CS Energy Response to OFA Design and Testing

Supplementary Report: Pricing

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Optional Firm Access, Design and Testing

Summary and key points

CS Energy thanks the Australian Energy Market Commission (AEMC) for consulting on the development of Optional Firm Access, Design and Testing. In particular we wish to thank the AEMC staff for holding a workshop on transmission pricing in Brisbane.

We hope the AEMC find this response helpful in finishing the design of Optional Firm Access (OFA) and in considering the implications of the design choices on generators, monopolies, regulators and the consumer.

We have previously considered the proposed design features of OFA and, where appropriate, have put forward recommendations for further investigation into the development OFA. This submission is consistent with our previous comments.

Primarily, CS Energy's recommendations relate to removing some of the complexities with the: involvement of the regulator and monopolies through the monopoly incentive schemes; short term access; inter-regional access; and the sculpting back of Transitional Access (which requires relying on the Long Run Incremental Cost (LRIC) pricing model to then charge generators at a regulated rate).

It is our view that the sculpting back of Transitional Access is unnecessary. This sculpting of access exposes CS Energy to the regulatory risk presented by the access procurement decision and the LRIC pricing model. We explained in the response to the previous consultation that this transitional feature of OFA is likely to be inefficient because it relies on a regulated mechanism for the sale of access rather than a market solution. A market solution would be where generators can trade access. CS Energy sees no reason as to why it is to be exposed to the LRIC pricing model, bar possibly the treatment of replacement capital expenditure, which we will explain further in this submission.

We see the only reason for the LRIC pricing model to be included in OFA is to provide a pricing signal for new entrant investors that are requesting additional access incremental to the access already allocated from the existing network. Otherwise, access should be traded between generators[1] on the secondary market.

The AEMC is seeking comment on whether the LRIC produces efficient prices. The AEMC has concluded that the concept of LRIC produces efficient prices. As a concept, *if applied perfectly*, a LRIC calculation would be an efficient price. Unfortunately the perfect application of LRIC is a very high standard that cannot be achieved in practice.

LRIC concept: efficient in theory yet inefficient in application.

The question today is whether the LRIC pricing model, as designed, achieves this standard to produce efficient prices. We believe it falls short of the standard and does not produce efficient prices. The

[1] Or the generators and network monopoly in the case of replacement assets

reasons for this are many, some of which are design choices of the AEMC for the model that should be revised.

Core reasons why the LRIC pricing model may not produce efficient LRIC prices:

1. Prices are not linked to the efficient costs of the revenue allowed of the network monopoly.
2. Extensive use of subjective assumptions creates a comparative but not absolute signal;
3. The expansion plan does not provide a direct link to constraint equations, coefficients, access quantities and therefore access settlement.
4. Prices are distorted by the "demand" for access for reliability purposes:
    a. "Reliability Access" particularly distorts pricing for existing generators.
5. Negative LRIC prices are not presented and may be needed where generators are a substitute for transmission and
6. LRIC creates problems upon queuing in deriving efficient prices.

1. Prices are not linked to the efficient costs of the revenue allowed of the network monopoly

CS Energy does not agree with the AEMC's assertion that a stylized approach to pricing has a number of advantages. As mentioned by the AEMC on page 9 of the consultation paper: "A stylised approach assumes away some of the complexity inherent in transmission planning."

To us, the stylised approach will "*assume away*" efficiency and may lead to imprudent investment decisions. The current method for transmission planning involves an economic test, the RIT-T, and a determination on the regulated monopolies expenditure proposals against the economic test of the National Electricity Objective ('NEO"). The LRIC pricing model does not include the same level of rigour.

> The LRIC concept deviates from efficient pricing by "assuming away" accuracy.

The expediency adopted in developing a stylised approach to pricing could not be mirrored in planning and monopoly regulation as the outcomes would be inefficient. It is our view that the LRIC pricing model needs to adopt more prudent economic tests and be found to be efficient in practice, not just assumed to be efficient in theory. The difficulty with long term transmission pricing is not in the efficiency of the concept, but the efficiency of its application. This is because the exact calculation of future costs and utilisation of a shared network with significant externalities is highly subjective.

The stylised approach, *assuming away the complexity*, lowers the bar from the present regulatory framework by reducing the economic rigour in determining whether and when transmission and generation will be built.

We recommend the AEMC reconsider the disjunct between the LRIC pricing model and the economic planning by the network monopoly. For instance the LRIC price calculated by the model may bear no witness to the investment plans of the network monopoly under the proposed model of the OFA. This discrepancy should not be "*assumed away*" in the LRIC pricing model. The LRIC pricing model should be improved to ensure it does bear witness to investment plans by the network monopoly.

2. Extensive use of subjective assumptions creates a comparative, not absolute signal

The AEMC states[2] that "*LRIC provides an efficient locational signal to generators*". The characteristics of LRIC are explained in the consultation paper, in that prices increase and decrease depending on proximity to the regional reference node ("RRN") and other demand centres and whether the local network is constrained or close to constraining. Just because the LRIC pricing creates a comparative scale of transmission prices, dependent on proximity to the RRN, does not mean the prices are efficient.

> LRIC pricing model produces comparative prices based on changing one assumption: proximity to the RRN.

A caveat is provided by the AEMC with the "other things being equal"; which is akin to using consistent assumptions and then only changing the proximity of the generator to the RRN. Unfortunately uniform assumptions do not reflect local, topographic, environmental, planning and commercial factors (or barriers) which may be just as important as the proximity to the RRN. We note these factors have been *assumed away* in the LRIC pricing model.

As a result of using consistent, subjective assumptions across a network the size of Queensland or the NEM is that accuracy and prudency are diminished. The locational signal is comparative, based on proximity, but not absolute with specific cost factors, which have been assumed away. Assuming away everything bar proximity is probably less of a problem on the major transmission circuits, but in more remote locations, where co-optimisation of generation and transmission is marginal, where the risk of stranding is greater, this may become a significant problem (with the LRIC pricing model).

As discussed during the Transmission Frameworks Review ("TFR") we already have non-absolute, comparative locational signals through the imposition of dispatch constraints on generators, loss factor allocations and the regulatory planning process. We question whether the LRIC comparative prices are as efficient as the present regulatory arrangements.

3. Expansion plan does not provide a direct link to constraint equations, coefficients, access quantities and therefore access settlement

After reviewing the LRIC pricing model we realise that the OFA deliberately does not link pricing to planning. The discrepancy between the two means the access price calculated under LRIC is a firm commitment by the generator that they must pay, but there is no resultant firm commitment as to what

[2] On page 8 of the consultation paper

the generator must receive. The network monopoly and regulator are not required to reconcile LRIC prices with actual or efficient costs, access quantities and settlement.

CS Energy would, after committing to purchase access and pay an LRIC regulated rate want: to know of the access quantities; flowgates to which this relates; durability of the access; and, most importantly, be able to reconcile the *access cost*, (LRIC), with the *access value*, (access settlement). In particular we wish for the LRIC pricing model to provide a direct link to constraint equations, coefficients, access quantities and therefore access settlement. It does not.

> The pricing model does not link access prices and quantities to dispatch and access settlement.

Given our first point, in that LRIC is only a *stylised approach* to pricing and does not directly relate to *real world* planning, this may be impossible.

4. LRIC prices are distorted by the "demand" for access for reliability purposes

a) "Reliability Access" particularly distorts pricing for existing generators.

A long standing complaint of the NGF, its consultants[3] and CS Energy in the development of OFA is the assumptions made by the AEMC in relation to the treatment of assets needed for reliability purposes. Parties have argued whether assets needed for reliability purposes are incremental.

The approach taken by the AEMC is to ensure assets needed for reliability purposes attract a positive LRIC price. This decision has unfortunately encompassed pricing existing sunk assets already required to ensure a reliable system.

The continued view held by the AEMC and its consultants is:

> "*We have therefore rejected the option of generators only paying for the access that is incremental to what would have otherwise been provided to meet reliability standards (i.e. receiving an implicit discount for providing reliability access*"[4]

Under the LRIC concept, if a generator appears in both the baseline and expansion plans the LRIC price would be zero. The network monopoly would build assets in both instances. This is known as a pricing "anomaly[5]" by the AEMC and has therefore led to redesign of the LRIC pricing model to ensure this does not occur and a positive price ensues.

The approach taken has been to include Reliability Access at each node to meet peak load, in both the baseline and the expansion but in the expansion add the access request. This means firm access can only be >= peak load for the calculation of the LRIC prices. The LRIC pricing model also includes a forecast of firm access[6] in the baseline to meet what appears to the growth in demand that is not fulfilled by access requests, which does appear to reduce the amount of Reliability Access.

[3] Frontier Economics 2012
[4] AEMC: TFR Final Report page 68
[5] Section 6.2.4 of the OFA Technical Report supplementing the TFR Final Report
[6] This is a different point than we are making here, it appears to be a design choice to increase access rather than allow prices of short-term access to be discounted by Reliability Access

CS Energy can understand the rationale for the AEMC's position – why create a pricing incentive for investors that, if they invest in a manner perfectly aligned to the reliability expansion plan then why should the price be zero? This "signal" of zero would not allow an investor to determine whether it is better to incur the absolute cost of a poorer wind resource, rail loop, gas pipeline or transmission connection asset. This is because these investors represent incremental investment in power generation.

Reliability Access appears to be a way of creating an absolute pricing signal to new generators.

The true incremental cost is the prudent and efficient value of the capital expenditure programme to be included in the regulated asset base (RAB) of the network monopoly. CS Energy believes the acid test for an efficient price is whether it reflects the efficient value of additional network costs.

Because of Reliability Access the LRIC pricing model is not presenting a true "*incremental*" cost to existing generators, or those new generators applying for access that can be provided from existing network capacity.

Generators, including CS Energy, have been consistent through the Transmission Framework Review (TFR) in explaining to the AEMC that if there is plenty of existing access then LRIC price should be effectively zero as long as the access is less than that capacity which exists. The NGF's consultants and in comments made in the technical critique of Optional Firm Access (by the NGF) explained that the inclusion of Reliability Access would result in inefficient pricing.

A zero price for incremental costing in instances whereby access is less than capacity, for now and foreseeable future is an obvious conclusion to be made, because the acid test is whether, with or without the access request there would be additional network costs.

Yet this is not the case in the LRIC pricing model.

CS Energy cannot understand how Reliability Access applies to existing investors. These investors have sunk capital into their stations, rail networks, transmission connection etc and have limited ability to respond to the LRIC pricing signal.

The existing power generation investments have been sunk concurrently with existing transmission investments. There was an alignment between the cost of the power station and the transmission network – therefore to create an access price for these generators based on their access request *plus* the reliability augmentation is falsely presenting the network as being constrained.

Reliability Access inefficiently creates an absolute pricing signal to existing generators with sunk investments.

A more reasonable pricing signal would be equivalent to zero if there is adequate capacity to service the requisite access and provide reliable supply to consumers (which we know to be true).

CS Energy recognises the dilemma for the AEMC in designing the LRIC pricing model. There is a need for the access price for requests in excess of existing capacity to include an adjustment for the reliability plan (as otherwise the absolute LRIC price is near zero) and hence the inclusion of Reliability Access appears necessary. This pricing signal is potentially relevant to *new entrant* generators (incremental investors) using new transmission capacity (incremental investments), but not incumbents using existing transmission capacity (sunk investment).

The solution appears simple.

The AEMC recognises the Reliability Access is a distortion to the provision of transmission access. CS Energy agrees.

Instead of including Reliability Access (reliability transmission augmentations in the baseline and incremental expansion plans), the consumer load can instead be supplied by existing generators as non-firm access. If there are no existing generators to meet the reliability standards then Reliability Access or future access requests can be added to the baseline.

Reliability Access should only be introduced ***after*** existing generators, rather than before.

In principle, if OFA is to be implemented then we should remove as many distortions, which have the potential to create perverse or inefficient outcomes, as possible from the design. It is clearly a distortion to apply Reliability Access to duplicate the existing transmission access of existing, sunk generation assets.

Under the existing OFA proposals, whereby the Transitional Access is granted for a period and then withdrawn from the generator:

- Existing generators will see “their” existing transmission access become “Reliability Access”.
- In order to receive access from existing assets (which they already receive) they will have to request access.
- LRIC prices will be based on the generator’s access request *plus* Reliability Access and the network may need to be expanded above the baseline.
- LRIC prices will be priced above zero as they will reflect the need to duplicate existing network for existing generators.
- Network monopoly will not need to augment the system to provide the access as this can be provided with the existing network, and
- Existing generators will have to pay access charges.

As a result of this dynamic, CS Energy concludes that the inclusion of Reliability Access prior to including existing non-firm generators is designed to create high LRIC prices.

These high prices do not reflect incremental investments in transmission and are therefore inefficiently high.

They could result in an inefficient transfer of wealth from existing generators to consumers.

By introducing Reliability Access ***before*** existing generators, prices are inefficiently high. This could be a transfer of wealth from generators to consumers.

Study analysing the effect of Reliability Access

CS Energy completed a study to investigate the distortion of Reliability Access ("RA").

We took the following approach:

- Redistribute directly connected load to connection points other than the RRN (to try to create a more representative power system).
- Modify the access request quantities "Access MW" in the pricing model to be closer to the Transitional Access ("TA") provided by the AEMC.
- Run a "study" in the LRIC pricing prototype with and without Transitional Access, which provides the access prices for "All_TA" and "NO_TA":
    - Note the access prices are based on a request for the "Access MW".
- Run an access request for 1MW at node 4CVL132 under the without Transitional Access "NO_TA" to calculate the Reliability Access calculated under this scenario, choosing 2015 as the base year.
- Dividing the Reliability Access by the Transitional Access ("RA/TA").

The results from the study are shown in Table 1 and Figure 1 below:

Table 1: Study analysing the effect of Reliability Access

Power Station	Capacity MW	TA MW	Node	Node #	Access MW	ALL_TA	NO_TA	RA 2015	RA/TA
Oakey	282	282	4OKT110	125	300	$258	$243	161	57%
Townsville	242	242	4TWN132	165	200	$654	$1,167	848	351%
Braemar	504	504	4BRA330	26	500	$73	$22	See below	
Callide C	840	840	4CVL132	55	800	$472	$415	484	58%
Callide B	700	700	4CVL275	56	700	$236	$138	403	58%
Gladstone 275	1120	1107	4CRI275	54	1100	$201	$229	0	0%
Gladstone 132	560	503	4CRI132	53	500	$235	$101	0	0%
Kogan Creek	744	744	4WEE275	171	700	$69	$22	425	57%
Wivenhoe	500	500	4MTE275	111	500	$22	$7	0	0%
Barcaldine	55	42	4BAC132	10	50	$2,810	$3,186	32	75%
Millmerran	852	852	4MLM330	105	800	$108	$28	486	57%
Braemar 2	519	519	4BRA330	26	500	$73	$22	See below	
Darling Downs	644	644	4DAR275	58	700	$79	$22	368	57%
Mt Stuart	423	411	4MTS132	112	400	$940	$1,188	1483	361%
Roma	80	55	4COU132	52	100	$9	$18	See below	
Condamine A	144	98	4COU132	52	100	$9	$18	See below	
Barron Gorge	60	60	4KAM132	85	50	$244	$1,107	210	351%
Kareeya	81	81	4CHA132	39	100	$242	$1,279	284	351%
Mackay	30	30	4MKY132		50	$35	$375	105	351%
Stanwell	1460	1460	4SPS275	149	1400	$236	$294	841	58%
Swanbank E	385	381	4SBE275	147	400	$10	$9	0	0%
Tarong North	443	443	4TNG275	161	400	$8	$14	See below	
Tarong	1400	1400	4TNG275	161	1400	$37	$19	See below	
TARONG ALL		1843	4TNG275		1800	$80	$28	1052	57%
BRAEMAR ALL		1023	4BRA330		1000	$104	$29	584	57%
ROMA and CONDAMINE		153	4COU132		200	$11	$19	128	84%

The “ALL_TA” study presents access prices based on an access request for an investor connecting a new generator to the transmission network to duplicate the existing power station that already has Transitional Access. These are extremely high prices, but represent an unlikely scenario, given there is no need for the capital to be invested in power generation, not now and for the foreseeable future. These prices represent what one would assume to be a limit on access prices. These prices are quite high, which is surprising given the network and power generation market are overcapitalized and demand is low. The access price is probably high because the level of Transitional Access is high. The volume of TA in the model is 11,898MW, which is well in excess of capacity needed to provide a reliable supply. The access request adds to the almost 12GW of Transitional Access and it is therefore no surprise that the access price is high.

The “NO_TA” study presents access prices based on an investor connecting a new generator to the transmission network to duplicate the existing power station that does not have Transitional Access. These remain extremely high prices and should represent what one would assume to be access prices for existing generators once Transitional Access is withdrawn by the Regulator. The prices are lower than the ALL_TA study, but remain high. That prices are high, is counterintuitive given the network and power generation market are overcapitalized and demand is low. You would expect, with the application of the LRIC method that if the network can provide access to the existing generators (which it can as proved by the allocation of Transitional Access), there would be no incremental investment in capacity resulting in a high LRIC price.

The price is either high because the model is introducing a distortion to the demand for access “Reliability Access” or the model is assuming the existing assets will be constrained in the future through forecast demand for access. It may be both.

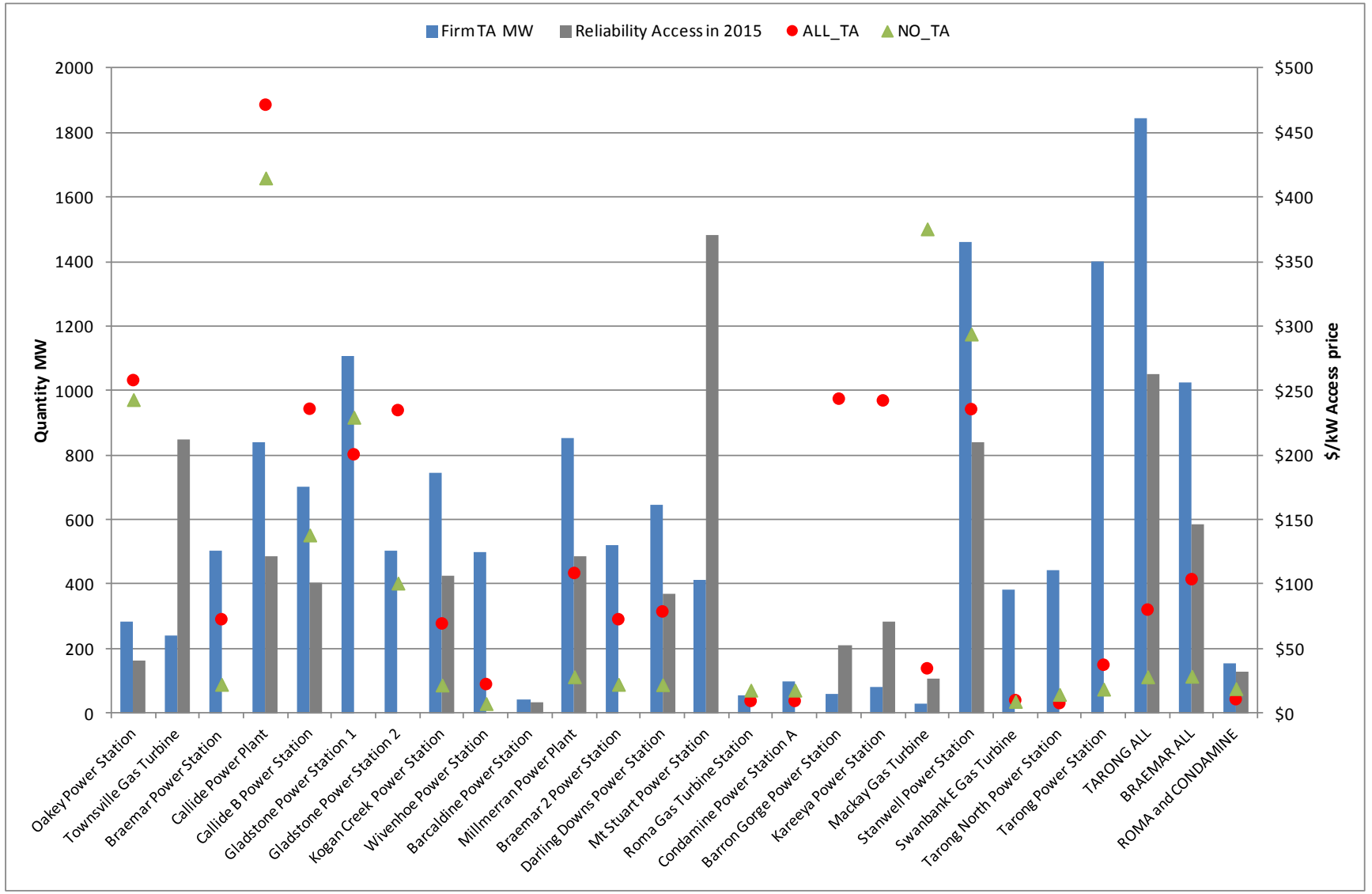
In this instance the access price is high because of a distortion from Reliability Access is high. The volume of RA in the model, shown from the access request for 1MW at 4CVL132 is 7,894MW. The access request adds to the almost 8GW of Reliability Access and it is therefore no surprise that the access price is high.

Please note the LRIC pricing model for the access request for 1MW at 4CVL132 also added 231MW in 2015 of access, distributed across the nodes, in addition to the 1MW requested by the applicant. The price is therefore the function of both the forecast access and the Reliability Access.

Forecasting future, incremental access requests and including them in the baseline expansion plan is a tenet of the LRIC method, but the same cannot be said of Reliability Access. Reliability Access is a feature in the application of the LRIC pricing model and distorts prices from efficient levels.

The studies provided a strange outcome, in that in some instances the Reliability Access was well in excess of Transitional Access. In North QLD the prices under the NO_TA study were greater than the ALL_TA study as Reliability Access was greater than Transitional Access at nodes in the north. For some reason there was no Reliability Access assigned to the two Gladstone, Swanbank and Wivenhoe nodes.

Figure 1: Access quantities, prices for QLD under study for 1MW access request at Callide 132kV



5. Negative LRIC prices are not presented and may be needed where generators are a substitute for transmission

In our response to the "First Interim Report: OFA Design and Testing" we stated that a solution needs to be found to reward flowgate support generators. It is disappointing that counter flow incremental usages (negative access quantities) are not being considered in the LRIC pricing model. This is because it may create more stable dispatch and financial results under constrained conditions. This is because it increases the flowgate access quantity and reduces the propensity for the flowgate to constrain.

We remain of the view that an investigation into the sale of negative flowgate quantities to flowgate support generators, or generators are paid LRIC costs, may be of benefit in this regard.

During the transmission frameworks review it was widely discussed that because demand is not exposed to local prices (compared to full locational pricing) there is no direct signal for a generator to locate in sections of the network where the generator provides a substitute to investing in transmission, bar the incentive to avoid other flowgates within the region that may be congested.

If we ask the questions: "Would we have to invest in new transmission capacity if a generator closed? Would we discover that a number of generators are substitutes for transmission?" The answers should be yes, especially for locations like Port Lincoln, Gladstone and the Snowy Hydro scheme, otherwise the network was not planned optimally.

6. LRIC creates problems upon queuing in deriving efficient prices.

CS Energy understands the AEMC is presently considering the approach to issuing LRIC prices upon multiple access requests. This may also occur when Transitional Access is withdrawn by the Regulator. Unfortunately the LRIC pricing concept does not include arrangements for queuing or competing access requests. The baseline versus incremental expansion plan is a rigid rule that must be adhered to, unless some arbitrary assumptions are to be made as to including other competing applications for access in the baseline.

We request the AEMC, prior to the final report, determine the arrangements for co-ordinating requests for access when Transitional Access is withdrawn. In this scenario every generator may be applying for access simultaneously, with each participant affecting others' prices. This difficulty in allocating access upon withdrawal of Transitional Access is one of the reasons why CS Energy requested the second option, to grant Transitional Access and rely on secondary trading of access.

To some extent, the concept of deep connection does have some similar queuing problems to the LRIC approach as each request can be treated individually, as the timing and quantity of the investment can 'trigger' the full capital cost.

In contrast, the status quo and LRMC approaches to pricing and allocating transmission access are less susceptible to queuing problems because they don't rely on the 'with-without' comparison.

In addition to the six reasons we believe the LRIC pricing model does not produce efficient prices, we note some limitations in the pricing model that can be improved:

1. Directly connected load is not distributed across the network, but allocated to the Regional Reference Node (RRN).
2. LRIC model duplicates the existing network to provide additional access, ignoring economies of scale from voltage upgrades, asset reconfiguration and non-network options (for example post contingent tripping schemes, ancillary services, generation).
3. Cost assumptions are simplistic and ignore topology, easements, licensing, etc.
4. Allocation of new firm access to nodes within a zone should be improved.

In addition to comments on the existing pricing model, the AEMC has asked for views on replacement capital expenditure. Specifically the AEMC has asked:

Whether the inclusion of replacement expenditure into the LRIC pricing method is considered appropriate?

In principle we understand the case for the inclusion of replacement expenditure. There may be an instance whereby it would be efficient for the network monopoly not to replace assets or to reconfigure the network as the system develops. In this scenario it may be sensible for access quantities to be diminished at particular nodes.

The AEMC is proposing, with the inclusion of replacement costs in the LRIC price that access quantities are rationed by price. Another way of doing this would be for the network monopoly to buy-back access at particular nodes from generators that have Transitional Access, possibly after undertaking a RIT-T assessment to ensure such action satisfies the NEO. CS Energy believes this may be more efficient than the including replacement capital in the LRIC pricing method.

> An efficient way to deal with replacement assets is for the network monopoly to buy back Transitional Access from generators.

One question that arises with our suggestion of the networks buying back access, is whether this provides a signal to incremental generators to ensure it is efficient to replacing assets. It is our view that incremental investors will be using incremental transmission investments and therefore only need to face the LRIC pricing signal of increments to the baseline (not decrements). This is because these investors, should they be replacing an existing generator could efficiently buy transmission access (traded bilaterally) from existing generators and these assets will remain if they have a useful life. If they have a determinate life and the network monopoly want to acquire the assets, then this can also occur with it buying back the access instead of the new entrant generator.

Should the AEMC choose to ignore our recommendation then we believe inclusion of replacement expenditure in the LRIC pricing model, given the present inaccuracies in the application of the LRIC pricing concept, may be unwarranted. At this stage CS Energy is not persuaded that the model is assessing incremental network development efficiently and believes replacement capital expenditure may be a case of 'false accuracy".