RENEWABLES INTEGRATION

STATUS REPORT

NIE Networks Ltd

SYSTEM OPERATOR FOR NORTHERN IRELAND Ltd.

February 2016

1. INTRODUCTION

Renewable Generation Update
The electricity network in Northern Ireland (NI) is facing an unprecedented demand for the connection of renewable generation.

To date, 659 MW of large scale generation (≥ 5 MW) has been connected to the network with a further c. 601 MW committed to connect.

In addition to this an estimated 187 MW of small scale (<5 MW, including microgeneration) renewables has already connected to the distribution network, with a further c. 119 MW small scale committed to connect.

The total amount of renewable generation already connected to the network is 846 MW, with a further c. 720 MW committed to connect.

The context for connecting renewable generation to the grid has changed significantly following Utility Regulator (UR) Determination (DET-572). This concluded that NIE Networks was not entitled to require grant of planning permission as a pre-requisite for applying for a generation connection to the Distribution System.

As a result NIE Networks changed its generation connection application policy on 12 August 2015 for distribution connection applications. The pre-requisite of planning permission remains for transmission connection applications to SONI.

Consequently NIE Networks received a very large number of applications for generation connections to the Distribution System in a very short period of time; amounting to around 870 MW. This presents significant challenges for both the transmission and distribution systems where the level of connected (846 MW) and committed generation (720 MW) already well exceeds the capacity of the transmission system.

Given this context, it is clear that the current process for assessing connections, which adopts an incremental approach for assessing impact to the grid, is not appropriate. An alternative must be implemented which addresses, in particular, the extent of transmission analysis required and to avoid time consuming re-working of offers.

SONI and NIE Networks believe that an alternative Connection Offer Process is required. This proposed alternative process is described as the "Batch Process" and SONI and NIE networks are proposing to issue a joint consultation paper shortly following on from the Renewable Generation industry workshop held in December 2016.

Renewables Targets and Incentives Schemes
In its 2010 Strategic Energy Framework DETI set a target for 40% of electricity consumption in Northern Ireland to be generated from renewables by 2020. Recent estimates concluded that this would require a total of c. 1,600 MW of renewable generation. In March 2015, DETI published a Discussion Paper on "CFD Implementation in NI – Strategic Issues"[1] which sought views on the specific NI strategic policy issues that implementing the Contract for Difference (CFD) scheme[2] will bring for NI customers and renewable generators. Among other effects, the discussion paper explains that the introduction of the CFD scheme will mean that there may be no basis for the Northern Ireland Executive to set a NI renewable

[1] Available at http://www.detini.gov.uk/cfd_implementation_-_ni_specific_issues_paper.pdf
[2] CFD's will be replacing the Renewables Obligation in GB as the main way of supporting large-scale renewable electricity generation and it is intended that it will also replace the Northern Ireland Renewables Obligation (NIRO) As a result the NIRO will close to new generation on 31 March 2017.

target. Instead NI will contribute to the UK target[3]. As part of this, DETI is also carrying out an assessment of the incremental costs and benefits of different renewable electricity levels.

Whilst the recent CFD consultation and DETI's review of its target raises some uncertainties around the extent and pace of renewables growth it remains the case that at present the transmission and distribution networks cannot provide, on an unrestricted basis, for all of the connected generation. In addition, it is planned that a significant amount of additional generation will connect prior to the cessation of the NIRO arrangements in March 2017. Without significant development of the transmission system in particular the degree of restriction will continue to increase as this further generation connects to the network.

DETI has established a NIRO closure working group with the objective of facilitating the maximum MWs or projects deployable within the framework of the NIRO Closure Orders and associated eligibility criteria and grace periods. A number of the issues will require close cooperation between NIE Networks and SONI and will require significant engagement.

Transmission Planning Roles and Responsibilities

Responsibility for the planning, design and construction of the transmission developments required to address these challenges rests jointly with the Transmission System Operator (TSO), SONI and the Transmission Owner (TO), NIE Networks.

The relationship between SONI, as TSO, and NIE Networks, as TO, is governed by the Transmission Interface Arrangement (TIA) as approved by the Utility Regulator. To satisfy the requirements of the EU's IME3 directive the transmission planning function of NIE Networks transferred to SONI on 1st May 2014 and the TIA was amended to reflect these new arrangements. SONI now undertake all transmission investment planning activities (including transmission connections) and are responsible for establishing the location and routing arrangements for transmission projects, and for obtaining consents, permits and planning approvals. NIE Networks, as TO, is responsible for the delivery of transmission projects.

This report details the status of the various projects presently underway or planned.

2. TRANSMISSION PROJECTS

2.1 Medium Term Plan (MTP)

The MTP involves a series of individual projects designed to reinforce the 110kV network to increase capacity and to remove bottlenecks. Work under this plan is still ongoing.

2.2 Renewable Integration Development Plan (RIDP) and Network 25

The RIDP was established in 2007 by the all-island Licensees, NIE Networks and EirGrid and strongly supported by the other NI Licensee, SONI. It reviewed the network capacity limitations in the north and west of Northern Ireland and the north west of the Republic of Ireland, against the level of renewable generation expected to seek connection there by 2020, aligned at that time with the NI and RoI governments' targets to have 40% of electricity from renewable sources. RIDP identified the issues which will arise due to the connection of renewable generation and considered a large number of solution schemes. All involve new extra high voltage, 275 and 110kV infrastructure and the uprating of some existing circuits. The RIDP included extensive consultative interactions with stakeholders and detailed

[3] The UK targets are for 15% renewable energy by 2020 is to be met from heat, transport and electricity. The UK does not have a specific renewable electricity target but for modelling purposes it is assumed that 30% renewable electricity is required to meet the 15% wider energy target.

technical, economic and environmental studies for a number of "candidate schemes". In 2013, the project reached the point where it had arrived at a preferred overall scheme option.

It was originally intended that phase 4 of RIDP would pursue further development of the preferred scheme. However, emerging market circumstances and the evolving nature of demands for transmission connections have brought about recognition of the need to examine transmission development in the north and west in the context of overall development needs across Northern Ireland. For this reason, in 2013, it was decided that in NI, phase 4 of RIDP would focus on the preparation by SONI of a transmission development plan for the whole of Northern Ireland (Network 25) supported by an associated Strategic Environmental Assessment. Work had commenced on this with the intention of progressing a public consultation on Network 25 and a statutory consultation on the associated SEA during 2015. In view however of the uncertainty over the extent and pace of renewables growth in NI associated with the cessation of the NIRO arrangements and DETI's assessment of the costs and benefits of different levels of renewable deployment, the RIDP preferred scheme is now being reviewed. It is anticipated that this will result in revised development proposals which will be set out in the Network 25 strategy and plan, which is now planned for consultation alongside an SEA of that plan, in 2016.

2.3 Generation Cluster Infrastructure

To facilitate the connection of renewable generation to the electricity grid NIE Networks, as the Distribution Network Owner, DNO, will group or "cluster" their arrangements for the connection of generators (generally onshore wind farms) so that the generators will share transmission network infrastructure as far as practicable. Clustered connections generally involve the construction of a 110/33kV substation, connection to the 110kV network and individual 33kV generation connections. There are expected to be at least 9 cluster substations either complete or under development before 2020. When NIE Networks, as DNO, have identified the need for a cluster, application is made to SONI for the transmission element of the cluster connection. On completion of the associated pre-construction phase, SONI will hand over the project to NIE Networks, asTO, under a Transmission Project Agreement (as described above). NIE Networks, as TO, will then progress the construction phase of the project.

Gort, Tremoge and Rasharkin clusters have all secured construction approval and are progressing under the management of NIE Networks.

Curraghamulkin cluster has UR pre-construction approval and is currently being developed by SONI and pre-construction works are progressing well. Early pole procurement has been made to expedite timelines for the delivery of this cluster.

NIE Networks have made application to SONI for the connection of the proposed Garvagh cluster to the transmission system and secured UR pre-construction approval in principle. SONI have established the connection arrangements and NIE Networks TO are currently working on a construction quote.

NIE Networks DNO have applied to SONI for the connection of the proposed Kells, Newtownstewart and Cam clusters. SONI have provided the information required to NIE Networks DNO for Kells and Cam clusters. It has been decided that the Newtownstewart cluster should be processed along with the recent influx of connection applications to ensure optimum transmission system development, taking into account all renewable generation seeking a connection in that area.

2.4 North South Interconnector (NSI)

The proposed interconnector will require the construction of a new 275/400kV substation and a new 400kV overhead line between Turleenan (Dungannon) and Woodland (Meath). SONI has responsibility for development of the section from Turleenan to the RoI border and the project is currently in the pre-construction phase. Following submission for Planning Approval in Northern Ireland in December 2009, a Public Inquiry commenced (and was adjourned) in

March 2012. An updated planning application was submitted to DOE in April 2013 and, following the transfer of planning responsibility from NIE Networks to SONI in May 2014, all interested parties were formally advised of the change of applicant.

On Monday, 1st June 2015 SONI submitted an Addendum to the 2013 submission. Following a subsequent consultation process administered by DOE, the planning file has recently been returned to the PAC. It is a matter for the PAC to determine a schedule for recommencement of the Inquiry, which is likely to take place later this year.

The portion between the RoI border and Woodland is being developed by EirGrid. EirGrid's application to An Bord Pleanála (ABP) was submitted on Tuesday, 9th June 2015, and following a subsequent public consultation process in Ireland, ABP have recently advised their intention to convene a public Oral Hearing to commence in early March 2016.

It is hoped that planning consent can be secured in both jurisdictions within 2016. When consents have been finally secured for this important project, it will be passed to NIE Networks and ESB Networks for delivery of the construction stage.

3. Small Scale Forecasting Project

SONI and NIE have scoped a PhD project to look at the integration of small scale generation into the NI load forecasting process. The first project presentation took place on 4th February 2016 with most of the current work focusing on investigating possible sources of data that can be used in historical analysis. This part of the project will continue for several months and will eventually be used in the evaluation of any forecast tool that is subsequently developed.

4. PROJECTS STATUS

4.1 Projects in Construction

Transmission projects in construction are the responsibility of NIE.

Category	Project	Project Description	Status
MTP	Omagh Main Transformers	Replacement of 2x40/60MVA transformers with 2x63/90MVA	Complete (completion report to be submitted)
MTP	Dungannon to Omagh A&B Phase 2 (Part 1)	Complete up-rating with Invar	Complete (completion report to be submitted)
MTP	Dungannon to Omagh A&B Phase 2 (Part 2)	Divert both circuits to Tamnamore	Complete (completion report to be submitted)
MTP	Kells to Coleraine Phase 1	Up-rate Terrygowan to mid-Antrim with HTLS conductor	Complete (completion report to be submitted)
MTP	Kells to Coleraine Phases 2 and 3	Ph 2 - Up-rate Kells to Terrygowan with HTLS conductor, Ph 3 – Up-rate mid –Antrim to Col with HTLS conductor	Ph2 Construction ongoing (will be complete 2016 – dependant on outages) Ph3 Complete (completion report to be submitted)
MTP	Tamnamore Phase 2	Install a second 275/110kV interbus transformer, Divert second 275kV line multiple 110kV lines into Tamnamore, Install 200MVA cable on selected 110kV circuits	Complete (completion report to be submitted)
Cluster	Rasharkin (formerly known as Mid-Antrim)	Initially 1x90MVA Tx with room for 2nd, Looped into Kells – Coleraine portal line	Construction ongoing – civils complete, 110/33 Tx due to be delivered mid Feb, stretch target for completion end of Sept 16.
Cluster	Tremoge	Initially 1x90MVA Tx with room for 2nd, Looped into Dungannon – Omagh B	Construction ongoing– civils complete, 110/33 Tx due to be delivered mid Feb, stretch target for completion mid Nov 16.
Cluster	Gort	Initially 1x90MVA Tx with room for 2nd, Looped into new Tamnamore – Omagh 110kV cct	Construction ongoing– civils complete, 110/33 Tx due to be delivered mid March, stretch target for completion end of Dec 16. Associated Landowner/DETI risks with the 3rd 110kV Overhead line, Tamnamore-Gort-Omagh, being managed by SONI and NIE Networks

Table 1: Transmission projects in construction

4.2 Projects in Pre-Construction

Transmission projects in the pre-construction stage are the responsibility of SONI.

Category	Project	Project Description	Status
MTP	Tamnamore to Omagh new circuit	Construct a new 110kV single circuit between Tamnamore and Omagh	Outstanding SONI Pre-construction work ongoing, two partial Article 40's issued, NIE Networks have commenced construction activity where possible to do so. Landowner/DETI risks, being managed by SONI and NIE Networks
Cluster	Curraghamulkin (formerly known as Drumquin)	Initially 1x90MVA Tx with room for 2nd, 110kV line to new switching site to be connected to Omagh/Enniskillen 110kV cct	SONI Pre-construction work ongoing. Planning application submitted 9 Feb 2016 to Fermanagh and Omagh Council
Transmission Connection	Brockaghboy Wind Farm	Construct a new 110kV single circuit between Brockaghboy and Rasharkin	SONI Pre-construction work ongoing. Planning application submitted to Causeway Coast and Glens and Mid Ulster Councils on 18 Dec 2015.

Table 2: Transmission projects in pre-construction

Distribution projects in the pre-construction stage are the responsibility of NIE.

Category	Project	Project Description	Status
SSG Small Scale Generation	33/11kV Primary Substation Transformer Investment -£2.3m agreed in October 2013	Work at 33/11kV primary substations to cater for impacts of small scale generation.	Work at a number of primary substations is now approved. Design and procurement is underway. Work underway at a number of sites
SSG Small Scale Generation	33/11kV Primary Substation Transformer Investment- request for further substations	Work at 33/11kV primary substations to cater for impacts of small scale generation.	NIE have submitted a request to the UR for further funding to do transformer works at more substation which have reached capacity and can be rectified with lower level investments

Table 3: Distribution projects in pre-construction

4.3 Investment Plan

Transmission projects in the investment planning stage are the responsibility of SONI.

Category	Project	Project Description	Status
RIDP	Phase 1 - Scope	Establish the scope and assumption. Carry out technical analysis to determine the issues	Complete
RIDP	Phase 2 – Technical analysis	Develop reinforcement options. Complete detailed electrical analysis of option. Recommend a number of technically feasible solutions	Complete
RIDP	Phase 3 – Preferred Scheme and Final reports	Detailed environmental, technical and economic analysis of options. Stakeholder consultation. Recommend a preferred option.	Complete (completion report submitted)
Network 25	Phase 4 – Construction RIDP Phase 4 now defined as preparation of Network 25 and associated Strategic Environmental Assessment	RIDP Phase 4 now defined as preparation of Network 25 and associated Strategic Environmental Assessment (as detailed below)Preparation of a strategy document that sets out the future transmission development requirements. Also the carrying out of an associated Strategic Environmental Assessment	Commenced, however scope now under review to take account of uncertainties relating to planned cessation of NIRO arrangements and DETI review of renewables targets. Draft Network25 and SEA planned for consultation in 2016.
Connection	200MW offshore tidal - Torr/Fair Head	Connection and ATR	Not commenced, Feasibility Study complete. NIE Networks working with developers to try to progress small scale demonstration project.
North-South Interconnector	400kV Interconnection	Construction a new 400kV overhead line between Turleenan (Dungannon) and NI/ROI border.	At PAC
Cluster	Garvagh	Scope of cluster S/S and transmission arrangements presently under consideration	SONI have determined connection arrangements and NIE Networks as TO are progressing the construction quote.
Cluster	Newtownstewart	NIE have applied to SONI for a transmission connection	NIE Networks DNO have applied to SONI. This will be

			considered with the influx of connection applications due to increased levels of generation in the west Tryone area.
Cluster	Kells	NIE have applied to SONI for a transmission connection	SONI have issued NIE Networks DNO with information required.
Cluster	Cam (Coleraine area)	NIE have applied to SONI for a transmission connection	SONI have issued NIE Networks DNO with information required.

Table 4: Planned Transmission projects

5. PROJECTS INDICATIVE SCHEDULE

Table 5 provides an indicative programme for each of those projects that are in the pre-construction or construction phases.

Category	Project	2009				2010				2011				2012				2013				2014				2015				2016				2017				2018				2019				2020			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
STP	Dungannon to Omagh A&B Phase 1																																														
MTP	Omagh Main Transformers																																														
MTP	Dungannon to Omagh A&B Phase 2 (Part 1)																																														
MTP	Dungannon to Omagh A&B Phase 2 (Part 2)																																														
MTP	Kells to Coleraine Phase 1																																														
MTP	Kells to Coleraine Phases 2 and 3*																																														
MTP	Tamnamore Phase 2																																														
MTP	Tamnamore to Omagh new circuit																																														
Cluster	Rasharkin (formerly known as Mid-Antrim)																																														
Cluster	Tremoge																																														
Cluster	Gort																																														
Cluster	Curraghamulkin (formerly known as Drumquin)																																														
Cluster	Garvagh																																														
Cluster	Newtownstewart																																														
Cluster	Kells																																														
Cluster	Cam																																														
Trans Conn	Brockaghboy Windfarm																																														
RIDP	Phase 1 - Scope (2007 - 2008)																																														
RIDP	Phase 2 – Technical analysis (2008-2011)																																														
RIDP	Phase 3 – Non technical analysis																																														
Network 25	Network 25/SEA (Preparation/consultation)																																														

Table 5: Indicative Project Timelines

Key
NIE Networks DNO investigation
SONI Transmission Planning
NIE Networks DNO Pre-construction approval
SONI Pre-construction work
NIE Networks TO Construction approval
NIE Networks TO Detailed design/Construction work
NIE Networks TO Completion Report

*NOTE- This work is Outage dependant