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Brisbane, QLD
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Dear Commissioners,

I propose that an explicit carbon price be incorporated into the National Energy Rules.

Description of the rule proposal

1. Generators are charged by AEMO according to their carbon emissions as part of the weekly settlement process.
2. The carbon price applied by AEMO should be determined;
    a. by a statement from the Ministerial Council of Energy (MCE[1]), if such a statement[2] has not expired,
    b. or by a specialised panel similar to the reliability panel that is subordinate to the AEMC. Such an "Emissions Panel" would set a value of emissions reduction with reference to National Energy Objectives and the Targets Statement.
3. Carbon revenues collected by AEMO should be distributed to market customers.
    a. In the event that the Nelson Review leads to the creation of an ESEM scheme operator that needs to recover costs, carbon revenues should first be applied to reduce ESEM scheme cost shortfalls and any revenues left over should be dispersed to market customers.

I note that the AEMC cannot initiate rule changes, but that once a rule change is submitted the AEMC is free to make a more preferable rule change. It is highly likely that with the considerable resources for consultation and analysis at their disposal, the AEMC will be able to find a more preferable and detailed rule change than the rule outlined above.

Issues with the existing rules, and how this rule change addresses them

Put simply, the issue with the existing National Electricity Rules is that they have been developed over almost three decades with reference to a specific set of National Energy Objectives that have recently changed. The rules that were appropriate for the old objectives are not necessarily optimal for the new objectives, which now include emissions reduction.

[1] The National Energy Law (NEL) refers to the Ministerial Council of Energy (MCE). Recently, Ministers have referred to themselves as the Energy and Climate Ministerial Council (ECMC) and the Energy Minsters Sub-Group. For consistency with the NEL, I shall refer to the MCE rather than the ECMC in this submission.
[2] Note that the AEMC values carbon emissions at $80/tCO2e in 2026 according to a current MCE statement.

The issues with the current rules lacking an explicit wholesale carbon price are (1) revenue insufficiency for clean capacity, (2) inefficient long term investment, (3) dispatch inefficiency, and (4) inefficient exits.

The AEMC have themselves articulated the issues created by a lack of a carbon price in their submission to the National Electricity Market wholesale market settings review[3];

To quote the AEMC's own words;

One of the "*fundamental challenges with the NEM that are impacting longer-term investment decisions* [is that] *The unpriced cost of carbon emissions in the electricity sector means that there is no strong in-market signal for generators to exit to achieve lower emissions objectives.*"

"*Revenue insufficiency is one of the critical issues the future NEM will face".* "*This stems from unpriced environmental externalities that impact the exit decisions of thermal generators thereby exacerbating the revenue insufficiency challenge faced by renewable generation"*

"*In the absence of policies that explicitly value carbon, governments have chosen to intervene to achieve emissions targets. For the remaining non-government-owned assets, such government interventions can potentially disrupt investment signals for the private sector and influence exit decisions.*"

The primary emissions reduction mechanism in the NEM will be capital investment in new clean capacity of various forms. The primary effects to consider is therefore revenue insufficiency and investment efficiency; however dispatch efficiency and ordering of coal retirement also matters to a lesser extent for the purpose of efficiently balancing prices and emissions reduction.

Due to the attention placed on the Nelson review at the current point in time, I have also discussed how implementation of a key Nelson Review recommendation, the Electricity Services Entry Mechanism (ESEM) contracts would work in tandem with this rule change.

Revenue insufficiency

A market where capacity with low short-run costs is forced in (either by ESEMs or by direct government action) will be a bearish market. Non-market addition of capacity creates a feedback loop where ESEMs or other government support becomes needed for all new capacity.

So if carbon is not priced, we will experience a policy feedback loop where (1) revenue is insufficient for low carbon investment, (2) governments still have decarbonisation objective and so subsidise low carbon capacity in some form, (3) the additional capacity contributes to lower wholesale prices, exacerbating the revenue insufficiency.

[3] https://consult.dcceew.gov.au/nem-review-initial-consultation/take-the-survey/view/24

Such a result is not consistent with the NEO. If governments are continually intervening in the market to achieve decarbonisation, then the National Energy Rules are not correctly balancing the objective of emissions reduction against the other objectives.

Adding a carbon price to the NER would enable the AEMC or the MCE to increase revenue sufficiency for clean capacity.

Revenue sufficiency under the Nelson Review outcomes

The Nelson review aims to solve revenue sufficiency by introducing an Electricity Services Entry Mechanism. However, the ESEM scheme will also have a revenue sufficiency problem. As the ESEM adds capacity to meet emissions reduction objectives, the spot price will be lower than the counter-factual and the ESEM contract payouts and scheme cost recovery will increase, resulting in more projects needing an ESEM contract in the first place. The cost recovery needed by an ESEM scheme operator will necessarily become very large. Over decades, as the market shifts to needing more capital investment and incurring less operating costs, the cashflows and value transfer in the ESEM scheme cost recovery mechanism could become larger than the cashflows and value transfer in the spot market itself.

The ESEM scheme growing to dwarf the spot market itself isn't necessarily a problem if the ESEM scheme itself is wholly efficient. But the bluntness that gives the ESEM scheme several advantages also detracts from a more detailed level of investment efficiency.

Inefficient long term investment

Without a carbon price in the NEM, there is value lost in capacity that can supply intervals with higher marginal carbon intensity.

Unlike in 2012-2014, there is a greater diversity of fuels setting the price in the NEM, and therefore a greater diversity of marginal carbon intensity across time intervals.

Renewables set the price at zero or lower in some intervals, which are intervals with zero (short-run) marginal carbon intensity. Under a carbon price, such intervals can still be expected to be priced near zero. Adding additional clean generation to these intervals does not result in marginal emissions reductions as any generation is just replacing other renewable generation (at least on a short run basis).

Also, we can expect storages to set the price low in a growing number of intervals where (1) storages can't be fully utilised before a full recharge opportunity, (2) where the recharge opportunity is from curtailed renewables and (3) enough independent storages exist to prevent the use of market power. Such intervals also have a low or zero marginal carbon intensity and can be expected to remain cheap under a carbon price.

That leaves intervals where either coal or gas are setting the price directly, or are the opportunity cost for storages. Because carbon is unpriced in those intervals, the importance of those intervals to investment revenue modelling is lower than it should be under the balance of National Energy Objectives that includes emissions reductions. We can imagine a wind farm with diversified wind, generating more often in price intervals where coal is the marginal source of emissions, vs a wind farm that is highly correlated to other wind farms frequently displacing those wind farms if it isn't curtailed itself.

Clean capacity that contributes more generation to intervals with higher marginal carbon intensity, contribute more to the National Energy Objective of emissions reduction than those that don't.

Pricing carbon in the NER would help raise investment efficiency by increasing the investment case for those projects that create a greater marginal emissions reduction benefit. The increase in investment efficiency also extends to investment activities that occur before direct project investment as well, such as project development and commercial R&D.

Inefficient long term investment under Nelson Review outcomes

The Nelson review ESEM contracts can solve revenue sufficiency for clean capacity in aggregate. But because the ESEM contracts will be standardised, the spot market will still be a large determinant of which projects are "better" than others, relative to their ESEM contractual hedge.

Therefore there remains a gap in investment efficiency, whereby projects that create the greatest marginal emissions reduction aren't being valued for the increased emissions reduction relative to those projects that generate more in periods of low marginal carbon intensity.

Under a spot carbon price, investors will desire projects that have generation patterns favourable to capturing the carbon price uplift. Such projects will contribute more to emissions reduction than the counter-factual as they will be more strongly aligned to pricing intervals where generation has a higher marginal carbon intensity.

ESEM contracts and a spot carbon price would act together to increase each other's effect on investment efficiency.

Dispatch inefficiency

No economic mechanism exists under the rules to determine time periods or market conditions where it would be preferable to dispatch cleaner, higher cost fuels ahead of cheaper, higher emissions fuels.

A lack of spot carbon pricing results in both productive and dynamic inefficiency. The productive inefficiency occurs where higher emissions generators are dispatched out of a carbon-inclusive merit

order. Dynamic inefficiency also occurs because carbon is mostly a stock in the atmosphere and valuing future emissions reductions is inefficient when lower cost emissions savings are available in the present.

I describe one specific example;

In times of low demand, NSW black coal and Victorian brown coal compete to supply NSW demand over the interconnector. Victorian brown coal generally out-competes NSW black coal in the merit order despite marginal interconnector losses, because brown coal is so cheap. The effective price of Victorian generation to supply NSW (and QLD) marginal load is governed in NEMDE by interconnector loss equations. At times of high flow northwards on the Vic->NSW interconnector, brown coal effectively costs more in NSW than at periods of low flow because the system has to pay for marginal losses on the interconnector.

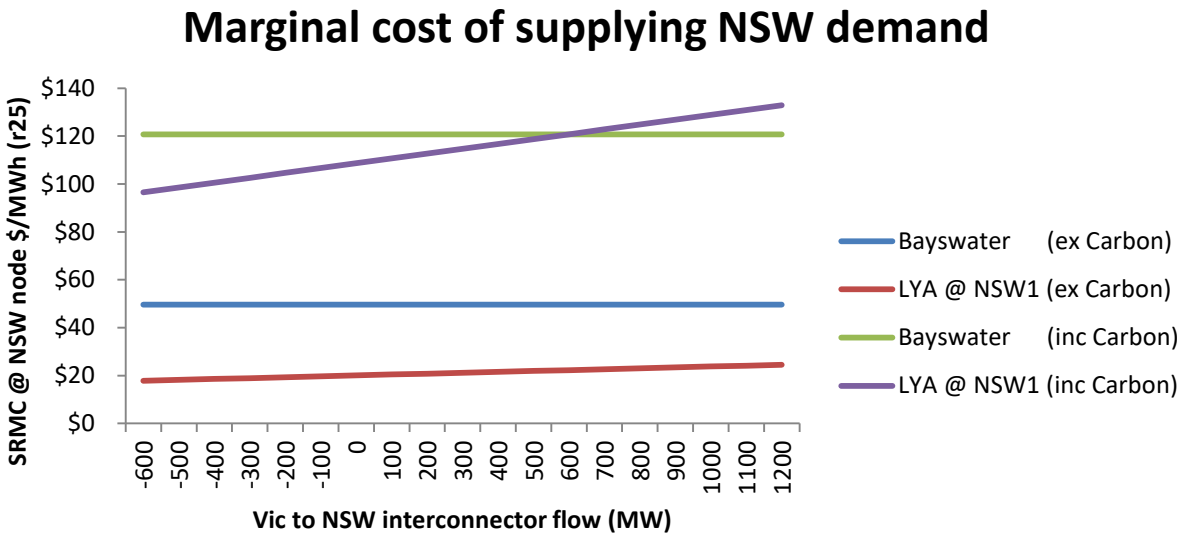
The inter-regional loss factor between NSW and VIC for FY26 is governed by the below equation;

Inter-regional loss Factor = 0.9649 + 1.7257E-04*VNt – 1.4631E-05*Vd + 5.7202E06*Nd + 1.4938E-05*Sd

At AEMO's low demand reference point of Vd = 3500, Nd = 5000, Sd = 1000, the interconnector loss equation simplifies to;

Inter-regional loss Factor = 0.929 + 1.7257E-04*VNt

Using the AEMC's interim Value of Emissions Reduction of $75/tCO2e, I show the relative resource cost of Bayswater and LYA to supply NSW load under low demand conditions and at various levels of interconnect flow;



The chart shows that under current market conditions, with carbon unpriced, Loy Yang A can always out-compete Bayswater on price, even taking into account substantial marginal interconnector losses. From a carbon perspective, not only is Loy Yang A higher emissions, but those emissions are higher again when delivering power to NSW load under conditions of high northward interconnector flow.

If carbon emissions were internalised to the market at the MCE's currently stated value, then Bayswater would more efficiently supply NSW load than Loy Yang A under conditions of low demand and high northward interconnector flow.

To pre-answer a possible objection that the SRMC assumptions from the ISP that underpin this chart may be incorrect or change in future; that is the point of markets, to reveal information and adapt their efficiency over time.

The lack of a carbon price is driving real resource misallocation in the spot market now, when considering the additional National Energy Objective of emissions reduction.

It is worth re-iterating that the quantum of emissions reductions possible via improving dispatch efficiency of the existing fleet is far less than the emissions reductions available from constructing new clean capital assets.

Inefficient Exits

Under the status quo, and also under possible Nelson review outcomes, exit decisions are made without reference to carbon emissions. For example, Eraring power station is theoretically the next coal generator planned to close. However, it is also relatively low carbon compared to Victorian brown coal generators. A market with a carbon price might have seen Victoria brown coal units exiting earlier and Eraring staying online longer, with a net improvement in the balance of objectives across carbon emissions, price and reliability.

The lack of a carbon price in the spot market therefore leads to a reduction in the dynamic efficiency of exit decisions.

Contribution to the achievement of the relevant energy objective

The proposed rule change contributes to all parts of the National Energy Objectives;

"to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:

a. *price, quality, safety, reliability and security of supply of electricity; and*
b. *the reliability, safety and security of the national electricity system; and*

c. *the achievement of targets set by a participating jurisdiction—*
    i. *for reducing Australia's greenhouse gas emissions; or*
    ii. *that are likely to contribute to reducing Australia's greenhouse gas emissions."*

The achievement of targets set by a participating jurisdiction

Starting with "*the achievement of targets set by a participating jurisdiction for reducing Australia's greenhouse gas emissions*", we can consider in particular the Commonwealth's series of targets driving towards net zero by 2050.

Net zero across the entire economy leaves very little room for the National Electricity Market to produce any net emissions. There could be an economic case for infrequent use of gas firming generation to be "netted" by permanent physical removal of CO2 from the atmosphere by other means in the economy. Such as scenario implies a non-zero and high Value of Emissions Reduction, which is currently reflected in the MCE's VER statement where carbon escalates to $420/tCO2e (real23) by 2050.

Greenhouse gases exist mostly as a stock in the atmosphere, and it would be inefficient to emit now what is expensive to capture and sequester later without pricing the difference. That must be balanced against the likely improvements in technology in future and the time value of capital, hence the construction of a price trajectory with a lower value on carbon now than in the future.

The point remains that if we (both as a commonwealth and as energy consumers under the NEO) value carbon in 2050, 2045, 2035 and 2030 and carbon exists as a stock, then we should also value carbon now, as the MCE VER statement does in fact do.

Efficient investment

A spot carbon price will act to increase investment efficiency by increasing revenue available in intervals with higher marginal carbon intensity.

The increase in investment efficiency will act in the same way either with or without the Nelson review's ESEM contracts. A spot carbon price and an ESEM complement each other in terms of investment efficiency. An ESEM contract substantially removes investment risk created by a change or removal of a spot carbon price. However, a spot carbon price still increases price in some supply/demand conditions more than others, creating differentiated emissions reduction value for projects that the ESEM contracts are too blunt to achieve.

Efficient operations

As outlined earlier, if carbon has a value now (which it does), then there are circumstances in which generators are dispatching outside their carbon-inclusive merit order, resulting in a net less to operational efficiency against the full set of energy objectives.

Long term interests

A spot carbon price acts in the long term interests of electricity consumers by

1. reducing the long-term stock of carbon in the atmosphere vs the counter-factual via more economically efficient operations of the system. Therefore it reduces both climate damages and the future necessary "catch-up" pricing.
2. contributing to investment efficiency, resulting in lower capital and future operational costs to meet emissions reduction objectives

Electricity consumers already face a high *external* price for fossil generation via climate damage and inefficient economic policy that tries to find carbon savings in more expensive parts of the economy. Internalising carbon costs results in economic efficiency the lowers the *total* price consumers pay, over the long term.

Quality, safety, reliability and security

A spot carbon price will have no impact on these objectives as they are already guaranteed or efficiently priced by other mechanisms.

The Market Price cap of $22,800/MWh is vastly higher than the value of emissions reduction, even by 2050, so reliability will always massively outweigh emissions reduction in the efficient economic framework that the AEMC shepherds.

Expected potential impacts on those likely to be affected

The main impact will be reduced asset values for owners of the most carbon intensive generation. Although generators could pass through carbon costs in the short term, the improvement to investment efficiency would mean that fossil generation is replaced faster than it otherwise would have been by new clean generation.

Gas generation may even see an increase in revenues and asset values in the short to medium term as their carbon impost would be less than the carbon pass-through from coal generation in many pricing intervals. In the long term, gas generation itself would set the price in more intervals and therefore lose any ability to earn additional margin over the counter-factual.

Owners or off takers of clean generation could experience a short-medium term increase in revenue, but the existence of new entrant competitors, with or without ESEM support, will naturally cap any large increases in asset values.

Consumers that proportionally use more energy in periods when clean generation sets the price at their marginal short run costs, would benefit at the expense of consumers who used proportionally more

energy in periods when fossil generation sets the price in the market. This contributes to allocative efficiency.

The AEMC's powers and obligations

The AEMC is empowered to make this rule under the NEL as it relates to regulating the operation of the national electricity market as per Part 4 Division 2 Section 34(1)(a)(i). Also, emissions reduction is now a "thing contemplated" by the NEL, so the AEMC also has the power to make this rule under the very broad powers of Division 2 Section 34(1)(b).

Part 4

Division 2—Rule making functions and powers of the AEMC

34—Rule making powers

(1) Subject to this Division, the AEMC, in accordance with this Law and the Regulations, may make Rules, to be known, collectively, as the "National Electricity Rules", for or with respect to—

(a) regulating—

(i) the operation of the national electricity market;

…

(b) any matter or thing contemplated by this Law, or is necessary or expedient for the purposes of this Law.

Section 42 states that the MCE *can* provide a statement on the value of greenhouse gas emissions and the AEMC must use that value *if present* when applying the amended objective.

42—Administrative guidance about value of greenhouse gas emissions

(1) This clause applies if—

(a) administrative guidance is issued by a government or regulatory entity about considering or applying the amended objective; and

(b) the guidance includes the value, or a method of working out the value, of greenhouse gas emissions or greenhouse gas emissions reduction; and

(c) the guidance is consistent with any MCE statement.

(2) The value or method stated in the administrative guidance must be complied with by the government or regulatory entity in considering or applying the amended objective.

In the absence of a statement from the MCE, or if that statement expires, then the AEMC would be free to determine their own method and price for balancing emissions reduction and other National Energy Objectives, as they currently do when determining the value of customer reliability.

Part 4 Division 3 Section 39 explicitly enables the AEMC to establish panels similar to the reliability panel. If such a panel is needed to provide a carbon price in the absence of an MCE statement, then the AEMC is explicitly empowered to create such a panel.

39—Establishment of committees and panels (other than the Reliability Panel) and working groups

The AEMC may establish committees and panels (other than the Reliability Panel) and working groups to—

(a) provide advice on specified aspects of the AEMC's functions; or

(b) undertake any other activity in relation to the AEMC's functions as is specified by the AEMC.

Broader context

In the AEMC's guide to their decision making framework[4] they place particular emphasis on the big picture.

When making decisions, we cannot lose sight of the bigger picture, the depth and breadth of the reforms that are occurring and the need to manage the unprecedented challenges facing the sector.

As AEMC decisions guide action towards a decarbonising, affordable and reliable energy system, we must consider the broader changes occurring in technologies, stakeholder behaviour and jurisdictional policies (including emissions targets).

In considering the bigger picture, particularly with regard to jurisdictional policy, it is worth considering the context in which emissions reduction was added to the NEO.

[4] https://www.aemc.gov.au/sites/default/files/2025-03/How%20the%20national%20energy%20objectives%20shape%20our%20decisions%20260325.pdf

ECMC (EMSG) Information Paper

When deciding to update the National Energy Objective, Energy Ministers released an Information Paper[5]. Key points the Energy Ministers wished to convey included;

1. Ministers noted "*majority support for applying the '**economic efficiency'** framework for the emissions reduction component, **and its key benefits** of ensuring balanced, well-understood decision-making*."
2. ***"Ministers have supported** an approach that provides for the operationalisation of **valuing emissions reduction in regulatory processes through** a combination of targeted transitional arrangements, regulations and **rules."***

The broader context here is that not only the Energy Ministers, but the majority of concerned stakeholders value the AEMC's historic application of economic efficiency principles. The Energy Ministers placed a great deal of trust and executive function in the hands of the AEMC in furtherance of the updated NEO.

Also, the Energy Ministers, when updating the NEO, explicitly envisaged operationalising a value of emissions reductions through rules.

When consulting on the update to the NEO[6], energy ministers explicitly noted that market bodies such as the AEMC are intended to continue using the full range of their powers;

*"References to 'decisions' above encompasses **the full range of functions, powers and obligations** assigned to the market bodies where they are already required to be undertaken with reference to the energy objectives"*

In the case of the AEMC, those powers include making rule changes with reference to the NEO, including the emissions reduction objective.

Energy Ministers also re-confirmed the importance of temporal trade-offs, sometimes resulting in higher charges on consumers in the short term;

"The focus of the energy objectives on the long-term interests of consumers provides a temporal aspect to these considerations. For example, investment in transmission may increase the costs paid by

[5] https://www.energy.gov.au/sites/default/files/2023-06/Incorporating%20an%20emissions%20reduction%20objective%20into%20the%20national%20energy%20objectives%20-%20Information%20Paper.pdf

[6] https://www.energy.gov.au/sites/default/files/2022-12/ESOM%20OOS%20Nov%2022%20ATT%20B%28a%29%20-%20Consultation%20paper%20-%20incorporating%20an%20emissions%20reduction%20objective%20in%20the%20national%20energy%20objectives.pdf

consumers in the short-to-medium term but has the long-term impact of improving reliability and security, and reducing the emissions intensity of the National Electricity Market (NEM).”

A final part of the bigger picture is that there have been so many external government interventions into the electricity market because the structure of the NEO, the NEL and NER itself has not been delivering governments what they desire. One of the AEMC’s limitations is that they cannot initiate rule changes themselves, they can only initiate reviews. This rule change proposal is a vote of confidence in the AEMC’s ability via its consultative process and economic analysis framework to make a more preferable rule, than that which might be imposed by individual government jurisdictions.

Conclusion

The National Energy Objectives now include emissions reduction as an objective. The AEMC is expected by industry and explicitly by the Ministerial Council on Energy to apply economic efficiency principles when evaluating rule changes in furtherance of the full suite of National Energy Objectives. The Targets Statement is only a minimum that the AEMC must consider.

A spot carbon price would contribute to investment efficiency, operational efficiency and allocative efficiency against the full suite of National Energy Objectives.

The AEMC does not have the power to initiate rule changes and so therefore has been incapable of implementing a carbon price or other decarbonisation rule changes on their own initiative. Now that this rule change has been submitted, they have the power to implement many possible variations of a carbon price, via enacting a more preferable rule.