2. What, if any, additional weighting should the CRU apply to diversity of supply considerations in its decision-making process?

There are two types of fuel shocks: price shocks and quantity shocks. Price shocks affect the fuel price (increase or decrease of gas /oil price). Quantity shocks affect the provision of the fuel. Diversity of supply may help to address price shocks, but the impact of interconnection on quantity shocks is quite uncertain.

In case of asymmetric gas shocks (i.e. shocks that affect Ireland only), transmission lines with other countries add some extra electricity capacity. However, in the event of symmetric gas shocks (gas shocks that symmetrically affect European countries), interconnection will not be really helpful for the Irish system. As a result, CRU should carefully examine the impact of a gas/oil quantity shocks across Europe and their effects on Ireland with and without extra interconnection, in order to assess whether new transmission lines may be help to diversify supply. It seems particularly important in this context to provide evidence on the reliability of supply of interconnection in times of scarcity – especially in the event of symmetric shocks.

If diversity of supply here refers to differences in generation prices, interconnection with France may help in reducing the Irish power prices. Moreover, a gas price shock should be better managed if electricity interconnection is achieved with a country in which nuclear is a significant part of the overall installed capacity. In order to establish the effects of a price shock on fossil fuels an EU-wide system model should be adopted.[1]

Thus, the CRU should put a different weight depending on the purpose of the diversity of supply (price vs quantity shocks).

3. Should the CRU take EU interconnection targets into account in its evaluation? If so, how?

Interconnection (IC) is not a target in itself but a means to an end. It is considered to support achieving the objectives of the energy trilemma, i.e. economic competitiveness, security of supply and environmental sustainability. As such, IC competes with other technologies and it is important to evaluate which technology provides the highest benefits in relation to these objectives at the lowest costs to consumers.

For instance, new ICs aim at achieving price convergence across member States and reducing the curtailment of renewables, hence increasing the share of renewables and decreasing carbon emissions. Therefore, the EU targets on emissions for 2030 may be considered to have a direct link to the amount of IC required at the EU level. However, the CRU should first evaluate (coherently with EU targets and policies) whether the same targets could be achieved with technologies different from ICs, such as battery storage. Storage can be built at the grid level, at the retail level or may be built by renewables themselves in order to offset the risks associated with the unpredictability of their outcome.

As a result, the CRU should consider studying the impact of new interconnection on emissions and on price convergence together with the outcome of storage technologies. This is because the overall EU targets on emissions may be achieved faster and less costly by storage, offsetting the gains of new interconnection.

[1] See for an example Di Cosmo et.al.(2017) available here: http://bit.ly/2oz4hgP

If storage technologies become cheaper over the next years, the study of the link between interconnection and storage may prove that the two technologies are substitutes rather than complements. As a result, the CRU should know the costs associated with IC projects and how to repay them if batteries become available at a lower cost. [2]

In order to take into account the EU targets, a full European model for both interconnection and storage should be used, as the spillovers of new IC lines between Ireland and other EU countries and the impact of different types of storage could not be captured in a stylized model for Ireland and few other states only.

Coordination with the EU institutions (IEB, Commission) should be promoted in order to investigate whether the IC projects are helpful at the overall EU level. In particular, it would be very interesting to investigate whether the costs of the IC will be spread across the consumers in the two countries interconnected (Irish and France for the Celtic interconnector and Irish and UK for the Greenlink) or if there are some European financial support for these projects. If the UK is involved, it should be carefully monitored how Brexit would affect the project financing.

Finally, any general EU interconnection guidelines should be challenged and suitably adopted to the local (Irish) context, e.g., guidelines based on % of installed capacity[3] **or on average price differences**[4]**. In relation to the former, the structure of the power generation portfolio, in particular the share of storage should be considered. In relation to the latter, the costs of IC (e.g., depending on topography and line length) and overall demand need to be taken into account. Taking into account the size of the market is particularly important in order to correctly evaluate the costs and the benefits associated with a new interconnection project. The CRU should test whether the difference between the electricity prices in two zones is high enough to justify the costs associated with the investment in new interconnection, which are country-specific.**

5. Are there any gaps in the policy backdrop outlined in this paper?

The CRU should not limit the analysis to the effects of new transmission lines. As highlighted before, new technologies may become economically profitable in the next years. As a result, the interconnectors or the transmission lines may lose part of their profitability. Moreover, the CRU should be aware about the spillover effects associated with each technology, and should prioritize models at the EU-scale.

6. Are there any gaps in the evidence base outlined in this paper?

A technically sound welfare analysis should be provided together with the analysis of the impact of new interconnection lines. Cost minimization is not the only variable that should be taken into account by the CRU.

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[2] See Di Cosmo et.al.(2017).

[3] European Commission, Communication on European Energy Security Strategy, COM(2014)330; European Council, Conclusions of 24 October 2014, EUCO 169/14

[4] On this see the Expert Group on electricity interconnection report, available here: http://bit.ly/2F55yH4 (November 2017)

First, the studies that take the total cost minimization into account should clearly define if the costs considered are at the EU or at the Irish level. This information should be included in section 3.5 of the document.

This is particularly important as the solution undertaken minimizing the Irish costs may not be optimal from the EU system perspective. As Lynch et al. (2012) highlight, system investment choices on network expansions are less costly (and then, more efficient) than national choices.[5] This means that CRU should consider what is the best solution for Ireland taking into account the wider EU picture. Second, the funders of the project should be identified, in order to understand if the actors that gain from the project are the same who pay for it. Some financial scenarios should be developed to stress whether an EU contribution from IEB would change the financial impact of the project.

Finally, the role of Brexit should be examined if any project between Ireland and UK is carried on, as the EU funding may be limited and the conditions of the financial agreement may be different from other EU partners.

[5] Muireann Á. Lynch, Richard S.J. Tol, Mark J. O'Malley, Optimal interconnection and renewable targets for north-west Europe, Energy Policy, Volume 51, 2012, Pages 605-617