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ESRI ECONOMIC & SOCIAL RESEARCH INSTITUTE

Response to ESB Networks Investment Plan Approach for Price Review 6 (PR6): Submission from the Economic and Social Research Institute

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Introduction

We welcome the opportunity to contribute to ESB Networks' consultation on their investment plan approach for Price Review 6. In this document, we respond to the subset of the questions for which we can provide insight.

Do you agree with the strategic outlook and strategic environment we set out that is shaping the direction of the PR6 Investment Plan? Please provide your feedback.

Do you agree with the proposals to improve resilience, safety and reliability of the network that we set out to support our PR6 Investment Plan? Please provide your feedback

We appreciate the scale of investment required to deliver on the infrastructural requirements, both to facilitate the growing population and general demand, but also the changing use of the system as we meet our decarbonisation targets. We welcome the direction of the investment plan which focuses on these requirements explicitly.

The investment required to ensure a resilient, safe and reliable network are numerous and dependent on a number of factors that are difficult to predict. The infrastructural requirements at a given moment in time at a given location are predicated on the uncertain evolution of many uncertain factors (e.g. the pace of demand growth, the development of decarbonisation technologies, the pace at which we see an electrification of heat and transport; supply-side developments such as investment in solar and wind generation).

A cost-effective approach may incorporate the value of time and the option to wait in an investment strategy. For instance, it may be clear with a high degree of certainty that a given baseline investment in distribution capacity at a given node will be required. The requirement of additional distribution capacity is less certain. If it is possible to invest in a given capacity level now, and invest in the additional capacity at a later date, Real Options analysis helps to identify what is the optimal investment in this scenario. It may be better to invest in both the baseline and additional capacity requirement now, or to invest in the baseline capacity only. If it is the latter, there is value in waiting until there is greater certainty that the additional investment is needed. This minimises the likelihood of overinvesting. This approach will also help to identify the decision points at which the additional capacity investment is worthwhile.

Planning and lead-in times should be accounted for in such an analysis. In addition, risk should be considered; investments should be made that provide security of supply with adequate certainty, not exposing the Irish consumer to undue risk.

Some examples of research in this field:

- Boomsma, T. K., Meade, N., & Fleten, S. E. (2012). Renewable energy investments under different support schemes: A real options approach. *European Journal of Operational Research*, *220*(1), 225-237.

- Fernandes, B., Cunha, J., & Ferreira, P. (2011). The use of real options approach in energy sector investments. *Renewable and sustainable energy reviews*, *15*(9), 4491-4497.
- Krystallis, I., Locatelli, G., & Murtagh, N. (2020). Talking about futureproofing: Real options reasoning in complex infrastructure projects. *IEEE transactions on engineering management*, *69*(6), 3009-3022.
- Martins, J., Marques, R. C., & Cruz, C. O. (2015). Real options in infrastructure: Revisiting the literature. *Journal of infrastructure systems*, *21*(1), 04014026.
- Herder, P. M., de Joode, J., Ligtvoet, A., Schenk, S., & Taneja, P. (2011). Buying real options–Valuing uncertainty in infrastructure planning. Futures, 43(9), 961-969.

Do you agree with the proposals to decarbonise electricity and to develop a more flexible and integrated energy system to support our PR6 Investment Plan? Please provide your feedback.

We welcome the acknowledgement to develop a more efficient planning and grid connection application process. This is of great importance to achieve cost-effective decarbonisation. We also welcome recent CRU announcements to this effect, with amendments made to the grid application process to facilitate more timely connections. Both of these developments are in line with recent ESRI research (Longoria et al., 2024) quantifying the costs of planning and regulatory delays.

Longoria et al., (2024) uses hypothetical scenarios to illustrate how the development time for energy projects is influenced by the organisational rules of the planning/regulatory processes. Utilising a model of the Irish electricity system, known as ENGINE, this paper analyses the impact of several renewable energy project delay scenarios on power systems costs, carbon emissions, and electricity prices.

There are a number of findings associated with this research. Extended decision times on the development of new renewable electricity generation leads to higher carbon emissions in the short term, as thermal power plants must fill the gap. We investigate a number of scenarios of regulatory delay. For the analysed scenarios, we find that wholesale electricity prices are up to 10% higher and CO_2 emissions up to 4% higher. These delays are separate to delays associated with developers securing financing, or public opposition and planning appeals.

There are a number of policy recommendations arising from this research that may be relevant for investment and regulatory processes involved in PR6. More frequent application windows can reduce the incidence of delays. We find that application gates should occur at least twice annually. In September 2024, subsequent to the undertaking of Longoria et al. (2024), the Commission for Regulation of Utilities (CRU) announced that gates for grid connection applications will occur every 6 months. This will begin in 2025.

In addition, enhanced coordination between regulatory and planning authorities could aid project delivery, streamlining the entire regulatory process for large-scale energy developments. We recommend that applications for authorisations could occur in parallel, and better coordination between regulatory bodies could reduce the administrative burden on applicants and regulatory authorities. Reforms enacted in September 2024 appear to better facilitate parallel application. This recommendation is consistent with earlier research calling for a `One-Stop-Shop' regulatory mechanism for large-scale energy project approval and the EU Commission's recommendation under the REPowerEU plan to tackle slow and complex permitting for major renewable projects.

References

- Longoria, G., Lynch, M., Farrell, N., & Curtis, J. (2024). The impact of extended decision times in planning and regulatory processes for energy infrastructure. *Utilities Policy*, 91, 101824.

Do you agree with the proposals to further empower and support our customers to shape our PR6 Investment Plan? Please provide your feedback

It is encouraging to see the emphasis placed on consumer engagement and empowering consumers to adopt more efficient and cost-effective technologies, such that both system cost and consumer costs are minimised in the long-term. Systems to make it easy for consumers to participate in markets for energy and flexibility are important and we welcome this acknowledgement. There is some research from the ESRI and elsewhere which may inform this decision-making***.***

For instance, there is limited evidence to support information campaigns as a method to encourage consumers to change energy consumption. Studies have failed to find any impact of such information campaigns on energy consumption (See Diffney et al.). Efforts to facilitate uptake of Time of Use tariffs, the adoption by households of flexibility-enabling technologies, etc. should be evidence based. For instance, there is much work in the field of behavioural science demonstrating how one may maximise the likelihood that a householder will adopt a given technology, and overcome negative biases to make decisions that are in their private and the public interest. We would strongly advocate for an evidence-based approach to any such undertakings in this regard.

- Diffney, S., Seán Lyons and Laura Malaguzzi Valeri, "Evaluation of the Effect of the Power of One campaign on Natural Gas Consumption", Energy Policy, Vol. 62, November 2013, pp.978–988, Published online 12 August 2013

Do you agree with the proposals to address the enabling structures and capabilities required to deliver on the PR6 Outcomes and Objectives and which are being considered for our PR6 Investment Plan? Please provide your feedback.

We welcome the explicit consideration of the impact that many of these changes may have on consumer bills. There are several economic principles that one may apply when setting tariffs for utilities that involve numerous cost components. Please see Farrell and Meles (2022); Farrell (2021) for a discussion of cost-reflectivity. One such approach is that of Coasian pricing. This is the basis for multi-part tariffs that comprise a fixed, capacity and energy-related charge.

Applying these principles to transmission tariffs, the volumetric price should be set equal to the marginal cost of electricity transmission (i.e. the cost of transmitting the last kWh of electricity through the system); the standing charge should be proportional to the burden that consumer places on fixed costs while a capacity charge should be proportional to each consumer's contribution towards the transmission capacity requirement. This should ideally contain a spatial component, guiding efficient investment and not overburdening a given location on the system.

It is important that tariffs are cost-reflective as they incentivise efficient behaviour. Electricity tariffs are two-part tariffs. It is important that the volumetric (€/kWh) component is cost-reflective (i.e. equal to marginal cost) as it facilitates efficient consumption decisions. It is also important that the standing charge is cost-reflective as it facilitates efficient connection decisions (e.g. whether to connect to the grid or to go off-grid). While this is of lesser concern for households in Ireland, relative to other countries with a greater risk of consumers going 'off-grid', it is still of non-negligible concern. A cost-reflective tariff with a spatial component may help to guide a more efficient spatial distribution of new connections; something of particular importance for industrial and commercial connections. Indeed, if the electricity supply evolves to be predominantly fixed cost driven, it may be a salient issue for new residential connections.

- Farrell, N. and T. Hadush Meles (2023). The equity and efficiency of electricity network tariffs, ESRI Working Paper 744, Dublin: ESRI , https://www.esri.ie/publications/the-equity-and-efficiency-of-electricity-network-tariffs
- Farrell, Niall. "The increasing cost of ignoring Coase: Inefficient electricity tariffs, welfare loss and welfare-reducing technological change." Energy Economics 97 (2021): 104848.