Funding Investment in Electricity Transmission

1. Introduction

1.1. There are a number of ways to set a revenue allowance for capital investment in a price control context. These are: an ex ante allowance; a revenue driver; cost pass through; or a revenue adjustment mechanism – e.g. TIRG. These options are discussed below and the preferred option developed.

2. Ex-ante allowance

- 2.1. The existing price control for SHETL is based on an ex ante allowance for anticipated capital expenditure. Indeed, the same mechanism has been used to set the capital expenditure allowance in each price control since vesting. In a relatively stable investment climate this is an efficient means to set allowed revenues. The historic price controls have also been set in the context of a "deep" connection charging policy so that if there was an unanticipated requirement for a new connection, the licensee could fund this directly through the connection charge rather than through an ex ante allowance.
- 2.2. The current price control is characterised by a great deal of connection activity for new renewable generation coupled with uncertainty of the timing and extent of investment requirements since these are inextricably linked to the generators' ability to bring their projects to completion. While it is possible, indeed necessary as part of the connection offer process, to identify the transmission investment required to connect the generator, the investment is only necessary provided the generator connects.
- 2.3. The current charging arrangements are also very "shallow" which means that most of the investment costs are treated as transmission infrastructure and funded through price-controlled revenue rather than connection costs. Consequently, an increment to the price controlled revenue is required to fund the investment.
- 2.4. It is, nevertheless, possible to develop a range of scenarios for transmission investment to cater for renewable generation. However, whichever scenario is used as a base case for setting ex ante revenue allowances, the only certainty is that it will be wrong, given the scale of the uncertainty. This means that either the licensees will be receiving revenues for investment that has not taken place, or will not be receiving any revenue for an investment that has become necessary.
- 2.5. Such is the range of investment levels compared to historic trends that it is difficult to balance these conflicting interests: firstly of the transmission licensees to ensure that the funding is adequate to cover the investment; and secondly customers who do not want to pay for a planned investment that has not materialised.
- 2.6. For these reasons we do not believe an ex ante allowance is appropriate for investment to connect new renewable generation in this price control.

3. Revenue Drivers

- 3.1. At present, National Grid's revenue allowance is set on an ex ante basis, but supplemented by a revenue driver the Gt term. This automatically increments the allowed price controlled revenue according to the volume of new generation connecting to the system. At present this is just a broad-brush sum such that wherever the generator connects, the revenue increment is triggered even if the connection location is where there is a deficit in generation and no investment is triggered.
- 3.2. Clearly there are refinements to this model that could look at more regional or zonal increments linked to the investment requirements in each zone. However, flaws still remain due to the lumpiness of transmission investment. This can be illustrated by looking at the economic benefit of the Beauly-Denny investment as presented in the TIRG final proposals, reproduced in simplified form below with a constrained energy cost of £70/MWh with the costs annualised by application of an illustrative 10% annuity factor.



- 3.3. This illustrates a break even point of 1200MW of additional generation at which point it is equally effective in terms of economic efficiency to constrain generation or construct the line (note that this analysis is based solely on assumptions about constraint costs and not on any technical limitations of the system that may drive investment at a different volume of generation). Construction of the line enables further generation totalling around 1000MW to connect before further upgrades become necessary.
- 3.4. This implies a "revenue" driver of around £33m per GW of generation, and the allowance would gradually increase to £33m per annum as generation connects into the newly released capacity.
- 3.5. However, the actual revenue requirement is in two parts. Firstly, for the threeyear construction period, revenue equivalent to the cost of capital on the investment to date is needed. After the project is completed, an additional

allowance for the depreciation would also be required under the normal price control principles.

3.6. The revenue driver, even if perfectly matched between the capital cost of the project and the MW capacity released, results in a significant mismatch between the revenue requirements of the TO and the revenue obtained through the revenue driver. This is illustrated in the graph below.



- 3.7. In years one to three, no new generation connects, and in the subsequent four years, the capacity is gradually filled at a rate of 250MW per year. If capacity could be provided to exactly match the generators' requirement, then the revenue driver would provide the right level of income. However, because the investment is required in advance of the first generator connection, and because the investment delivers much more than the initial increment of capacity required, there is a very large funding gap amounting to some £90m before any adjustments for interest.
- 3.8. This shows that with a revenue driver that is set with perfect foresight in terms of the £/MW incremental cost of the investment there will be a very large funding gap to be addressed. Clearly this could be done at the periodic price controls and the allowances "trued up". However, this would be a considerable risk for the licensee because it would be forced to demonstrate at that review that the investment was economic and would have to negotiate the truing up allowance from a position of already having committed the investment. This is unacceptable. Indeed, if Ofgem have to in any event approve this "trued up" allowance, this defeats the objective of an automatic revenue driver that does not require Ofgem approval.
- 3.9. There is therefore a real risk that a mechanism based on revenue drivers would incentivise transmission licensees to delay or defer investment beyond the point where it is efficient to commence work. In the context of providing infrastructure to facilitate new renewable generation, this could in turn have

implications for Government environmental aspirations and wider security of supply.

- 3.10. A further refinement suggested in the consultation is for a more zonal revenue driver. To calculate such zonal drivers would require all the potential zonal investments to be identified and a zonal driver calculated. Since Ofgem would require to sign on to such a zonal figure based on the forecast cost, Ofgem would in effect be "approving" each identified project. The zonal driver approval would appear to have the same drawback of Ofgem "approval" as identified for the TIRG mechanism, without dealing with the funding gap issues identified above.
- 3.11. In this regard, we would note that the equivalent process in the gas entry auctions to set new UCAs has been particularly inefficient and has led to unintended outcomes. We believe that these issues could be even more significant in the context of electricity transmission investments, given the wide variation in cost/MW of individual projects.
- 3.12. It is also clear that a scheme based on revenue drivers would require a complex set of ancillary arrangements in relation to, for example, incentive scheme caps, collars and sharing factors. Again, this not only introduces significant additional complexity, but also risks unintended consequences. The level of the scheme parameters would clearly drive licensees' behaviour and there could be an additional risk that if these parameters are set at an inappropriate level (whatever that might be) otherwise efficient investment may be deferred.
- 3.13. We do not therefore believe that a revenue driver approach, even with the zonal refinements suggested in the consultation is workable in practice.

4. Cost pass through

- 4.1. Cost pass through is a mechanism used for a number of cost items in the price control. However, they have a common feature in that they are generally not controllable by the licensee. These include rates and licence fees for example.
- 4.2. Cost pass through could be used in the context of transmission investment but we do not believe this would be in the interests of customers, since there are no incentive properties associated with cost pass through. It is for this very reason that the traditional pass through items are uncontrollable costs.
- 4.3. The licensees would also be at risk at the periodic reviews of some of their investments being deemed to be uneconomic and disallowed.

5. Revenue Adjustment Mechanisms

- 5.1. The final means of setting revenue requirements is through some form of revenue adjusting mechanism. In this context we would class the existing "TIRG" term in the transmission licence as a revenue adjusting mechanism. We believe that this is capable of being used and developed for future large investments.
- 5.2. The TIRG term came about as a result of the Ofgem review of transmission investment for renewable generation. The process involved the transmission

licensees identifying a number of major transmission reinforcements that would be required to enable the significant volume of renewable generation to connect. Ofgem's consultants reviewed the transmission licensees plans for these major network investments in terms of the economic efficiency of the investment, whether there was sufficient evidence of new generators to allow the licensees to progress with the projects and the additional capacity released.

- 5.3. Where a project passes both these tests of economic efficiency and demonstrated need, the projects are classed as "baseline" and eligible for funding. On the basis of this review, some projects were classed by Ofgem as baseline and funding released through a licence modification. This modification ensures that funding is only released when construction actually commences, and funding is only in respect of the capital expenditure forecast made by the licensee at the time of the economic assessment, subject to review of costs should the detailed planning and consent process oblige the licensee to incur unforeseen costs. This means that the normal features of RPI-X regulation are retained.
- 5.4. The features of the TIRG term are therefore that:
 - the efficient investment to release the required capacity is identified in terms of a project definition;
 - the project outputs are identified in terms of capacity released;
 - the spend profile is identified;
 - a revenue allowance is released from the start of actual construction of the project; and
 - the licensee is incentivised to construct the project below the forecast level of spend.
- 5.5. Unlike the ex ante approach, there is no risk of setting a revenue allowance too high or too low with the inherent inefficiencies. Any project submitted to Ofgem for inclusion within TIRG would be subject to the usual scrutiny one expects at price control reviews (by, for example, review by expert engineering consultants). There is also no risk that the investment is inappropriately delayed, since, once the project is identified, it could be approved and progressed relatively quickly (as was the case with the Beauly-Denny line)
- 5.6. Unlike the revenue driver approach, the revenues under a TIRG mechanism would match the actual investment rather than the incremental capacity release, avoiding the risks associated with truing up the income at periodic reviews. Again, this negates any possible incentive to inappropriately delay investment.
- 5.7. Unlike cost pass through, the TIRG mechanism ensures that the usual efficiency incentives in RPI-X regulation are retained. A TIRG mechanism also limits the risk for the transmission licensee in that ex ante "approval" of the investment is obtained.
- 5.8. A possible criticism of the TIRG mechanism is that the licensee must approach Ofgem with the details of each project for the revenue adjustment term to be designed. However, even in areas where a revenue driver funding

mechanism has been implemented, (such as gas entry) there is evidence that the licensee still requires Ofgem approval before committing to expenditure.

- 5.9. An example is the approval of investment in the gas transmission system to connect the Aldborough gas storage facility. This required the calculation of a unique "revenue driver" obtained, in effect by reverse engineering from the forecast capital expenditure, followed by ex-ante approval by Ofgem of National Grid NTS's (NGNTS) capex.
- 5.10. This possible drawback is therefore not unique to the TIRG mechanism. We also believe that the number of projects involved in a TIRG mechanism would be small a handful of projects for each licensee over the five year period. We therefore do not consider that any concern about Ofgem approval of individual schemes provides sufficient justification for adopting a revenue driver approach, with all of the attendant problems.
- 5.11. Recognising this issue, we believe that there is a balance to be sought as to the scale of project that might qualify for a "TIRG" funding mechanism, and those which should simply be constructed as "business as usual", funded through the normal ex ante transmission revenue allowance.
- 5.12. In addition, we believe that the "business as usual" ex-ante capex revenue allowance should cover all the costs of load related expenditure at the more local infrastructure level. This would include, for example the costs of progressing planning and consenting of lines identified in the connection offers as well as the generator specific local infrastructure. Major projects qualifying for TIRG type funding would only be those nominated major projects identified as requiring specific funding due to the uncertainty regarding need (driven by user connections) and timing. The ex-ante capex allowance should also cover programmed asset replacement in the usual way.

6. Conclusions

- 6.1. We believe that ex ante allowances, cost drivers and cost pass through mechanism all have significant failings in setting revenue allowances for major, user-driven, transmission investments. None of these arrangements can share the investment risk equitable between licensees and customers, nor can they deal with the uncertainty of timing and level of expenditure required in the price control. There is also a concern that these mechanisms will lead to an inappropriate delay in bringing forward otherwise efficient investments
- 6.2. A revenue adjustment mechanism, as currently characterised by the TIRG allowance, allows revenues to adjust only when investment takes place; ensures an efficient level of investment; and retains efficiency incentives on the licensees.
- 6.3. Given that these TIRG licence adjustments will only take place for a very small number of projects, we believe that this is the right way forward for the price control.