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Project TransmiT: Response to 20/12/2011 Consultation.

I refer to the Project TransmiT consultation document reference 188/11, published on 20 December 2011, setting out OFGEM's initial views on the way forward with the review, and asking for comments by 14th February. This is my response to the consultation. In terms of the specific questions posed in Appendix I of the consultation document, this response really falls under Chapter 4, Question 2: that is, it relates to an additional impact which the present consultation has not yet addressed.

Background

In the earlier phase of Project TransmiT, I submitted two papers, (Cuthbert 2010a and Cuthbert 2010b): these papers can be accessed on the Project TransmiT Web Forum.

Paper Cuthbert 2010a showed that the assumption of reference node invariance which underlay the calculation of marginal costs in the National Grid Transmission charging model did not hold above a certain threshold level of generation capacity. One implication of this was that generators in the north of the grid system were likely to face unduly high charges. Another implication was to call into question the present symmetric approach to connection charges, as between demand and supply.

Paper Cuthbert 2010b demonstrated that there were serious flaws in the current cost charging model used in the calculation of the Expansion Constant in the National Grid Transmission Charging model, and argued that a review of this aspect of the model should be undertaken as part of Project TransmiT.

Comment on present proposals

The present proposals are for a much flatter profile of charges geographically: and also, in effect, imply the abandonment of the previous symmetrical treatment of demand and supply. Since these changes are consistent with the arguments put forward in Cuthbert 2010a, they are to be welcomed.

OFGEM have, however, confirmed that the charging model underlying the present proposals uses the same approach in calculating the Expansion Constant as in the old National Grid transmission charging model. That is, the proposal put forward in Cuthbert 2010b that this aspect should be reviewed has not been acted on. Rather than repeating the arguments in my previous paper, however, I will take this opportunity to present the anomalous effects of the present approach in a different way.

The basic problem in calculating the Expansion Constant is how to work out the sequence of charges it is appropriate to make over the lifetime of an asset, to compensate the investor for making the original investment. The National Grid Transmission Model uses the same approach as used by most UK utility regulators, which is based on the following current cost formula:-

if x is the target real rate of return, (set by the regulator);
if r is the annual rate of inflation; (where x and r are expressed as fractions),
and if n is the asset life,

then a unit investment in year 0 will give rise to a charge

$$\left(\frac{1}{n}+\frac{x(n-j+1)}{n}\right)(1+r)^{j} \quad \text{in year j, for j= 1,...n.} \qquad (1)$$

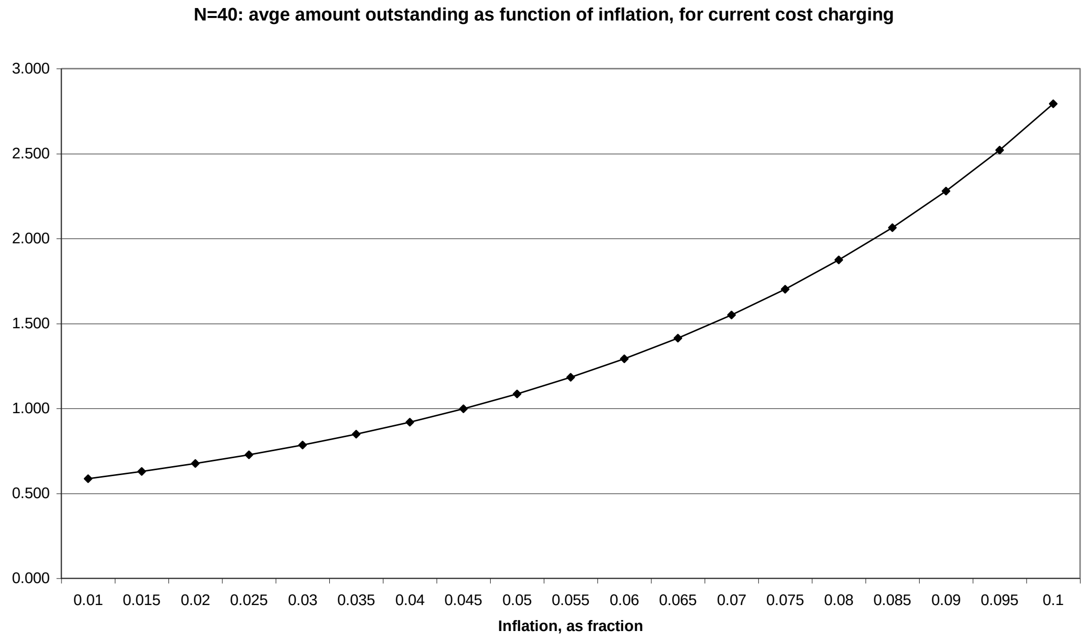
It is a standard result that this way of compensating an investor will give the investor an internal rate of return, (IRR), of (x+r+xr) on their investment. So the investor gets a nominal rate of return essentially equal to the real target rate of return plus the rate of inflation: and hence earns a real rate of return equal to the target rate. Those looking for a justification of the use of current cost charging do not normally look beyond this fact.

Just looking at an investment in terms of the IRR being earned, however, does not do justice to the potential complexities of the situation. Also relevant is the average amount outstanding on which this return is earned over the life of the investment. To give some examples:-

- Suppose I lend, (invest), a given amount for a total period of n years, and each year the borrower pays me back 1/n of the original loan, plus interest accrued that year on the outstanding debt, calculated at interest rate y: then I will earn an IRR of y over the period of the loan, on an average amount outstanding over the period of the loan of just over 50% of the original investment.
- Suppose that the borrower pays me back in a series of flat, mortgage style payments over the n years, again calculated so the IRR is y. Then I will be earning this return on an average amount outstanding over the period of the loan of around 60%-70% of the original investment.
- Suppose that the borrower pays me outstanding interest each year, at interest rate y, and then redeems the whole amount of the loan in year n: then I will be earning the IRR of y on an average amount outstanding over the period of the loan of 100% of the original investment.
- And if the borrower does not pay me all of the interest outstanding each year, then I will earn my IRR of y on an average amount outstanding which will be greater than 100% of my initial investment: perhaps much greater.

(Note that what I have called here the "amount outstanding" is the same as the concept of "unrecovered investment", introduced by Soper, 1959.)

In the case of the payment scheme in formula (1) above, (which is what underlies the calculation of the Expansion Constant in the National Grid model), it turns out that the average outstanding amount on which the IRR (x+r+rx) is earned is a function of n, (asset life), and r, (rate of inflation). The graph of this function is as follows, assuming an initial unit investment, and an asset life of 40 years.



As the graph shows, the average amount outstanding on which the IRR is earned increases rapidly as inflation increases. If inflation is 2.5%, then the average amount outstanding is 72.7% of the original capital investment: for inflation at 5%, this rises to 108.5%: and for inflation at 7.5%, this rises to 170.3%.

The graph immediately reveals the very odd nature of this current cost charging model. Why, if inflation is 2.5%, is it reasonable to reimburse the investor by letting them earn their nominal IRR on an amount outstanding which, over the forty year life of the asset, averages just over 70% of their investment: while if inflation is 7.5%, they earn their IRR on an amount outstanding which averages over 170% of their investment? There is no logic to this.

But the effects go beyond mere lack of logic: as inflation rises above very modest levels, then the increase in the average amount outstanding on which the investor is earning their return gives rise to the kind of excess charges and windfall profits identified in Cuthbert 2010b: in addition, since current cost charging makes capital investment a very profitable activity, investment priorities are likely to be thoroughly distorted.

Conclusion

The different way of looking at the effects of current cost charging put forward here reinforces the case put forward in my original submission, Cuthbert 2010b: there is an urgent need for Project TransmiT to incorporate a review of the use of current cost charging in the National Grid transmission charging model.

References

Cuthbert, J. R., (2010a): "*The Concept of the Reference Node Invariance Threshold: and why it implies the existing NG transmission model is likely to lead to sub-optimal location of generation capacity*." Paper submitted to OFGEM TransmiT Review, and available on Project TransmiT Web Forum.

Cuthbert, J. R., (2010b): "*Why the Current Cost Charging Method Used in the NG Transmission Model Needs to be Reviewed*." Paper submitted to OFGEM TransmiT Review, and available on Project TransmiT Web Forum.

Soper, C.S. "*The Marginal Efficiency of Capital: A Further Note*", The Economic Journal, Vol. 69, No.273, 1959, pp.174-177.