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Manager, MCE Secretariat
Department of Industry, Tourism and Resources
GPO Box 9839
Canberra ACT 2601

By email MCEMarketReform@industry.gov.au

NATIONAL FRAMEWORKS FOR DISTRIBUTION NETWORKS: Network Planning and Connection Arrangements

The South Australian arrangements for Network Planning and Network Connection have undergone extensive review on two separate occasions over the last decade. The first such review was in the lead-up to national market reforms whilst the second review was conducted more recently and involved significant stakeholder consultation. ETSA Utilities has participated in both of these reviews and would like to provide input into these current proposals. We note that the independent report on network planning and connection arrangements has been released by you for stakeholder comment as an independent paper. It has not yet been considered by SCO and does not represent a policy position.

ETSA Utilities fundamental concern on this consultation is the inappropriate application of certain transmission solutions to distribution problems. The consultants' papers recognise the differences between transmission and distribution and then proceed to ignore these differences when considering network planning and connection arrangements. It is ETSA Utilities' understanding that every regulatory review of new distribution connection arrangements in Australia has recognised the need for signalling the cost of upstream works to some customers (certainly NSW, Victoria and South Australia). However, NERA and Allens have recommended a different approach.

ETSA Utilities response to the MCE and SCO is aimed at highlighting the challenges that distributors will face, and the likely pricing outcomes that customers will see under the NERA/Allens approach. ETSA Utilities urges the MCE and SCO to seek further counsel before contemplating the more critical proposals of NERA and Allens.

Transmission and Distribution – Some Differences

To illustrate a simple difference in planning between the transmission and distribution system, consider a CBD area. The distributor is able to forecast with a reasonable degree of accuracy the level of demand growth at the transmission system interface. The transmission system can then plan any reinforcement with a reasonable degree of certainty

The overall CBD growth will be influenced by the movement in Gross State Product. However, within the distribution system, the location of the growth is less clear. It may be that growth will occur through the filling of vacant office/retail space, or through the construction of new office/retail space.

Using Adelaide as an example, there has been significant development of new buildings in Hindmarsh Square, in Victoria Square, on Waymouth Street and along North Terrace. There is more development occurring than would have been expected in 2004 when our Reset expenditures were prepared. New connection assets have been built and system reinforcements put in place to enable the new loads to be supplied. The increase in distribution supply capacities within the CBD will exceed that forecast at the transmission interface. Many of the tenants for the new buildings will be from existing buildings, so much of the load is shifting location within the CBD. The transmission demand growth could remain in line with our earlier forecasts, despite the increased distribution activity.

This situation occurs across South Australia for the distributor. In a given year, ETSA Utilities will have about 24,000 applications for new or amended customer connection applications. We might get perhaps 10 inquiries for a generation installation (excluding PV installations) with perhaps 2 generators connecting each year. More often, these customers require relatively short-term responses to meet their commercial needs. In those instances where augmentation is required, the construction time-frames do not allow for the time necessary to conduct the public consultation proposed by NERA/Allens.

Our distribution system covers some 80,000 kms covering transmission interfaces, sub-transmission, high voltage and low voltage systems with nearly 800,000 customers connected. This is a significantly different operation to that faced by a transmission company. It is impractical to predict the information requirements for new customers and generators. It is more important to be able to have simple, transparent procedures in place, and to have a timely response to those customers whose connection requirements require more complex arrangements. It is these requirements that lead to ESCOSA's Electricity Guideline No 13 covering the application of Chapter 3 of the Distribution Code (new connections and modifying existing connections to the distribution system).

It is important to recognise that Guideline 13 was established after extensive consultation with stakeholders, with input by expert consultants and consideration of many alternative options. The amount of effort that the South Australian community has put into these arrangements will not be dismissed lightly, especially if arrangements which have proved to be effective and meet stakeholder requirements are replaced by some untested arrangement. Guideline 13 has dramatically simplified the customer connection process, eliminating so many issues and concerns for all parties.

The Importance of Augmentation Charges

NERA and Allens have recommended that it is inappropriate to charge customers for the upgrading of the upstream network, and that it is better to charge for these works through tariffs. Their argument is that it is incorrect to charge the straw that breaks a

camel's back. ETSA Utilities would agree that it is inappropriate to charge the straws. However, we believe it is appropriate to charge the bales of hay, the saddles and the baggage that are more likely to break the camel's back. The South Australian augmentation arrangements impact on the developers and moderate-sized businesses but avoid the residential and small business customer (the straws).

The arrangements developed by the jurisdictional regulator with customer and distributor input recognise this requirement. In South Australia, perhaps 200 of the 24,000 annual applications for new/amended connection incur an augmentation charge with a small number requiring an application-specific calculation for this charge. Without the likelihood of such a charge, significant uneconomic development would occur, increasing the investment in the electricity distribution system at the expense of higher charges to all customers.

Under Guideline 13, augmentation is not charged for the first 90kVA of a connection (25kVA for a rural SWER system). Those customers above that incur an augmentation charge that reflects the average metropolitan area cost. If the customer's demand increase exceeds 5% of the local zone substation capacity (a figure published in our annual planning reports) or if the customer's new load is more than 15km from the local substation, then an individually assessed augmentation charge is calculated (which cannot be less than the standard charge). If the new customer will advance augmentation by more than two years and that augmentation would then be forecast within the next 10 years, then an augmentation charge based on the unit cost of that augmentation will be calculated. Using the analogy from above, the customer is not charged for a whole new camel, but rather for the proportion of the total carrying capacity of the camel required by the customer.

The other key outcome of Guideline 13 is that the arrangements are transparent, reproducible and able to be calculated independently by developers whilst still providing an appropriate economic pricing signal, particularly to those connections that would directly influence the need for significant augmentation. This aspect of independently reproducible arrangements has been valued by customers and has resulted in a better working relationship between customers and the distributor.

Unfortunately, the NERA/Allens paper does not recognise that an economically sound outcome can be achieved through augmentation charges. There has been discussion that postage-stamp distribution pricing should be replaced with a locational approach, in lieu of augmentation charges. The complexity of such a situation is difficult to comprehend, with issues of regional sub-transmission congestion overlaid by local HV/SWER congestion. Such an arrangement would, at best, be impractical. At worst, the equity issues of double charging customers in congested (or congestion-relieved) areas would cause a political storm. Original customers who financed the initial distribution system would then be required by a locational pricing system to pay more so that new customers can be supplied, or perhaps to discourage new customers from seeking connection. ETSA Utilities expects that Ministers and Jurisdictional Officials will understand that such proposals are not practical.

Situations requiring Augmentation Signals and Unique Distribution Arrangements

ETSA Utilities' distribution network covers much of South Australia, resulting in limited incidences of extension. New customer connections, especially where the new customer is atypical of the local land use, can result in some upstream works, whether that be reinforcing the HV system, or in larger customer situations involving the substation and sub-transmission system. Some typical examples are set out below.

1. A customer wants to construct an aquaculture facility in a remote location. This work involves a small extension, but a major upgrade of the HV system back to the substation. The local electricity system has been designed to provide basic electricity supply to a dry-land farming community, not to an aquaculture facility. ETSA Utilities has had recent experience with two of these facilities. Augmentation comprised much of the \$1M works required. In one case, the customer has found it more economic to utilise local diesel generation than to have the network reinforced and extended, the other facility is likely to commit to grid supply shortly.
2. A developer wants to convert coastal farmland into a subdivision. The local electricity system has been designed to provide basic electricity supply to a dry-land farming community, not to a sea-change residential development. Under the Guideline 13 arrangements, the developer knows that more than 90kVA in development (or 25kVA from a SWER line) will attract augmentation, and will probably require a unique calculation under the 15km rule as well. Uneconomic developments are prevented through this mechanism.
3. A mine wants to take supply. The life of the mine may be a few years (perhaps 6) or it may be a longer-term mine. The existing network needs to be upgraded to supply the mine. Under a contribution arrangement, these costs are recovered upfront, irrespective of the life of the mine

Our existing arrangements work well in all of these situations. We are not confident that the NERA/Allens proposals will deliver satisfactory outcomes. Allens/NERA need to advise how their arrangements would deal economically with these situations.

Principals for New Connections

5 years ago, the SA connection arrangements were being reviewed by the then SAIIR (now ESCOSA). ETSA Utilities proposed a number of principals continue to apply to distribution. Much of this is appropriate today. However, the emphasis of these principals is different to that promulgated by NERA/Allens. We ask that SCO/MCE consider these principals in their deliberations on Network Planning/Connection Arrangements.

“Introduction

Electrical infrastructure assets have by their nature a relatively long life, and revenue from these assets needs to be recovered over the life of these assets. Assets used to supply customers can be specific to that customer, such as connection assets, or shared with other customers, such as upstream network assets. Where new connections require additional connection or extension

assets specific to a customer or augmentation of the shared assets a network service provider will be asked to provide those assets in order to make the customer connection. Some connections will not be economic however – that is, they will cost more to install than they are likely to deliver through a state-wide tariff regime. In such cases the customer will be required to make a contribution towards the uneconomic portion in order to prevent existing customers from being burdened with an uneconomic connection to the network. It is the calculation of this contribution that is the subject of this review by the SAIR.

General principle

A general principle of economic efficiency is that existing customer prices should not increase as a result of another customer connecting to the system. A distributor should not be required to subsidise a new customer, either at the expense of existing customers through raising average prices, or reducing the distributor's profitability.

Effect of customer contributions

Customer contributions have many effects including:

- *supplying an immediate cash injection to partially fund the customer specific capital works of the distributor;*
- *provision of a locational signal to likely customers, encouraging location near to the existing system, particularly in areas where there is spare capacity available as contributions are likely to be lower; and*
- *reducing the regulated asset base for future regulatory reviews and reducing the level of network prices that would otherwise be levied to all customers had the customer not made that contribution.*

Underlying Principles Recommended

1. *Existing customer prices should not increase when new customers are connected.*
2. *New customer's payment for use of the network through network prices should be recognised, preventing double payment by customers for assets.*
3. *Whilst state-wide distribution pricing is in place, capital contributions are required to provide the only locational pricing signal which can identify network congestion and the need for augmentation to potential customers.*
4. *Customers should fairly and equitably share the costs of the existing network and of network extensions.*
5. *The distributor's profitability should not decrease as a result of connecting new customers. Regulatory arrangements should encourage the distributor to connect new customers.*

6. *The distributor's financial viability should not be impacted significantly by the cash flow necessary to finance the (unexpected) new customer's connection.*
7. *The distributor should not be able to double charge customers generally for connection through contributions and network charges. Contributed assets should be excluded from the regulatory asset base used to periodically determine network prices.*
8. *Contribution policies should be relatively simple and transparent to understand and implement, particularly for small customer connection.*
9. *Contribution policies should be able to be applied consistently and provide reproducible outcomes."*

Conclusion – Augmentation and Contributions

ETSA Utilities has endeavoured to illustrate to the MCE/SCO the unique issues that a distributor must face (compared to a transmission network) when dealing with new customers and network planning. The importance of an augmentation/capital contribution requirement that is sophisticated enough to deal with the real issues of uneconomic customers cannot be underrated. It cannot be replaced by some other network pricing mechanism. Any alternate proposal should be carefully tested against a variety of principles and typical distribution connection situations to see whether a more economically efficient outcome will occur.

ETSA Utilities expects that the primary outcome of the NERA/Allens proposals will be higher network prices for customers resulting from uneconomic connections by marginal developers. This also implies an inequitable arrangement where new developments are subsidised by all other customers.

ETSA Utilities recommends that the jurisdictional arrangements set out in Chapter 3 of the Distribution Code and in Guideline 13 continue to apply.

Comments on Network Planning Proposals

The proposals for Network Planning discuss the use of 'transfer capability'. This is a transmission term that is useful in meshed networks linking both generation and customer load.

However, distribution systems are generally radial networks, often with one-way flow and occasionally with a loop. The critical concept is capacity, not transfer capability. The primary issue is one-way flows on the radial system and managing the customer requirements. ETSA Utilities has 24,000 customer supply applications a year, and perhaps 10 non-PV-generator inquiries (with perhaps 2 being implemented). Distribution's main game is still about getting power from the transmission system economically to customers. To increase the capacity at a connection point might require an upgrade to several upstream network elements, which will depend on the requirements of that individual application (typically customer but equally an issue with generators). The important outcome is a timely response to the prospective

customer, not the availability of a complex planning document that might answer that customer's inquiry if the customer was technically minded.

NERA/Allens propose that planning reports should include likely changes in loss factors on the system. The variation in requirements of a customer/generator with any significant capacity is likely to cause a step change in the distribution losses on the system. Using the radial transmission system of Yorke Peninsula as an example, a system was in place to supply customers, operating at a modest level of losses and supplying a one-way flow of electricity down the peninsula to customers. A wind-farm was then established, and was sized in line with the transfer capacities of that transmission line, with electricity flowing back up the peninsula. The transmission loss factor changed by perhaps a 25% increment. If a generator half of that size had connected, the loss factor would have had perhaps a 10% increment. It seems unworkable to provide this dynamic type of information for 80,000 kilometres of network, let alone of use to prospective generators. Again, a timely response to a prospective customer and transparent arrangements are likely to be of much more value.

It is impractical to try to forecast any distribution system constraints beyond that of the more significant parts of the sub-transmission and zone substation system. In the smaller capacity rural systems, a single customer (eg a mine, an agricultural processing plant or a new irrigation area) may well cause a constraint upstream that needs to be relieved, but could not be predicted until that customer lodged a connection application.

The NERA/Allens paper also proposes arrangements where distributors are required to undertake planning arrangements for works over \$0.5M. The arrangements were amended in South Australia by ESCOSA to relax the \$2M and \$0.5M reporting requirements to something more practical (see Guideline 12). Our concern here is partly the additional cost implied by the NERA/Allens approach, but is primarily the unnecessary production of information that will not be utilised. ETSA Utilities is keen to undertake demand management and embedded generation where possible, but we do not think the publication of voluminous reports will increase the implementation of demand management solutions. It is more important to allow the distributors to determine what opportunities there are that are suitable for demand management and to be allowed (and encouraged) to seek responses to those situations.

ETSA Utilities recommends that the jurisdictional arrangements set out in Guideline 12 continue to apply.

Please contact James Bennett on (08) 8404 5261 if you wish to discuss this submission.

Eric Lindner
GENERAL MANAGER, CORPORATE AFFAIRS

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