



**Transmission and Distribution Pricing
Review**

**Working Group on Inter-regional Hedges
and Entrepreneurial Interconnectors**

**Entrepreneurial Interconnectors:
Safe Harbour Provisions**

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Definitions

The following definitions are used in this paper.

Interconnector. A network element that connects networks located in different regions of the National Electricity Market (NEM).

Entrepreneurial interconnector. An interconnector for which there is an entitlement to derive income through its participation in the spot market.

Non-regulated interconnector. An entrepreneurial interconnector for which there is no entitlement to recover any revenue through regulated network service charges.

Hybrid interconnector. An entrepreneurial interconnector for which there is an entitlement to recover some revenue through the imposition of regulated network service charges. As with other entrepreneurial interconnectors, income may also be obtained through participation in the spot market.

Regulated interconnector. An interconnector for which there is an entitlement to recover a determined level of revenue through the imposition of regulated network service charges. There is no entitlement to retain any additional revenues arising from the operation of the interconnector in the spot market.

Safe harbour provisions. A set of provisions conformance to which should ensure an application's approval. There is no implication that non-conforming applications would necessarily be rejected, although they would not be assured of receiving approval.

Preamble

The impetus to establish the National Electricity Market arose from an expectation that competitive market-based arrangements would be likely to yield more efficient outcomes in the electricity supply industry, and thus ultimately greater benefits to consumers, than had the traditional centrally planned approach. Nevertheless it was recognised that serious technical impediments existed to moving to a competitive market in electricity transport. For example, the strong operational interdependencies that arise in a free-flowing AC meshed network make it difficult to apply a market-based approach. Therefore, apart from a few exceptions, the Code treats network services as prescribed services (as defined in the Code) to be provided by regulated monopoly businesses.

One exception, the topic of this paper, relates to non-regulated interconnectors. The Code envisages that under some circumstances it may be feasible to adopt a competitive approach to inter-regional transport. Such a concept is potentially attractive in that it would avoid the regulatory problems and costs associated with centrally managed augmentation, however there would need to be adequate safeguards to promote efficient and equitable outcomes. The Code is silent on what those safeguards would be, specifying that the market participation rules for non-

regulated interconnectors will be established by NECA through the Code change process.

NECA has asked the working group on inter-regional hedges and entrepreneurial interconnectors to consider what form the rules should take, not only for non-regulated interconnectors but also, potentially, for hybrid arrangements. One of the group's terms of reference invites it to:

- *recommend rules to govern the participation of entrepreneurial interconnectors in the national electricity market and advise on implications for other aspects of the market design such as network augmentation criteria.*

The concept of “entrepreneurial interconnector” is to be interpreted broadly. Consideration is to be given to a range of options that might vary in the degree of regulation that would be required.

The working group is addressing this reference in three stages:

1. By seeking to identify ‘safe harbour’ provisions, i.e. conformance to which should guarantee approval for an entrepreneurial interconnector application;
2. By seeking to define the degree of discretion which should be permitted with regard to approving other applications, and
3. By exploring the scope for future extensions and variations to the recommended safe harbour provisions.

The present paper reports on the progress made so far in identifying suitable safe harbour provisions for non-regulated interconnectors. The views and recommendations set out in this paper are those of this working group and do not necessarily reflect those of NECA. While some progress has also been made in relation to hybrid interconnectors, that work is not considered sufficiently advanced to allow firm recommendations to be put forward here.

The draft safe harbour provisions are considered to represent a logical progression towards enabling more market-based provision of certain transmission services. To some extent they parallel developments occurring elsewhere in the world but they nevertheless remain somewhat experimental. Innovation is not necessarily bad – in fact it is essential to progress. However it should be approached with due caution. Thus it will be important for the draft provisions recommended here to be exposed to wider scrutiny before deciding whether to incorporate them in the Code.

It is also important to ensure that if any deficiencies do slip through, they will be picked up earlier rather than later. It is therefore recommended that:

The Code should be amended to require a post-implementation review of the rules for entrepreneurial interconnectors.

The review should be conducted at the earliest opportunity consistent with allowing some worthwhile post-implementation experience to accumulate. Thus it should probably be held within the first three years, but preferably not until at least one

application has been processed. The scope of the review should not extend to considering withdrawing any approvals that had by then been granted, as any such possibility would be bound to inefficiently deter investors. However its terms of reference could include the possibility of disallowing any further approvals.

Safe Harbour Provisions for Non-regulated Interconnectors

The recommended safe harbour provisions for non-regulated interconnectors are itemised in this Section.

Commentary following the statement of each provision is intended to provide some background as to the reasons for its inclusion. Areas of uncertainty are also identified.

Configuration. The interconnector must comprise a single two-terminal element of at least 30 MVA capacity that directly connects networks in different price regions.

It is considered that at this stage the safe harbour provisions should not extend to intra-regional connections or multi-terminal augmentations. While in due course it may be possible to sanction low capacity non-regulated interconnections, some areas of uncertainty remain regarding (e.g.) regulator shopping and the interface of distribution and transmission functions, the possibility of inefficient windfall gains across zonal boundaries, consequential changes necessary to the Code etc. For these reasons, it is recommended that at this stage the safe harbour provisions be restricted to fairly substantial interconnections. The proposed 30 MVA threshold would be consistent with the present Code threshold for requiring generators to be scheduled.

The restriction to a two-terminal topology was considered necessary in order to permit clear and succinct safe harbour provisions to be developed in relation to such matters as scheduling and dispatch, entitlement to spot market revenue and exposure to network service charges (see below). However it means that a development that initially complied with the safe harbour provisions would cease to be compliant in the event that an intermediate offtake point was subsequently installed. The interconnector manager would then have the option of applying to retain non-regulated status on some negotiated basis or of applying for regulated status, as discussed below.

Requirement to be scheduled. The interconnector will be required to be scheduled and will be the subject of analogous rights and obligations to those applicable to scheduled generators and loads. There will for example be a right to make a price/volume offer of the transport capacity into dispatch and to expect that, constraints permitting, it will be dispatched in accordance with the offer. There will be an obligation to follow dispatch instructions and to submit pre-dispatch and PASA information in accordance with normal timetables.

There are two mechanisms through which generators and customers can participate actively in the spot market: the scheduled and non-scheduled routes. In the case of

scheduled plant, a central dispatch process determines the operating level in accordance with submitted bids and offers. The plant manager is required to operate the plant in conformance with the dispatch instructions. In the case of non-scheduled plant, the plant manager can respond independently to broadcast dispatch prices and pre-dispatch projections.

In principle, both scheduled and non-scheduled options might be provided for non-regulated interconnectors. However there is already a precedent for requiring large generators to be scheduled so as to help ensure that system security can be maintained and the market be conducted in an orderly fashion. For similar reasons, it is proposed that non-regulated interconnectors be required to be scheduled.

Managers of scheduled generators and loads are given the right to trade actively in the spot market. The above provision would extend this to non-regulated interconnectors. An alternative could have been to require the capacity of non-regulated interconnectors to be dispatched on the same basis as regulated ones. That is, transport would always be priced at short run marginal cost (SRMC): the marginal cost of losses, or the marginal opportunity cost of a constraint. This 'passive participation' approach would have minimised the extent of the departure from the treatment accorded to regulated interconnectors. However in the presence of economies of scale, SRMC-based revenue can be insufficient to provide a commercial return on the most cost-effectively sized links (e.g. refer to Section 3.3. in "Principles of Efficient Pricing for Transmission and Distribution" prepared by NERA for NECA). Thus the passive participation approach might provide insufficient incentives to take advantage of economies of scale.

Hence it is proposed to permit active participation in the spot market. Active participation is routine for generators where economies of scale issues can similarly arise.

It is anticipated that it should be reasonably straightforward to extend the present dispatch algorithm to handle transport offers. One approach would be to express the offers as violation penalties on flow constraints. The algorithm would dispatch a flow in the interconnector only if the price differential was large enough to warrant violation of the constraint. A number of constraints could be used to represent a series of price bands.

Entitlement to spot market revenue. There will be an entitlement in each spot trading interval to the value of energy flowing from the interconnector less the value of energy flowing into the interconnector. Metering will normally be required at each terminal and the prices at the terminals will be calculated in a similar way to other transmission connection points, although it may be appropriate to use a dynamic or time-of-use loss factor if the flow is extremely variable. There will also be an entitlement to a revenue stream arising from any use of the interconnector to deliver ancillary services.

Under this proposal, the interconnector manager receives the net revenue accruing from arbitraging between the energy markets at its terminals. Because of transport losses, the interconnector flow will need to be metered at both ends unless it can be

demonstrated that the losses can be inferred with sufficient accuracy from single point metering.

The interconnector may also add value by making ancillary services originating in one region accessible in another. It should be both equitable and efficient for the interconnector manager to receive payment for delivering ancillary services where applicable. The form of the payment will depend on progress in refining the ancillary services trading arrangements.

Controllable flow. The flow through the interconnector must be independently controllable if the interconnector forms part of any network loop.

This should ensure that the flow can be matched to dispatch instructions without unnecessarily restricting the possible patterns of injections and offtakes. By contrast, achieving a particular flow in one element of a free-flowing meshed network may entail significant constraints on the sizes and locations of injections and offtakes.

A free-flowing link would cease to conform to the safe harbour provisions if and when it became part of a loop. The interconnector manager might then (for example) (i) install flow control equipment so as to again become conforming, (ii) adopt whatever alternative arrangements might be deemed acceptable at that time, or (iii) apply for regulated status.

It is acknowledged that the controllability requirement significantly restricts the scope of the safe harbour provisions. However the proposed *entitlement to spot market revenue* (see earlier) would not be appropriate as it stands in the case of a free-flowing meshed element. Some progress has been made in developing a suitable modification – perhaps based on apportioning revenues in accordance with dispatched flows rather than physical flows. As yet this work is not sufficiently advanced to incorporate into a safe harbour provision that could be relied upon to promote efficient and equitable outcomes.

Network service charges. There will be a requirement to meet the full costs of dedicated connection assets. Exposure to other network charges and rebates should be to the extent necessary to provide efficient investment and operational drivers.

The question of what network charges and/or rebates should apply to non-regulated interconnectors ultimately needs to be resolved in the context of some broader issues. These include for example how network service charges should be allocated amongst market participants generally and how much reliance should be placed on negotiation between individual participants and network service providers (NSPs) to achieve efficient and equitable outcomes.

The proposed provision is therefore offered only on a tentative basis at this stage and may not necessarily represent the ultimate view of all members of the working group.

The reasoning underlying the tentative position is as follows.

In the National Electricity Market, network charges can serve two quite distinct purposes:

1. efficiency promoting: to provide drivers for efficient utilisation of existing and future network facilities, and
2. cost recovery: to recover the balance of revenues determined as being due to network service providers.

Given that there will be few controls over the location and operation of non-regulated interconnectors, it is important that proponents are exposed to the right efficiency drivers. Hence they should be exposed to any significant network charges and or rebates that fall within the efficiency promoting category.

The regional design of the spot market provides locational drivers for the main transmission backbone, and hence there may not be much need to impose drivers through network charges for this part of the network.¹ However efficiency-promoting network charges and rebates may well be needed in respect of the sub-transmission and distribution networks. Such signals would relate to the degree of local congestion and the costs of relieving that congestion.

Given that the introduction of a generator or the removal of a load will have equivalent effects on congestion, it would be expected that efficiency-promoting signals at any location would be equal and opposite for generation and loads. Thus whether an interconnector was obliged to pay a charge at a terminal or receive a rebate would depend on whether the direction of flow was such as to relieve or exacerbate congestion at that location. An interconnector could thus be entitled to a net rebate if it was used to transport from a non-congested to a congested part of the network, and might pay a net charge if transporting in the other direction.

As with other market participants, it should be both efficient and equitable for proponents to face the full costs of any dedicated connection assets and to contribute appropriately to the costs of negotiated deeper augmentations or access compensation arrangements. Conversely, proponents should be entitled to an appropriate rebate if the introduction of the interconnector avoids or postpones augmentation in the shared network. In practice it may perhaps be difficult to design charges and rebates that could always be relied upon to provide efficient drivers. Even so it may still be possible to arrive at reasonably efficient and equitable outcomes through direct negotiations between the proponent and NSP within an even-handed negotiating framework.

As noted above, additional TUOS charges may be imposed purely for cost recovery purposes. Three factors are relevant when considering to what extent the proponent of an non-regulated interconnector should be exposed to such charges: equity, distortion and materiality. The revenue has to be recovered from market participants somehow, and the burden should be shared equitably. On the other hand imposing a

¹ Though this would depend for example on new regions being created if and when congestion becomes likely, and on regulated network augmentation occurring only when it is the most cost-effective option available.

cost recovery levy risks distorting a participant's behaviour, leading to an overall loss of benefits from the market. Distortion will be minimised if charges are levied where they least influence participants' behaviour. Finally, there may be merit in keeping arrangements simple if other considerations are not material.

Whether non-regulated interconnectors should be required on equity grounds to contribute to cost recovery is ultimately a matter of judgement.

No contribution to cost recovery is required in the case of a regulated interconnector. Thus requiring a non-regulated interconnector to contribute would risk distorting its ability to compete. On the other hand, there is likely to be some risk of distortion wherever costs are recovered, so the question is really whether there is more risk if costs are recovered from interconnector proponents than if they are recovered elsewhere. This may perhaps be the case. An interconnector's core business is in exploiting small locational differences in the value of electricity. The profitability of such a business may be proportionately more influenced by a levy on electricity than a business in which electricity is a relatively minor input.

The Code provides for financial transfers to eventually come into play between NSPs in different regions. These transfers should be taken into account when considering whether a non-regulated interconnector should contribute to the recovery of the balance of network costs.

Thus the issue of whether non-regulated interconnectors should contribute to network cost recovery is not black and white. On the grounds of simplicity and the lack of clear justification to do otherwise, it may be appropriate to exempt interconnector participants from the requirement to contribute to the recovery of network costs beyond whatever may be incidental to achieving efficient drivers.

Requirement to enter into connection agreements. There will be a requirement to enter into a connection agreement with the NSP at each terminal. The associated rights and obligations will be comparable to those applying to a pair of participants with equivalent injection and offtake characteristics.

Generators and customers connecting to the network have rights and obligations as set out in the Code. For example, generators presently have rights to negotiate access compensation arrangements through to the local regional reference node and conceivably customers may be accorded equivalent rights in the future. There are obligations in terms of protection equipment, harmonic distortion, reactive loading etc.

An interconnector has an equivalent impact on the rest of the power system to a generator - load pair with similar injection and offtake characteristics. It seems reasonable that comparable rights and obligation should apply in the case of an interconnector to those that would apply in the case of the equivalent generator - load pair.

Exposure to costs and benefits of impacts. The interconnector manager will be required to pay for identifiable services dedicated to supporting the use of the interconnector. The interconnector manager may also be required to compensate for any impact that the introduction of the interconnector may have on the usability of the rest of the network and conversely may be able to share in usability improvements.

It may be possible to identify support services, such as reactive support or rapid unloading capability, that are solely or principally required in order to enable the interconnector capacity to be utilised. In such cases it would seem both efficient and equitable that the costs of provision be charged to the interconnector.

The introduction of a new network element can sometimes have negative impacts on the usability of the existing network. The controllability requirement (see earlier) should help reduce the risk of this happening, but may not entirely rule it out. If there are any negative impacts it seems both efficient and equitable that the interconnector manager should be exposed to them. Conversely, it would be appropriate for the interconnector manager to be able to share in any improvements to the usability of the network.

NEMMCO powers to direct. NEMMCO will have similar powers to direct the operation of a non-regulated interconnector to those it presently holds in regard to other scheduled plant. Similar rights to compensation will be available.

The Code gives NEMMCO certain powers to direct the operation of scheduled plant, e.g. in relation to the provision of ancillary services, at times of low system reserve, and when the plant is not conforming to dispatch instructions. These powers are intended to safeguard the orderly operation of the market while minimally distorting the market. It seems appropriate that they should be extended to interconnectors that are actively participating in the market.

As with directions to generators and loads, the dispatch price should, where appropriate, be adjusted to reflect the conditions that would have applied had the direction not been issued.

Rights to compensation exist when generators or loads are subject to direction. Comparable rights should apply in the case of interconnectors, although there may be particular practical difficulties in accurately assessing the compensation that should be payable.

Participation in Reserve Trader contracts. In principle, some or all of the interconnector capacity could become the subject of a reserve trader contract. As usual, the entitlement to spot market revenue would be assumed by the reserve trader and the capacity would be offered to the market at VoLL.

The reserve trading provisions in the Code are intended to help ensure that 'the lights stay on' despite possible failures of the market to balance supply and demand. Such failures might occur for example because of market immaturity, the distortionary

impact of the price cap (VoLL), lags in the development of technology to support demand side responses, etc.

The reserve trading provisions are intended to cause minimal distortion. That is, they should not discourage the evolution of more market-based alternatives.

Keeping the lights on depends in part on having adequate transport facilities available. Thus it seems reasonable in principle to include interconnectors in the list of plant that could be subject to a reserve trader contract. For example, such a contract might cover the temporary recruitment of additional support services that increased the usable capacity of the interconnector.

Exposure to competition. There will be no restriction on the entry of competing regulated or non-regulated interconnectors, providing that they meet the criteria prevailing at the time.

The aim should be to achieve a level playing field not only between regulated and non-regulated interconnections but also in relation to supply and demand side alternatives. This may however require some review of the criteria governing regulated augmentations to ensure that they will proceed only when they represent the most cost-effective option.

Option to convert to regulated status. The interconnector owner can apply to convert to regulated status at any time. The revenue entitlement will be assessed at that time.

As already noted, the concept of a non-regulated interconnector is still somewhat experimental. It might be argued that as well as the usual commercial risks, the proponent of a non-regulated interconnector may face additional risks related to market design deficiencies that may only become apparent once the first interconnectors are operational.

Providing a right to apply for regulated status may help ensure that investment is not inefficiently inhibited by such non-commercial market design risks. However it is important that the conversion option should not shield the proponent from normal commercial risks, e.g. the risk of having over-judged the future demand for the interconnection service. It is therefore essential that the regulated revenue entitlement is based on the assessed need for the facility at the time of the application, rather than guaranteeing a return on the original capital cost.

The suggested provision covers transitions to regulated status in a manner that is intended to be broadly consistent with the existing Code provisions (e.g. Clause 3.12.3). The Code does not presently provide for transitions in the reverse direction, i.e. from regulated to non-regulated, and it is not recommended that such a provision be included in the safe harbour provisions at this stage, although it might be considered in the future. Care would be needed to ensure that there was no scope to obtain windfall gains by strategic alternation between regulated and non-regulated status.

Sunset clause. Initial approval to operate as a non-regulated interconnector and participate actively in the market may be limited to a specified interval.

The preceding provision, to permit conversion to regulated status, was intended to address the non-commercial risks which the novelty of the non-regulated interconnector concept may pose for prospective investors. On the other hand, the novelty of the concept may also bring some risks for the market at large. For example there may be some residual risk of an interconnector manager being able to exploit an unforeseen market design deficiency to the detriment of the market as a whole. Hence it may be prudent to apply a sunset to the initial approval. At the expiry of the approval period, there would be a right to apply to convert to regulated status and receive a regulated revenue assessed on the deprival value at that time. Alternatively, the opportunity may still exist to continue on a non-regulated basis.

Investment in such long-lived, high cost assets as interconnectors may be inhibited if the approval period is too short. A fifteen-year minimum approval period may represent a reasonable compromise. However it is noted that at this stage ACCC authorisation of the Code does not extend beyond 2010, which may in practice impose a shorter horizon.

It is not intended that this provision should provide any protection from the effect of any Code changes introduced during the period for which approval had been granted.

Market power considerations. It will be acceptable for a party to control up to 35% of the capacity available to supply either of the interconnected areas, taking into account the interconnector capacity controlled plus any cross ownership with other businesses participating in the market.

Particularly if an interconnector's capacity can be actively traded in the spot market, there may be potential for the exercise of undue market power in some circumstances. Due to economies of scale or the difficulty of obtaining easements, there may not always be a credible threat of competition from new interconnector entrants, although there may still be effective competition from supply and demand side alternatives.

The proposed provision focuses on the level of concentration of control over supply to the areas that adjoin the interconnector. Cross ownership may result in a party or consortium controlling other interconnection and/or generating capacity in the market apart from the interconnector capacity itself. It is suggested that the risk of exercise of undue market power should be sufficiently small if the total thus controlled does not amount to more than about one third (say 35%) of the total supply capacity available to either of the interconnected areas.

In principle, concentration of control could be diluted by divesting rights to offer shares of a link's capacity into the market and receive the resultant revenue stream. The proposed provision acknowledges this possibility. It would require however that the management of the maintenance of the physical link be adequately ring-fenced.

It is not considered that cross-ownership with regulated interconnection capacity should necessarily give rise to market power issues as the dispatch of regulated capacity is largely outside the control of its owner. However effective ring fencing would still be required between the regulated and non-regulated businesses (see below).

It is recognised that the issue of market power is one that particularly deserves wider consideration and that the proposed 35% threshold is somewhat arbitrary. The proposed provision is offered as a starting point for discussion.

Ring fencing. There must be adequate ring fencing from any co-owned regulated network business to ensure that the operation of the regulated business will not be influenced by the possibility of consequential profit or loss for the non-regulated business.

The profitability of a non-regulated interconnector may depend on how the regulated network is managed. The timing of outages of regulated assets may have a crucial influence on revenue for example. Thus if there is cross ownership with a regulated network business there is the potential for perverse incentives to arise in relation to the management of regulated assets. It would be important that the businesses be sufficiently ring fenced to prevent that happening.

Cross ownership with other market participants has been considered in the preceding provision (*Market power considerations*).

Submission of access undertaking. An access undertaking must be submitted of the form specified in the Code.

As in the case of regulated interconnections, the undertaking will require that access be available in accordance with the Code, although the applicable Code provisions will be different. For example in the case of a non-regulated interconnector, there will be a right to actively trade the transport capacity in the spot market, but no right to receive regulated revenues determined under the provisions of Chapter 6. As with a regulated interconnector, acceptance of the access undertaking by the ACCC would protect the asset from declaration under the Trade Practices Act.