Submission to the Electricity Authority

On

Transmission Pricing Methodology:

Avoided cost of transmission (ACOT) payments for distributed generation

Submitted by

Amethyst Hydro Ltd

Submission

1. This paper constitutes our submission to the Electricity Authority on their Working Paper entitled "Transmission Pricing Methodology: Avoided cost of transmission (ACOT) payments for distributed generation" released on 19 November 2013 (the Working Paper). The submission has been prepared by Amethyst Hydro Ltd.

2. Amethyst Hydro Ltd is a joint-venture company created to develop the Amethyst Hydro scheme near Harihari on the West Coast of the South Island. 88% of the company is owned by Westpower Ltd, with the remaining 12% owned by Harihari Hydro Ltd. The scheme was successfully commissioned in June 2013 and has operated reliably since that time, feeding up to 7.6 MW of power into the local Westpower sub transmission network.

3. Amethyst Hydro Ltd welcomes the opportunity to provide this submission in view of the significant impact that a change in the methodology currently applying to payment of ACOT rebates would have on its business. Any significant change in the existing methodology would have far reaching and potentially unwelcome economic impacts, both on existing and potential future projects as well as the economy as a whole, and it is therefore pleasing that the authority has expressed a desire to understand the efficiency implications of any changes to the TPM in relation to ACOT payments prior to making any final decisions.

4. The Working Paper provides a valuable insight into current practices regarding the treatment of ACOT payments and raises some valid questions concerning the economic benefit created by Distributed Generation (DG). In particular, the Authority's preliminary conclusions in relation to ACOT payments that are of most interest to Amethyst Hydro Ltd note that:

    - ACOT payments do not provide a direct incentive to locate distributed generation in a particular area to relieve congestion and/or provide an alternative to transmission.
    - That distributed generation appears to have no observed effect on transmission investments.
    - ACOT payments have little observed effect on distribution investments or costs.
    - A prevalence of distributed generation can cause net cost to the distributor.

- That there is a net increased cost to households as a result of ACOT payments.

5. On the basis of these preliminary findings, the EA consider that it would be appropriate to change the payment methodology to one based on avoided economic costs, rather than using the current relatively simple and direct approach of paying rebates to distributed generators on avoided Transpower interconnection charges to the distributor.

6. Amethyst Hydro Ltd wishes to respectfully challenge the EA's reasons for arriving at these conclusions based upon our own experience and therefore hopes to add additional breadth and depth to the discussion. We further trust that this will assist the EA in reaching a robust outcome, which achieves a maximum net economic benefit.

7. Our primary submission comments on the Working Paper are set out below and generally align with the Authority's preliminary conclusions as detailed in paragraph 1.15 of the Working Paper.

Provision of locational incentives

8. The Working Paper expresses a view that ACOT payments do not provide a direct incentive regarding location of distributed generation. Whilst we accept this observation at face value, it does not necessarily follow that such an outcome is economically inefficient and we have outlined our reasons for this view in the following paragraphs.

9. For the purposes of this section of the submission, economic efficiency is defined using a classical breakdown into the following three dimensions:-

    - Allocative
    - Productive
    - Dynamic

10. From an allocative efficiency perspective, there is doubtless some economic benefit to be gained by providing locational incentives for a generator to be located where it will produce the greatest economic benefit. This would ensure allocation of resources to the highest value use. However, this is predicated on the basis that there are multiple competing projects with similar project performance indices and costs of production and potential investors who are locationally agnostic.

11. The reality is that DG initiatives are often proposed and developed by parties who are only interested in investing in their own localities. This effect becomes more pronounced as the size of the DG project reduces. Therefore, any direct locational signal may have the undesired effect of reducing investment in DG in non-constrained areas (by virtue of an effective cross subsidisation), while not necessarily transferring that investment to another theoretically more efficient location. Moreover, any such net loss of incentive to invest in DG would appear to fly in the face of the government's stated policy intent for Part 6 of the Electricity Industry Participation Code 2010 (Code) to "encourage investment in DG".

12. Our contention is that new distributed generation, particularly those projects involving renewable generation sources such as hydro, wind or geothermal are driven far more directly by productive and dynamic efficiency, being the production of outputs at least cost and maximisation of welfare over time. In turn, this is directly influenced by the cost and availability of the fuel source which is very much determined by the location. Other costs such as the capital cost or the price which will be received for the electricity generated, while having a direct impact on any final investment decision, are not impacted by the location to anywhere near the same extent.

13. In Appendix D, the EA discusses its rationale around potential productive inefficiencies that may result from the application of ACOT payments if generation that was unprofitable without ACOT revenue were to proceed at the expense of other more productively efficient generation. Our experience suggests that it is most unlikely that any final investment decision on an otherwise unprofitable scheme would be made solely on the basis of ACOT revenue, considering the comparatively minor contribution ACOT makes to overall revenue (generally less than 10%) and the uncertainty of maximum generation coinciding with the Regional Coincident Peak Demands (RCPDs). In this regard, the Working Paper contains a suggestion that distributed generation is inherently unreliable by stating that in most cases there is a "low contribution of intermittent DG to meeting peak demand"[1]. While we strongly disagree with the statement at a macro or regional level, there is a relatively high risk of "missing" the peaks for any individual project and this risk is taken into account during the project feasibility study and associated financial performance analysis. As a result, the value of ACOT is significantly ameliorated and risk of ACOT payments resulting in otherwise unprofitable investments is considered so unlikely as to be immaterial.

[1] Paragraph 8.4 of the Working Paper under the heading demand forecasting

14. On the other hand, if there is a marginally profitable scheme that does not go ahead because of uncertainty around potential changes to the existing ACOT methodology (rather than the technical risk of the level of avoided peak charges), this could result in a lost opportunity. It could therefore be argued that this could result in a lack of productive efficiency as less efficient generation sources that do not benefit from ACOT go ahead.

15. Of course, the most valuable efficiency dimension in the overall hierarchy is that of dynamic efficiency. Any investment in local distributed generation, particularly where this comes from truly renewable generation such as mini hydro where the running costs are generally fixed, will bring benefits to the local community and indeed the whole country for many years to come, even if it is marginally less efficient than competing alternatives, in productive or allocative terms, at the time it is constructed. To a large extent, and with a few minor exceptions where generation created transmission constraints may already apply, dynamic efficiency benefits are not dependent on location.

16. We therefore suggest that the lack of locational incentive should not be of significant concern to the EA when considering changes to the ACOT methodology and that other considerations outweigh any perceived negative impact that this might have.

DG impact on transmission investments

17. The Working Paper includes a preliminary conclusion that ACOT payments, and the existence of DG, appears to have no observed effect on transmission investments. This is factually incorrect when looked at from a historical perspective.

18. Our experience includes a long history of association with local hydro distributed generation through our association with Westpower Ltd and its predecessor, the West Coast Electric Power Board.

19. The West Coast of the South Island has, until recently, suffered from extreme transmission constraints, which resulted in very low security of supply levels. It was only with the advent of the proposed but ultimately ill-fated Pike River Coal Mine load that a sufficient economic driver existed to construct a new 110 kV transmission line into the area. This project was submitted to

the Electricity Commission as Part IV of Transpower's Grid Upgrade Plan in October 2007 and after some further revisions, successfully passed the grid investment test and was approved for investment. The line was commissioned in September 2011.

20. The key issue here is that but for the construction of the 10 MW Kumara Hydro Scheme[2] in 1978, a significant investment of some $20 million in an additional 110 kV transmission line would have been required at least 20 years earlier.

21. Along with the Kumara Scheme, there are several other distributed generation schemes on the West Coast totalling around 8 MW, and many of these have sufficient storage to allow them to run whenever needed.

22. In the early-1980s, there were two 66 kV transmission routes into the West Coast, with each line being capable of supplying around 20 MW. With a maximum demand at that time of around 30 MW, there was insufficient transmission capacity to maintain supply to the West Coast when there was an outage on either of the two transmission lines due to scheduled maintenance or faults. Even when one of the existing transmission lines was eventually upgraded to 110 kV in 2005, this proved to be less than reliable due to an ongoing problem with flashovers. As a result, the West Coast was often left reliant on the combination of a single 20 MW circuit from Coleridge, the Kumara Power Scheme and other local DG (along with load control) to keep the lights on.

23. It is generally accepted by those in the NZED at the time that, but for local generation such as the Kumara Scheme, significant investment would almost certainly have been required in the transmission network at some stage during the 1980's to maintain a secure supply to the West Coast.

[2] This scheme consists of three separate power stations, with the largest single unit being 6.5 MW, and is located approximately 20 km south of Greymouth. A storage lake was constructed as part of the scheme. As it is completely embedded in Westpower's network, it can rightly be considered as distributed generation.

24. Similarly, we are aware that commissioning of the third 220 kV transmission circuit between Islington and Kikawa in Nelson was deferred for a number of years until the late 2000's as a direct result of reliance on local generation schemes such as Cobb and Branch.

25. There are numerous other examples, such as the Kaimai Scheme near Tauranga, where DG has had a major impact on the timing of development of the transmission network.

26. While DG schemes often do not have sufficient reliability to be individually included in any transmission planning forecast, the larger the group and diversity of DG becomes, the more reliable it is. It is this very diversity that has added so much economic value to "NZ Inc." by deferring investment in other more costly solutions.

27. Clearly, historic investment in local distributed generation has had a very significant impact on the timing and level of transmission investments. There is no reason why such investments will not continue to have a similar impact in the future and we therefore find it difficult to accept the EA's preliminary finding in this regard.

ACOT payments have little observed effect on distribution investments or costs

28. As for the comments regarding transmission investments above, we also wish to draw the EA's attention to an apparent misapprehension regarding distribution investments or costs.

29. The commission appears to have relied upon a cursory review of the asset management plans of only four distributors, none of which appear to have as long a history of involvement with DG as Westpower. It would seem less than prudent to draw such a significant conclusion from what is a relatively minor sample of officially disclosed documents, and certainly not without discussing this issue more directly with those in the industry who are well informed on the subject. We therefore welcome this opportunity to assist the EA in broadening its catchment.

30. An inspection of page 141 of Westpower's 2013/23 Asset Management Plan would have garnered the following:-

"*The imminent commissioning of Westpower's Amethyst Hydro Station in 2013 will reduce the demand on the Hokitika bus as it will be injecting into the 11 kV side of the supply transformers and thus offset some of the load on this bus. As this is a run-of-the-river station that will be operating continuously at levels above 3 MW, except of course for maintenance and fault shutdowns, it is considered to be a relatively reliable source of embedded generation that can rightly be taken into account in the load forecast.*"

31. In fact, Westpower's investment of some $1.8 million in the form of installing a new supply transformer and associated circuit breakers and protection has been able to be deferred from 2014 to 2019 or later, depending on actual load increases. These assets are owned by Westpower as part of its distribution network and it has clearly received significant economic benefit from the commissioning of the Amethyst scheme, which is ultimately passed on to its consumers.

32. Other benefits that come from having deeply embedded distributed generation include the ability to "island" the schemes and supply local areas when supply from the main grid or sub transmission network is unavailable due to maintenance or faults. This has greatly assisted Westpower in carrying out scheduled maintenance work on spur sub transmission lines, reducing the need for alternative generation sources or live line techniques and therefore resulting in greatly reduced costs.

33. To the extent that ACOT payments encourage and support local DG investment in the network, there is clearly a resulting benefit in terms of distribution investments or costs, provided of course that the DG reduces demand on key assets, such as in the case noted above.

A prevalence of DG can cause net cost to the distributor

34. Amethyst Hydro accepts this statement, notwithstanding the fact that the opposite may also be true as noted above, but do not understand the linkage with the current discussion around ACOT, as opposed to Avoided Cost of Distribution (ACOD).

35. ACOD, whether it turns out to be a net benefit or cost, can be negotiated directly between the two parties, namely the distributed generator and the lines business. This is generally handled through a Generator Connection Agreement (GCA). Costs can be quantified and included in any connection charge. If significant upgrades to the network are required to connect the generator to the network, or to reduce losses faced by the generator in delivering its energy to the nearest GXP, this can be added to the connection charge or, alternatively, paid for upfront by the generator in the form of a capital contribution. Similarly, any net savings can be used to reduce the level of the connection charge.

36. Therefore a mechanism already exists to deal with such costs in a bilateral manner and this preliminary finding in itself does not provide a strong driver to modify the existing ACOT payment regime.

There is a net increased cost to households as a result of ACOT payment

37. The authority's analysis in this regard suggests a net cost to consumers of around $10 per household per annum, on the basis that all connected consumers are paying both the full Transpower charge plus the full cost of the ACOT payments. This is correct as far as it goes, but it unfortunately seems to ignore any benefits, particularly around dynamic efficiency as well as the significant deferral of capital expenditure in the transmission network.

38. Transpower's charges are directly related to their costs under the regulatory framework and so, as transmission costs are reduced by virtue of DG, and clear examples of this have been shown above, the charges must also reduce. Of course, transmission investment is lumpy by nature and such benefits do not accrue immediately, but over time they are very significant and this point appears to have been completely ignored in the Working Paper.

39. ACOT charges are a true economic forward-looking charge that reflects the long run marginal cost of new transmission investments. As such, it should not be surprising that there could be a lag between the payment of ACOT rebates and the benefit accruing to the transmission

network. However, as a country, we are now reaping the benefits of DG investment from the past and it is no reason why this should not continue into the future. In fact the Authority's list of embedded generation stations in Appendix C of the Working Paper demonstrates just how significant this contribution is.

40. If the net benefits from DG displacing transmission are correctly included, it is our view that the conclusions reached by the authority will be somewhat different.

General comments

41. The following comments are of a more general nature and deal with some of the collateral issues raised in the Working Paper.

42. There appears to be some concern around incentivising generators to locate in areas where there is an import constraint. The Amethyst Hydro Scheme and the Kumara Hydro Scheme before it is a case in point where this has occurred. Although recent transmission investment has occurred on the West Coast, there are still periods when transmission is constrained due to maintenance and local DG has helped to alleviate any negative impacts.

43. In any case, new renewable DG can still displace less efficient non-renewable generation sources even if located in areas without a current import constraint. As the Authority has noted, most recent DG has come from renewable energy sources and any marginal incentive provided by ACOT payments to these generators has no doubt encouraged this investment, which is entirely congruent with existing government policy objectives in this regard.

44. At a GXP level, ACOT payments do not accrue whenever a GXP is importing energy as the interconnection charge is based purely on export values. This acts as a crude but effective signal to discourage further DG investment once a net balance position is achieved on any particular GXP.

45. We note in the paper that ACOT payments are considered to be a relatively recent phenomenon, driven in part by the 2007 DG regulations. Contrariwise, our experience has been that this type of payment, in one form or another, has been in existence for a number of decades. Certainly as far back as the 1980s, Westpower was internally accounting for the transmission benefits that accrued by virtue of the operation of its Kumara Scheme. When Westpower sold its generation assets to TrustPower in 1999 as a result of the Bradford reforms, the Generator Connection Agreement included an ongoing provision for the payment of ACOT, and this was included in the business valuation model. Accordingly, they are nothing new.

46. The suggestion that electricity lines businesses have the potential to abuse their positions of market power by somehow providing better ACOT deals for their own DG compared with other parties[3], thus creating an inefficient, not to mention unethical, cross subsidisation is unwarranted. The current information disclosure regime means that such behaviour would soon be exposed and even the risk of resulting public scrutiny provides an effective deterrent. Moreover, as would be expected, the Authority states that it has no evidence to suggest that this has happened in practice.

47. In paragraph 11.10 of the Working Paper the Authority considers that DG plant built in a constrained region is likely to be rewarded by higher wholesale prices than if it had been built on a list constrained area. While this may be true for relatively small scale DG, any significant DG project will likely result in significantly lower wholesale prices by effectively removing the constraint. It could then be argued that the net economic benefit created by such a situation effectively becomes a wealth transfer from the DG investor to local consumers, as the DG investor has been unable to capture the economic benefits it has created. While this may indeed create some competition benefits, it does seem somewhat inequitable as on the one hand there is an accepted principle that the exacerbator should pay, while this does not appear to be balanced against a "benefiter" being able to share in the ensuing benefits.

[3] See paragraph 10.3 of the Working Paper under the title "Risk of inefficient subsidies were distributor's own DG"

48. Of a strictly editorial nature, and for the interest of the Authority, Table 6 in Appendix C appears to be incorrectly labelled in the header row with some labels being repeated in more than one column.

49. In Table 3, Turnbull Power Station is included in the list and there is the implied suggestion in paragraph 10.5 that it may have added to transmission costs. In fact Turnbull is part of an isolated distribution network at Haast and has no connection to the national grid.

Concluding comments

50. DG already faces a number of entry barriers, particularly in the South Island where HVDC injection charges represent a significant hurdle to new investment that would result in exporting energy back into the national grid at the GXP. This is effectively a disincentive to the construction of new renewable generation in this area, and while not directly related to the discussion of ACOT charges, it is salient that new DG investors could face a "double whammy" if the value of ACOT payments is further eroded by a change in policy, thereby reducing economic investment in this important area.

51. The impact of any significant change in policy in this regard should be carefully considered prior to implementing any new policy. In particular, if existing DG were no longer encouraged to generate at times of maximum RCPD, which is effectively what happens through the transparent pass through of avoided interconnection charges, this could have far reaching ramifications on the demand placed on the national grid, particularly in import constrained areas. Generators would be left to maximise their revenue by chasing periods of high energy value, which may or may not coincide with periods of peak transmission demand. Even generators which have no storage capability would be less likely to ensure plant was available at these times, perhaps even maintaining their plant during periods of maximum constraint. On the surface, this would appear to be a highly inefficient and undesirable outcome.

52. If the Authority does eventually decide to review the current policy by rewriting Schedule 6.4 of the Code, this should only be undertaken after full and careful consultation with the industry on the form and substance of any future policy framework so that business uncertainty and regulatory shock is avoided. Moreover, any future policy should correctly value the true benefits that DG brings to the economy, something which is not yet evident from the analysis undertaken, and ensure that these benefits are channeled through to the creator of the benefits and in an economically efficient fashion.

53. While ACOT payments may not be quite as efficient as other models in strict economic terms, they form a simple and well understood mechanism that achieves an effective outcome and provide a means of internalising the dynamic efficiency benefits that are created by DG. The potential benefits of changing this approach would appear to be far outweighed by the potential risks involved.

Moving forward

54. We would like to thank the Authority for giving us the opportunity to provide this submission from the standpoint of a small DG who could be significantly impacted by any change in the existing policy around ACOT payments. We would be happy to respond to any queries that may arise from your consideration of this paper.

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