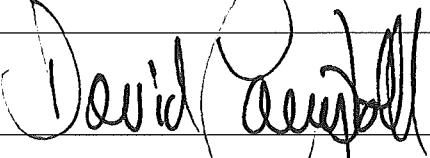
ACCURACY ASSURANCE STATEMENT

Steps taken to ensure this are:-

- Regular update reports from each project team member for their area of responsibility.
- Evidence of work undertaken by the project team is verified by the section manager as part of their day-to-day activities. This includes;
 - Checking and agreeing project plans.
 - Holding regular team project meetings and setting/agreeing actions.
 - Conducting frequent one-to-one meeting and setting/agreeing actions.
 - Confirming project actions are completed.
 - Approving and signing off completed project documents.
 - Approving project expenditure.
- Weekly reports are produced by each section manager of the progress of the work their department is undertaking.
- Director and Senior Management summary reports for the project progress are produced.

Author		Date	12 th December 2014
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Euan Campbell Norris – Senior Project Manager

Signed (1)		Date	12 th December 2014
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David Campbell – Future Networks Manager