



An Coimisiún
um Rialáil Fóntas
**Commission for
Regulation of Utilities**

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RE: Review of the Security of Energy Supply of Ireland's Electricity and Natural Gas Systems Consultation – CRU Consultation Response

The CRU welcomes the opportunity to respond to the Department's Review of the Security of Energy Supply of Ireland's Electricity and Natural Gas Systems Consultation. Our key points summarised below are covered in detail in the appendix:

- The CRU considers that the focus of the next stage of assessment should be on mitigation options to address scenarios 4 and 5 (as these mitigation options would also address risks arising in scenarios 1-3)
- The electricity mitigation options, while welcome, are in general already underway and do not address gas security of supply. Therefore the focus in the next stage of assessment should be on gas and storage options.
- Energy storage and resilience in the State should be considered across all the vectors including liquid fuels, oil storage as well as electricity and gas storage options.
- Indigenous production of gas as well as commercial LNG should remain within the options for further technical feasibility assessment and CBA
- A full CBA of the options is crucial, along with consideration of who should bear those costs.

Please find enclosed our detailed response.

Sincerely,

[Redacted signature]
[Redacted name]

The CRU is Ireland's independent water and energy regulator. Our mission is to protect the public interest in water, energy and energy safety and a core element of our vision is to ensure a safe, secure, and low carbon future at least cost. CRU welcomes this opportunity to respond to the Department's Review of the Security of Energy Supply of Ireland's Electricity and Natural Gas Systems Consultation (the "Consultation").

[CRU Response Summary](#)

Ireland is becoming increasingly reliant on a single source of gas via the interconnectors from Moffat in the UK. In 2020, 51% of Ireland's electricity was powered by natural gas, with approximately 75% of annual supply coming via the Moffat interconnectors. With the Corrib gas field at full production, a reduction in supply to Ireland from Scotland via the Moffat interconnectors would require immediate actions to be taken on the electricity system to maintain natural gas supply. A sustained (greater than a few days) impact on natural gas supply via the Moffat interconnectors would result in supply disruptions on the electricity system also. The economic impact of such a combined energy event would be in the order of billions of Euro¹.

In terms of the five scenarios presented in the Consultation, mitigating against the risks of Scenarios 4 and 5 should be prioritised. Addressing the risks presented by those scenarios would simultaneously safeguard Ireland against the less severe disruptions depicted in Scenarios 1 to 3. GNI has projected that, from winter 2022, domestic gas production in Ireland will not be sufficient to cover supply to protected customers at times of peak demand coincident with a full disruption of gas supply from the UK via the Moffat entry point.

Disruption to supply via the Moffat interconnectors, as depicted in Scenarios 4 and 5, therefore represents the significant risk to Ireland's energy system that should be promptly addressed by proactive strategic mitigation options. To enhance security of both our gas and electricity systems, and address the evident geopolitical risks, Ireland should introduce measures that diversify our gas supply in the short term, in volumes capable of meeting peak demand, current and future, for a period that would provide sufficient time to secure alternate gas supplies. An example of such a measure is to access an FSRU; this measure could address supply disruptions in the short term, facilitating the longer-term procurement of further diversification and development of other security measures such as LNG import facilities (commercial or State-owned) additional indigenous gas production and / or strategic storage facilities. LNG infrastructure which can in the future be used for green hydrogen, may provide security of supply in the short and long term.

The Consultation provides a useful overview of the gas and electricity systems and demand and supply data in Ireland and provides informative analysis in relation to a number of mitigation options to address potential supply disruptions scenarios. CRU notes that the European outlook on energy security has been significantly impacted in recent months, and consequently many risks once deemed improbable as part of a national risk assessment have since actualised or are now deemed possible. While the Consultation has undertaken analysis in this respect outside of its original scope, CRU considers that it would be advantageous for the outcome of the Consultation to refine the scenarios to be assessed in further detail, for the purpose of focusing on associated mitigation options.

¹ <https://www.esri.ie/system/files/media/file-uploads/2015-07/WP397.pdf>

The CRU considers that some options which were initially not shortlisted (including further indigenous gas production and commercial LNG development) should be put forward for additional cost benefit analysis and technical feasibility assessment, before a final decision is taken to progress. The CRU also considers that energy storage and resilience in the State should be considered across all the vectors including liquid fuels, oil storage as well as electricity and gas storage options.

[The role of CRU in Energy Security for Ireland](#)

[Electricity](#)

S.I. No. 60/2005² sets out the role of CRU with regard to monitoring and taking measures to ensure security of electricity supply in Ireland. The CRU is also the competent authority for Ireland under EU Regulation 941/2019 on risk preparedness in the electricity sector³. The CRU works with EirGrid in its role as Transmission System Operator and ESB-Networks in its role as Distribution System Operator to undertake these roles. The CRU also relies on DECC and the Government to provide the over-arching policy framework that enables it in its role.

In 2021, the CRU published the [CRU Security of Electricity Supply: Programme of Actions](#)⁴ (the “Programme”). This Programme has been put in place to address short and medium-term risks to the generation adequacy of the electricity system. The Programme includes both demand and supply side measures, and at its core, the enduring solution for the electricity system: the procurement of 2000MW of new, flexible gas-fired generation that will facilitate the integration of further renewables and support the energy transition.

[Gas](#)

CRU is the competent authority for Ireland under EU Regulation 2017/1938⁵ concerning security of gas supply. Regulation 2017/1938 requires the CRU to develop a National Risk Assessment of all relevant risks affecting the security of gas supply. This National Risk Assessment must include an assessment against the Infrastructure Standard⁶ and the Supply Standard⁷.

- The *Infrastructure Standard* assesses a country’s resilience against the loss of the single largest infeed during a day of exceptionally high gas demand with a probability of 1-in-20 years.
- The *Supply Standard* assesses a country’s ability to supply its protected customers⁸ under certain stress scenarios.

² S.I. 60/2005, European Communities (Internal Market in Electricity) Regulations

³ Regulation (EU) 2019/941 on risk-preparedness in the electricity sector

⁴ https://www.cru.ie/document_group/security-of-electricity-supply-programme-of-actions/

⁵ Regulation (EU) 2017/1938 concerning measures to safeguard the security of gas supply

⁶ Article 5 of Regulation 2017/1938

⁷ Article 6 of Regulation 2017/1938

⁸ All NDM sector customers (residential and some small business) and, in addition, priority customers in the DM sector which are of the following categories: • Hospitals and Nursing Homes including retirement homes; • High Security Prisons; and • District Heating Schemes

This National Risk Assessment feeds into the CRU development of a National Preventive Action Plan⁹ (NPAP) and a Natural Gas Supply Emergency Plan¹⁰ (NGSEP).

Risks

As set out in the CRU Annual Report on Gas Security of Supply 2022, Ireland no longer complies with the EU Infrastructure Standard. Following upgrades to the two gas interconnectors to Ireland from Scotland in 2018, Ireland's standalone *Infrastructure Standard* figure (i.e. the percentage of 1-in-20 peak demand which could be covered in the event of a disruption to our largest single infeed) grew from 28% to 85%. Based on forecasts for 2024/25, this figure falls to 65%, largely due to the declining supply from Corrib.

Ireland can meet the *Supply Standard* requirements, including ensuring gas supply to its protected customers for a period of 30 days in the case of disruption of the single largest gas infrastructure under average winter conditions.

However, from this winter 2022, GNI has projected that domestic gas production in Ireland will not be sufficient to cover supply to protected customers at times of peak demand or in the event of a full disruption of gas supply from the UK via the Moffat entry point.

The Russian invasion of Ukraine and its subsequent impact on gas supplies to the EU, has highlighted the benefits of having diverse sources of supply in terms of technologies, infrastructure and country of origin. Significant and rapid developments in the European energy markets and energy infrastructure have taken place as a result, and further interventions can be expected. The completion of new interconnection routes, the development of LNG import and storage infrastructure, the introduction of energy price caps, and the establishment of the joint purchasing EU Energy Platform as examples, hold the potential to impact supply volumes, routes and flows across Europe and the UK.

Mitigation Options

Comments on Mitigation Option Context

“[*A Policy Statement on Petroleum Exploration and Production in Ireland*](#)” published in August 2022 outlines the commitment to end the issuing of new licences for the exploration and extraction of gas on the same basis as the decision taken in 2019 by the previous Government in relation to oil exploration and extraction. This was taken to align with the Programme for Government and the Climate Action and Low Carbon Development (Amendment) Act 2021.

However, this decision did not include published technical analysis as to whether the ending of future new licenses would result in an overall reduction in emissions. In many scenarios, indigenous production would likely have reduced emissions versus imported natural gas. A [study](#) by the United Kingdom regulator, the North Sea Transition Authority, on imports of gas to the United Kingdom show that LNG has significantly higher (59 kgCO₂e/boe) lifecycle emissions than indigenous production (22 kgCO₂e/boe) or pipeline production (18 kgCO₂e/boe) from Norway. For comparison, emissions related to production from the Corrib gas field are 4.2 kgCO₂e/boe¹¹.

⁹ https://energy.ec.europa.eu/system/files/2020-04/npap_ireland_2018_0.pdf

¹⁰ https://energy.ec.europa.eu/system/files/2020-04/national_gas_supply_emergency_plan_2018_0.pdf

¹¹ https://www.vermilionenergy.com/files/Corrib_Acquisition_and_2022_Budget_Presentation.pdf

On this basis and in light of recent developments, the decision to end the issuing of new licences for exploration and extraction of gas should be re-visited. The CRU considers that indigenous gas production should be further assessed as a potential security of supply mitigation option.

The "[Policy Statement on the Importation of Fracked Gas](#)" published in May 2021 states that "It is foreseen that the outcome of the review of the security of energy supply of Ireland's electricity and natural gas systems would supersede the policy statement on the importation of fracked gas". We note that this topic is not included within the current review.

The CRU considers that it may be useful to clarify if there is a distinction in Government policy between onshore fracking of shale gas reservoirs (noting the concerns raised in the Policy Statement on this practice) and the more conventional offshore fracking which is an established practice. Drawing a precise distinction between these two practices would allow for reconsideration of indigenous gas resources (using well-established and potentially lower emissions practices) to support security of supply. It could also facilitate the consideration of importing LNG extracted through a wider range of offshore production practices, removing limitations on diversification possibilities for Ireland.

[General Comments on Proposed Mitigation Options](#)

European energy security of supply developments in recent months have emphasised the importance of safeguarding Ireland's energy security. As Ireland's energy regulator, the CRU is one of the several state bodies playing a significant role in progressing measures to enhance Ireland's energy security.

The CRU is supportive of the diverse proposals outlined in the Department's Consultation. Some of the measures, such as the electricity mitigation package, are already being progressed under the CRU's remit. At the same time, the CRU considers that the short-listed measures, and their underlying assumptions, would require further analysis before a decision is taken to progress.

The short-listed measures capable of addressing the supply disruption scenarios 4 and 5, would require significant investment. Consideration of associated mitigation options outside of the current short-list, such as potential new indigenous gas exploration and production activities as well as strategic LNG storage combined with a commercial LNG development, should be included. Subsequent detailed cost/benefit analyses of the mitigation measures identified as addressing scenarios 4 and 5 would support the identification of the optimal solutions for Ireland.

Additionally, some measures may have technical barriers that would limit their potential to address a shortfall in gas supply. Cost-benefit analyses should therefore be accompanied by technical feasibility assessments, as well as analysis of other impacts of the proposed options such as greenhouse gas emissions. Following a thorough analysis, the most appropriate solutions should be progressed.

A question as to where the costs associated with various options should be allocated is also of relevance. This may differ from option to option depending on where the greatest benefits lie. Where investment is made that is not on the basis of a commercial case, but rather to address a strategic national policy imperative e.g. strategic storage, there may be a strong case for Exchequer funding of this development. Given the potential high costs associated

with developing strategic storage infrastructure and filling this with strategic stocks of gas, any available option to reduce the costs (for example, co-locating this with commercial LNG infrastructure) should be explored and assessed.

The CRU also considers that the next stage of assessment of mitigation options should include the ability to support future decarbonisation; for example, the usage of existing and future natural gas reservoirs for the storage of natural gas or hydrogen in the future.

The Consultation notes that, where a gas supply disruption leads to a power system supply disruption, the implementation of the individual electricity mitigation options in the short-list would address the electricity supply deficit alone, but would have no direct or positive impact on the gas supply. Conversely, the gas mitigation options presented can fully or partially address both the unserved gas and electricity demand. While the CRU is supportive of, and active in the delivery of electricity security of supply risk mitigation options, it is our view that mitigating against a gas supply disruption will best address Ireland's energy security needs both in the short term, and as we deliver on our decarbonisation goals in a safe and secure manner.

[Comments on Proposed Mitigation Options](#)

- ❖ Gas Storage Facility (modelled on Southwest Kinsale reservoir)
- ❖ Floating LNG Terminal (non-commercial)

To address Ireland's energy security requirements, mitigation options should be designed to respond to an initial shock e.g. Scenarios 4 and 5, and should enable and facilitate the introduction of alternate gas supplies e.g. via commercially contracted LNG, to the Irish system in the absence of the Moffat entry points. CRU proposes that the long-list mitigation options associated with storage and LNG supply are reassessed to account for the changes in energy security risk levels across Europe. Further assessment should include a detailed cost/benefit analysis.

The Consultation and report have not provided sufficient evidence to eliminate a commercial floating LNG terminal from consideration and the CRU considers that this option should be assessed as one of the shortlisted options.

- ❖ Gas Mitigation Package (gas storage, renewable gas, green hydrogen and gas demand side response)

As above.

Progression of all or elements of this package, should be based on the outcomes of a detailed cost/benefit and technical feasibility analysis.

- ❖ Onshore Energy Storage Project

This option could be considered in combination with an alternate gas supply route, e.g. commercial LNG, for use in times of supply disruptions.

- ❖ Natural Gas Demand Management

Enhanced monitoring of demand growth in the electricity and gas sectors in Ireland would support our network development planning and the achievement of our emissions targets. The delivery of national policy and or strategy, led by Government Departments relating to demand management and flexibility would contribute strongly to the delivery of this.

The CRU has taken several steps to manage electricity demand, e.g. introducing new tariff structures and restricting network connections for certain large customers. Taking into account the considerations set out in the CRU's letter to Minister Eamon Ryan of 18th October 2022 as well as the voluntary gas demand reduction measures currently under consideration by the Minister under Regulation (EU) 2022/1369, similar measures should be taken for gas. Regarding the residential sector, the Climate Action Plan already calls for the ban of the installation of gas boilers in new homes by 2023. The majority of gas demand is from power generation, so there is a limit to what gas demand management can achieve without curtailing electricity supply.

- ❖ Additional Electricity Interconnection
- ❖ Additional Electricity Storage – Pumped Hydro
- ❖ Additional Generation Capacity – Dispatchable Low Carbon (biomass)
- ❖ Increased secondary fuel storage at gas fired power generation

CRU supports the development of non-gas energy sources, such as those set out above, as they bring strategic diversity benefits to the electricity system that would support the system in times of gas supply disruptions. However, as discussed previously, the CRU would emphasise the importance of focusing primarily on measures that would directly mitigate against the risks to security of gas supply outlined in Scenarios 4 and 5. Although the development of non-gas energy sources would be beneficial, it is unlikely to sufficiently address those risks if implemented in isolation or in small measure.

In relation to secondary fuel storage, the 2009 CRU decision paper "*CER/09/001: Secondary Fuel Obligations on Licensed Generation Capacity in the Republic of Ireland*" sets out the current secondary fuel requirements for gas and CHP units of more than 10MW. The requirements were established in recognition of the share of natural gas as a primary fuel source for power generation and Ireland's reliance on imported gas at the time.

The provision is intended to mitigate for a short term (up to 5 days) gas supply shortage. While small incremental extensions of the secondary fuel storage requirements under this policy decision would increase the resilience of the electricity system accordingly, where on site storage is required, there may be limitations to such a proposal e.g. cost, planning, environmental, safety, in particular where applied to existing gas generation plant.

However, there is an opportunity to consider alternative approaches that would provide for significantly increased and sustained secondary fuel provision in the event of a gas shortage, i.e. secondary fuel stocks that can be continuously replenished during a gas supply disruption. This would significantly enhance the effectiveness of this mitigation measure and should be further assessed. In a broad sense, options to bolster energy storage and resilience in Ireland should consider potential for diversification and be examined through all available vectors, including oil as well as gas.

Progressing strategic gas storage to support electricity and gas security is likely to incur high costs. Oil storage may be less expensive, particularly where there are existing oil storage facilities on the island of Ireland. It would be beneficial if the next stage of assessment and CBA could give the option of trading off the costs and benefits of strategic gas storage vs strategic oil storage for power generation.

There is a particular opportunity in the coming years as the need for NORA strategic stocks may decline in line with reduced oil demand as transport is increasingly electrified. Many of the NORA oil sites are co-located with gas-fired power generation. Rather than running these down, they could be converted to providing significant and sustained secondary fuel provision in the event of a gas shortage.

This is one potential option that could provide value if energy storage and resilience in the State is to be considered across all the vectors including liquid fuels. This would require Government policy decisions as this is beyond the scope of the CRU regulatory remit.

- ❖ Conversion of a gas fired power plant to hydrogen

This measure is not expected to be deliverable in the short or medium term.

- ❖ Electricity Mitigation Package (DSR and Batteries)

CRU supports this measure which is progressing under the Programme.

Additional Mitigation Options

Further measures that could contribute towards Ireland's energy security of supply include improving the attractiveness for the existing petroleum authorisations to progress through their respective stages to allow for subsequent actions to be carried out (be that exploration or development). The CRU notes that in most other European and global countries where an oil and gas industry exist, efforts have recently been made to have additional licensing rounds and/or increase the awarding of licenses and development of hydrocarbon resources.

In Ireland, such measures could include 1) Ministerial decisions on the extension requests that have been submitted to DECC, 2) increasing attractiveness for existing authorisations to progress their exploration activities (e.g. through increased availability of seismic data, organisation and promotion of conferences to share information and develop improved understanding of Ireland's offshore geology and potential targets), 3) review of other (including non-technical) requirements by undertakings to progress licenses, 4) incentives to carry out activities to improve capacity and/or productivity of existing producing assets (i.e. Corrib), and 5) and other measures.

As discussed above, the CRU supports reconsidering the potential for indigenous exploration and production of gas. Concerns regarding security of supply in recent months have led other EU countries to prioritise energy production using indigenous fuels – for example, the UK has announced that new North Sea gasfields will be prioritised during a licensing round aimed at boosting indigenous production, while Germany and the Czech Republic are both extending their reliance on their respective coal fields. This sets a precedent for Ireland to re-examine the possibility of exploring and developing new indigenous gas fields.

In addition, commercial LNG and a commercial storage option should also be considered. These options would align with the recent EU Regulation 2022/1032 with regard to gas storage, which mandated the filling of gas storage across Europe as a mitigation measure to enhance security of supply in the face of a significant risk of a gas supply shortage.

Tools and Policy Measures

- ❖ Joint Planning

CRU supports the proposal for a joint assessment of electricity and gas demand to inform gas and electricity system planning. This proposal aligns with the proposed EU Gas Directive on common rules for the internal markets in renewable and natural gases and in hydrogen of December 2021¹², which proposes that the gas network development plan, shall “*be based on a joint scenario framework developed between the relevant infrastructure operators, including relevant distribution system operators, of at least gas and electricity*”

❖ Regular Energy Security Review

The CRU supports this proposal.

❖ International Arrangements

Through active participation across EU energy working and coordination groups, the CRU will continue to engage, input on and influence emerging legislation and initiatives that may impact our international arrangements and current supply sources with the UK.

Conclusion

The CRU would summarise the key points made in this response as follows:

- The CRU considers that the focus of the next stage of assessment should be on mitigation options to address scenarios 4 and 5 (as these mitigation options would also address risks arising in scenarios 1-3)
- The electricity mitigation options, while welcome, are in general already underway and do not address gas security of supply. Therefore the focus in the next stage of assessment should be on gas and storage options.
- Energy storage and resilience in the State should be considered across all the vectors including liquid fuels, oil storage as well as electricity and gas storage options.
- Indigenous production of gas as well as commercial LNG should remain within the options for further technical feasibility assessment and CBA
- A full CBA of the options is crucial, along with consideration of who should bear those costs.

¹² Brussels, 15.12.2021 COM(2021) 803 final 2021/0425 (COD)

Appendix A – CEPA Security of Supply Technical Report: Comments and Recommendations for Further Analysis

The study and outcome would benefit significantly from splitting out the technical scope and having a separate technical engineering assessment. The methods employed to identify options, assess feasibility and perform concept selection lack a level of detail that would strengthen this type of assessment. 4.1 Baseline Assumptions (pg. 34). The charts and information within DECCs consultation document illustrate trends to approximately 2030.

Within the CEPA analysis, consideration is given to two discrete points in time, 2025 and 2030, when assessing the mitigation options. However, it appears that there will be a demand for gas for a significant period subsequent to 2030. Analysis should be carried out to determine a range for how much and how long gas will be required beyond 2030, and this should be taken into consideration in the analysis.

This may have an important effect on the analysis and the outcome. For instance, if gas is to be needed until 2040-2050, analysis should be undertaken to determine the relative attractiveness of different options such as new interconnectors versus LNG terminals. This should take into account lifetime costs and other non-financial factors such as ability to serve as a backup in various shock scenarios as well as ability to respond to other risks, e.g. regarding the uncertainty of the development of electrification of heating systems, and the proliferation of hydrogen and its ability to drive the energy transition.

5.1 Technical assumptions surrounding the disruption to Russian gas supplies (pg. 70). The assumptions include: “*Ireland retains full discretion over which consumer groups in Ireland get constrained first in the event of a gas shortage.*” This statement does not account for the agreed arrangements between GNI and National Grid in the ‘*Joint Protocol for Loadshedding at the Moffat Interconnection Point in Network Gas Supply Emergencies*’. Sensitivity D best reflects the loadshedding arrangements for Ireland, not the base case.

5.5 International Developments. On page 31, for the Netherlands it is stated that “*Indigenous supply from the Groningen gas field and other fields in the Netherlands, both onshore and offshore*”. It has been highlighted by the Dutch safety regulator (The Dutch State Supervision of Mines (SSM)) at the recent AGM of the International Regulators Forum that further production from the Groningen gas field cannot be carried out safely, due to subsidence and damage occurring as a result of further gas extraction. The regulator has specifically requested that where appropriate, this latest update be included in relevant discussions. This request should be acknowledged in future analysis.

7.1 Appraisal of short-listed gas mitigation options. A number of the mitigation options are proposed and have been assessed as “strategic”, whereby the option being proposed is to be implemented and run by the state, and gas from these options will only be utilised in the event of a shock scenario materialising. For instance, the “strategic LNG FSRU” option (7.1.1) and the “strategic gas storage” option (7.1.2). There are a number of aspects that should also be considered for these types of strategic options:

- As identified in section 7.1.1 (pg 100), one of the challenges is that it “*would only be utilised during periods in which there is a material risk of demand disruptions*”. This is a unique operating mode and as highlighted “*we have not identified any FSRUs which are currently used for this purpose*”. As such, can this option be deemed to be

technically and economically feasible? The same concern/question is also relevant for the “*strategic gas storage*” option – would it be technically and economically feasible to maintain an underground gas storage system which would only be used infrequently after prolonged periods of inactivity? Such an operating mode for these options presents a key decision – to maintain facilities constantly, or to mothball.

- Note that it may be helpful in order to assess all initially identified options to include a definition for both technical and economic feasibility.
- The cost per unit of gas / heat to the taxpayer for these “strategic” options is likely to be significant. By reverting to a more typical operating mode - i.e. use on a regular basis rather than only in the event of a shock scenario - the financial efficiency and economic attractiveness of these options would be greatly improved. This provides more value to the taxpayer, with the same or similar security of supply benefits, once the appropriate additional measures are put in place.
- How the projects will be funded, the cost of financing, and potential challenges with the Irish government (or state agencies) being the “customer” with service providers, as opposed to private companies traditionally (for instance, this may be difficult contractually, where there are different appetites to risk) should be considered.

7.1.1 Strategic LNG FSRU. The cost of delivering the “strategic LNG FSRU” option should be provided with an associated range of uncertainty (e.g. +50%/-30%). This uncertainty is likely to be significantly higher based on the method employed (as described in pg99). This option would benefit from further analysis including a set of initial engineering, commercial and other assumptions, to appropriately define the concept. Defining the same level of cost accuracy (e.g. +50%/-30%) and applying this across all options may further help to assess feasibility. Subsequently, cost accuracy for selecting or prioritising the concepts should also be defined, and likely to be within a narrower range (e.g. +30%/-15%).

7.1.2 Strategic gas storage. Costs of delivering the option (pg 104). The paper states that “*much of the fixed infrastructure associated with the gas storage facility at Kinsale remains in-place in a decommissioned state*”. This is not up-to-date; all the Kinsale area infrastructure has now been decommissioned and most of it has been removed. Using the Kinsale reservoir(s) for gas storage would require a project to design and install facilities including pipelines, wells, controls, compression facilities etc. Taking this into account, further work is required to demonstrate the technical and economic feasibility of this option.

7.1.2 Strategic gas storage. Cost of delivering the option (pg 104). Given that the Islandmagee storage facility is still in the early stages of development, the Rough gas storage facility and project in the UK could also be considered as another indicator of costs for this option.

7.1.2 Strategic gas storage. An additional option that is not considered in this section is the use of the Corrib field as gas storage. Alternative to current operating modes could be considered, whereby A) the field is shut-in for a period throughout the winter and in the event of a shock scenario materialising, production could be commenced. This may also allow for increased linepack to be utilised, with both the production and transmission pipelines able to go to higher pressures than what would be possible during normal production. During the extended shut-in, this would may also allow for reservoir pressures to increase, and when production commences could allow for increased flow rates for a period of time. B) The field operates as injector during a certain period and as a producer at other times (similar to how

Kinsale had operated until 2017). It should be noted that the field is currently being depleted with pressures dropping over time.

7.2.5 Hydrogen plant conversion (pg 123). This option has been included in the short list. It is important that this and all hydrogen-related options are reviewed in light of a definition for technical feasibility (i.e. do all parts of the concept meet the threshold?). The option may be carried forward, but appropriate caveats and potential backups may be required, until all aspects of the hydrogen concept have been proven to be technically feasible (and achieved the desired levels of technological readiness levels). This may not occur for many years to come, and other proven back-up options may hold more value until such time.

An onshore slow-liquefaction storage facility (Pg 89). As stated, “*Relative to an underground storage facility, the option may therefore only be able to provide mitigation for a more limited number of days*”. This option could benefit from further details as to whether there are any examples of similar options being implemented globally where fabricated onshore storage tanks (as opposed to traditional underground storage reservoirs) are used to store gas, or other fluids, to be made available for the supply of energy in the event of shock scenarios materialising. The volumes and cost required and emissions associated with liquefaction, may reduce the attractiveness of this option. Furthermore, the potential introduction of newer technologies and apparent lack of other examples already operating could pose challenges to proving technical feasibility for this option. Safety considerations and siting of such large inventory tanks should also be evaluated.

Appendix B: Long-list of Mitigation Options. “*Additional gas interconnector*” has not been shortlisted. A potential new gas pipeline to Norway may have substantial benefits, although the costs would also be high. Interconnection with Norway (rather than GB) would add to the diversity of supply routes. Norway has been identified as a source of gas with low flaring and emissions¹³. Such an interconnector could provide additional options for gas imports on a daily basis, and also diversification in scenarios of disruption / security (especially in the case of Norway). The linepack volumes could also be substantial. Additionally, a new pipeline could be specified such that it could be re-used in future for transportation of hydrogen or CO₂ (noting that Norway has already initiated the model for importation of CO₂ from other countries). As an example of a pipeline project, the 725mi Langeled subsea pipeline commenced transporting natural gas from Norway to the United Kingdom in 2006. The project cost £1.7 billion and was constructed in two years. It is therefore acknowledged that further analysis of this option would only be beneficial if it appears that the costs of other mitigation options are also high.

¹³ [Tackling flaring: lessons from the North Sea \(Capterio, 2020\)](#). PDF