



Benn Barr
Chief Executive
Australian Energy Market Commission
Level 15/60 Castlereagh St,
Sydney NSW 2000

Lodged via AEMC website

Dear Benn,

Re Coordinating Generation and Transmission Investment

Neoen does not support this reform.

Normally we would distance ourselves from regulatory activities but find ourselves forced to defend against numerous radical reforms likely to inhibit trade and investment in the NEM.

About Neoen

Neoen is the leading French, and one of the world's leading independent producers of renewable Energy. Neoen is a responsible company with a long-term vision that translates into a strategy seeking strong, sustainable growth. We have over 3 GW of projects globally in operation and under construction, including in the NEM: Hornsdale Wind Farm (309 MW in SA); Parkes, Griffith, Dubbo, and Coleambally Solar Farms (combined 255 MW in NSW); Bulgana Green Power Hub (hybrid wind/battery system) and Numurkah Solar Farm (combined 314 MW in VIC); and the Degussa Hybrid Power System (10.6 MW in WA). Neoen is also the owner of Hornsdale Power Reserve (150 MW battery) in SA.

LMP is the Solution - what is the Problem?

The AEMC has pushed locational marginal pricing (LMP) as the "solution" since the start of this process, meanwhile the "problem" has changed three times.

The below is Here is the problem statement from the AEMC's information sheet 7 Sept 2020:

The proposed transmission access reform model has been developed in response to the transition that is currently underway in the electricity system. The NEM will replace most of its current generation stock by 2040. The electricity system of the future is likely to be characterised by many relatively small and geographically dispersed renewable generators, connecting to windy or sunny parts of the network, which historically have not needed large amounts of transmission capacity.

There is no clarity on the problem let alone quantification of its current impacts on the NEM. The nebulousness of a future potential issue is a convenient excuse for the fact that this is **a solution in search of a problem.**

Misfeasance

The blind faith of LMP believers has led to a process undermined by an abuse of authority. The AEMC has repeatedly ignored concerns about the harm of the reform, ignored evidence of this harm, and ignored potential alternatives. All the while pretending to listen to what we had to say in order to show “stakeholder engagement”.

Neoen has demonstrated that LMP creates barriers to new entry, creates incentives to collude or exert market power, and that it increases cost of capital. Any one of these issues should have been enough to cease pursuit of LMP. The AEMC’s dismissal of empirical evidence with a declaration of their beliefs highlights that this is an ideological process based purely on theory with no regard for the best outcome for consumers.

Neoen’s trust in the NEM’s governance has been sapped by the COGATI process. This frustration has turned to despair now that the AEMC has railroaded LMP into the ESB Post 2025 streams.

Design

The proposed design necessarily increases risk and adds cost which consumers will ultimately pay for.

Added cost

Consider a new build plant trying to enter the market after LMP has been established. The developers find a site with adequate connection and decent resource. Now they must go about finding the financial transmission rights (FTRs) for the node. They are likely to have been bought by speculators or other market participants by now. If a competitor wishes to block the development, it will not proceed. Let’s assume the FTRs are all held by an easily identifiable speculator (willing to sell) who has bought the FTRs cheaply knowing they become valuable if a generator builds there. If the generator buys FTRs from the speculator it necessarily increases the cost of energy. They may be willing to spend more on FTRs than will be returned in compensation in order to get finance. Notably the extra money they have spent on top of the original sale price does not help firm the FTRs or subsidise TUOS – it goes to the speculator. The AEMC already identified such rent seeking behaviour in other markets with LMP (PJM) and yet in this case somehow decides to ignore it.

The design of FTRs results in higher costs than benefits to generators flowing through to energy prices.

Incomplete hedge

Firstly, the removal of MLF from the FTRs greatly reduces their value. The volatility of dynamic MLFs decreases certainty of delivery reducing the ability to contract and the certainty in spot revenues. Dynamic MLFs provide the only potential improvement in efficiency in the whole COGATI process, but generators need a hedge for them. The efficiency benefit of LMP can easily be overwhelmed by strategic bidding at the margin where the marginal generator can more easily identify their contribution to volume weighted average price (VWAP).

The FTRs are also not firm. As mentioned above, if FTRs are bought when they are valueless and new generation makes them valuable there will not be enough sale revenue to back the FTR.

Furthermore the most harmful constraints to generators came as a surprise. The NW-VIC system strength constraints curtailed generators to 50% capacity. If they had bought full FTRs to the previously known network rating, there would have been a large payout to them without a large sale revenue from FTRs. In addition to this those generators would be incentivised to bid to -\$1000 to maximise returns from the FTRs. This would rapidly deplete the cash backing all FTRs and undermine the entire scheme.

FTRs could be rescaled to reduce payouts but again, this makes them a terrible hedge.

Generators simply want an FTR that puts a floor on MLF and a ceiling on curtailment. This can easily be done without LMP by targeting these volumetric components directly, as demonstrated to the AEMC by Neoen.

Clear Harm to the Australian Economy

The complexity of LMP is certain to increase the cost to NEM consumers. NERA's cost-benefit analysis is flawed (as discussed later) so most of the overstated benefits can be disregarded.

The AEMC has already been made aware of these issues in discussion with Neoen, but they are repeated here for public awareness.

Cost of Capital

The cheapest new entrant energy comes from capital intensive projects with long term contracts and long term debt. LMP creates a significant new price risk, far greater than the existing volume risks. This is partially offset by an incomplete hedge in the form of FTRs. The previously mentioned new entrant will have debt terms limited by the length, capacity, firmness, and availability of FTRs. They have no certainty about the future cost of FTRs, their availability, or the impact if they cannot get them – a far greater market risk. The risk of COGATI has increased since dynamic MLFs were confirmed not to be hedged via FTR.

The natural response of the financiers to increased uncertainty is to reduce allocated debt, debt tenure and increase expected returns. In addition, the project investors will also aim to increase target equity returns as a result of such uncertainty. The combination of less debt and higher equity returns will substantially increase cost of capital. For a conservative 200 bps increase in WACC this would increase contract prices by at least \$5/MWh. In a future where all generator stock will be replaced, we can multiply this increased cost by total NEM consumption of 200 TWh to get an **increased cost of \$1B per annum to consumers**.

Restriction of Supply

The most efficient use of transmission infrastructure is one where utilisation is high, and the impact of curtailment is minor but frequent. That is, a large amount of low cost supply for a given amount of transmission. The AEMC propose to restrict the supply of FTRs to improve firmness, necessarily restricting the amount of generation able to acquire finance. With supply of low marginal cost generation reduced it must be made up with high marginal cost generation located close to load centres. As there will be little curtailment with a restricted FTR market the volume weighted average price (VWAP) will converge to the marginal price of the most expensive generator. Depending on the price of gas and the increased frequency of gas setting price this could **increase wholesale costs to consumers by \$1.4 billion to \$4.8 billion per annum**.

The requirement to purchase FTRs early in the development process increases the cost of development by an order of magnitude. This will restrict developer's ability to progress multiple projects at once and encourage the development of low risk projects rather than low cost ones. Thus, the competition pool for new supply is diminished, reducing the optimal selection of projects. If optimality in project placement is reduced by 1% this **increases wholesale cost to consumers by around \$100m per annum**.

Gaming

Fracturing the market gives increased opportunity to exert temporary, localised market power. The AEMC does not consider that generators can work as a portfolio or bid to a price other than SRMC. The NERA simplified solver model does not allow for this kind of behaviour as all generators must bid at SRMC.

Consider a simplified constraint with three generators. NEMDE aims to keep the Equation MW below a threshold, while minimising cost: curtailed MW * (spot-bid price). RRP was assumed to be \$50. Customer value is preserved by maximising the amount of generation that makes it to the load.

Constraint - Status Quo

	Availability	MW out	Factor	Equation MW	Bid	Cost
G1	100	90	1	90	-\$1,000	10500
G2	100	100	0.1	10	-\$1,000	0
G3	100	100	-0.5	-50	-\$1,000	0
Total	300	290		50		10500
Goals		<i>Customer Value</i>		<i>Total <=50</i>		<i>Minimise Total</i>

In the status quo there is an incentive to bid to the floor to remain generating. If all generators do this the maximum customer value is preserved as only the most impactful generation is curtailed.

This practise is a negative cost to consumers as more low cost generation makes it into the wider market.

In a future dominated by zero marginal cost generation there are no operating cost benefits that can be realised by LMP.

Constraint - LMP

	Availability	MW out	Factor	Equation MW	Bid	Cost
G1	100	100	1	100	-\$1,000	0
G2	100	0	0.1	0	\$0	5000
G3	100	100	-0.5	-50	\$499	0
Total	300	200		50		5000
Goals		<i>Customer Value</i>		<i>Total <=50</i>		<i>Minimise Total</i>

Under COGATI a wide variety of bidding strategies become available.

Consider all generators have 100 MW of FTR, and G1 and G3 to be in a portfolio. All generators are ambivalent to LMP and need only bid below the VWAP of \$50 to be dispatched. However, if G1 bids to floor they also increase the LMP for G3 who must remain generating to keep the Equation MW below 50. G3 will be paid \$500 LMP as long as they bid below \$500.

G2's revenues are constant, so they have no interest in the shenanigans. The G1/G3 portfolio has significantly increased revenues by dropping their bid price at G1. The marginal cost of generation may also be increased as overall supply is reduced, i.e. Customer Value was reduced.

Note that with the AEMC/NERA's upside-down definition of value (lower constraint cost) they believe this outcome to be better than the status quo.

There are thousands of constraints like this active in the NEM, and batteries create new chances to exacerbate constraints for additional profit. The cost of this is impossible to know, but it would not be unreasonable to expect a 1% uplift in VWAPs due to strategic bidding, on the order of **\$100m p.a. cost to consumers**.

The wrong reform at the wrong time

The AEMC state that LMP has been successful elsewhere as proof that it will benefit Australia. LMP has merely not been allowed to fail. Consumers and suppliers have no choice in the market structure. It is telling that no other commodity markets naturally form LMP structures – this is because buyers and sellers do not want the instability that comes with high complexity.

The “success” of LMP is stated by the LMP believers who managed to get their way in other markets. Of course they would represent their efforts as effective and for the greater good! The AEMC has not presented general metrics across markets that demonstrate LMP markets are better (admittedly this is quite difficult).

What we don't see from the LMP proponents are the band aids required to keep things operating; the example markets are all propped up by extra-market cash:

1. **Taxpayer investment**

Taxes are regularly spent on guaranteeing “efficient” investments.

Coupled with a concentration of authority in government departments it can make the impacts of corruption or incompetence enormous for consumers.

2. **Tax incentives**

Supply side incentives primarily affecting tax that reduce net cost of capital.

Highly effective at fuelling investment and reducing wholesale prices, at the cost of taxpayers.

3. **Reliance on speculation**

Welcome at first, if you can get capital put in high risk, low reward projects.

It seems doubtful customers can hope for it in the NEM.

These extra cashflows are ignored by the AEMC and NERA who presume that investors will be interested in merely being paid their short run costs. It is not in the AEMC's power to provide suppliers with a return on capital so LMP will starve the NEM of investment.

This is the wrong time for radical change. The issue raised in the problem statement is that we are going through a period of great change so the last thing we need is additional change for its own sake. This transition requires substantial continued investment in new infrastructure, and we cannot afford a hiatus. Another price shock would likely spur investment regardless of the market structure, but that should not be the plan we have for consumers.

Modelling refutation

There are two major issues with the NERA modelling that render it mostly worthless.

Firstly, the model is cost based. Customers do not pay the cost of energy but rather the price of it. Minimisation of cost produces incorrect assumptions of plant deployment where capital invested in a project is not recouped.

Secondly, the model assumes generators do not bid to maximise revenues, instead they are operated to minimise system costs. The AEMC continues to dismiss strategic bidding as an option despite its prevalence in all real markets. Neoen requested a version of NERA's simplified Excel model which would allow us to show this, but the request was not met before this submission was due.

The cost-based SRMC reasoning is consistent with a not-for-profit vertically integrated monopoly. Indeed, LMP would be useful to such an entity in exposing price signals within their network where they might otherwise remain hidden by a cost based approach. However, the NEM is not an omniscient, benevolent monopoly so this basis of reasoning is flawed.

In general the AEMC and NERA have an upside-down definition of value which distorts their goals and discredits their results. Value is not the bid price as AEMC presume.

In a normal commodity market, value is expressed as the product of demand and marginal price. Supply that cannot be delivered to meet demand does not impact the marginal price but is also not paid for. In the NEM a generator is paid only for the energy that makes it to the consumer and the supposed "generator subsidy" is a mirage. In fact, the use of marginal losses instead of actual losses imposes a wealth transfer from generators to consumers. This loss rent is the true distortionary subsidy. For large currents, the marginal loss is approximately twice the actual I²R loss. While marginal losses are useful for setting price, when used in settlement they create an inefficient locational signal that discourages good use of the transmission network.

Overall, NERA and the AEMC assume that the locational signals to invest are improved without demonstrating it. This of course should result in enormous benefits depending upon how dishonest the inputs are. The AEMC has still not demonstrated how the locational signals are improved for a new generator.

Consider a generator in the status quo. They look at a node with a good MLF and no curtailment. Is it a good spot to build? They conduct modelling of future MLF and curtailment to find out.

Now consider under COGATI. The generator observes a node with LMP that does not experience price separation. Is it a good spot to build? They cannot accurately model the contract position, cost structure, and bid strategy of each generator in the NEM (and thus the LMP, VWAP for every 5 minutes over 30 years). Simplifications to their modelling will need to be made that decrease certainty in the results.

In short, historical LMP does not give an investor any indication of where to construct in order to have a good asset for the future. LMP is not a tool to inform decision making but an arbitrary numbers game to penalise otherwise rational behaviour.

Race to floor bidding

In reality wind and solar are the generators most engaged in the behaviour so NERA's modelling must be in error. A casual glance at AEMO's constraints report and dispatch outcomes would dispel the myth that race to the floor bidding has a major cost to society. The AEMC previously suggested that the cost of this was on the order of \$4m p.a. NERA's figure 5.3 suggests that 8.33% of all black coal energy is inefficiently dispatched. This enormous volume should be quite obvious if true. Neoen has suggested many times for the AEMC to use actual data instead of synthetic data to prove their position. We are yet to see evidence to support COGATI that is not purely theoretical.

Dynamic Losses

Clearly there is some dispatch efficiency benefit from the use of dynamic losses, but it is also abundantly clear that this benefit is quite small. The variable cost of the generator accounts for almost all of their loss adjusted bid price. Because price setting generators tend to have good MLFs, the variation in dynamic MLF is nearly always smaller than the differences in variable operating cost. For there to be a benefit several things need to be true:

1. The marginal unit's dynamic MLF is lower than their average MLF.
2. The next most marginal unit's dynamic MLF is higher than their average MLF.
3. Fuel costs need to be very close
4. The bid stack is at the point where the two variable costs meet

This is only possible a small proportion of the time and the marginal benefit is also quite small because the variable costs must be close.

It would be much more convincing to use actual historical data to demonstrate the benefit of dynamic MLFs. NERA's use of lossless dispatch distorts the results beyond usefulness. The unserved energy is an indicator that something is quite wrong. The use of average fuel costs means the differentiation between units disappears; this increases the probability of benefits occurring.

Neoen does not completely disregard the potential for dynamic losses to improve efficiency, but the reported benefits should be heavily discounted given the grossly non-representative modelling.

Again, the increased cost of capital induced by dynamic marginal losses is certain to outweigh dispatch efficiency improvements.

Liquidity

Increased uncertainty about future dispatch outcomes due to LMP means high levels of contracting is risky. FTRs do not hedge against this. Prudent generator behaviour under LMP will reduce overall liquidity levels. For example, a gas generator selling caps can currently take its MLF into account well in advance. With dynamic MLF they will have to account for the minimum potential MLF that could occur when they want to generate. This means they cannot sell as much volume forward.

The unhedgeable risk mentioned by NERA is far smaller than the risk imposed by LMP. In the status quo you can miss out on the opportunity to generate some of your capacity. Under LMP you are paid nothing for anything you do generate under constraint. In effect LMP extinguishes profit whenever curtailment occurs, rather than proportionally to the constraint. Coupled with the withholding of FTRs (which are non-firm) and generators unhedgeable risk is increased in all scenarios.

Competition

The barriers to entry imposed by LMP, as well as the increased complexity of modelling, and the reduced risk of a portfolio diverse in location provides benefits to large, vertically integrated incumbents compared to small individual generators.

With increased power to block new generation, control the contracting of new generators, and set the VWAP, it would be possible for large participants to extract oligopolistic rents.

Generator Placement

“PLEXOS does not automatically allow the user to allocate deployment of new capacity to individual nodes based on the commercial signals offered by Regional Reference Prices under the No-Reform scenario.”

This means NERA ignore the fact that good developers model MLF and curtailment for their generators at targeted nodes. That is, there is already discovery of the efficient locational signal into the future.

The placement of generators in the Reform scenario assumes they have perfect foresight and knowledge about all nodes. Conversely the Non-reform scenario deliberately assumes they are inefficiently placed. NERA is simply cheating the inputs to meet the AEMC's goals.

The use of homogenous resource profiles for wind and solar erases the locational benefits that come with superior resource profiles. Other costs are also homogenised meaning only transmission is regarded for efficient generator location.

Adding capital cost to plant according to the difference between LMP and VWAP in no way reflects how generators are financed and constructed. This artifice should be disregarded entirely.

The battery model is inconsistent with reality by fixing charge costs. “our modelling under the Reform scenarios dispatches gas peaking plant in preference to batteries in most periods.” It is not clear whether this produces differences in the results as the installed amounts in each scenario seem quite similar.

Results are driven by assumptions not market design

In the No Reform case, there is a divergence after 2035 where lots of unproductive solar plant is built and price rises significantly. It is unlikely that this plant would recover its capital cost if solar produces during low price periods and is heavily constrained. Clearly NERA has simply tweaked their numbers to meet the client's goal rather than divined some particular change in investor behaviour 15 years into the future.

The purported benefits are concentrated in this latter part of the curve making them entirely reliant on the modellers' inputs. Neoen does not find this at all convincing and dismissing the latter period from the benefits negates them almost completely.

Summary

The AEMC's obsession with LMP and disregard for real life investment objectives results in a non-credible assessment of the benefit of reform. Ignoring major economic levers, they focus on minor incremental improvements to justify radical change.

NERA's modelling manipulates the inputs to arrive at a predetermined outcome on behalf of their client. They validate the AEMC's beliefs by misrepresenting investment decisions and customer value.

The COGATI process is a shameful reflection upon the state of NEM governance and should be brought to a halt immediately.

Discounting NERA's benefits appropriately and adding in costs not considered paints a stark picture of how harmful this reform could be.

Annual Results 2035 (Million \$2020)	
	Benefit
Capital cost savings	\$0
More efficient locations from LMP	\$6
Sub-optimal development pool	-\$100
Eliminate Race to Floor	\$4
Dynamic losses	\$10
Interregional competition	\$9
Strategic LMP bidding	-\$100
Wealth transfer to consumers	\$105
Lower renewable supply	-\$1,400
Increased Cost of Capital	-\$1,000
Increased modelling cost	-\$50
Sum of costs and benefits p.a.	-\$2,516

What makes a good generator location?

Neoen provided the AEMC with a spreadsheet demonstrating that overbuilding renewable capacity on a line maximises customer value, even if curtailed energy is compensated with higher prices. High utilisation of transmission, with regular, low impact curtailment is an indication of efficient investment in generation. That is, the most amount of energy was received and used by consumers.

A remote solar farm with cheap land costs and excellent irradiation will always have a lower cost of energy than one close to a city on cloudy, fertile land.

A wind farm with excellent resource will be 25% more productive than one built based purely on easy access to the network.

We must make more effective use of our renewable resources rather than artificially excluding generators that experience some congestion.

Neoen is available to participate in further discussions at the AEMC's behest.

Should you have any questions or seek to follow up this submission at any time, please feel free to contact Tom Geiser via email at tom.geiser@neoen.com.

We look forward to engaging with the AEMC and stakeholders further on this and future reviews.

Kind regards,



Tom Geiser,
Senior Market Manager,
Neoen Australia