



Northern Ireland  
Assembly

## Research and Information Service Briefing Note

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# Electricity: security of supply

## 1 Introduction

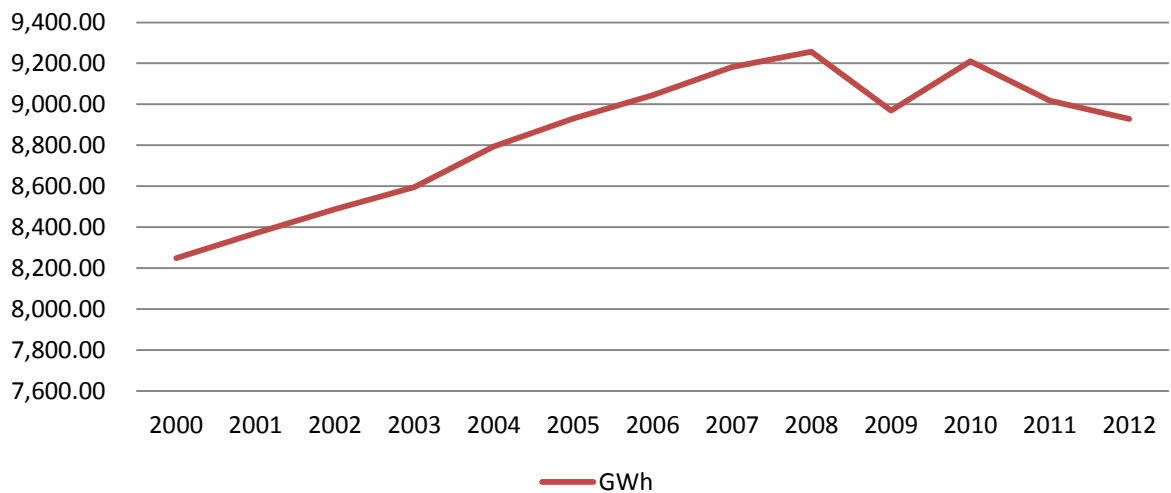
The following paper provides an overview of evidence presented to the Enterprise, Trade and Investment Committee<sup>1</sup> on the issue of electricity security of supply. To provide context the paper begins by examining historic electricity consumption in Northern Ireland and outlining forecasted consumption until 2022.

## 2 Northern Ireland - Electricity Data

Historic NI electricity consumption is plotted in Figure 1, which shows yearly consumption (in GWh) from 2000 to 2012. Over this period consumption has increased by 8.24%. Consumption saw steady growth of approximately 1.5% per annum between 2000 and 2007. Growth began to slow in 2008 (0.8% on the previous years) and contracted for three of the four years that followed (2009, 2011 and 2012). This contraction resulted from recessionary conditions which suppressed energy usage.

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<sup>1</sup> Note: evidence from Gaelectric has also been provided. The company has not provided evidence directly to the Committee, but has been in contact with the Northern Ireland Assembly Research and Information Service

**Figure 1: Northern Ireland electricity consumption 2000 to 2012<sup>2</sup>**

Source: SONI

Figure 2 shows estimated total electricity demand for Northern Ireland for the period 2013 to 2022. Total electricity demand measures the energy sent from generators to meet demand and self-consumption, which is energy produced and used by consumers onsite. Three scenarios are presented – low, medium and high. These scenarios consider future economic and temperature conditions. Economic conditions are the main differentiating factor between the scenarios, with the low, median and high estimates corresponding to pessimistic, realistic and optimistic views of the economic outlook. SONI, who are responsible for these estimates, believe that the medium forecast is the *'best estimate of what might happen in the future'*.<sup>3</sup>

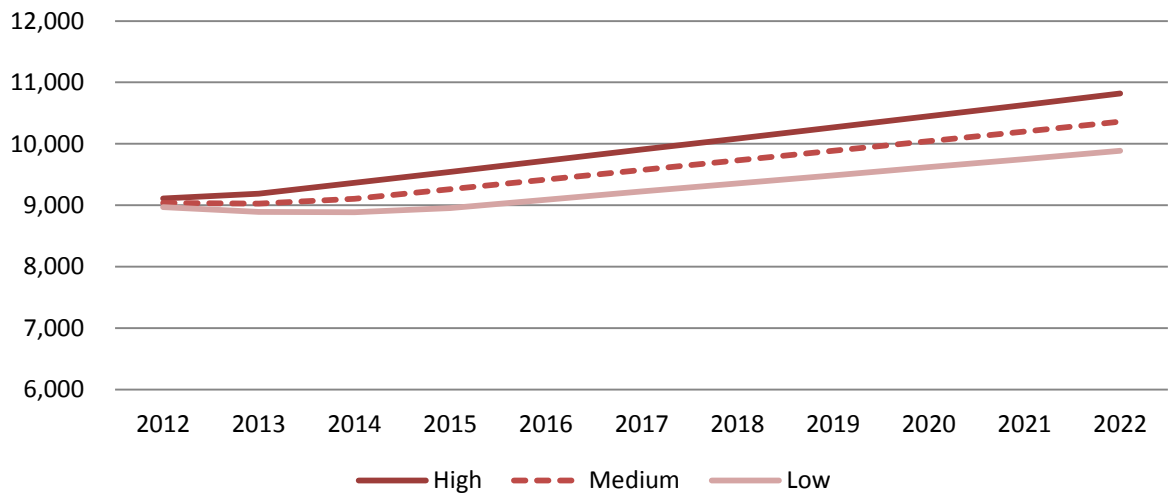
That forecast predicts that electricity consumption will continue to contract in 2013 (by 0.1% on the previous year) before returning to growth from 2014 onwards. SONI's medium estimate indicates that demand will not return to pre-recession levels until 2015. The medium forecast predicts total growth of 15% from 2013 to 2022.<sup>4</sup>

<sup>2</sup> Data provided by SONI 25 July 2013

<sup>3</sup> SONI & EirGrid *All-Island generation capacity statement 2013-2022* (January 2013)  
[http://www.eirgrid.com/media/All-Island\\_GCS\\_2013-2022.pdf](http://www.eirgrid.com/media/All-Island_GCS_2013-2022.pdf)

<sup>4</sup> *Ibid*

**Figure 2: Northern Ireland total electricity demand forecast 2013 to 2022 – low, median and high scenarios<sup>5</sup>**



Source: SONI

### 3 Northern Ireland Electricity deficit post 2016

Amongst most pressing issues facing the NI electricity market is the risk to security of supply from 2016 identified by the System Operator for Northern Ireland (SONI) in their Generation Capacity Statement 2013-2022. SONI's licence obligations require it to "track the generation capacity that is available... in Northern Ireland and on the island to ensure [there is] sufficient generation capacity to meet demand in the future".

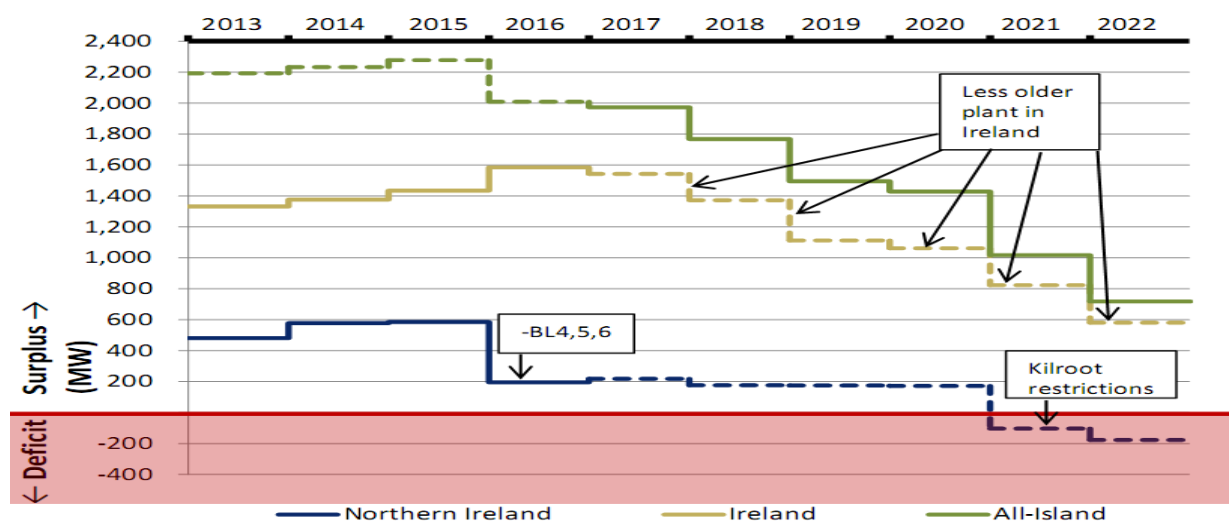
The Operator's most recent statement, published January 2013, found that, given present conditions, Northern Ireland's security of supply would be at risk from 2016 and in deficit from 2021. This is illustrated in Figure 3. There are three reasons for this deficit:

- Despite the Republic of Ireland experiencing a surplus of generation, limitations in interconnection between the two jurisdictions restrict the amount of generation that can be transferred to Northern Ireland. The delay in the North-South Interconnector is a barrier to resolving this issue. A planning application for the Northern Ireland element of the interconnector was submitted in December 2009 and resubmitted in April 2013.
- EU Emissions Directive<sup>6</sup> will, from 2016, result in the reduction in generation capacity from the Ballylumford plant, and restrict generation at the Kilroot plant.
- Faults on the Moyle Interconnector, which connects Northern Ireland and Scotland, have halved its capacity. Full restoration of this capacity is not likely to be restored until 2017.<sup>7</sup>

<sup>5</sup> *Ibid*

<sup>6</sup> The Large Combustion Plant Directive and Industrial Emissions Directive

Figure 3: Security of supply in Northern Ireland to 2022<sup>8</sup>



Source: SONI

SONI and the Northern Ireland Utility Regulator (the Regulator) have both stressed the importance of increasing interconnection between the two jurisdictions as a way to mitigate security of supply risks. The Regulator has explicitly stated that it is “imperative that the second North/South Interconnector is progressed and delivered as soon as possible”.<sup>9</sup>

SONI provide more detail on this:

*The Northern Ireland generating adequacy margin will be tight until the commissioning of the second North/South tie line. We bring that to the fore because, in the absence of any proposals on the table or any discussion that anyone is having with us about conventional generation, we are obviously aware of the North/South interconnector — it is the only means we have at our disposal to consider how the adequacy position will change. Once the North/South interconnector comes along, the energy that is available in Ireland can be exported to Northern Ireland and we can close this deficit. **So, we are making the point quite clearly that, in the absence of any other local proposals, the North/South interconnector***

<sup>7</sup> Northern Ireland Utility Regulator *Security of Supply in Northern Ireland Information Paper* (12 June 2013) [http://www.uregni.gov.uk/uploads/publications/20130612\\_Electricity\\_security\\_of\\_supply\\_paper.pdf](http://www.uregni.gov.uk/uploads/publications/20130612_Electricity_security_of_supply_paper.pdf)

<sup>8</sup> SONI & EirGrid *All-Island generation capacity statement 2013-2022* (January 2013) [http://www.eirgrid.com/media/All-Island\\_GCS\\_2013-2022.pdf](http://www.eirgrid.com/media/All-Island_GCS_2013-2022.pdf)

<sup>9</sup> Northern Ireland Utility Regulator *Security of Supply in Northern Ireland Information Paper* (12 June 2013) [http://www.uregni.gov.uk/uploads/publications/20130612\\_Electricity\\_security\\_of\\_supply\\_paper.pdf](http://www.uregni.gov.uk/uploads/publications/20130612_Electricity_security_of_supply_paper.pdf)

***is the only single proposal that we are aware of that would change the situation. (Emphasis added).***<sup>10</sup>

Uncertainty surrounds the interconnector's future, however. As noted above, the original planning application was submitted in December 2009. This application was referred to the Planning Appeals Commission and subject to a public inquiry, which was subsequently suspended in 2012. Since then Northern Ireland Electricity (NIE) has submitted a second application (April 2013) for the NI element of the interconnector. Considerable uncertainty surrounds the granting and timing of planning permission on both sides of the border. SONI and the Regulator anticipate that 2017 is the earliest date for delivery. However, SONI note that:

*For the North/South interconnector, we have a date of 2017, but we cannot stand over that. The planning application has been made by NIE, but we have not got a date for the Planning Appeals Commission hearing yet. That has to go through due process and you have to come out the other end. You also have to build the line, which has to be done in conjunction with a project in the South of Ireland. So there are a number of risks with the delivery of that project by 2017.*<sup>11</sup>

The estimated cost of the Northern Ireland element of the North-South Interconnector is £90m.<sup>12</sup>

A number of other possible remedies and mitigating factors exist. The most immediate is the restoration of the Moyle Interconnector to full capacity. Mutual Energy, who owns the interconnector, is investigating an interim repair solution. It is anticipated that this could lead to a short-term fix by 2016, adding a further c250MW of generation into the market, leading to a surplus of c450MW.<sup>13</sup>

The Utility Regulator has noted, however, that given "the more recent history of faults on the Moyle Interconnector" Mutual Energy is investigating a long-term solution to restore it to its previous capacity and reliability. It is anticipated that such a solution would take four to five years, with a commission date of 2017 viewed as realistic. The cost of such a project would be in the region of £60m, although Mutual Energy notes a degree of certainty with this figure at present.<sup>14</sup>

Commenting on the Moyle Interconnector during written evidence to the Enterprise, Trade and Investment Committee in June 2013 SONI stated:

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<sup>10</sup> Northern Ireland Assembly Committee for Enterprise, Trade and Investment, Minutes of Evidence *Electricity Supply — SONI Generation Adequacy Report: Security of Supply Post-2015* (27 June 2013) <http://www.niassembly.gov.uk/Assembly-Business/Official-Report/Committee-Minutes-of-Evidence/Session-2012-2013/June-2013/Electricity-Supply--SONI-Generation-Adequacy-Report--Security-of-Supply-Post-2015/>

<sup>11</sup> Northern Ireland Utility Regulator *Security of Supply in Northern Ireland Information Paper* (12 June 2013) [http://www.uregni.gov.uk/uploads/publications/20130612\\_Electricity\\_security\\_of\\_supply\\_paper.pdf](http://www.uregni.gov.uk/uploads/publications/20130612_Electricity_security_of_supply_paper.pdf)

<sup>12</sup> *Ibid*

<sup>13</sup> *Ibid*

<sup>14</sup> *Ibid*

*There has been some progress with the restoration of the Moyle interconnector. Correspondence between Mutual Energy and the regulator has been published on that and there has been some indication of the costs. However, from [SONI's] perspective, there is no Gantt chart or contract that says that [they] are going to deliver x by date y, which is what we need in order to be sure that we are addressing the problem. The Moyle interconnector will only ever contribute to a solution; it will not be the solution to the security-of-supply issue.<sup>15</sup>*

Developing additional generation capacity is another possible remedy to Northern Ireland's security of supply issues. However, as noted in the SONI quote above, there are no proposals to develop additional capacity. The Regulator confirms that there is no additional conventional generating capacity in the pipeline, but notes that additional renewable energy is expected to come on stream. This is not, however, viewed as an adequate solution to security of supply risks. On this the Regulator notes that the anticipated level of renewable generation required to meet the 40% target is incorporated into SONI's capacity report. Furthermore, they add:

*Additionally, the intermittency and disparate nature of connections of wind generation do not make such generation a reliable source for addressing a security of supply issue arising from a large generation outage from 2016. Other renewable generation options are unlikely to be available until 2016.<sup>16</sup>*

DETI do have the power to direct the Regulator to invite tenders (or invite tenders itself) for additional generation capacity (conventional) or demand side efficiency solutions. Additional capacity could be secured by upgrading current generation plants to meet EU Emission Directive requirements, or by developing a new generation plant. Either option would ultimately be paid for by the consumer and according to the Regulator, both they and the Department are:

*...mindful that provision of increased interconnection in due course could obviate the need for significant investment in long term generation in Northern Ireland and therefore avoid unnecessary additional consumer costs.<sup>17</sup>*

Northern Ireland may also be able to seek derogation from the Emission Directive which will remove a substantial amount of generation capacity (510MW) from the system from January 2016. The Regulator has stated that any 'scope to extend the deadline for compliance will be tested'. They concede, however, that 'while the

<sup>15</sup> Northern Ireland Assembly Committee for Enterprise, Trade and Investment, Minutes of Evidence *Electricity Supply — SONI Generation Adequacy Report: Security of Supply Post-2015* (27 June 2013) <http://www.niassembly.gov.uk/Assembly-Business/Official-Report/Committee-Minutes-of-Evidence/Session-2012-2013/June-2013/Electricity-Supply--SONI-Generation-Adequacy-Report--Security-of-Supply-Post-2015/>

<sup>16</sup> Northern Ireland Utility Regulator *Security of Supply in Northern Ireland Information Paper* (12 June 2013) [http://www.uregni.gov.uk/uploads/publications/20130612\\_Electricity\\_security\\_of\\_supply\\_paper.pdf](http://www.uregni.gov.uk/uploads/publications/20130612_Electricity_security_of_supply_paper.pdf)

<sup>17</sup> *Ibid*

*Directives have provision for potential derogations, discussions to date with the Department of the Environment on the possibility of an appropriate derogation for current generating plant at Ballylumford is not considered a realisable option given the formal undertaking to close'. In their discussions with the ETI Committee, SONI had the following to say about a potential derogation:*

*...it will take a huge political effort to get a derogation. I know that Northern Ireland has a bit of a track record of looking for derogations, and this is another one. This is a short-term fix for a problem that we are aware of in advance. That is one possibility. It is possible to go out to the market to look for other generator solutions. There is a cost to what needs to be done at Ballylumford to make it compliant. So if we do not get a derogation and we were to make the Ballylumford plant compliant, a business case could be looked at and there may be other commercial opportunities that other generating companies could bring to the table if that was afforded to them.<sup>18</sup>*

The AES Ballylumford (which operates the Ballylumford power station) in evidence to the ETI Committee stated that the *'most effective solution for all stakeholders would be to obtain a derogation of the IED emission limits for the B station'* but that securing a derogation was *'not allowed under the current legislative structure'*.

To this they added:

*If you stand back and look at all the stakeholders involved, not only us but everybody who is involved — the consumer, the regulatory authority and government — you see that the simplest and most cost-effective solution is derogation, because that turns into a "business as usual" scenario. We would continue to invest annually in our normal operating costs and in maintenance repair, and the station would continue to exist, doing exactly what it is doing right now, and it would compete on that basis.*

*The limit of our ability to influence the push for derogation really stops at the environment authority and our discussion with the Department and the regulatory authority. That is what we can put on the table. We can provide the technical analysis to say, "This provides us with a potential solution to fill a gap from 2016". Certainly from our perspective, that is what we have been able to do. The derogation process, as we understand it, is rather complex, especially when you get into the level of EU interaction. As we found out with the carbon price floor derogation earlier this year, it is a very complex process. Other than our being able to provide baseline*

<sup>18</sup> Northern Ireland Assembly Committee for Enterprise, Trade and Investment, Minutes of Evidence *Electricity Supply — SONI Generation Adequacy Report: Security of Supply Post-2015* (27 June 2013) <http://www.niassembly.gov.uk/Assembly-Business/Official-Report/Committee-Minutes-of-Evidence/Session-2012-2013/June-2013/Electricity-Supply--SONI-Generation-Adequacy-Report--Security-of-Supply-Post-2015/>

*information, it is really in the Department's hands to be able to manage that interaction for the derogation process...*

*... We have been advised by the environment authorities that the internal review of the legislation that manages the IED component — the aspect of compliance of units — as well as further discussions with DETI has shown that there is no way for a plant that has opted out right now. The B station has opted out; that decision was made back in 2007. **Legally, there is no opportunity for it to go through a derogated process.** We would have to invest to be compliant with the new emissions standards.<sup>19</sup> (emphasis added)*

The company also raised the option of investing in the B station to ensure it is IED compliant. They stated, however, that *'[i]n order to fully understand the total investment likely to be required, a more extensive engineering evaluation will be completed by the end of 2013 to outline the full business case and the full extent of investment required'*. They added that their decision to invest or not would be influenced by:

*...anticipated changes to the electricity market in 2016, including the likely restructuring of capacity and ancillary service payments, will play a key part in determining the overall project risks. At first glance, and given those uncertainties, it is likely that a capacity contract could be required to make this a commercially attractive project. That will be confirmed by the total cost estimates as they become clear later this year.<sup>20</sup>*

In the above quote, and at other points in their evidence to the Committee, AES note that two investment routes are likely to be considered. The first is a merchant route where the company would bear all the risks of investment themselves. If the second route was to be explored the company would seek a capacity contract, within which the risk would be borne by the consumer.<sup>21</sup>

In their evidence to the Committee the Confederation of British Industry (CBI) stated:

*For security of supply, it is pretty obvious and pretty simple: we need the interconnectors [Moyle at fully capacity and additional north-south interconnection], and we need them to be resolved very quickly. If the interconnectors are resolved in 2018, then we will have a problem, because we will have turned off a power station in 2016 and will have been struggling for two years. Therefore, there is a need to find out the issues*

<sup>19</sup> Northern Ireland Assembly Committee for Enterprise, Trade and Investment, Minutes of Evidence, *Electricity Policy Review: AES Briefing* (26 September 2013) <http://www.niassembly.gov.uk/Assembly-Business/Official-Report/Committee-Minutes-of-Evidence/Session-2013-2014/September-2013/Electricity-Policy-Review-AES-Briefing/>

<sup>20</sup> *Ibid*

<sup>21</sup> *Ibid*



*that can be addressed in order to overcome the road blocks and get those connections in place quickly.*<sup>22</sup>

The CBI also postulated two ‘short-term’ solutions which they argued would mitigate supply risks – load shedding and aggregation.

Aggregation would see large users pool their standby generation with a view to making it available to the market at times when the system is strained. Customers doing so would be treated like generators; they would bid generation into the SEM pool and receive a capacity payment for making their generation available. Load shedding is a form of demand side management which would see large industrial customers going off-grid at peak times and by doing so lessen the demand on the system. They suggested that incentives could be explored, for example large users might receive a capacity payment for shedding load at particular times. CBI argue that *‘there is no reason, in principle, why you cannot bid a reduction in demand [into the SEM pool], rather than bid additional generation’*.<sup>23</sup>

An additional step, which could potentially mitigate security of supply risk, is energy storage. Compressed Air Energy Storage (CAES) may enhance electricity system management by allowing energy generated from renewables in off-peak hours to be stored and dispatched during peak times. The technology can help to minimise the challenges associated with balancing intermittent wind energy and has the potential to minimise Northern Ireland’s reliance on fossil fuels.

Studies have been carried out by the British Geological Society and Geological Survey NI on the suitability of Northern Ireland’s geology for energy storage techniques.<sup>24</sup>

Gaelectric Gas Storage Ltd is proposing a CAES project in Larne which could potentially see a plant with between 140MW and 300MW capacity being introduced.<sup>25</sup> Larne has been chosen as it is home to salt deposits that are potentially suitable. The company was granted a ‘Consent to Drill’ Licence by the Department of Enterprise, Trade and Innovation (DETI) in July 2013. Exploration drilling began in August 2013 and is set to take approximately 12 weeks. The work currently underway will confirm the depth and thickness of the salt deposits, to take core samples and will allow the company to map the area. Should exploration and subsequent work go to plan, the company intends to develop a fully operational plant by 2017.<sup>26</sup>

In a letter to DETI’s energy division with regard to the post-2016 security of supply risks, Gaelectric offered their support to the development of additional North/South Interconnection as *‘a means of reducing costs to the consumer, integrating renewables*

<sup>22</sup> Northern Ireland Assembly Committee for Enterprise, Trade and Investment, Minutes of Evidence, *Energy Review: Confederation of British Industry* (19 September 2013) <http://www.niassembly.gov.uk/Assembly-Business/Official-Report/Committee-Minutes-of-Evidence/Session-2013-2014/September-2013/Energy-Review-Confederation-of-British-Industry/>

<sup>23</sup> *Ibid*

<sup>24</sup> Geological Survey NI *Energy Storage* <http://www.bgs.ac.uk/gsni/energy/storage/>

<sup>25</sup> Gaelectric <http://www.gaelectric.ie/index.php/energy-storage/>

<sup>26</sup> <http://www.gaelectric.ie/index.php/energy-storage/larne/project-update-2/>

*and alleviating security of supply concerns’, yet expressed concern that the ‘North-South Interconnector and increased interconnector capacity are viewed as the ultimate solution’. To this end the company argued that:*

*Whilst interconnectors will provide cost reflective and adequate quality electricity, it has been shown over recent years that they cannot guarantee long term physical availability given the recent experience of outages on the Moyle Interconnector.*

*As an example should the North-South interconnector become unavailable, Northern Ireland will not have physical access to adequate capacity in its jurisdiction. This by definition cannot therefore be deemed as long term security of supply, and it should be considered that Northern Ireland, despite the development of two interconnections, will remain capacity inadequate. Moreover, transmission interconnection cannot be valued as equivalent to a portfolio of indigenous generation for either the predictability of cost or reliability to deliver a secure and sustainable electricity supply.<sup>27</sup>*

The developer concludes that additional interconnection and the restoration of capacity at Moyle should be accompanied by development of CAES to “ensure that the long term stability of the electricity system in Northern Ireland is maintained and the integration of renewables is further encouraged”.<sup>28</sup>

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<sup>27</sup> Letter from Gaelectric to DETI, provided by Gaelectric 04 September 2013

<sup>28</sup> *Ibid*