Agenda

Advancing economics in business

Integrated Transmission Planning and Regulation: what choice of tender model?

Competitive allocation mechanisms in the energy market are designed to reveal private information held by the participants, and crystallise the economic value of that information through the bidding process. However, the costs incurred by participants may sometimes outweigh this value. What factors determine whether allowing competing developers to bid for the right to deliver onshore transmission projects is likely to benefit electricity consumers, and what might such a mechanism look like?

In its Integrated Transmission Planning and Regulation (ITPR) project, Ofgem, the energy regulator for Great Britain, undertook a fundamental review of the arrangements for planning and delivering onshore and offshore electricity networks, as well as electricity interconnectors.[1] The project sought to ensure that:

- the GB electricity network is planned in an economic, efficient and coordinated way;
- project delivery is efficient, and consumers are protected from undue costs and risks.

Following the consultation, the final conclusions were published on 17 March 2015. Ofgem concluded that the system planning and coordination role of the system operator (SO) of the GB electricity system should be expanded to offshore transmission, including multi-purpose projects and interconnectors, and that onshore projects of significant scale should be subject to competitive tender.[2] The choice of the tendering model will be subject to a separate consultation from autumn 2015.

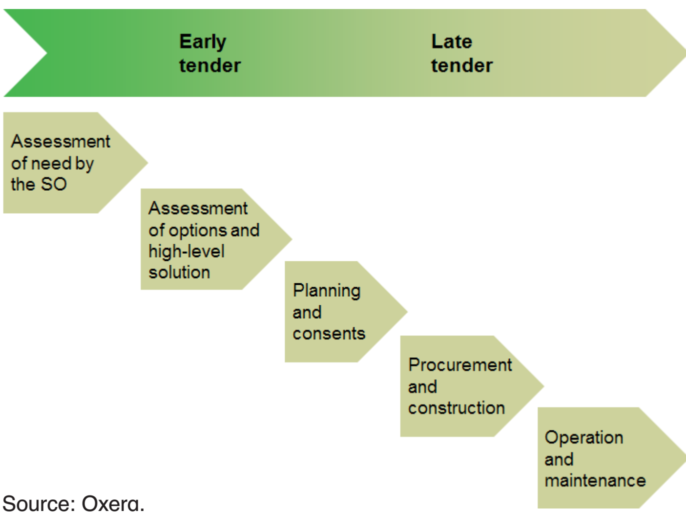
Choice of tendering model

The choice of tendering model is relatively wide and ranges between early and late tenders, as shown in Figure 1. The difference is the stage of development at which the project is put out to tender. An early tender would be conducted prior to a final design being agreed, allowing bidders to compete on the basis of alternative project specifications. A late tender would be conducted after the project specification has already been agreed (between Ofgem and the SO), with the tenderers then competing to deliver the agreed project specification.

An early-stage tender for a transmission project might proceed as follows.

- The SO assesses the need of the transmission system for more capacity, and deems that the connection between two major GB transmission zones needs to be reinforced. Subject to its assessment being accepted by Ofgem, the broad requirements for the reinforcement are specified, with some room for variation in capacity and timing.
- A number of project developers pursue different solutions, with each solution accredited by Ofgem with input from the SO. Each developer undertakes planning independently, with permission for different projects potentially being coordinated by the SO prior

Figure 1 Choice of tendering model for GB electricity transmission



Source: Oxera.

to the selection stage in order to minimise the risk of the winning project being denied planning consent. In this example, the reinforcement allows for a number of viable alternatives in terms of route and technology (overhead, underground or underwater cable), with each option having different associated costs.

- Each tender submission specifies costs, technology, timing of delivery and capacity, within a certain range set in advance by the SO. Any developer participating in the tender will need to have already obtained planning permission. The winning project is then selected on the basis of a formula that trades off cost against date of delivery and capacity. This tender model is most similar to a competitive auction for renewable capacity, where neither the exact technology for delivering renewable capacity nor the exact time of delivery is specified.

A late-stage tender for the same project might proceed as follows.

- The SO assesses the need of the transmission system for more capacity, and decides that the connection between two major GB transmission zones needs to be reinforced. Subject to its assessment being accepted by Ofgem, the SO determines all key detailed engineering requirements and the timing of delivery, carries out feasibility studies, and obtains all the necessary permits. As part of this, the SO determines which route and technology option represents the most economic solution. Finally, it determines the timing for the project.
- Developers bid to fulfil the specified requirements and then to own and operate the asset.

Key considerations for the optimal model

The key factors that determine the optimal tendering model are the information held by tender participants and the SO, and the cost for developers of participating in the tender.

Overall, optimal auctions and other tender mechanisms are designed to enable private information held by the participants to be revealed to the party running the auction. This information is communicated through the participants' bids. If the amount of information held by participants is not significantly greater than that held by the party running the auction, the benefits of implementing such a mechanism are reduced.

Ofgem has not yet expressed a preference for an early or late model of tendering projects. Two key factors involved in this decision are the extent and direction of information asymmetry between the SO and project developers, and the cost of several alternative project proposals being developed in parallel. The following trade-off between these factors may determine which model is likely to achieve the best outcome in terms of cost.

1. Where project developers have particular information and expertise that the SO does not have, and the cost of several alternative project proposals being developed in parallel is manageable, an early-tender model is likely to be optimal. In this case, the lowest-cost outcome is brought about by making best use of the information held by project developers through the competitive tender.
2. Where the SO has a similar amount of information to that held by the body of developers, and the cost of several alternative project proposals being developed in parallel is significant, a late-tender model is likely to be optimal.

An early-tender model would involve considerable costs for project developers in project planning, consenting, and securing the appropriate resources to be able to deliver the project. These costs would be recovered by the winning developer only, with other tenderers facing a loss. In a stable equilibrium with rational participants, the potential outcome of the tender would be sufficiently attractive for the winner such that the uncertain prospect of winning is sufficiently attractive to induce the participants to incur significant sunk costs.

The academic literature on auctions suggests that high costs of participating in a competitive tender will tend to discourage entry.[3] This will mean that competition is reduced and the expected gain to the winner will tend to increase. This expected gain will compensate participants for the risk that the sunk costs of participation may not be recovered. Reduced tender participation will also act to reduce the sum of all sunk costs incurred by participants and increase the probability of any one participant becoming the winner, helping to balance the benefit of participation against the costs.

To the extent that there is scope for innovation in onshore transmission projects, an early-tender model could thus encourage a greater degree of innovation, since the winner would reap some of its benefits. A late-tender model would be less likely to be conducive to innovation, since detailed project design would be undertaken by the SO, which would not face strong incentives to reduce the cost of individual projects.

Risk and returns

The risk factors for participants in an early tender, highlighted above, mean that the rates of return on the project that emerged as the winner would have to be consistent with those typically expected by developers of speculative projects. These are typically much higher than the rates of return made by regulated network utilities.[4]

The risk for participants in a late tender would be considerably less than in an early tender. Given that sunk costs of tender participation would be likely to be much lower than for an early tender, the most significant risks would relate to project delivery and subsequent operation of the asset. These risks would be similar to those faced by a regulated network utility on new projects, and hence the corresponding rates of return would also be expected to be similar to network utility project returns.[5] The risks would be likely to be higher than for an offshore transmission owner, since the latter does not bear construction cost risk. While construction risk might not be correlated with overall market risk, investors often demand a higher rate of return for 'idiosyncratic' risks that would not be remunerated in a standard capital asset pricing model (CAPM) framework.[6]

The outturn rate of return achieved by the winner of a tender process would be uncertain—partly due to the winning developer's outturn construction costs being uncertain. In addition, the revenue of the winning developer would be uncertain at the bidding stage, as it would be the outcome of a competitive tender process. This is the mechanism by which the benefits of competition are revealed in the context of a tender process.

The tender process would have to be backed up by a binding commitment to the outcome for the lifetime of the asset. A well-functioning auction will result in a competitive level of expected return. Introducing a regulated cap on price or returns after the outcome of the auction is known would therefore reduce returns to below the competitive level and undermine the auction process.

Conclusion

By expanding the competitive tender model to onshore transmission, Ofgem's aim is that even a late-tender model will provide some economic benefits in terms of lower capital expenditure and operating costs, as well as lower required rates of return for project developers. In terms of the additional benefits that could be offered by an early-tender model, these are likely to be determined by a trade-off between the value of additional information held by competing project developers, on the one hand, and duplication in project development costs and greater risk to project developers, on the other.

A feasible outcome in which early-stage competitive tendering of electricity transmission projects is viable is likely to involve a low number of tender participants, thereby keeping duplication of planning and consenting costs to a minimum. It is also likely to attract a very different kind of investor to those that would typically be attracted to the stable but low rates of return available on regulated transmission assets.

One key challenge in realising the benefits of an early-tender model will be to design a mechanism that achieves the best outcome for electricity consumers, even with a low number of tender participants. Other challenges will include making the mechanism work alongside the UK planning regime, and designing a mechanism that can deal with trade-offs between different aspects of competing projects without the benefit of full certainty.

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[1] Ofgem (2015), 'Integrated Transmission Planning and Regulation (ITPR) project: final conclusions', Impact Assessment – Supporting Document, 17 March, available at: https://www.ofgem.gov.uk/ofgem-publications/93913/itprfinalconclusionsimpactassessmentpublicationfinal-pdf.

[2] Further details on the options for the criteria for competitive tendering are set out in Ofgem (2015), 'Criteria for onshore transmission competitive tendering', letter from Cathryn Scott, 29 May, available at: https://www.ofgem.gov.uk/ofgem-publications/95004/criteriaopenletter-pdf.

[3] For a non-technical discussion of the relationship between auction entry costs and the number of participants, see section 8 of Klemperer, P. (1999), 'Auction Theory: A Guide to the Literature', *Journal of Economic Surveys*, **13**:3.

[4] See evidence from the investor survey in Oxera (2011), 'Discount rates for low-carbon and renewable generation technologies. Report for the Committee on Climate Change', April, available at: http://www.oxera.com/Latest-Thinking/Publications/Reports/2011/Discount-rates-for-low-carbon-and-renewable-genera.aspx.

[5] This is different from the weighted average cost of capital (WACC) of a network utility, which is calculated over the entire asset base, including existing and partly depreciated assets.

[6] Oxera's 2011 report explains why the CAPM may not be applicable to large infrastructure investment projects. Oxera (2011), 'Discount rates for low-carbon and renewable generation technologies. Report for the Committee on Climate Change', April, available at: http://www.oxera.com/Latest-Thinking/Publications/Reports/2011/Discount-rates-for-low-carbon-and-renewable-genera.aspx.