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Our Ref:

Mr John Pierce
Chair
Australian Energy Market Commission
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Dear Mr Pierce,

The Victorian Department of Primary Industries (DPI), as the portfolio agency responsible for energy market development in Victoria, is pleased to make this submission in response to the Australian Energy Market Commission's (AEMC) Discussion Paper for its Inter-Regional Transmission Charging rule change, issued on 25 August 2011.

Any queries in relation to this submission should be directed to John Krbaleski, Director, Network Policy by email at john.krbaleski@dpi.vic.gov.au or by phone on 03 9658 4436.

Yours sincerely,

Mark Feather
Acting Executive Director
Energy Sector Development
26 / 9 / **2011**

Victoria
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DPI SUBMISSION TO THE AEMC NATIONAL ELECTRICITY AMENDMENT (INTER-REGIONAL TRANSMISSION CHARGING) RULE 2011 - DISCUSSION PAPER

The Victorian Department of Primary Industries (DPI), as the portfolio agency responsible for energy policy in Victoria, welcomes the opportunity to comment on the Australian Energy Market Commission's (AEMC) Discussion Paper for its Inter-Regional Transmission Charging rule change, issued on 25 August 2011.

Overview

This submission makes the following key points:

- **Economic efficiency**: DPI concurs with the AEMC's assessment that economic efficiency is an overarching requirement for any rule change as described in the national electricity objective.

- **Scale economies**: DPI recognises that transmission assets and networks are subject to substantial economies of scale which may justify building excess capacity to meet likely future demand. This is in effect taking out a real option on likely future development for the benefit of future network users. Building excess investment may lead to the need for trade-offs with productive and allocative efficiency. As future demand is inherently uncertain, especially over time, any exploitation of economies of scale should be modest, limited to medium time frames and the costs allocated in a way that avoids loss of allocative efficiency.

- **Allocative and dynamic efficiency**: Dynamic efficiency relates to innovation through technology, organisational structures, processes and products which leads to what Schumpeter called creative destruction. Allocative efficiency relates to the allocation of scarce resources and products to the highest value uses and rather than being a static concept, it continues to apply as innovation and creative destruction occur. DPI considers that the Discussion Paper is not correct in stating that trade-offs between allocative and dynamic efficiency are required in transmission pricing.

- **Short run and long run pricing**: There appears to be no economic basis for using the fixed costs as locational signals in relation to existing network users. Allocating fixed costs on the basis of location to existing users would be likely to lead to declines in economic efficiency. Exposing potential network users to fixed costs may be appropriate where the costs relate specifically to the differences in the cost of incremental network expansion at each location (not the full LRMC). Prior to commitment these relative costs would be included in any decision in terms of location. However, once the potential network user has committed, the fixed costs should be allocated as fixed charges rather than usage charges in order to avoid a loss of allocative efficiency. The allocation of fixed cost recovery on the basis of utilisation or usage has no merit from an economic efficiency perspective.

- **Cross-subsidies**: One of the main rationales for the introduction of the inter-regional transmission charge was to reduce or remove cross-subsidies which were considered to be likely to increase with changes in generation as a consequence of climate change policies. The existence of cross-subsidies between regions appears to be considered by the AEMC and MCE to be self-evident. However, when a strict use of an appropriate test for cross-subsidies is applied (cost of interconnected network versus stand-alone networks), it is unlikely that they would exist for existing networks. DPI considers, that for existing networks, only cross-subsidies that exist through the application of a strict cross-subsidy test should be included as assets for the inter-regional transmission charge.

- **New assets**: DPI considers only new assets that demonstrably enhance the capacity of inter-regional transfers, including any investment to maintain transfer capacity that would otherwise decline, should be included in the asset base for the inter-regional transmission charging regime.

- **Assessment framework**: DPI is supportive of the proposed assessment framework with some caveats with respect to the inclusion of sunk costs, the application of future investment signals and the use of causer and beneficiary pays. In addition while it sensible to promote administrative efficiency, transparency and stability, these should be weighted in the assessment framework in terms of the benefits and costs to overall efficiency.

- **Design features**: DPI is generally not supportive of the design features canvassed by the Discussion Paper. DPI has proposed an alternative methodology in section 5.

- **Options**: DPI does not support any of the options proposed for implementing the inter-regional charging mechanism as none of them are likely to promote efficiency consistent with the national electricity objective. An alternative methodology is proposed in section 5.

The detailed submission follows.

1. Introduction

This document is the DPI submission in response to the AEMC Discussion Paper in relation to the proposed Inter-regional Transmission Charging Rule change request. DPI notes that the AEMC published a Draft Rule Determination in December 2010. However, following significant issues raised by NEM participants and stakeholders with regard to the Draft Rule Determination, the AEMC has extended the period of time for making a rule determination and is giving further consideration to the proposed Rule change. The Discussion Paper is the first step in the extended process and seeks broad input on the proposed Rule change, including a variety of options for implementing the Rule change.

The submission is structured as follows:

- Section 2 considers the rationale for the proposed Rule change as set out by the AEMC and MCE.
- In Section 3, the issue of economic efficiency is considered as it would be expected to apply to the proposed Rule change, in accordance with the National Electricity Objective (NEO).
- Section 4 provides commentary on the AEMC proposed assessment framework.
- Section 5 considers the key design features.
- Section 6 of the submission considers each of the options for inter-regional transmission charging set out in the Discussion Paper.
- Appendix A provides some detail around the history of the development of the proposal relevant to the DPI submission.
- Appendix B lists the references used in this submission.

2. Stated rationale for Rule Change

The Ministerial Council on Energy (MCE) submitted a Rule change request to the Australian Energy Market Commission (AEMC) in February 2010 which sought to implement an inter-regional transmission charging regime. While earlier work had considered the issue of inter-regional charging, the Rule change request was stimulated by the AEMC's Review of Energy Market Frameworks in light of Climate Change Policies completed on 30 September 2009, which recommended the introduction of the inter-regional transmission charge and sought the MCE to submit the Rule change request.

The rationale for the Rule change request was argued on economic efficiency grounds, specifically to:

- improve the cost reflectivity of transmission charges
- reduce or even remove implicit cross-subsidies that exist in the current arrangements.

The expansion of the Renewable Energy Target (RET) and the likely introduction of pricing of carbon were considered to increase the case for inter-regional charging because of the likely changes in power flows and increased inter-regional power flows. This was considered likely to lead to increased cross-subsidies over time.
A more detailed summary of the rationale as set out in various AEMC papers and the MCE Rule change request is included in Appendix A.

3. Economic Efficiency

As the AEMC sets out in the Discussion Paper, any Rule change must be consistent with the NEO which focuses on efficiency in terms of investment and electricity use with the caveat that the focus requires the long term perspective. The NEO,

> "is to promote efficient investment in, and efficient use of, electricity services for the long term interests of consumers of electricity with respect to price, quality, reliability and security of supply of electricity and the reliability, safety and security of the national electricity system (2005, p. 15)."

Definition

DPI has a different understanding of how the various elements of economic efficiency are defined and how they should be applied to the issue of inter-regional transmission pricing than that set out in the Discussion Paper.

Neoclassical economics defines efficiency in terms of cost and allocation as follows:

- Cost or productive efficiency is achieved where a combination of outputs are maximised with respect to inputs
- Allocative efficiency is achieved where a finite set of resources or products are allocated to their highest value uses (i.e. those that provide the greatest benefit relative to costs)

In more modern times a third leg of economic efficiency, known as dynamic efficiency, has been adopted in regulatory economics. Dynamic efficiency refers to innovation through new or improved processes, organisational arrangements, products and services. Dynamic efficiency is related to Schumpeter's idea of creative destruction, in which economic transformation and long term growth is driven by innovation while at the same time destroying existing economic value especially where industries and companies fail to adapt.

In general, achieving productive and allocative efficiency is consistent with achieving dynamic efficiency. Importantly, through the process of creative destruction, the value of some sunk assets may be destroyed (that are made obsolete through innovation). However this does not mean that productive and allocative efficiency is reduced. On the contrary, innovation drives change in the underlying value of existing assets, but the remaining value in the assets can then be operated at maximum productive efficiency and with the goods and services produced allocated to the maximum value uses.

It is difficult to apply the concept of creative destruction and as a consequence dynamic efficiency to regulated markets because the form of regulation generally protects the value of assets, at least from the perspective of investors. In the case of transmission regulation, assets are effectively protected by rolling forward the regulated asset base (RAB) at each five year review. In theory there is a concept that the asset base could be adjusted, to optimise out of the RAB, assets that have effectively fallen in value (for example: use and hence value of transmission lines can change with permanent changes in patterns of generation or demand). However in practice this facility has not been utilised.

Economies of scale

Scale economies are an important but separate concept relating to firms or industries where the average cost of production varies with size. Increasing economies of scale means that the average cost of production falls as scale increases and falling economies of scale means that average cost increases as the scale increases. In most firms and industries, economies of scale increase initially, but at some point the complexity of size outweighs capital efficiency whereupon average cost begins to increase again with increasing scale. Operating at maximum economies of scale lowers costs and improves productive efficiency. As a concept it has no bearing on dynamic efficiency.

Consideration of economies of scale may be relevant where additional users are likely to eventuate within a reasonable time frame, and significant savings are achievable through integrating investments rather than undertaking them in a piecemeal or incremental fashion. This may justify larger investments with excess capacity now to meet the existing and future need. Importantly, investing for future users in effect is taking out an option on behalf of those future users. Uncertainty around future use means that any additional investment may only be partly utilised or in the extreme case not utilised at all. Hence decisions to make scale efficient investments which include capacity for the future should be assessed in a real options framework, where the value of the option in making the investment is compared with the value of the option of waiting to see if future users eventuate.

Taking out options on the future by constructing excess capacity as a consequence of economy of scale benefits locks in the investment regardless of whether the future users eventuate. In competitive markets, the risks of such investments are born by the investor because the additional cost cannot be passed on due to competition. In such circumstances, investors would only undertake the investment where the likely payoff exceeded the additional costs of the excess capacity. In regulated markets, where excess capacity is approved and constructed, existing users are generally required to fund the excess capacity in the hope that they will benefit from lower overall costs as new users come forward. Hence in the short run, funding excess capacity comes at a cost to existing users with the expectation that as new users join the network that costs will be shared and overall costs will be lower for both existing and new users. As the costs are locked in and the benefits are uncertain (increasingly so the further out in time that they are expected to accrue), caution must be applied in exploiting economies of scale in regulated markets.

Cost reflectivity

The concept of cost-reflective pricing is used throughout the Discussion Paper. The concept of cost-reflective pricing in relation to transmission systems was considered by the Council of Australian Governments as part of the process of microeconomic reform.

> "network charges for EHV transmission networks and lower voltage sub-transmission networks should in principle be cost reflective ensuring that both franchised and non-franchised customers and generators are charged, on a consistent basis, in accord with their use of network assets, and taking into account the impact of network constraints (1994)."

In general, cost reflective pricing involves ensuring that all costs are recovered and to the extent that it is practical to do so, that the allocation of costs to individuals or groups reflects benefits or negative externalities imposed by individuals or groups.

Cost-reflective pricing is only relevant in the absence of competition; i.e. in regulated markets where prices are set via regulated mechanisms. Cost-reflective pricing seeks to replicate competitive pricing outcomes for the regulated sector, in order to promote allocative and dynamic efficiency. However, in the case of existing transmission networks, a large portion of the costs are fixed and sunk and do not vary with network utilisation (non-locational and common service charges). For existing networks the value of location is determined by the short run marginal cost (SRMC) which is embodied in losses and congestion only. Using the non-locational and common service charges for existing networks in addition to the SRMC to send locational signals will result in excessive prices, which would lead to allocative inefficiency. Hence any application of cost-reflective pricing should avoid allocating the non-locational and common service charges on a locational basis.

Cross-subsidies

Reducing and removing cross-subsidies between transmission networks was one of the two primary reasons given by both the AEMC and MCE to introduce a regime of inter-regional transmission charging.

The fact that electricity is transported through one part of the network to get to another part of the network without payment for the common costs of the network through which it is being transported does not make a case for the existence of cross subsidies.

As noted in the DPI submission of 25 February 2011, the existence or otherwise of cross-subsidies was considered by Faulhaber in his seminal work on cross-subsidies in public enterprises. Faulhaber noted that:

> "if the provision of any commodity ... by a multicommodity enterprise subject to a profit constraint leads to prices for the other commodities no higher than they would pay by themselves, then the price structure is subsidy-free (1975, p. 966)."

As previously highlighted, the question of the existence of cross-subsidies requires that the provision of transmission services intra-regionally in the absence of interconnection between regions would have lower costs than the provision of transmission services across the same region where interconnection with other regions exist.

No evidence has been presented by either the AEMC or the MCE to suggest that cross-subsidies exist across regional transmission networks. Rather the existence of cross-subsidies appears to be established axiomatically. However, investment in intra-regional transmission assets has traditionally been undertaken on a region by region basis, with the jurisdictional planning body in each region responsible for planning to the local jurisdiction. While a modest amount of inter-regional planning occurred at the boundaries, intra-regional transmission investment was primarily focussed on delivering services to consumers within each region. Inter-regional investments were taken into account where they provided benefits to intra-regional

planning (imports) but intra-regional investment was not generally undertaken to aid inter-regional capability (exports) as it was generally beyond the scope of the jurisdictional planning requirements on the jurisdictional planning body.

In essence, intra-regional transmission investments within each region have been largely undertaken to support intra-regional transmission capability. Once undertaken for this purpose these investments are in economic terms sunk (cannot be unwound). In the absence of interconnection, each region would face the requirement to pay all of the costs of intra-regional investment except for assets specifically associated with inter-regional transfers. However it is quite likely that without the inter-regional transmission capability that intra-regional investment would have been required to be greater. Rather than providing a cross-subsidy, it is likely that the interconnection of regions is providing a benefit to each region through shared infrastructure leading to lower costs compared with stand-alone transmission systems.

The only exception would be the case of assets that are directly involved with the interconnection of regions – the so called interconnectors, particularly where they were established under NEM based Regulatory Tests. However it is understood that the cost of these assets are already shared between regions.

Hence one of the key rationales on which the proposed draft rule change is based, that the existing arrangements result in implicit cross-subsidies, is not substantiated by the facts and the manner in which intra-regional transmission systems have been planned and constructed historically.

Allocative and dynamic efficiency

The Discussion Paper (Appendix A) defines:

- allocative efficiency as a component of static efficiency when capital and technology do not change (along with productive efficiency); and,
- dynamic efficiency as the optimal allocation of resources over time when capital and technology can change.

The Discussion Paper argues that while transmission charging should encourage both the so called static efficiency and dynamic efficiency, that the unique characteristics of transmission results in conflicts between them.

DPI does not agree with this perspective. As outlined above, allocative efficiency relates to the optimal allocation of resources to the highest value uses. The definition of dynamic efficiency in the Discussion Paper really refers to allocative efficiency over time. The Discussion Paper does not define or consider the real concept of dynamic efficiency associated with innovation and brought about through creative destruction.

As a consequence, DPI considers that there are a number of areas in which the Discussion Paper economic reasoning is difficult to understand with respect to the efficiency objectives that should be applied to inter-regional transmission pricing. These include:

- limiting allocative efficiency considerations to the use of existing assets;
- applying allocative efficiency characteristics to dynamic efficiency;

- confusion between the concepts of economies of scale and dynamic efficiency;
- a lack of distinction between the efficient utilisation of existing transmission assets and the process by which new transmission assets are committed and then utilised; and,
- limited consideration of the climate change policy drivers.

The Discussion Paper limits allocative efficiency to a static concept in which existing resources (in this case transmission assets) would be allocated to the highest value use. However, the economic literature applies no such limitation to the concept of allocative efficiency. As new capital enters the market and new technologies are developed and used, allocative efficiency remains the primary concern. In addition, rather than conflicting as proposed by the Discussion Paper, changes wrought through innovation and creative destruction (dynamically efficiency) are expected to remain allocatively efficient as the changes occur.

The Discussion Paper appears to confuse the concept of economies of scale with dynamic efficiency. The Discussion Paper correctly identifies that scale economies are present in transmission systems in the sizing of specific assets and across the set of transmission assets. This in effect means that the average cost of provision of transmission services is lower at larger scale. As demand for transmission services is generally expected to grow, there are reasonable arguments for oversizing elements of the transmission system in order to take advantage of economies of scale to meet the growing demand. This is essentially an issue of productive efficiency not one of dynamic efficiency.

However, as noted above, this oversizing to take advantage of economies of scale is in fact a real option on the likely growth in demand for transmission services. The extent and likelihood of this growth becomes more uncertain the further out in time for which it is planned. As an example sizing transmission line towers such that a second line could be built to meet growth that has a reasonable expectation of occurring within the next five years has a reasonable chance of having a beneficial payoff. However, building a transmission line at twice the capacity that is needed today to meet growth in demand expected in twenty years is unlikely to provide net benefits. Hence it is expected that only modest exploitation of economies of scale are warranted in transmission planning and development.

It is well understood that transmission short run marginal prices reflect losses and constraints only (broadly referred to as congestion) and, apart from some very rare circumstances, that these marginal prices are only a small portion of the total costs of supplying transmission networks. The remainder of the costs are fixed (do not vary with utilisation) and are often hard to attribute to specific users on a benefits or causer basis.

In order to avoid loss of allocative efficiency the recovery of the fixed costs which are not attributable should ideally be undertaken in a manner that minimises distortions in the price of transmission use. In general this would require the costs to be allocated simply as a fixed charge. However, in recovering the fixed costs, these fixed charges may be legitimately varied depending on the willingness to pay of the individual entities or groups in order to avoid incentives for inefficient bypass – the so called Ramsey pricing principle highlighted in the Discussion Paper. The issue of avoiding

distortion in pricing for usage is largely to avoid overpricing network usage costs which would lead to loss of allocative efficiency through deadweight loss.

The Discussion Paper canvasses allocating some of the fixed costs to specific locations to signal the long run marginal cost of expanding the transmission network at those locations. In particular, the Discussion Paper argues that,

> "if the SRMC signals in the wholesale market are considered inadequate for the task of driving efficient network development over time, then transmission pricing may also be used to play a role in supporting this latter objective. This requires that a portion of the sunk network costs of the network are oriented to providing a forward looking locational signal. For example, charges could be structured to reflect the LRMC of the network in particular areas (the charge would therefore vary by location to reflect future network requirements) (2011, p. 36)."

The Discussion Paper goes on to argue that the justification for the use of LRMC is because only relying on the use of congestion prices for locational signals may result in generators and users locating remotely from each other or in areas that are already heavily utilised, and as a consequence, bring forward the need for inefficient network development, resulting in inefficient network costs over time.

DPI considers that these arguments are inconsistent and fail to consider the broader regulatory framework.

In the case of existing network users (generators and consumers) the locational decisions have been made and so there is an efficiency detriment in pricing network access at each location above the short run marginal price, as it would lift the locational price above the cost of congestion and lead to loss of allocative efficiency.

In the case of new generators seeking to locate in areas that are heavily utilised, they will face congestion which would lead to them or other generators being constrained off as there is no guarantee that the transmission system would be expanded. Where the new generator has a clear cost advantage over incumbents (through technological or process based innovation) and would expect to be dispatched at the expense of the incumbents, it represents a dynamically efficient outcome with some value in existing investments destroyed (creative destruction). This form of competition is essential in the NEM spot market and promotes dynamic efficiency.

Importantly, under the current regulatory regime, generators receive no preferential right to access nor do they receive compensation when they are constrained off. Hence where the cost advantage did not exist, the cost of congestion reflects the true marginal cost of network utilisation and would be a major disincentive to invest at that location. The relative risks of congestion at each feasible location would be considered and in the absence of any other compelling factors generators would be unlikely to choose to connect at a point in the network where it was likely to suffer greater congestion.

Imposing LRMC costs on generators seeking to connect at these locations will potentially block new and more efficient generation competitors from entering the market leading to a loss of dynamic efficiency to the detriment of consumers. In addition, as the LRMC of any network development will depend upon historical investment decisions and the order in which new entrants come forward, the use of

LRMC pricing is likely to lead to volatile and inconsistent transmission prices. Hence under the existing regulatory regime, there is appears to be no economic benefit for imposing LRMC based prices on existing and new entrant generators.

In the case of electricity users connecting to the existing network, the selection of a location remote from generators is in itself not an inefficient outcome, especially where capacity exists within the sunk transmission investment to support the location selected without any development.

However, more importantly, the regulatory arrangements promote network expansion independently of decisions by consumers to connect. The five year regulatory pricing decisions tend to be based on broad estimates of load growth with transmission development designed to meet those estimates. There is little or no emphasis on creating incentives for networks to specifically negotiate with new consumers for the expansion of networks beyond the development of customer connection points[1]. In practice, broad obligations on Transmission Network Service Providers (TNSP) to meet across the board reliability standards work actively against such an outcome. While cost reflective network pricing (CRNP) regimes seek to establish a proxy for negotiated locational payments at least for larger consumers, these tend to be crude approximations and so arguably have limited value in decisions to locate and provide little in terms of promoting efficient network development.

DPI considers that there is no economic benefit in using LRMC pricing linked to network usage for existing consumers as the locational decision has been made and pricing usage above congestion costs will lead to a loss of allocative efficiency. In relation to potential consumers, some variation in fixed costs to reflect expansion costs at different locations may be warranted. These fixed costs will be considered in locating investments. However, usage costs should be limited to short run marginal pricing for potential consumers as well to avoid loss of allocative efficiency.

A major part of the rationale for inter-regional transmission charging is that significant changes are expected to occur as climate change policies are implemented. The policies that are likely to have most effect on transmission networks are the RET scheme and implementation of carbon pricing. The changes brought about by these policies are mostly in the generation sector, with renewable generation entering the market and with high emissions generating plant (typically coal-fired plant) operating less and even closing and being replaced by lower emissions generating plant (expected to be gas-fired plant over the foreseeable future). While the rise in electricity prices is expected to lead to less consumer demand, the reduction is expected to be modest (especially with the emissions intensive trade exposed industries being well compensated under both schemes. Hence the changes in network usage is largely expected to be brought about by changes in generation patterns.

As noted above, generators face the cost of congestion including facing the risk of being constrained off without compensation and do not currently pay towards the recovery of fixed network costs. As changes in the type and location of the

[1] There are a small number of notable exceptions where the consumer's demand is large and significant new network expansion is required to connect. However, even in such cases the directly attributable expansion costs tend to be limited to connection assets.

generating mix will cause most of the changes in generation patterns and network flows (creating the need to reconfigure and expand existing networks) and as generators do not contribute towards the recovery of fixed costs, the inter-regional transmission charge would appear to have little economic merit (as it would not be levied on the participants driving the changes) even where the Discussion Paper's general arguments about economic efficiency were accepted.

4. Assessment Framework

Section 3 of the Discussion Paper sets out an assessment framework for development of options applying to inter-regional transmission pricing.

DPI acknowledges that any inter-regional transmission pricing framework must be consistent with the NEO which as noted above is to promote investment and operational efficiency over the long term.

DPI notes the Discussion Paper's argument that an efficient charging regime would require trade-offs between allocative and dynamic efficiency. DPI disagrees with this analysis and notes that efficient markets are in effect markets that are productively and allocatively efficient over time. Dynamic efficiency is promoted through innovation which may lead to creative destruction but the resulting arrangement should promote productive and allocative efficiency.

Dynamic efficiency appears to be confused in the Discussion Paper with respect to economies of scale which provide a case for building excess capacity for potential future developments. These decisions are in effect real options to meet potential future demand which is increasingly uncertain the further out in time that it is expected to eventuate. This means decisions to build excess capacity to take advantage of economies of scale should be assessed in terms of the likelihood that the capacity will be utilised (the option value). There is no apparent efficiency benefit in applying forward looking signals above the short run marginal price for capacity that is already constructed, as once constructed it should be priced at its short run marginal price in order to maximise allocative efficiency.

DPI agrees with the Discussion Paper's assessment that short run marginal prices provide efficient locational signals to the market. However, DPI notes that forward looking price signals based on the LRMC of network development at each network location are unlikely to lead to improved efficiency. In particular, applying such charges to existing users or to sunk transmission investments will lead to a loss of economic efficiency. In addition once potential users have committed, applying locational prices above the short run marginal price will also lead to a loss of economic efficiency[2]. As Vickery noted,

[2] In applying LRMC at each location to potential users, the price faced by each user is highly dependent on historical investment decisions and the order in which they queue to be connected. This can cause large losses in system wide efficiency and economic welfare because the prices paid are inconsistent and the potential consumers are not ordered from highest to lowest willingness to pay. For example, consider two scenarios of two entities seeking to connect consecutively. In the first scenario the first entity has a high willingness to pay but faces a low locational cost (as no expansion is required) and connects. The second entity seeks connection with a low willingness to pay but because the first entity connecting used up the excess capacity, the second entity faces a high locational cost reflecting expansion – and chooses not to connect. However if the order of connection was reversed

> "the aura of definiteness surrounding average cost as a basis for setting future prices is spurious: the allocation of the intra-marginal residue among products or over time is completely arbitrary, while past average costs give little better estimates of future average costs than they do of future marginal costs. The difficulties of estimating marginal cost are solely technical, not conceptual (1948, pp. 237-238)."

DPI considers that some modifications are required to the proposed framework for it to be consistent with the NEO and to maximise efficiency benefits. These modifications are as follows:

- Recovery of costs of existing network – the inter-regional transmission charge should not include sunk cost recovery components except where the provision of interconnection is demonstrably cross-subsidised by one or both intra-regional networks (based on the cross-subsidy test outlined by Faulhaber discussed above) – recovery of any sunk costs should be structured in order to avoid loss of economic efficiency (fixed rather than usage based).
- Signal for future investment – the inter-regional transmission charge should not include provisions for signalling future investment – the cost of congestion is the only price in relation to locational signalling that should be applied.
- Causer or beneficiary pays – should only be applied in relation to new investments which enhance the inter-regional transfer capability.
- Procedural and implementation issues – are reasonable criteria but they should be weighted in terms of effect on economic efficiency – for example reducing transaction costs lowers the deadweight loss but if in doing so the structure of the inter-regional charge increases the deadweight loss by a greater amount then higher transaction costs associated with a much more efficient charging structure would be warranted.

The revised criteria would be suitable for assessing the options proposed and any other options for the proposed inter-regional transmission charge.

5. Key design features

The Discussion Paper sets out several questions for which the AEMC is seeking a response in terms of design of the inter-regional transmission charge.

These questions focus heavily on the existing CRNP type methodologies applied by TNSPs in each region. As discussed above, CRNP is at best a crude approximation of transmission LRMC and does not enhance economic efficiency for the existing users on the existing network and potential users where existing networks have spare capacity and provides arbitrary signalling benefits for potential users where capacity may be required to be expanded.

As an alternative, DPI proposes the following methodology be applied:

1. The short run marginal price of transmission (congestion cost) should be retained as the only form of locational price signal for existing network users.

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they would both connect and overall welfare would be higher. Pricing to all entities at the LRMC of the next expansion regardless of the level of excess capacity available avoids discrimination but still prices the entity with the lower willingness to pay out of the market (and overall welfare would be lower) and hence is essentially arbitrary, as highlighted by Vickery (1948).

2. The short run marginal price plus any fixed costs (allocated as set out below) would provide efficient signals to potential users.
3. Fixed costs to be recovered via the inter-regional transmission charge should be limited to costs which are clearly associated with inter-regional transfer. This would be determined as follows:
    a) For existing transmission assets, the difference between each regional transmission networks total costs to be recovered and a transparent estimate of what that cost would be in the event that each region was served as a stand-alone network without interconnection with other regions (i.e. a measure of the true cross-subsidy if it exists at all). This would be undertaken on a once and for all basis at the commencement of the charging regime.
    b) For new transmission assets, only fixed costs for assets that are demonstrably being implemented to enhance transfer capacity from one region to another including any investment to maintain transfer capacity that would otherwise decline[3].
4. Fixed costs should be recovered in a manner that avoids reductions in allocative and dynamic efficiency:
    a) For existing network users charges should be fixed and no user should be charged more than the economic benefit from network usage.
    b) For potential network users, charges should be set to reflect the maximum cost of capacity that would be utilised.

It should be noted that DPI supports a uniform methodology to be applied in terms of the inter-regional transmission charge.

6. Options

The Discussion Paper set out three options for implementing the inter-regional transmission charge. These are considered below.

Modified load export charge

The modified load export charge (LEC) option is similar to the LEC that was proposed in the Draft Rule change except that a consistent methodology for calculating CRNP would be prescribed. DPI does not support the modified load export charge as:

- the assets to be included do not reflect the true incremental cost of assets involved in establishing inter-regional transfer when compared with the cost of providing stand-alone regional networks (the true measure of any cross subsidy);
- it does not specifically limit charging to assets that are demonstrably involved in transferring electricity between regions;
- it does not differentiate between existing sunk investments and future investments;
- it does not differentiate between investment to support enhanced intra-regional transmission capability and inter-regional transmission capability;

[3] Notably where additional generation locates in one region and exports are increased to an adjacent region but the existing transfer capacity is not enhanced, generation is locating efficiently to utilise existing capacity

- it proposes to incorporate components of non-locational and common service charges which will reduce allocative and dynamic efficiency; and,
- it proposes charging on an energy flow usage basis, which may be misinterpreted in a manner that is inconsistent with the benefits and rationale for transmission investments.

DPI is of the view that neither the original LEC nor the revised LEC are preferable for implementing inter-regional transmission charging as it is unlikely to enhance efficiency consistent with the NEO.

Cost sharing

The cost sharing option seeks to identify assets involved in inter-regional transfers and then share the costs of those assets between regions. The Discussion Paper leaves open the option of using all assets or just new assets. Once inter-regional assets were determined and costs allocated to TNSPs, costs would be recovered from customers by adjustments to the current transmission charging regime.

This approach has some conceptual similarities with the methodology proposed by DPI in the previous section in that it seeks to limit the charges to assets specifically involved in inter-regional transfers especially if the arrangement applied only new assets. However, DPI does not support the option as:

- the assets to be included (through the load flow analysis) do not reflect the true incremental cost of assets involved in establishing inter-regional transfer when compared with the cost of providing stand-alone regional networks (the true measure of any cross subsidy);
- where existing assets were included it does not differentiate between existing sunk investments and future investments;
- depending on the method of implementation it proposes to incorporate components of non-locational and common service charges which will reduce allocative and dynamic efficiency;
- it proposes charging on an energy flow usage basis, which may be misinterpreted in a manner that is inconsistent with the benefits and rationale for transmission investments; and,
- the proposal simply involves cost shifting with costs passed through to different users using the same TNSP CRNP methodologies detract from allocative and dynamic efficiency.

DPI is of the view that the cost sharing option is not suitable for implementing inter-regional transmission charging as it is unlikely to enhance efficiency consistent with the NEO.

NEM wide CRNP

The NEM wide CRNP option is also similar the original LEC proposal in the Draft Rule change and modified LEC proposal except that a NEM wide CRNP assessment would be undertaken that would allow charges to be allocated across all regions from all other regions. DPI does not support the NEM wide CRNP option for similar reasons to not supporting the modified LEC as:

- the assets to be included do not reflect the true incremental cost of assets involved in establishing inter-regional transfer when compared with the cost of providing stand-alone regional networks (the true measure of any cross subsidy);
- it does not specifically limit charging to assets that are demonstrably involved in transferring electricity between regions;
- it does not differentiate between existing sunk investments and future investments;
- it does not differentiate between investment to support enhanced intra-regional transmission capability and inter-regional transmission capability;
- it proposes to incorporate components of non-locational and common service charges which will reduce allocative and dynamic efficiency; and,
- it proposes charging on an energy flow usage basis, which may be misinterpreted in a manner that is inconsistent with the benefits and rationale for transmission investments.

DPI is of the view that the NEM wide CRNP option is not suitable for implementing inter-regional transmission charging as it is unlikely to enhance efficiency consistent with the NEO.

Appendix A – Inter-regional charging rationale

This Appendix highlights a number of statements by the AEMC and MCE setting out the broad rationale for the inter-regional transmission charging regime.

AEMC 2009 Energy Markets Framework Review

The AEMC's Review of Energy Market Frameworks in light of Climate Change Policies was undertaken as a consequence of an MCE request.

The 2009 AEMC Review recommended an obligation on transmission businesses,

> "to levy a new charge – a load export charge – on transmission businesses in adjacent regions, for inter-regional flows from the region to adjacent regions. The level of the load export charge would reflect the costs incurred in the use of the transmission network in the region to transport electricity to the adjacent network (2009, p. 42)."

The AEMC went on to state that the objective of the proposal was to

> "improve the overall cost-reflectivity of transmission charges, and remove existing implicit cross-subsidies between customers in different regions. These cross-subsidies could represent a potential barrier to the coordinated planning of transmission investment across regions (2009, p. 42)."

The AEMC rationale for this proposal was that it considered,

> "that the introduction of the CPRS and the expanded RET has the potential to increase the transmission network investment undertaken to facilitate flows between regions. This is because climate change policies are likely to lead to changes in flows on the network as they change the economics of generation investment decisions and electricity production. It is likely that renewable generation will be concentrated in certain regions given the distribution of renewable fuel sources. This may lead to increased power exports from those regions and increased imports into other regions (2009, p. 43)."

In the context of the existing system, the AEMC noted,

> "currently flows between regions over the duration of a year tend largely to offset each other. However, the increase in renewable generation under the expanded RET, in particular, may lead to significantly increased levels of net flows on interconnectors."

This led the AEMC to conclude that,

> "the lack of a robust inter-regional transmission charging mechanism essentially prevents transmission network charges being seen across region boundaries, leading to less cost-reflective transmission pricing. Against this background, increased net inter-regional flows will lead to greater cross-subsidies between customers in different regions (2009, p. 44)."

Importantly, the AEMC Review promoted the inter-regional charging regime on the basis of removing implicit cross-subsidies and to improve the overall cost reflectivity of transmission charges. At the time of the Review, the AEMC appears to have accepted that cross-subsidies already existed and that because directional flows may increase over time – stimulated by pricing of carbon and the Renewable Energy Target (RET), that these cross subsidies may increase, and as a consequence that this

may in some way inhibit the efficient use and development of the interconnected transmission system.

2010 AEMC rule change request

The 2010 MCE Rule change request appears to have largely accepted the AEMC views on inter-regional transmission. In particular the Rule change request notes that the benefits of the proposed regime would be "more cost-reflective transmission charges and the elimination of implicit cross-subsidies between consumers in different regions" (2010, p. 5). The MCE goes on to note, in regard to these stated benefits that:

> "these will promote the efficient use of, and investment in, the transmission system. In particular, they will remove a potential barrier to the co-ordinated planning of transmission investment across regions, which will become increasingly important as the dispersion of generation across the network and resulting pattern of network flows changes as a result of climate change policies. They will therefore ensure that the long term interests of consumers of electricity are promoted with respect to the price of supplying electricity (2010, p. 5)."

AEMC draft rule determination

The AEMC published a Draft Rule Determination on 2 December 2010. In making the Determination, the AEMC noted,

> "without a robust inter-regional transmission charging mechanism, transmission network charges would not be effectively seen across region boundaries. As customers do not contribute to the costs of transmission assets in other regions that support electricity flows to their region, even if they benefit from those flows, the charges for the imported energy may not reflect the long-run marginal cost of serving loads in the importing region (2010, pp. 1-2)."

Further the AEMC stated,

> "current transmission charging arrangements, where customers do not contribute to the costs of transmission assets in other regions that support electricity flows to their region, do not fully reflect the interconnected nature of the NEM. Under the current arrangements, inter-regional flows result in implicit cross-subsidies where a region that experiences net-imports has not faced a price that fully reflects the costs of transporting that energy. The materiality of this issue is likely to increase in the future given that greater inter-regional flows are anticipated as a result of changes in the location of generation and for other reasons such as in response to climate change policies (2010, p. 9)".

Appendix B – References

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