



From the office of the Chief
Executive

Cathal Boylan MLA
Parliament Buildings
Belfast
BT4 3XX

9 June 2009

Dear Cathal,

You will no doubt be aware that I have written to the Chairman of the Environment Committee, providing further input to the Committee on the new North-South electricity transmission line. The letter took longer to write than I hoped, initially because I wanted to reflect fully the results of latest contacts with Askon, and subsequently because of election purdah.

The content that is perhaps of most interest to your constituents will be the comparison between the Askon and PB Power reports. I would stress that we regard these both as credible pieces of work by respected consultancies. However, they have used quite different methodologies and assumptions. For your reference I have attached to this letter the detailed analysis of assumptions that I have sent to the Committee. We consider that the methodology and assumptions underlying the PB Power work are broadly more credible and applicable to Northern Ireland conditions.

It is perhaps worth clarifying the status of the PB Power report. I regard PB Power as impartial in this matter. Indeed, I also think that NIE are impartial, in the sense that they do not have a financial interest in under- rather than over-ground lines. Any extra costs arising from different designs of this line would not be borne by NIE or its shareholders, but by customers. (Extra costs arising from inefficient execution would be a different matter.) NIE is, however, accountable to us under its license to 'ensure the development and maintenance of an efficient, co-ordinated and economical system of electricity transmission which has the long term ability to meet reasonable demands for the transmission of electricity'. NIE can have no motivation to favour one technology

over the other apart from this duty to act economically on behalf of customers in Northern Ireland.

I indicated that I would be willing to meet with your constituents to discuss this matter. We exist for the benefit of consumers, and are accountable public servants. I would, however, seek your personal commitment that the meeting would be carried out in a seemly and business-like fashion, and would wish you to chair the meeting. I think such a meeting would need a clear agenda and purpose, and some ground rules. My purpose in meeting would be to hear concerns, and to explain to your constituents the nature of our role, the wide set of issues at stake in this matter, and the nature of the processes through which they can have their concerns considered. I do not think it would be constructive to try to dissect “on the hoof” the technical reports, and I would anyway not be the best interlocutor for such a conversation.

If you would like to take up this offer of a meeting, would you give me a call to discuss please?

Yours sincerely,

Iain Osborne
Chief Executive

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Annex Comparison of PB Power and Askon Reports

Both of these reports relate to the proposed development, approved by the Regulatory Authorities and Governments in Northern Ireland and Ireland, for a 140km, 400kV circuit between Turleenan in Co. Tyrone and Woodland in Co. Meath. As part of their assessment of the technical alternatives available to them, NIE and EirGrid commissioned internationally recognized consulting engineers PB Power to carry out a thorough comparison of options, and their final report on this subject was published in February 2009. This report concluded, among other things, that underground cabling would cost more than seven times as much to install and almost twice as much to operate throughout its lifetime in comparison with an overhead line. A separate report

by Askon, commissioned by North East Pylon Pressure (“NEPP”), a lobby group opposed to overhead lines, had concluded that the lifetime cost of an underground option would be only some 40% more than an overhead line, and should therefore be adopted by NIE in view of the perceived environmental advantages.

Both of the reports are professional and detailed and have made useful contributions to the evaluation of the options for delivery of this project. There are of course numerous differences in scope, approach and assumptions.

A significant shortcoming of the Askon report, in terms of its potential contribution towards the evaluation of the options for the NS interconnector, is its scope. It focuses on only part of the overall route and did not consider the portion which includes the interconnection with Northern Ireland or any of the route within Northern Ireland. For example Askon proposed the use of a disused railway line for routing the Woodland – Kingscourt cable section and presented CapEx figures based upon this assumption whilst no such option exists on the NI section.

So while many of the assumptions underlying the reports vary, many of the conclusions of the Askon report, such as the recognition that cabling would be significantly more costly to install than overhead lines, are in approximate alignment with the findings of the PB Power Report. There are, however, a number of key differences.

Both reports have taken the cost comparison beyond the immediate construction cost and have examined the impact of lifetime power losses (arising from unavoidable electrical resistance in any power line). The main difference between them, however, is that ASKON have calculated the costs of power losses to be far higher for the overhead line than they would be for an equivalent underground cable, whilst PB Power’s calculations have reached the opposite conclusion. The reason for this fundamental difference is that whilst the PB Power calculation is based upon circuit loading estimates provided by the system operators (SONI and Eirgrid), ASKON’s calculation^[1] is based on current loading assumptions which they have made for themselves. Power losses are highly dependent upon loading, and in general overhead lines will have the higher losses when heavily loaded and underground cable will have the higher losses when lightly loaded, so an accurate comparison between the two is critically dependent upon these loading figures.

By adding together their estimated capital and the operating costs, including the value of their calculated losses, ASKON have concluded that the overall “lifetime costs” of an underground cable (designed as they have proposed) would be only 40% more than their assumption of an overhead line cost. In comparison, PB Power have concluded that “lifetime costs” would be more than five times higher for an underground cable installation. This difference is significant, but is wholly understandable given the significant differences in loading assumptions for a power line which is being designed for application within the particular circumstances applicable to this island

The question of what is the economically optimum loading of current across the proposed NS interconnector has to be considered in the context of size of the transmission system on the island of Ireland, its low level (relative to European mainland countries) of interconnection with its neighbours and its planned operation along with the existing NS interconnector.

The existing interconnector is a double circuit overhead line rated at 1500MW, which means that the maximum secure capacity, having provided for the potential loss of one circuit, is 750MW. However, for a number of technical and operational reasons, the maximum designed power transfer level is currently 450MW. The interconnector performs two primary functions. Firstly it facilitates sharing of rescue flows if a generator unexpectedly and suddenly trips from service, and secondly it facilitates power trading exchanges within the competitive electricity market.. Approximately 100MW is reserved in the north-south direction and 200MW in the south – north direction for rescue flows, leaving the balance of the 450MW capacity for energy trading purposes.

One of the main benefits of the second interconnector, geographically separate from the first, is that the chances of both lines tripping at once would be very low. So, in principle, both lines could operate at up to 750MW in the same direction, say south to north, and if one of them tripped the other could immediately take up the power flow. Allowing for rescue flows, shared between the existing and new interconnectors, the upper limit for energy trading flows would increase to about 700MW north to south and 650MW south to north, which would substantially increase the scope for electricity trading and for the application of further renewable generation. However, whilst transmission systems have to be designed to meet the maximum expected power flows, actual average flows will be far lower and the power system operators have forecast an average usage for the new line of 500MW. It is the average power transfer that is the key input for calculations on power losses and how the cost of these might accumulate over time, and the ASKON calculations were performed without reference to either NIE or Eirgrid on this critical figure. The typical European usage for a 400 KV line would be higher due to the larger size and therefore stability of their systems, thus their ability to tolerate larger trips and also their greater interconnection with their neighbours which averages out the peaks in European power flows to a greater extent. The higher line loadings assumed in the Askon report are not in line with Northern Ireland's operational and security requirements.

The result of this is that Askon have produced costs which are higher for the overhead line option and lower for the underground option than those produced by PB power. The reason that the load assumption affects the results to this extent is that for overhead lines the losses increase rapidly with sustained high loading. So assuming a much higher flow results in much higher assumed losses and therefore a higher cost of operation over the lifetime of the project relative to the underground option. Realistic

circuit loading estimates result in the power losses which are in fact lower for the overhead line than they are for the underground cable and the costs outlined in the PB Power report. This concludes that underground cabling would cost more than seven times as much to install and almost twice as much to operate throughout its lifetime in comparison with an overhead line.

Other key differences in approach between PB Power and ASKON;

- The ASKON report asserts that an overhead line would not meet operational security requirements since failure of that line would reduce transfer capacity to zero. ASKON uses this point to argue that a double cable circuit would provide an improved performance level. However, the writers have failed to recognise the significance of the fact that the proposed new circuit will be operated in parallel with the existing interconnection circuit and that taken together, the proposals meet all of the required industry standards for operational security.
- The reliability of underground cable systems is a major issue for strategic transmission systems because when they do fail they take many times longer to repair than an overhead line. We have concerns that in presenting an analysis of cable system reliability ASKON have not fully considered the impact and incidence of third party damage and actual cable failures. If cable were to be used for the North – South Interconnector this would involve more than 1000 cable joints, each of which represents a failure risk.
- The ASKON report has made assertions on the environmental impacts arising from an overhead line but takes relatively little account of the environmental impacts arising from a cable installation process that would require a 22m wide swathe, including a substantial “haul road”, to be built across the countryside as part of any cable installation process. It must be understood that underground cabling of this scale would have significant environmental impact - as explored in the PB Power report.
- Whilst the ASKON investigation was focussed mainly on the section between Woodland and Kingscourt in the Republic of Ireland, with broad projections assumed for the NI section, the PB Power investigation examined the specific circumstances applicable to the entire proposed route and all of the terrain in question. The report examined a wide range of issues, including routing and installation options, performance and reliability, security, both capital and “lifetime” operating costs and environmental impacts arising for feasible options.

At present just over 20% of the cost of electricity to the domestic consumer in Northern Ireland relates to the network. The cost to Northern Ireland of constructing the North South Interconnector is estimated to be £65M of which £15M relates to the construction of the 400kV overhead line. The cost of the overhead line would add approximately

£1.5M per year or 0.2% on to the domestic consumers' annual bill for the next 40 years. Obviously if this were 7 times greater for underground cable it would be around £10.5M or 1.4% per year.

However, it is important to bear in mind that if undergrounding were adopted for this project despite the cost then this could set a precedent for future or indeed current high voltage transmission lines greatly compounding the cost to the customer.

Finally it should be noted that NIE has the obligation, under its license to 'ensure the development and maintenance of an efficient, co-ordinated and economical system of electricity transmission which has the long term ability to meet reasonable demands for the transmission of electricity'. NIE can have no motivation to favour one technology over the other apart from this duty to act economically on behalf of customers in Northern Ireland.

[\[1\]](#) P73 of ASKON Report