mutualenergy

CONSULTATION RESPONSE

Review of the Security of Energy Supply of Ireland's Electricity and Natural Gas Systems

28th October 2022

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Background to Mutual Energy

Mutual Energy Limited ("**MEL**") owns and operates large-scale, strategic, energy infrastructure in the long-term interest of Northern Ireland ("**NI**") energy consumers, including critical energy infrastructure linking the NI energy system to Great Britain ("**GB**"); the 500 MW HVDC electrical Moyle Interconnector and the Scotland to Northern Ireland Pipeline for gas. Both assets are essential to maintaining security of energy supply in NI. As well as these subsea assets, MEL owns large sections of the onshore NI gas transmission network (the Belfast Gas Transmission Pipeline and the West Transmission Pipeline) and is a gas Transmission System Operator ("**TSO**") in NI.

MEL established a joint venture with Gas Networks Ireland ("**GNI**") UK (the other NI gas TSO) to provide a market operator function. The Gas Market Operator for Northern Ireland ("**GMO NI**") ensures the efficient transportation of gas across the entire NI gas network.

As a mutual company MEL has no shareholders and hold a key strategic objective to deliver savings to NI energy consumers across the life of our assets. Our licence structures allow us to raise debt-finance at a low cost of capital, and this model could reduce the cost to consumers of future investment in large-scale, capital-intensive strategic energy infrastructure.

Introduction

MEL is responding to this consultation on the basis that NI faces many of the same security of supply concerns as Ireland.

In terms of physical gas supply NI relies upon upstream infrastructure owned and operated by GNI UK - the compressor station at Beattock and the pipeline from Moffat to Twynholm. This critical infrastructure supports the importation from GB of the majority of the natural gas consumed on the island of Ireland. GNI also own and operate the gas interconnector between NI and RoI which improves the security of supply of gas to each jurisdiction.

Ireland and Northern Ireland share a single electricity market (the SEM) that operates an all-island capacity mechanism. Development of the new North South electricity interconnector will significantly increase the cross-border transmission capacity reducing the zonal constraints currently imposed upon the capacity market, further increasing the electrical interdependency of the two jurisdictions in delivering security of electricity supplies.

Given this existing co-dependency on shared energy infrastructure it would seem sensible that all-island solutions to security of supply concerns are sought, an approach that is likely to benefit both jurisdictions and their consumers.

Key Recommendations

The recent geopolitical tensions, leading to the loss of Russian gas imports to the EU, has indicated the need to further improve security of energy supply on the island of Ireland, while the drive towards net zero has highlighted the need for a long-term storage solution for renewable energy. Northern Ireland offers a potential mitigation option not formally considered within the present review that could help achieve both these requirements on an all-island basis.

We therefore recommend:

- **A formal framework is put in place that facilitates cross border collaboration on security of energy supply, given the extensive interdependency of the energy systems in both jurisdictions**

- **Formal consideration is given to the development of salt-cavern storage of natural gas and hydrogen at Islandmagee in Northern Ireland to improve all-island energy security, as well as the longer-term decarbonisation objectives of both jurisdictions.**

- **Gaseous storage is coupled with development of renewable gases such as hydrogen and biomethane, and the use of hydrogen in power generation. While immediate security of supply issues must be dealt with, given the 2050 net zero target, a myopic focus on solutions to near-term issues should be avoided and a long-term strategy for decarbonised energy security developed.**

- **The restriction on the commercial operation of mitigation options – including gas storage and LNG (FSRU or other) – is reconsidered. Excluding commercial operation of gas security of supply mitigation options undermines their utility, significantly reducing their potential benefits for consumers. It also makes solutions extremely expensive to implement and operate and could therefore unnecessarily put their delivery at risk.**

The remainder of this response sets out our answers to the consultation questions.

Security of Supply Risks

1. Are there any other security of supply risks that you can identify in addition to those set out in section 6?

The risk of further tightening of the global gas market, which could lead to market disruption and/or failure should be considered. Leaving aside the recent supply shock due to withdrawal of Russian gas supplies to Europe because of the ongoing war in Ukraine, the welcome move towards decarbonisation of energy may create longer-term risks for global gas supplies, and therefore Irish security of supply (post 2030). Natural gas will be required over the mid-term as a 'lower emission' fossil fuel as the Irish economy decarbonises but the ongoing transition to zero carbon alternative energy sources globally may mean that overall investment in securing new natural gas supplies reduces.

While not unwelcome of itself, in practical terms this dynamic could lead to a prolonged tightening of the global gas market, especially in the worst-case scenario – if

decarbonisation proves more challenging than anticipated (becomes more back-ended towards 2050). The potential risk of a tight global gas market should therefore be factored in as a longer-term consideration when assessing security of supply mitigation options. We note that the current assessment does not properly consider this potential for disruption to the global gas market.

For further information please see our answer to Q3 below.

2. If there are other risks that you have identified, could you outline some mitigation options to address the risk(s)?

Developing large-scale underground natural gas storage on the island of Ireland would reduce the exposure of Irish consumers to gas market disruption and/or failure. The gas storage project at Islandmagee in Northern Ireland has all substantive environmental consents in place and could be progressed quickly, especially with cross-border cooperation.

In contrast, access to LNG (including FSRU solutions) only improves security of supply if sufficient LNG cargoes are available and securable at a price Irish consumers can afford to pay. CEPA also highlights the risk of relying on an LNG FSRU as a strategic store commenting:

"We have not identified any FSRUs which are currently used for this purpose. As such, the technical feasibility of the FSRU to hold LNG for extended periods of time in a pressurised state would need to be determined."[1]

For further information see our answers to Q3, Q5 and Q10 below.

3. Are the five shock scenarios that were considered, and the additional scenarios related to the Russian invasion of Ukraine, sufficiently broad?

Loss of Russian gas supplies to Europe is now a reality. Therefore, assessment of Irish security of supply should consider the impact of a potential further disruption to global gas supplies. In particular, the risk that a further major supply issue could lead to a shortage of global gas supplies, including LNG cargoes, resulting in temporary market disruption, or worst-case, a market failure – e.g. due to protectionism.

This scenario is important in assessing the effectiveness of the mitigation options proposed. While FSRU LNG would diversify Ireland's access to the global gas market, it only addresses security of supply if 1) LNG can be made available when required; and 2) Ireland is able and willing to pay the price required to attract LNG cargoes. In contrast large scale gas storage on the island of Ireland, if properly managed, could ensure that a reserve of gas is available to Ireland to mitigate security of supply issues, even if the cause is due to global shortages and/or market disruption or failure.

Mitigation Options

4. Do you have any additional mitigation options that you think should be considered?

The gas storage project at Islandmagee in Northern Ireland should be formally considered as a mitigation option within the review.

[1] CEPA report p100

As a general comment, security of energy supply should be considered within an all-island context. This could help improve the energy security of both jurisdictions, while reducing the costs to consumers of achieving it. See our answer to Q10 below.

We also recommend that the restriction on the commercial operation of gas mitigation options – including gas storage and LNG (FSRU or other) – is reconsidered. Recent events in the EU have demonstrated that commercial operation of assets can be made consistent with security of supply requirements via policy interventions, while longer-term energy policy direction can mitigate the risk of locking in natural gas use in Ireland over the long term – out to 2050. Excluding commercial operation of gas security of supply mitigation options undermines their utility, significantly reducing their potential benefits for consumers. It also makes them extremely expensive to implement and operate and could therefore unnecessarily put their delivery at risk.

5. Which gas supply mitigation options, if any, should be considered for implementation?

There is limited information available on the GNI slow liquification storage option mentioned in the CEPA report. From the information that is provided it seems the storage facility may take a long time to fill, and the capacity of the project could be limited, compared to an underground gas storage project. There is therefore a risk that the scheme could be expensive when assessed relative to its contribution to security of supply when compared to the significantly broader utility of an underground store. It therefore seems unlikely to be an optimal solution.

As set out in our answer to Q3, developing LNG capacity in Ireland, while potentially useful, does not necessarily improve security of supply. It is not clear that FSRU can act as a strategic store and the contribution of LNG to security of supply depends upon the availability of LNG cargoes, as well as their price. The CEPA report also indicates that it could be expensive relative to the level of energy security it delivers. Upfront capital costs of developing an LNG FSRU facility are comparable with the development of the Islandmagee storage project,[2] while leasing the asset could cost more.[3] This excludes the substantial scarcity premiums that are likely to be required to secure LNG cargoes at times of gas market stress (assuming cargoes can be secured).

With an appropriate policy framework developing large-scale underground gas storage however could ensure a large reserve of gas is available to Ireland to mitigate security of supply issues, even if their cause is due to global shortages and/or market disruption or failure.

We note that the assessment of underground gas storage in the CEPA report is largely based upon the characteristics of the Kinsale field, but other large-scale gas storage solutions are available, including the fully consented salt cavern natural gas storage project at Islandmagee.[4] This project consists of 7 caverns that could provide the island of Ireland with a substantial working gas storage volume of up to 500 million cubic meters by 2030. A

[2] CEPA indicate a potential capital cost of €350m for the Islandmagee project and a capital cost in the region of €350m to €400m for an LNG FSRU installation.

[3] Assuming an annual leasing cost of €60m, similar to the Klaipeda LNG terminal as quoted by CEPA, and including an estimated upfront cost of €40m to connect the facility to the gas network, over a 10 year period it would cost c€640m for Ireland to lease an LNG FSRU. This figure excludes discounting. Even at a discount rate of 10% however the cost would be more than developing the gas storage project at Islandmagee.

[4] The project has secured all substantive environmental consents and has a gas storage license from the Utility Regulator in Northern Ireland.

seismic study of the area indicates the local geology could support the development of a further 8 caverns in the future, subject to all required consents being secured. If the original 7 caverns were developed for natural gas storage it would be technically possibly to convert them to store hydrogen in the future. Combined with the potential for 8 further salt caverns at the location which could be used to store hydrogen, up to c2.5TWh of hydrogen storage capacity could be delivered. With intergovernmental collaboration and support the project could therefore significantly improve energy security for the island of Ireland, as well as facilitating delivery of the wider decarbonisation of energy in both jurisdictions.

The potential of Islandmagee to deliver gas storage in the short to mid-term and to then transition to hydrogen storage in the mid to long-term should therefore be explicitly considered as a potential mitigation option within the current security of supply review.

Large-scale underground gaseous storage solutions however should be coupled with development of renewable gases, such as hydrogen and biomethane. Appreciating the focus of the energy security assessment is out to 2030, switching from natural gas to indigenously produced renewable gases, combined with development of large-scale renewable gas storage (particularly hydrogen), is likely to be essential to both achieving the 2050 net zero target and delivering enduring security of Irish energy supplies. While accepting immediate security of supply issues must be dealt with, given the longer-term objective of decarbonisation, a myopic focus on solutions to near-term issues should be avoided and a long-term strategy for decarbonised energy security developed.

6. Which electricity supply mitigation options, if any, should be considered for implementation?

The secondary fuel option while on paper potentially attractive may prove difficult to implement in practice. Physical space may not exist at all power stations to implement/increase distillate storage capacity, while plant reliability may be negatively impacted when operating on secondary fuel. Sufficient sources of distillate also need to be made available quickly to replenish stocks after a major supply incident, or in the scenario of a protracted but intermittent gas supply issue.

Increasing the dependence of security of supply on a more carbon intense fossil fuel than gas is not consistent with Irish policy on decarbonisation. By contrast, developing upstream large-scale gas storage (the primary fuel used by dispatchable power generation) could be made consistent with longer-term decarbonisation objectives if combined with initiatives to accelerate hydrogen use in power generation. In the future this gas storage could be converted to hydrogen and in combination with large-scale green hydrogen production from renewables (e.g. offshore wind) could provide a sustainable net zero compliant fuel source for dispatchable power generation on the island of Ireland.

Implementation of additional DSR and lithium-ion battery storage above the levels assumed in the baseline may similarly prove difficult to deliver in practice. CEPA note "[t]he volume of both developments [lithium-ion batteries and DSR] is already relatively ambitious in the baseline" and conclude delivery of the additional capacity would require "innovative market and incentive design", observing that the associated delivery risk would be higher than a large-scale storage solution implemented upstream.[5] We note that greater system flexibility could be achieved with less delivery risk by developing a large-scale pumped hydro scheme, while the longer life of the asset would ensure that a substantial increase in flexibility is 'baked into' the all-island electricity system, continuing to support renewable generation over

[5] CEPA report p.130

the long-term – e.g. Turlough Hill has provided extensive flexibility to the Irish electricity system since the early 1970s. [6] Appreciating the restriction on potentially suitable sites, and in the context of the all-island SEM, development of large-scale pumped hydro storage is another potential area where cross-border collaboration on energy security mitigation options may be beneficial to both jurisdictions.

Electricity interconnection is important in improving access to wider GB and EU electricity markets but, like LNG solutions for gas, its impact upon security of electricity supply depends upon the availability of electricity imports when Ireland needs to bridge domestic supply gaps, and their price. While useful in managing domestic generation adequacy issues,[7] interconnection may be less effective in protecting Ireland from wider scale electricity market disruption – e.g. due to underlying gas shortages.

The development of a biomass plant presumably would require importation of feedstock and based upon CEPA's modelling would increase indigenous renewable curtailment. This seems inconsistent with wider Irish policy ambitions for increasing renewable generation (particularly offshore wind), and improving the energy independence of Ireland, which could be further bolstered by the development of large-scale electrolytic hydrogen production and hydrogen storage over the medium term. This would create a symbiotic relationship between renewable electricity generation and green hydrogen production, and provide a long-term solution to energy security, via large-scale seasonal storage of indigenously sourced renewable energy.

We therefore recommend that upstream large-scale underground gas storage and pumped hydro storage are prioritised as solutions to improving the security of electricity supply. Combined with development of electrolytic hydrogen production and the development of a policy to transition power generation and natural gas storage to hydrogen, these solutions support the longer-term transition towards a net zero compliant energy system.

7. What measures should be considered on the demand side to support security of supply of electricity and gas?

Improved energy efficiency, demand side flexibility and support for uptake of renewable gases.

While growth in energy demand will be driven largely by economic activities, reducing the primary energy requirement of those activities through improved energy efficiency measures will help reduce demand relative to the alternative.

Development of large-scale upstream storage solutions for electricity and gas with appropriate management could deliver significant increases in system flexibility, while offering potential economies of scale and less day-to-day operational complexity than implementing the equivalent flexibility via downstream end-user installations.

Supporting the transition of natural gas demand to renewable gases is also important. Leaving aside the fact that electrification may not be suitable for all end use cases, this creates a demand base to stimulate investment in renewable gas production capacity. In the case of hydrogen this is essential to ensure electrolytic hydrogen production is available to mitigate renewable curtailment, which is required to support the increase in renewable investment that is required to deliver net zero. The use of hydrogen in dispatchable power

[6] The typical lifespan of a lithium-ion battery storage system is twenty years compared to the 50 years plus of a pumped hydro storage scheme. The energy storage capacity of the pumped hydro scheme is also not subject to degradation with usage.
[7] If these don't coincide with generation adequacy issues in interconnected markets.

generation, combined with large-scale hydrogen storage solutions, should also be progressed as a net zero compliant solution for dispatchable power generation that will ensure the long-term security of Irish electricity supply.

8. Do you have any views on how the mitigation options should be implemented?

Mitigation options that deliver upstream large-scale gas and electricity storage infrastructure should be prioritised, given they offer enduring improvements in all-island security of supply, and support long-term compliance with decarbonisation objectives. See our answer to Q6 above.

Policy Measures

9. Do you support the policy measures proposed in section 8 of the consultation paper?

Yes. The measures outlined are important to ensure the ongoing security of Irish energy supplies. We would however further recommend that a formal policy framework is introduced to facilitate the identification and assessment of projects that are mutually beneficial to security of energy supplies on an all-island basis – see our answer to Q10 below.

10. What further tools and measures do you think would contribute the most to Ireland's energy security of supply?

We recommend a formal policy framework is introduced to facilitate the assessment of security of energy supplies on an all-island basis.

Northern Ireland shares the same primary energy infrastructure (from Moffat to Twynholm) to access GB gas supplies as Ireland. Both jurisdictions also share a single electricity market, including a capacity market that considers generation capacity adequacy on an all-island basis[8]. There is also significant alignment in the decarbonisation targets of both jurisdictions.

Assessing security of energy supply on an all-island basis therefore could improve energy security for each jurisdiction, while reducing the overall cost of its delivery for consumers. Because the gas and electricity transmission networks in NI and RoI are interconnected,[9] energy infrastructure developments in Ireland could help improve energy security in Northern Ireland, and vice versa.

For example, we note that the fully consented large-scale salt cavern natural gas storage project at Islandmagee is not explicitly considered as a mitigation option either within the CEPA report or the consultation paper. With intergovernmental collaboration and support this project however has the potential to deliver significant security of supply benefits to both Ireland and Northern Ireland, initially for natural gas (500 million cubic meters) and then for green hydrogen.

Caverns initially developed for natural gas could be converted to hydrogen in the future, while seismic studies indicate that the geology at Islandmagee supports the development of a further 8 caverns that could be used explicitly for hydrogen storage. In total the conversion

[8] Subject to satisfying a limited number of locational constraints, which are expected to reduce when the new North South electricity interconnected is delivered.
[9] Electricity interconnection between NI and RoI will significantly increase with the new North South interconnector.

/ further development of salt caverns for hydrogen storage at Islandmagee could deliver a potential total hydrogen storage capacity of 2.5TW on the island of Ireland, significantly helping to support the decarbonisation objectives of both jurisdictions, while also helping to secure long-term security of energy supply.[10]

[10] Large-scale hydrogen storage will be required to balance electrolytic green hydrogen production (powered by intermittent renewable generation) and hydrogen demand. It is also likely to be required to facilitate the decarbonisation of dispatchable power generation in the SEM.