Your ref: Project Initiation Paper on Congestion Management Model

28 January 2022

Ms Anna Collyer
Chair
Energy Security Board
Submitted via email to: info@esb.org.au

Dear Ms Collyer

Submission: Transmission Access Reform Project Initiation Paper

CS Energy welcomes the opportunity to provide a submission to the Energy Security Board's (**ESB's**) Transmission Access Reform Project initiation paper (**Initiation Paper**).

About CS Energy

CS Energy is a Queensland energy company that generates and sells electricity in the National Electricity Market (**NEM**). CS Energy owns and operates the Kogan Creek and Callide B coal-fired power stations and has a 50% share in the Callide C station (which it also operates). CS Energy sells electricity into the NEM from these power stations, as well as electricity generated by other power stations that CS Energy holds the trading rights to.

CS Energy also operates a retail business, offering retail contracts to large commercial and industrial users in Queensland, and is part of the South-East Queensland retail market through our joint venture with Alinta Energy.

CS Energy is 100 percent owned by the Queensland government.

Key recommendations

The NEM is changing and will continue to do so as it transitions to a market with more variable renewable energy (**VRE**) and an overall lower carbon footprint. This transformation will see the characterisation of the NEM shifting from centrally located dispatchable generation to small and geographically dispersed VRE generation, connecting to parts of the network with insufficient capacity and far from load centres. The existing grid and transmission access framework are not built for future needs.

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CS Energy maintains that transmission access reform cannot be considered independently of the broader transmission frameworks. This includes strategic decisions on the network topology of the future NEM and the necessary planning and investment to facilitate this change. Furthermore, the ESB must be cognisant of the disruption that any access reform will impose on the market, from a practical, rather than theoretical standpoint. The complexity also mandates detailed exploration, assessment and consultation, a process that has not been conducted to date.

CS Energy does not support the Congestion Management Model (**CMM**) as it currently stands, nor does it support the unilateral consideration of the CMM going forwards. The challenge of addressing the myriad of issues raised both by the ESB and by stakeholders will be compounded by the requirement to finalise the detail design by the end of 2022, which is an ambitious timeframe, given that access reviews over the last 2 decades have not resolved these issues.

Given the Initiation Paper invites proposals alternative to the CMM, CS Energy would like to see a commitment from the ESB to consider these alternative proposals, including through public consultation on equal footing with the CMM. Failure to adequately assess alternatives will reduce stakeholder confidence in both the determination that CMM is the best option for transmission access reform and the collaborative nature of the process.

Based on the information released to date on the as proposed form of CMM alternatives, there are several options that appear to address the ESB's assessment criteria sufficiently (and may be able to be modified to better address these criteria) to warrant further assessment, including:

- Edify Energy's Congestion Relief Market;
- The Public Interest Advocacy Centre's (**PIAC's**) risk sharing model for Renewable Energy Zones (**REZs**); and
- Snowy Hydro's dual floor price model to reduce transmission access risk.

CS Energy also proposes consideration of a fixed-shape time-of-day Marginal Loss Factor (**MLF**) as an alternative to CMM, to strengthen the locational and operational signals provided by the current MLF framework and dissuade new investment in electrically weak parts of the network.

An initial assessment of how these compare to the CMM applying the ESB's assessment criteria is shown in Table 1.

Table 1: Assessment of alternatives against selection criteria

ESB assessment criteria	CMM	Congestion Relief Model	Transmission cost sharing	Dual floor price	Time-of-day MLFs
Locational signals					
Efficient dispatch					
Congestion risk allocation					
Transmission cost allocation					
Implementation considerations					
Jurisdictional differences					
Interaction with non-energy markets					
Interaction with contractual arrangements					

Given the complexity of the topic and the constricted timeframe, it is imperative that the ESB establishes a transparent and collaborative process going forward to assess the CMM and alternatives, including:

- **Appropriate qualification of the challenges being addressed** – CS Energy disagrees with the materiality of the identified challenges and considers that they are being addressed within other market reforms. The CMM may only achieve marginal benefit. CS Energy cautions against focusing on issues that are likely to be transitionary and encourages the ESB to focus on the transmission framework required to deliver future needs;

- **A clear and consistent objective of the reform** - including a methodology for determining the efficient level of congestion over time as VRE capacity on the network increases together with an ability to measure tangible outcomes;

- **Pragmatic approach to assumptions** – the ESB needs to apply a level of pragmatism, based on current market practice, into all aspects of the design process. Worked examples, input into modelling and analysis as well as the contextualisation of the challenges must reflect the reality of the market and participant behaviour. Stakeholders need to be able to understand how the proposed reform will operate in practice and have confidence that all analysis reflects the operation of the market and market participants;

- **Consideration of other markets and reforms** – access reform cannot be considered in isolation of the broader market and its frameworks. In addition to transmission planning and investment frameworks, consideration of any design must consider the

interaction with mechanisms for the provision of essential system services, particularly as these will impact on the commitment and dispatch process;

- **Alignment with market principles** - that grant participants the greatest amount of commercial freedom to decide how they will operate in the market. This includes an acknowledgement that a centralised planning regime cannot be efficient in the presence of jurisdictional schemes that depart from NEM-wide considerations; and

- **Transparent and collaborative process** – the integrity of the design process relies on appropriate transparency and collaboration throughout the process. This includes:

    - Appropriate contextualisation of stakeholder feedback and tangible action to address issues raised throughout the consultation process;

    - Public consultation on all modelling so that assumptions and interpretation of the results can be peer reviewed. This is critical given all modelling performed by the ESB to date has been conducted after public consultation and has not addressed significant stakeholder concerns; and

    - Clear justification and qualification for decisions throughout the process.

CS Energy views this Initiation Paper as an opportunity for the ESB to leverage the inputs from stakeholders regarding both the process and the model design, and work with stakeholders to develop targeted reform that delivers efficient outcomes against the ESB's goals.

Responses to the ESB's streams

CS Energy's responses with further detail on the ESB's reform process and the two streams of work detailed in the Initiation Paper are set out in Attachment A.

If you would like to discuss this submission, please contact Evan Jones (Market Regulatory Manager) on 0419 667 908 or ejones@csenergy.com.au.

Yours sincerely

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ATTACHMENT A

Access reform is complex and the challenges in resolving the difficulties emerging with the shifting characterisation of the NEM from centrally located dispatchable generation to small and geographically dispersed VRE generation connecting to parts of the network with insufficient capacity and capability, should not be underestimated.

CS Energy does not envy the ESB's task in finalising a detailed design for congestion management by the end of 2022 as stipulated by the National Cabinet, given such a conclusion has evaded the numerous reviews that have occurred over the past 20 years as emphasised in the Initiation Paper:[1]

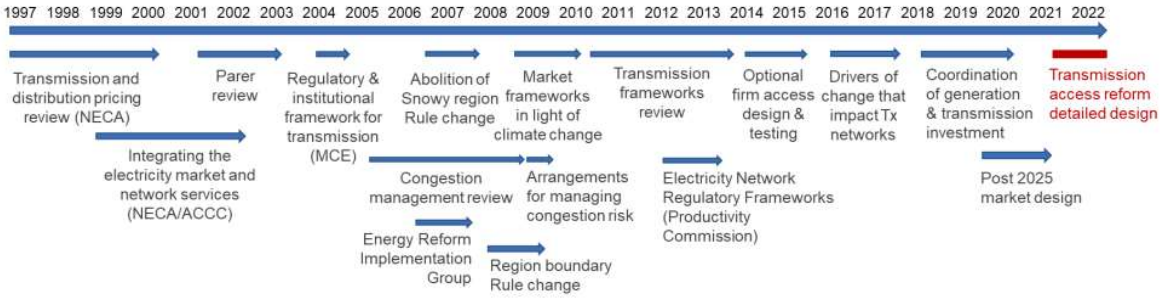

Figure 1: Timeline of NEM access reform reviews

One year to address the long list of outstanding issues (both those raised in the Initiation Paper as well as previous and future stakeholder feedback) will be challenging.

CS Energy expects the appropriate level of due diligence to be applied to this reform over the course of the year including:

- Appropriate qualification of challenges;
- Clear and consistent objectives;
- Alignment with market design principles;
- Appropriate assessment criteria and approach;
- Appropriate level of analysis;
- Transparent and collaborative design process; and
- Consideration of alternatives.

The specifics of any design will benefit greatly from first attending to these aspects and will help to ensure inadvertent outcomes to consumers are minimised.

[1] Energy Security Board, *Transmission Access Reform Project Initiation Paper*, November 2021, page 8

Appropriate qualification of challenges

CS Energy remains unconvinced by the evidence presented to date to support:

- The materiality of the purported issues (network congestion, locational signals and disorderly bidding) within the current market design;
- The inadequacy of existing frameworks;
- That transmission access reform is necessary and can be considered independent of other transmission framework reforms; and
- That the CMM is the preferred mechanism to address the purported issues.

Firstly, CS Energy considers the specified challenges associated with "race-to-the-floor" bidding and the need for a targeted solution both overstate the problem and do not acknowledge the range of practical reasons generators may bid energy into the market in good faith below their estimated short-run marginal cost (**SRMC**). These concerns were raised by stakeholders throughout the ESB Post 2025 process and its predecessor, the Australian Energy Market Commission's (**AEMC**) Coordination of Generation and Transmission Investment (**CoGaTI**).[2]

The materiality of network congestion suggested by the ESB is not supported by recent network constraint data published by the Australian Energy Market Operator (**AEMO**), which shows most of the constraints across the NEM are caused by system strength or frequency control requirements rather than network capability leading to congestion. While network congestion may increase in future, CS Energy disagrees with the modelling undertaken by the ESB to highlight its materiality.[3] The modelling was conducted after public consultation and thus did not grant stakeholders the opportunity to critique the assumptions or presentation of results. CS Energy is not alone in its concern of the analysis and considers it as setting a false premise for the design of a CMM or similar mechanism.[4]

Furthermore, information about potential congestion in network locations is readily available to guide new investments. AEMO publishes numerous reports providing locational signals to the market and potential investors, including annual *Regions and Marginal Loss Factors* reports and annual and monthly constraint reports. Transmission Network Service Providers (**TNSPs**) are also obligated to assess forward network capacity and identify the headroom for VRE to connect. By way of example, Powerlink provides a significant amount of information for parties seeking to connect to its transmission network through its *Transmission Annual Planning Report* (**TAPR**) and *Generation Capacity Guide* (**GCG**), including indicative assessments of available network capacity, proposed network developments and forecast network limitations.[5] Further locational signals to participants will arise from the implementation of the efficient management of system strength on the power system rule change.[6]

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[2] For example, CS Energy, *Submission: Consultation on Transmission Access Reform Interim Report*, October 2020, page 9; Energy Users Association of Australia, *Submission: Transmission Access Reform – A Consumer Perspective*, October 2020, page 7; Stanwell Corporation, *Response to AEMC Interim Report: Updated Technical Specifications and Cost-Benefit Analysis*, October 2020, page 20; Finncorn Consulting, *Submission to the Energy Security Board in response to the Post-2025 Market Design Options Consultation Paper*, June 2021, page 22; Stanwell Corporation: *Response to Post-2025 Market Design Options – A paper for consultation*, June 2021, page 17.

[3] FTI Consulting, *Forecast Congestion in the NEM*, August 2021

[4] For example, a key assumption applied was to identify congestion based on how many constraints were binding and their frequency. A binding constraint does not necessarily reflect an "issue"; conversely, constraints bind to reflect that the secure operating state has been satisfied for example.

[5] Powerlink, *2021 Transmission Annual Planning Report*, October 2021

[6] Australian Energy Market Commission, *Efficient Management of System Strength on the Power System rule determination*, October 2021

The ESB has not yet demonstrated why these locational signals are insufficient and has limited its focus entirely towards changing generator behaviour without due consideration of the broader and more material challenges in this space.

While CS Energy agrees that challenges will emerge with the shifting characterisation of the NEM from centrally located dispatchable generation to smaller and geographically dispersed VRE generation, the CMM is seeking to address two branches of a broader challenge rather than focusing on the strategic and holistic transmission framework that is required to deliver future needs.

There has been no consideration of reforms that may be required to the Transmission Use of System (**TUOS**) framework or to new generators funding investment in the shared transmission network. Furthermore, there is no attention to the growing misalignment in the timeframes of generation and network investment. The current frameworks were designed to reflect the NEM's topology at the time of its establishment in 1998. While some of these are expected to be addressed in the AEMC's *Transmission Planning and Investment Review*, the uncoordinated approach of these will lead to poor reform and adverse impacts for consumers.[7]

Whilst CS Energy remains concerned about the quality of reform that can be achieved with the current narrow focus, CS Energy provides the following feedback on the matters set out in the Project Initiation Paper.

Clear and consistent objective

The ESB has identified the challenges it seeks to address with the CMM (or alternative) but has not yet clarified or qualified the desired outcome. Market reform cannot be based on motherhood statements. Given the correlation of VRE output, the increasing proportion of VRE will naturally result in increasing incidents of concurrent generation exceeding network capacity. Furthermore, the intermittency of VRE means there will be a substantial upscaling factor for the additional VRE capacity required to nominally replace withdrawn synchronous capacity, which in turn would be expected to increase the occurrence of high coincident generation.

A level of spilt energy is already factored into the business case for new projects that recognises these dynamics. This suggests that the level of network congestion that is considered acceptable today is likely to be less than the efficient level in a power system comprising of a greater share of VRE.

Given congestion is one of the key challenges the ESB is seeking to address, it is imperative that the ESB define the efficient level of congestion for the future power system. A methodology for determining the efficient level of congestion is required and should be determined over time as VRE capacity on the network increases. This could perhaps be reflected in the frameworks as a planning standard or similar.

Only once the efficient level of network congestion has been established will the ESB, market bodies and stakeholders be able to assess the size of the challenge to be addressed, develop solutions that deliver the efficient level of network congestion (i.e. do not attempt to deliver an inefficiently low level of congestion) and assess whether the cost of reform is commensurate with expected benefits.

[7] Australian Energy Market Commission, *Transmission Planning and Investment Review*

CS Energy also contends that it is likely that the broad range of objectives (and the timeframes over which they apply) the ESB is proposing to address cannot all be adequately addressed through a single mechanism. There are more targets than levers, and the compromises required to attain the simplicity of a single mechanism are more than offset by the costs, complexity and disruption of a "big bang" solution particularly if elements are duplicative of other frameworks. The varying objectives of the CMM may warrant examination of potential solutions that address each objective individually.

Alignment with market design principles

(a) Open access regime

While not explicitly stated in the Initiation Paper, the proposed CMM model essentially shifts the NEM to a centralised planning regime. New projects can only feasibly locate in a REZ as identified by AEMO, as exposure to the congestion charge and the inability of new projects outside REZs to access congestion rebates is likely unsustainable by design. This is the antithesis of the NEM's market design principles, especially Sections 3.1.4(a)(1) and (5) of the National Electricity Rules (**NER**) which state:

> *3.1.4 (a) This Chapter is intended to give effect to the following market design principles:*
> *(1) minimisation of AEMO decision-making to allow Market Participants the greatest amount of commercial freedom to decide how they will operate in the market;*
> *…*
> (5) *equal access to the market for existing and prospective Market Participants*;[8]

CS Energy remains concerned that the significance of the change to the fundamental design of the market inherent in the CMM is not fully appreciated. Reliance on a centralised approach to investment may undermine investment efficiency, which will likely exacerbate the challenges associated with the rapid rate of change of the energy market transformation. This risk and uncertainty is magnified by the lack of a coordinated approach to transmission access, planning and investment. A centralised planning regime cannot effectively be considered independent of transmission investment and planning.

The ESB's preferred model for transmission access reform misappropriates the allocation of risk. Investors are required to assume the risk of locational decisions constrained by market body and jurisdictional fiat instead of relying on market signals and project specific factors that are extraneous to the market when investing in the new projects required to underpin the energy transformation.

As per the market design principles embedded in the NER, market participants should be given the greatest amount of commercial freedom to decide how they will operate in the market. The role of market bodies is to provide signals to market participants and potential investors who are then empowered to address any potential shortfalls. The Electricity Statement of Opportunity (**ESOO**) is an example of investment signals predicated on a potential market shortfall and allowing the market the opportunity to respond. CS Energy questions why the market is not being given the opportunity to similarly respond in this context.

CS Energy acknowledges the final CMM (or alternative) design may allow new investment at locations outside a REZ if signed off as suitable by a market body or Government. This

[8] Australian Energy Market Commission, *National Electricity Rules (version 177)*, January 2021

does not address stakeholder concerns about the impact of the proposed reform on investment and risk management, as it still relies on a central body to determine where new investment can feasibly locate:

- If the central body is using quantifiable criteria to assess where new investment can occur including all factors that contribute to the investment business plan, these could be made public to enable investors to assess potential locations across the network without seeking approval; or

- If the central body is not using quantifiable criteria, there is no way to determine if the central body's decision to not sign off on a non-REZ project is justified.

It is also unclear how the CMM intends to interface efficiently with jurisdictional REZ frameworks. A key attribute of REZ design is that sufficient network infrastructure be built such that a REZ does not create congestion in the shared network, negating the need for the CMM. Furthermore, given incentives are likely to be offered as part of jurisdictional programs for investment in REZs, any CMM would need to be designed to avoid "double-dipping".

Furthermore, efficient centralised planning relies on the constancy of approach in determining REZ regions and level of investment. This is performed on a NEM-wide basis via the Integrated System Plan (**ISP**) with the fundamental tenet being a plan that is least cost for the NEM. This centralised approach can be undermined by jurisdictional policies that seek to achieve objectives focused what is best for consumers within individual jurisdictions irrespective of whether this is efficient for the NEM. The 2022 draft ISP has already demonstrated a substantial shift in the generation plan compared with the 2020 projections. It is unclear how such a centralised approach that is forced to manage conflicts between NEM-wide and individual jurisdictional objectives will deliver investment certainty or efficient outcomes.

CS Energy does not consider there has been sufficient justification to warrant shifting to centralised planning and maintains that investors are in the best place to determine locational decisions provided they are armed with adequate information and consistent market signals.

(b) Consistent theoretical basis

Through the development of the transmission access reform workstream, a number of inconsistencies have emerged. These relate both to inconsistencies within the design process as well assumptions that do not reflect the realities of the market. This may lead to sub-optimal outcomes. Examples include:

- *Tension between short and long-term goals* – Discussion on the need and objectives of access reform interchanges between a focus on short and long-term objectives which naturally conflict. For example, the ESB states a long-term efficiency goal of new generation investment that is genuinely adding new generation capacity to the network rather than displacing incumbent generation. Simultaneously, it is striving for a market in which "*the profit maximising strategy given the congestion charge is to bid more closely to their true costs of generation* (that is, they bid in line with their short run marginal cost".[9]

[9] Energy Security Board, *Transmission Access Reform Project Initiation Paper*, November 2021, page 21

Investor certainty will be materially affected by a market reform that targets SRMC-based bidding. This is not a sustainable model for participants as it precludes recovery of long-term costs such as a return on investors' substantial capital investment. Such a focus will likely stymie new investment.

Conversely, if short-run efficiency is the goal of the reform (which CS Energy argues it shouldn't be), it is not clear how new generation displacing incumbent generation is inefficient from the market's perspective provided reliability and security are met. CS Energy is concerned however, that a focus on SRMC bidding also prioritises reliability over security and may be incompatible with other reforms underfoot.

- *Inconsistency in assumptions for analysis* – Appendix B of the Initiation Paper presents worked examples that demonstrate how the CMM will operate and the ESB's view of how it will impact participants. The assumptions made in these examples are simplistic and do not reflect how the market works (e.g. network topography, participant bidding behaviour, current and expected future provision of non-energy services), limiting the explanatory power of the worked examples.

  Similarly, CS Energy is concerned the approach to future modelling will replicate inconsistencies that were applied in previous modelling that don't reflect the reality of the market. Additional to the example above of the projected congestion modelling, the assumptions underpinning NERA's benefits analysis of the proposed Locational Marginal Pricing – Financial Transmission Rights (**LMP-FTR**) were not realistic representations of the market or how it functions, which skewed the estimated benefits of the proposed reform. These are then further exacerbated by the continued dismissal of the true costs of the reform to participants.[10]

- *Consideration of transmission investment* - The ESB has emphatically stated that transmission investment is out of scope for transmission access reform. While CS Energy disagrees with the validity of this, if it is to be excluded from consideration then the ESB cannot utilise transmission investment to justify transmission access reform. For example, the Initiation Paper states that TNSPs currently undertake additional transmission investment to accommodate poorly located generators, for example:

  > *Ultimately, customers bear additional costs if investing in the NEM is riskier than it needs to be,* particularly if poor generator location decisions result in transmission investment that would not be needed if the generators had located elsewhere [emphasis added].[11]

  Transmission investment undergoes the rigors of the Regulatory Investment Rest for Transmission (**RiT-T**) and CS Energy is not aware of any transmission investment by TNSPs that has occurred to accommodate poorly located generation. There are instances where generators have invested in the infrastructure themselves as it was clearly economical to do so, as well as instances where jurisdictions have chosen to invest in network augmentation (e.g., the Western Victoria Transmission Network Project). It would be helpful if the ESB could provide examples of investment undertaken to accommodate poorly located generator where the locational choice was based purely on market signals, whether current or expected. Establishing the current and expected magnitude of this additional investment will help stakeholders assess the materiality of this issue and compare the expected costs and benefits of this reform.

[10] For example, Baringa Partners, *An independent assessment of the NERA report on the AEMC's proposed transmission access reforms*, October 2020
[11] Energy Security Board, *Transmission Access Reform Project Initiation Paper*, November 2021, page 11

CS Energy contends that the inconsistencies (examples of which are set out above) are contributing to the ESB pursuing a significant market reform that does not appear to be consistent with the long-term interests of consumers. Establishing an internally consistent theoretical basis for the proposed transmission access reform will provide a firm guide for design choices made during development of the proposed reform and a benchmark against which potential reforms can be assessed and compared.

(c) Consideration of other market reforms

The ESB has presented the CMM as a stand-alone reform without acknowledgement or accommodation of the other significant market reform processes currently in train, including those within the ESB's Post-2025 Market Design project or being progressed by other market bodies. Of primary interest is the development of mechanisms to explicitly value and procure Essential System Services (**ESS**).

The ESB has stated that it is assuming that "all the system security challenges are resolved" in its consideration of access reform. Considering a market design in such isolation may lead to detrimental outcomes for the market and consumers. As has been outlined previously by the ESB, system security will play an increasingly important role in the market and this interaction cannot be dismissed. The development of missing markets to value and procure ESS will:

- Change the dynamics of network constraints and may go a considerable way to alleviating the identified network congestion issues, particularly given a large proportion of network constraints arise from system strength and frequency control concerns;

- The introduction of new mechanisms for ESS will change participant bidding behaviour as energy will be co-optimised with the provision of these system services; and

- Network congestion may arise from the outcomes in the ESS markets and this interaction must be explicitly considered in any transmission access reform to avoid penalising the provision of services to maintain system security.

Failure to assess how other reforms (both in-train and expected) will interact with and affect the operation and effectiveness of the CMM will result in a proposal that attempts to address purported issues with the current market design rather than address expected issues with the future market design.

Appropriate assessment criteria and approach

(a) Consistent assessment framework

While in any market design process it is expected that features will evolve and adapt as initiatives progress, the frameworks for assessment should not change. CS Energy notes that the Initiation Paper presents assessment criteria that are different from those used in previous rounds of consultation on potential transmission access reform models with no explanation as to the change.

In the April 2021 consultation paper, the three models (and two variations) proposed were assessed against four criteria - locational signals, congestion management, efficient storage signals and ability of generators to hedge risk - which were closely aligned with the issues

to be addressed (namely locational signals, congestion management, enabling new technologies and risk management tools).[12]

In the current round of consultation, the challenges to be solved are the same as the previous "issues to be addressed", but the assessment criteria are less specific:

1. Efficient market outcomes – investment;
2. Efficient market outcomes – dispatch;
3. Appropriate allocation of risk;
4. Appropriately [sic] allocation of the cost of transmission investment;
5. Implementation considerations; and
6. Flexibility to enable consideration of jurisdictional differences.[13]

A substantial, fundamental market reform of the type proposed by the ESB necessitates clearly defined and static assessment criteria. Changing assessment criteria mid-process without extensive justification and consultation about said changes raises concerns that the goals of the reform have not been settled.

(b) Enhanced assessment criteria

CS Energy suggests that the assessment criteria be weighted for materiality, with this weighting determined in consultation with stakeholders. This should be applied to the CMM and all alternatives proposed by stakeholders (both previously and as part of this consultation process). This would allow the proposals to be scored on a scale rather than a binary does/does not address approach. This will provide greater nuance in the assessment, allow alternatives to be ranked and compared for how well they address each assessment criteria and ensure the assessment identifies which alternatives are focussed on the most material issues raised by the ESB. Appropriate understanding of any trade-offs is crucial to any market design process.

Care must be taken to ensure the assessment identifies only the additional benefits delivered by each of the alternatives assessed. There is considerable overlap between the goals of the CMM and the goals of other rule change processes (previous, in-train and expected future rule changes), including:

- Five Minute Settlement (**5MS**) – Operational from 1 October 2021, it is too early to assess the impact of 5MS on the market, however, the AEMC has clearly articulated the expected benefits to include:
    - Improved price signals for more efficient generation and use of electricity;
    - Improved price signals for more efficient investment in capacity and demand response technologies to balance supply and demand; and
    - Improved bidding incentives.[14]

[12] Energy Security Board, *Post 2025 Market Design Options – A paper for consultation, Part A*, April 2021, pages 83-84
[13] Energy Security Board, *Transmission Access Reform Project Initiation Paper*, November 2021, page 15
[14] Australian Energy Market Commission, *Five Minute Settlement Rule Determination*, November 2017, page ii

- System strength – The system strength charge will send clearer investment and locational signals through its three components (system strength quantity, price and locational factor) which are each designed to signal to new connections a certain aspect of the impact of their locational decision on system strength. As such, this should result in more efficient decisions being made by new connecting parties, being in the long-term interest of consumers who gain the result of lower total system costs.[15]

- Wholesale Demand Response Mechanism – Requiring Demand Response Service Providers (**DRSPs**) to provide the relevant information to AEMO will increase the transparency of the level and availability of wholesale demand response in the NEM. AEMO can utilise this information to develop more accurate forecasts of the demand-supply balance, which would result in more efficient operational and investment decisions by AEMO and market participants.[16]

- Jurisdictional policies –State Governments are taking an active role in developing policies to help deliver on their goals for the energy industry. One of the primary mechanisms currently under development are REZ schemes to provide greater certainty and lower costs to potential investors and ensure efficient network utilisation.[17] These schemes will provide strong locational signals to new renewable energy projects and their coordinated approach ensures that network congestion arising from new investment is minimised.

To avoid double-counting benefits of reforms, the ESB's assessment must include only the marginal impact of the proposed reforms on the ESB's goal for transmission access reform.

The assessment criteria will also need to account for the CMM's combination of short-term and long-term objectives. The challenges of quantifying the benefits over the two timescales will be compounded by accommodating any potential inconsistencies or incompatibilities between realising both short-term and long-term benefits (e.g., whether the pursuit of short-term efficiency via SRMC-based bidding is consistent with long-term efficiencies in generation and transmission investment) and goals (i.e. whether one mechanism is able to provide effective, robust, signals across both investment and operational timeframes).

(c) Additional selection criteria

CS Energy considers it would be beneficial to include additional assessment criteria that align with the long-term goals and direction of the market. These will aid selection of a reform option that integrates with the rest of the market and addresses some stakeholder concerns to date about the ESB's preferred options:

1) Interaction with other wholesale markets

Given both the interrelated natures of the various aspects of the NEM and the suite of other reforms underway, transmission access reform must consider the impact on and integration with the entire expected future market design. Explicit examination of how transmission access reform options perform under a market design where ESS are adequately valued and procured will be vital to ensure this significant market reform aligns with and supports the future direction of the NEM. The ESB's assumption that all

[15] Australian Energy Market Commission, *Efficient Management of System Strength on the Power System Rule Determination*, October 2021, pages 41-42
[16] Australian Energy Market Commission, *Wholesale Demand Response Mechanism Rule Determination*, June 2020, page 152
[17] New South Wales Department of Planning, Industry and Environment, *Renewable Energy Zones – Access Scheme*, March 2021, page 17

system security issues are resolved in their consideration establishes an artificial landscape in which the CMM or other reforms will operate.

2) *Interaction with contract markets*

Given the importance of financial and contract markets for participant risk management, the impact of any proposed reform on these markets must be explicitly included in an assessment of alternative transmission access reform models.

Appropriate level of analysis

(a) Appropriate quantitative modelling

The simplified CMM worked examples in Appendix B of the Initiation Paper do not give stakeholders sufficient information or confidence of how the proposed transmission access reform is intended to work, particularly the interactions between the CMM and non-energy service provision.

In the examples it is assumed that participants bid the entirety of their capacity at SRMC. As detailed previously this is unrealistic for all types of generation and storage. Any outcome derived from an assumption of SRMC bidding may be reasonable (and simpler) from a purely theoretical modelling perspective, but it will reflect a maximum cap of benefits from the reform rather than the actual expected benefits. In the absence of any attempt to capture and model actual participant behaviour, relying on the outcome of a model that assumes SRMC bidding will overstate the expected actual benefits of a proposed reform.

Benefits

CS Energy reiterates its concern that a similar modelling approach to that undertaken previously for LMP-FTR will be adopted. As part of the September 2020 round of consultation on the CoGaTI interim report, the AEMC published NERA Economic Consulting's *Cost Benefit Analysis of Access Reform: Modelling Report*. While purporting to be a cost benefit analysis, this report only examined the potential benefits of the proposed reform. Stakeholder feedback raised myriad concerns with NERA's analysis, which was echoed by the Baringa Partners report (commissioned by industry) which provided a qualitative-based critique of NERA's work.

Baringa challenged both NERA's modelling methodology and the "real world" implications of the proposed transmission access reform, finding numerous issues with the assumptions underpinning the analysis. The cumulative impact of the highlighted issues meant there was a $1.5 billion per year overestimation of the potential benefits, with Baringa's high-level analysis concluding there was a negative net benefit to the reform:

> *Taking into account a change in discount rate and our other critiques of NERA's modelling, our high-level estimate of the net benefit of Reform over the 2026-2040 period is minus $337 million p.a. This is in stark contrast to the estimated net benefits of Reform in the NERA report, of $1,200 million p.a..*[18]

[18] Baringa Partners, *An independent assessment of the NERA report on the AEMC's proposed transmission access reforms*, October 2020, page 7

Costs

Further work will be required on the total costs of the proposed reform. As part of the September 2020 consultation process, the AEMC also published HARD Software's *A preliminary indication of the Information Technology costs of Locational Marginal Pricing*. This analysis appeared to considerably understate the implementation costs of transmission access reform, particularly for participants. HARD Software estimated the total cost to all participants as between $31.5 million and $37.8 million, which appears to have been determined without consulting participants. These figures are considerably lower than the estimated implementation costs of contemporaneous commensurate reforms, namely 5MS.

To inform deliberations about AEMO's proposed rule change to delay 5MS implementation, the AEMC engaged Deloitte to provide advice on participants' costs and capability relating to the proposed delay to the start date of the 5MS and Global Settlement (**GS**) rule changes. This analysis indicated the aggregate cost of 5MS/GS for all participants was between $388 million and $823 million.[19]

Consideration of costs to industry also seems to be limited to implementation costs of new IT systems for both AEMO and participants, but largely ignores the often-material costs to the contracts market and the flow-on impact to retail contracts.

The underestimation of costs increases the proposed net benefits by definition. Increased consultation with industry and verifiable sources is required to ensure any analysis of benefits and costs produces reasonable, replicable and robust results.

Interactions with other markets (current and expected)

Linkages with other current markets and market reforms will need to be modelled to ensure the benefits of the proposed model are not overstated. The CMM worked examples included in the Initiation Paper show CMM appears to work in a simple, theoretical energy-only market, but further work is required to demonstrate the benefits of the CMM in a more complex market that co-optimises energy and non-energy services. Of particular interest is how the actions of participants providing non-energy services affects the estimated benefits of CMM, and conversely whether the implementation of the CMM will affect non-energy service provision.

Given the critical role contract markets play in assisting participants manage risk, the interactions of the CMM with the contract markets (including contracting incentives, contracting behaviour and contract liquidity) will need to be examined.

Modelling the final design

Detailed modelling of the final design of the proposed reform is required to give all stakeholders confidence that the ESB and appointed modellers understand how the proposed model will function in the real world, and that these interactions are reflected in the modelling.

Peer-review of the modelling by stakeholders should also be non-negotiable. Had such critical evaluation occurred before NERA's and HARD Software's report were published, material issues with their analyses would have been identified and could have been rectified before finalisation. Correction of these issues would have improved the accuracy of the estimated costs and benefits, as well as stakeholder confidence that the modelling results

[19] Deloitte, *Delayed implementation of the five minute and global settlement rules*, July 2020

were based on a reasonable approximation of how the market actually operates. This also would have improved the accuracy and quality of information provided to the National Cabinet.

Any modelling and analysis that underpins the development of an access reform design must undergo public consultation.

(b) Clear definition of beneficiaries

CS Energy seeks clarification on how the ESB is defining benefits, both in terms of magnitude and the identified beneficiaries. The Initiation Paper states the ESB seeks to increase benefits from participants via:

- *The energy transition can be delivered more cheaply and quickly if new generators connect in places where we can get the full benefit of all the renewables coming into the national power system;*
- *Establishing a framework that rewards storage and demand side resources for locating where they are needed most and operating in ways that benefit the broader system; and*
- *In designing the details of the CMM, the ESB would like to actively balance previous industry feedback and limit unnecessary complexity while providing meaningful investment signals that reward investors for choosing locations that confer maximum benefit from our generation and storage fleet.*[20]

CS Energy is supportive of these outcomes at a high-level but considers there a need to for a more tangible approach in the design process. Clarification of what these benefits are, the magnitude of these benefits and which parties accrue these benefits will assist stakeholders to better understand the ESB's goals and objectives and ensure proposed alternatives deliver the benefits sought by the ESB.

Transparent and collaborative design process

In its briefings to industry on the Initiation Paper, the ESB solicited feedback about how its consultation process could be improved going forward. CS Energy would like to offer the following comments.

(a) Importance of contextualising stakeholder feedback

Industry would benefit from understanding this silent support received by the ESB as indicated during industry briefings (particularly given the ESBs co-incident statement that there has not been much public support) and the rationale of that support to inform future input into the process.

The Initiation Paper states:

> *The Post 2025 Market Design Review options paper proposed that the CMM with REZ adaptations, or CMM plus connection fee, could be applied in the medium term as a stepping-stone to a long term solution of locational marginal pricing and financial transmission rights (LMP/FTRs). While a number of generator and investor*

[20] Energy Security Board, *Transmission Access Reform Project Initiation Paper*, November 2021, pages 5, 6 and 23

representatives were opposed to LMPs in any form, a range of customer, generator, network, academic and other stakeholders expressed support for LMP in some form.[21]

CS Energy is concerned that limited, sometimes qualified support for access reform from stakeholders has been indicated as significant unqualified support for access reform in any form without properly detailing the context for the support and the conditionality of the support. In the TWG discussions, stakeholders overwhelmingly preferred the status quo over any of the proposed models. When probed to consider only the options, stakeholders considered the CMM as having the most merit for further progression, rather than support for the CMM as currently proposed.

In particular, support for an LMP-FTR solution appears to have been conflated with support for the CMM, with stakeholders listed as supporting LMP-FTR noting significant concerns with the CMM model, such as ENGIE highlighting each proposed medium-term option had been considered by the AEMC previously and not selected as the best option for the NEM, Enel Green Power's support for a CMM only as a stepping stone solution to a more comprehensive approach to transmission access reform, not the enduring solution now proposed by the ESB (and noting new entrants outside REZs will not be able to contractually hedge basis risk) and Spark Infrastructure supporting a solution that responds to concerns raised about LMP-FTR, but the CMM does not fulfil that criteria. Accounting for these considerable qualifications, stakeholder support for the CMM is limited.

(b) *Transparency of process*

As previously noted, CS Energy has been disappointed with the ESB's response to the material issues raised by stakeholder to date.

The treatment of the feedback provided by the TWGs to date illustrates this concern. During the TWGs held in February and March 2021, detailed notes of the transmission access reform were published then withdrawn and replaced with high-level notes that did not capture what had been discussed in the meeting, particularly with respect to critiques of the ESB's preferred option. TWG minutes for all workstreams were very high-level, did not reflect the discussions held or stakeholders' concerns and did not suggest an open-minded and collaborative approach to the reform process.

Stakeholder concerns with CMM have not been addressed

CS Energy maintains that the current iteration of the CMM does not address the material concerns raised about the impact of this reform. This includes both the large impact on participants as well as the expected disproportionate cost comparative to the anticipated small marginal benefit once the impact of other reforms such as 5MS are appropriately captured.

In the Initiation Paper, the ESB summarises the stakeholder feedback into three key concerns, namely:

- *The potential for projects outside REZs, which are otherwise efficient, to be disadvantaged as they would not receive access to congestion rebates and hence would be subject to greater risk and uncertainty;*

- *The lack of detail, which prevents a full assessment of the model, and*

[21] Energy Security Board, *Transmission Access Reform Project Initiation Paper*, November 2021, page 13

- *The reliance of the model on the planning framework rather than market signals.*[22]

This downplays both the breadth and depth of feedback provided by stakeholders. The ESB's more detailed summary of the feedback on the April 2021 Options Paper indicated several material issues with the proposed reform, including but not limited to:

- Model not sufficiently developed to properly assess;
- Insufficient evidence of issues in operational timeframes;[23]
- Locational pricing does not address the true problem of transmission underinvestment;[24]
- Model could give rise to new forms of gaming behaviour;[25]
- Model would introduce an unjustified level of complexity and uncertainty;[26]
- Model would make investments outside REZs unbankable;[27] and
- Model would impact contract markets.[28]

CS Energy is concerned that summarising stakeholder feedback may inadvertently minimise the issues raised by stakeholders. This is particularly concerning because the ESB has stated it seeks to:

> *Work with stakeholders to understand their concerns and* respond to them where appropriate [emphasis added]*, including by considering alternative mechanisms proposed by stakeholders.*[29]

Stakeholders have gone to considerable effort to respond to the numerous rounds of consultation on the ESB's transmission access reform. CS Energy queries what criteria the ESB is applying to determine the validity of stakeholder feedback.

(c) Consideration of alternatives

Given the consideration of alternatives is not in the ESB's recommendation to Energy Ministers nor the National Cabinet decision, CS Energy seeks clarification from the ESB of its commitment to due consideration of alternatives to the CMM. [30,31]

The ESB's consideration of alternatives to date has been limited despite ample opportunity to do so, both in terms of time and in terms of the range of alternatives proposed by stakeholders. Amongst these suggestions were new mechanisms forwarded by stakeholders, such as:

[22] Energy Security Board, *Transmission Access Reform Project Initiation Paper*, November 2021, page 14
[23] Submission to the Post 2025 Market Design Options Paper, *EDL*, June 2021
[24] Submission to the Post 2025 Market Design Options Paper, *Snowy Hydro*, June 2021
[25] Submissions to the Post 2025 Market Design Options Paper, *EnergyAustralia*; *Neoen*, June 2021
[26] Submission to the Post 2025 Market design Options Paper, *Grattan Institute*, June 2021
[27] Submissions to the Post 2025 Market Design Options Paper, *Enel Green Power*; *Clean Energy Investment Group*, June 2021
[28] Submissions to the Post 2025 Market Design Options Paper, *Australian Financial Markets Association*; *ASX*; *Flow Power*; *CS Energy*, *Clean Energy Finance Corporation*, June 2021
[29] Energy Security Board, *Transmission Access Reform Project Initiation Paper*, November 2021, page 6
[30] Energy Security Board, *Post-2025 Market Design Final advice to Energy Ministers Part A*, July 2021
[31] National Cabinet, *Summary of the final reform package and corresponding Energy Security Board recommendations*, October 2021

- The Public Interest Advocacy Centre's (**PIAC's**) risk sharing model for REZ transmission and fixed Marginal Loss Factor (**MLF**) alternatives were provided in its October 2020 submission to the ESB's September 2020 Post-2025 Market Design Consultation Paper; [32] and

- Edify Energy's Congestion Relief Market (**CRM**) was proposed in its June 2021 submission to the ESB's April 2021 Post 2025 Market Design Options Paper.[33]

Not only does it appear that these potential alternatives have not been materially advanced by the ESB since they were proposed, the ESB has made little comment on these alternatives (beyond the Initiation Paper noting Edify Energy's CRM as an example of an alternative model).[34] The status of smaller changes to existing mechanisms to strengthen investment and operational signals for incumbent and potential new projects is also unclear. This includes further developing transmission network heat maps, redeveloping NEMDE and publishing the LMPs from NEMDE in an easily digestible format.

Over the course of both the current and previous transmission access reform reviews, it has appeared that the ESB is looking for one "big bang" solution to the purported issues with the current market design instead of examining a range of solutions and considering combinations of smaller, effective, less invasive solutions to address the purported issues with the current access regime over both investment and operational timeframes. CS Energy suggests that instead of attempting to find a single solution that address all of the ESB's goals concurrently, each issue be examined individually and potential solutions to each challenge be developed to determine whether a range of smaller reforms can satisfy the ESB's goals and objectives particularly against the backdrop of the broader reform process.

CS Energy thus seeks clarification on whether the ESB intends to identify and consider alternative transmission access reform models. If the ESB is convinced of the need to progress the CMM, then stakeholder efforts are best focussed on rectifying the numerous challenges with the proposed model.

Public consultation on alternatives

Given the ESB has called for stakeholders to provide alternative solutions, it is incumbent on the ESB to publicly consult on these alternatives, to allow alternatives to be assessed on equal footing with the ESB's preferred CMM.

[32] Public Interest Advocacy Centre, *Post 2025 Market Design Consultation Paper submission*, October 2020, pages 33-36 and 38
[33] Edify Energy, *Submission to Post 2025 Market Design Options Paper*, June 2021, pages 1-2
[34] Energy Security Board, *Transmission Access Reform Project Initiation Paper*, November 2021, page 14

Stream 1 – Alternative solutions

Several stakeholders have proposed alternative mechanisms to address the ESB's concerns with, and goals for, the current market design. Below are several models CS Energy believe warrant further investigation to assess how well they perform (both in their "as proposed" form or with modifications) against the ESB's selection criteria.

Stakeholder alternative models

(a) Edify Energy's Congestion Relief Market

Edify Energy has proposed a Congestion Relief Market (**CRM**), bringing together congestion relief buyers and congestion relief sellers though a market mechanism to determine whether efficient congestion relief can be achieved. The model is summarised as:

- The CRM continuously accepts bids and offers from providers (sellers) and receivers (buyers) of congestion relief;
- After the NEMDE determines prices and dispatch for energy, the CRM only becomes active for congested nodes (i.e. those that have thermally binding constraints);
- If the congestion relief market determines a solution, it facilitates transactions where congestion relief buyers pay congestion relief sellers the local congestion relief price for the volume of congestion relief provided; and
- Congestion relief is dispatched, along with energy dispatch, with no further impact to prices at the Regional Reference Node (**RRN**).[35]

While CS Energy appreciates the use of the existing market design where practical and alleviating congestion only when participants reach a mutually-agreeable price to do so, it questions whether the market will be deep enough at key nodes to warrant the establishment and operation of a spot market. CS Energy suggests the ESB examine whether the intent of this proposal and the goals of the ESB could be satisfied through modification of the mechanism, such as bilateral deals between congestion relief buyers and congestion relief sellers.

(b) Public Interest Advocacy Centre's risk sharing model for Renewable Energy Zones[36]

The PIAC has proposed a model for REZ transmission investment that shares the cost and risk between consumers, generators, TNSPs and other investors:

- Feasible prospective REZs, including any necessary supporting network investments, are identified through the existing ISP process by AEMO, industry or government;
- A detailed design stage, incorporating a RIT-T or equivalent process, determines the optimal attributes for a given REZ, and selects one or more network design options that are best suited to support efficient investment and market outcomes. This stage includes market testing with prospective generators, investigation of planning approvals, and

[35] Edify Energy, *Response to Post 2025 Market Design Consultation Paper*, June 2021, page 2
[36] CS Energy acknowledges PIAC has previously suggested an MLF solution to improve locational signals for generators. While CS Energy supports the outcomes of this alternative, it believes there are intractable implementation issues that prevent this option from meeting the ESB's assessment criteria.

estimation of capex for different network options. A variety of sources of information should be considered to minimise the risk associated with speculative investment.[37]

At first pass, this alternative largely addresses only one of the ESB's assessment criteria; transmission cost allocation. However, given the focus of market bodies and State Governments on the development of REZs and CS Energy's position that a coalition of smaller reforms (each targeting a subset of the ESB's assessment criteria) may deliver greater net benefits, CS Energy believes this alternative warrants further investigation as part of a potential hybrid solution.

(c) Snowy Hydro's dual-floor price

Snowy Hydro has proposed a dual floor price model to reduce transmission access risk for dispatchable generation by lifting the Market Floor Price (**MFP**) for semi-scheduled generation. Snowy Hydro summarises its proposal thus:

> *In determining the priority order for transmission access, AEMO's dispatch engine ('NEMDE') trades off two things: bid price and transmission constraint coefficients. Each of these factors impact generators' transmission access. During congestion, competing generators bid at the Market Floor Price ('MFP', ie. -$1000/MWh) to try to guarantee dispatch. As all generators have the same (floor) bid price, NEMDE determines transmission access priority based purely on which generator has the (often very slightly) lower transmission constraint coefficient. This means that a wind or solar farm may displace dispatchable capacity based on marginal differences in their constraint co-efficient. This rule change proposes a simple solution, by raising the MFP for semi-scheduled generators to -$100/MWh, while leaving the MFP for scheduled generators at -$1000/MWh.*[38]

CS Energy supports the intent of Snowy Hydro's proposal, either as a stand-alone alternative or as part of a hybrid solution, and notes that it has raised changes to the MFP based on participant capability in terms of better aligning the energy price to system security needs.[39]

CS Energy believes further work is required to determine the volume of VRE that is bidding its capacity between -$100/MWh and -$1,000/MWh, to assess whether this solution would be expected to have a material impact on VRE bidding behaviour, or whether other pricing bands are more effective.

This proposal would be easy to implement as participant bids already go through a screening process to ensure bids are valid prior to inclusion in NEMDE.

CS Energy's fixed-shape time-of-day MLF

CS Energy believes there is scope to enhance the MLF settings to address the ESB's concerns with the existing market design. When the AEMC undertook quantitative analysis to compare marginal and average loss factors to inform Adani's Transmission Loss Factors rule change request, it determined that "*marginal loss factors provide and maintain the most efficient locational and dispatch signals to the market*".[40]

[37] Public Interest Advocacy Centre, *Post-2025 Market Design Consultation Paper submission*, October 2020, page 34
[38] Snowy Hydro, *Rule change request – Dual-Floor Price – Transmission Access Risk*, December 2021, page 7
[39] CS Energy, *Submission: Review of the Reliability Standard and Settings Guideline*, April 2021, page 2
[40] Australian Energy Market Commission, *Transmission Loss Factors Final Rule Determination*, page 12

CS Energy proposes the ESB examine potential changes to the MLF methodology to further enhance the power of the locational and dispatch signals MLFs provide to potential and incumbent projects as an alternative to CMM. CS Energy believes annual fixed-shape time-of-day MLFs for generators and scheduled load address the ESB's assessment criteria.

(a) Summary of proposed MLF solution

The current MLF methodology weights the underlying physical losses by expected consumption or export to calculate a flat MLF that applies for a financial year. The divergence of the current flat MLF from actual losses is illustrated for a solar farm in Figure 2. This highlights the generation-weighted flat MLF is lower than actual losses in the shoulder periods and higher than actual losses over the middle of the day.

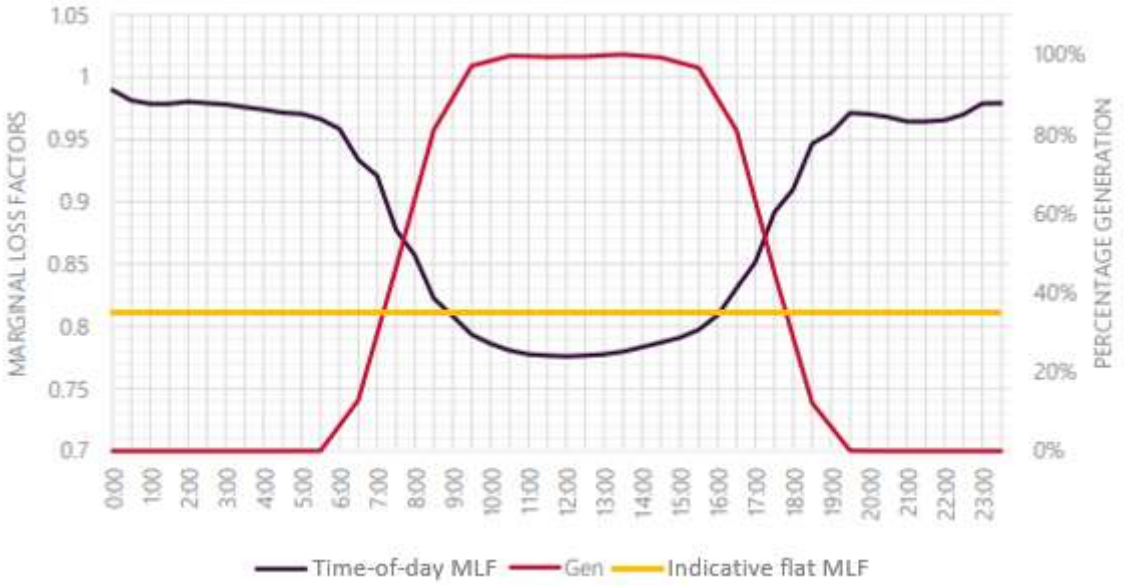
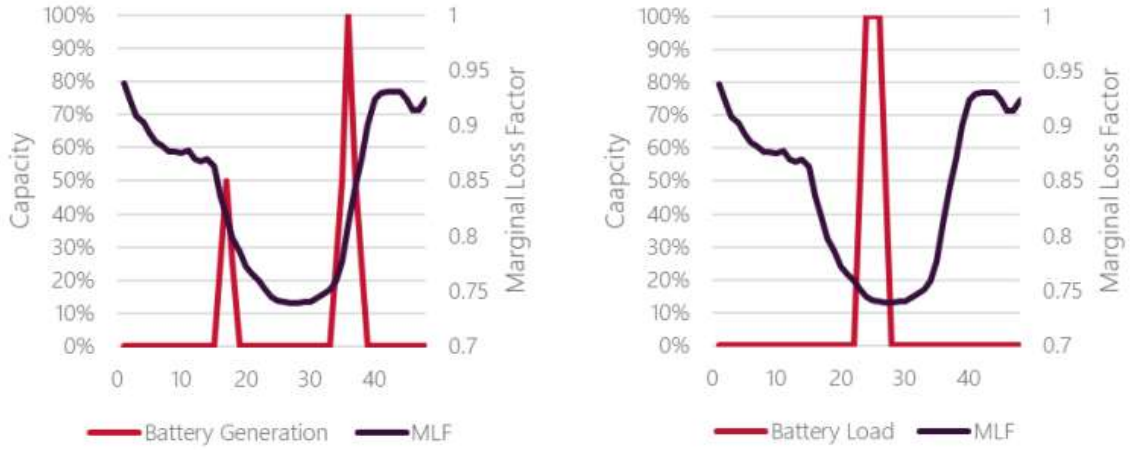


Figure 2: Time of day average MLF and percentage generation[41]

When the same underlying time-of-day MLF profile at a connection point is applied to all technologies connecting at that point, intertemporal differences in consumption and export result in different generation and load-weighted MLFs for different technologies. As illustrated by AEMO's example for storage (Figure 3), a battery exporting during morning and evening peaks when underlying half-hourly MLFs are high and loading across the middle of the day when underlying half-hourly MLFs are low will result in markedly different flat MLFs (0.8130 versus 0.7431). A fixed-shape time-of-day MLF would further enhance this differentiation between technologies, locations across the network and times of day.

[41] Adapted from Australian Energy Market Operator, *Regions and Marginal Loss Factors: FY 2020-21*, page 65



Battery generation MLF = 0.8130 Battery load MLF = 0.7431

Figure 3: Time-of-day impact of technology on MLF outcomes[42]

The proposed fixed-shape time-of-day MLFs would reflect the changes in physical losses of different generation units in different parts of the network over the course of the day, better aligning the incentives and signals faced by incumbent and potential participants over investment and operational timeframes.

The ESB has expressed concerns that "*some generators are connecting in locations where, a lot of the time, they are not adding new renewable energy to the power system; instead, they are displacing the renewable generators that were already there*".[43] CS Energy's proposed alternative would address this by calculating MLFs of new projects as the *true marginal* loss factor to reflect the marginal contribution of energy provided by the project beyond that of incumbent generation in that location on the network. Proponents of projects in heavily populated parts of the network would assess whether their project is commercial given its expected marginal energy contribution in that location. A low true marginal loss factor would dissuade new projects from connecting in heavily populated parts of the network, providing a robust locational signal for potential new projects. The time-of-day profile would also provide a signal of what technologies may be better suited to a particular location. This is akin to the current approach to system strength whereby new entrants are responsible for meeting the costs of addressing the impact of their locational decisions on system strength.

Having new plant bear the impact of their entry on transmission losses may also reduce year-to-year movements in MLFs for both incumbent generators and new entrants. As noted by AEMO:

> *The location of new generation projects and load developments on the transmission and distribution network has a significant impact on the MLFs in an area. As more generation is connected to electrically weak areas of the network that are remote from the RRN, MLFs in these areas will continue to decline*.[44]

True marginal loss factors for new entrants would be expected to reduce instances of plant connecting in electrically weak areas of the network as the new project alone would bear the impact of their entry on MLFs in that area of the network, as opposed to the impact smeared across all participants in the area as per the current methodology. This impact would then flow through to the operational timescale, with less capacity added to electrically

[42] Australian Energy Market Operator, *Regional and Marginal Loss Factors: FY 2021-22* . page 76
[43] Energy Security Board, *Transmission Access Reform Project Initiation Paper*, page 5
[44] Australian Energy Market Operator, *Regions and Marginal Loss Factors: FY 2021-22*, November 2021, page 38

weak parts of the network meaning typically lower congestion than would otherwise have been the case.

This is not to say that a new project's true marginal loss factor could not increase over time (e.g., as the network is augmented or incumbent plant withdraws), but that the relativity between incumbent MLFs and newer plant MLFs is maintained over time.

A fixed-shape time-of-day MLF could provide a stronger locational and operational signal than the current annual flat MLF without incurring the expense, disruption and uncertainty of more-invasive market reforms such as CMM.

(b) Assessment against the ESB's assessment criteria

An assessment of CS Energy's proposed MLF solution against the ESB's assessment criteria indicates this option warrants further investigation.

- *Efficient market outcomes – investment*

  An MLF that more-closely aligns with actual physical losses on the network over the course of the day will provide a strong locational signal for potential new projects. For example, the continued addition of solar PV is expected to further increase transmission losses over the middle of the day. The impact of time-of-day MLFs on expected revenue will influence investors' locational decisions.

  By assigning a true marginal loss factor to new projects, the locational signal of this proposed MLF solution will be considerably strengthened compared to both the status quo flat MLF and a time-of-day MLF. The cost of the new entrant's impact on transmission losses would be borne by the causer in perpetuity. The MLF could increase in response to changes in generation capacity, generation, load or network capacity in relevant parts of the network, but the relativity between incumbent generation and the newer entrant would be maintained so as not to adversely affect incumbents' transmission losses.

  Given projects are currently banked on an estimated MLF and proceed with annual MLF revisions, it is not envisaged that an annual fixed-shape time-of-day MLF would adversely affect investment certainty or investment efficiency.

- *Efficient market outcomes - dispatch*

  The MLF solution sends a transparent operational signal to participants and the broader market about the value of at-node generation over the course of the day. A time-of-day MLF would reduce both the incentive and the ability of plant to increase generation at times of typically high coincident generation and/or congestion. Further, it may also incentivise storage to time-shift energy from low-value to high-value trading intervals and provide non-energy services to the market.

  It is envisaged that the charge and discharge functions of storage would have fixed-shape time-of-day MLFs that reflect the relative contribution of each over the course of the day. Given the typical operation of storage, it may be that storage load would have an MLF profile akin to solar generation profile and storage generation would have an MLF profile akin to thermal generation profile.

  High coincident generation in a local area relative to load should would normally be expected to result in low MLFs for storage in that area, which will enable it to charge for

less than the RRP, then discharge at times when firm generation is required by the network and be compensated accordingly.[45]

As under the current methodology, generating units will know the applicable MLF for every Trading Interval at the time bids are entered, so there is no uncertainty about the prices at which the plant has been offered to the market and the price plant will receive when it is dispatched.

- *Appropriate allocation of risk*

  Any project that attempts to locate in a congested part of the network will wear an amount of risk (reflected in their marginal fixed-shape time-of-day MLF) commensurate to the additional congestion their locational decision and operation has caused on incumbent generation.

- *Appropriate allocation of the cost of transmission investment*

  The MLF alternative would maintain relativities between generation plant as available transmission capacity changes over time, either through network augmentation or existing generation withdrawing from the market.

  One potential area of investigation would be to determine whether there is scope for generators who contribute to network augmentation to have this contribution reflected in their MLF or if this would encroach on the Dedicated Connection Asset or Market Network Service Provider provisions. If possible, this would go some way to addressing the "free rider" issue that dissuades participants from currently contributing to network augmentation.

- *Implementation considerations*

  Consultation with AEMO would need to be undertaken to determine whether time-of-day MLFs are currently calculated under the current methodology and if not, how much additional work would be required to do so, as well as any other potential impediments to the implementation of the MLF alternative to CMM.

  Implementation would be expected to be relatively low cost and low intrusion, as it modifies an existing process rather than creating new mechanisms and processes.

- *Flexibility to enable consideration of jurisdictional differences*

  As time-of-day MLFs reflect the physics of transmission losses, it is not envisaged that they would impede or be impeded by different jurisdictional initiatives and policies (e.g., REZ schemes currently under development in some jurisdictions).

[45] Australian Energy Market Operator, *Treatment of loss factors in the National Electricity Market*, July 2012

(c) Assessment against recommended additional selection criteria

CS Energy has also considered this proposal against the additional selection criteria suggested earlier.

- *Interaction with other energy markets*

  The MLF solution does not adversely affect co-optimisation of energy and non-energy services by either AEMO or market participants.

- *Interaction with contract markets*

  The MLF solution does not adversely affect written contracts as it will not drive additional change in the future MLFs of incumbent plant beyond potential future MLF changes under the existing MLF methodology.

  If anything, insulating incumbent generators from adverse MLF impacts arising from new entrants should increase contract liquidity.

(d) Evaluation of select alternatives

An initial assessment of these select alternatives is given in Table 1 below which indicates they each address at least some aspects of the ESB's assessment criteria and CS Energy's recommended additional assessment criteria.

As part of the evaluation of alternative options, potential modifications to each alternative may be identified that enhance each option's alignment with and ability to address the assessment criteria.

Potential hybrid solution

As detailed above, CS Energy believes the ESB's current range of objectives for transmission access reform may be too broad to be adequately addressed by a single mechanism. CS Energy implores the ESB to rigorously assess all alternatives proposed by participants to date and as part of this consultation process, both as stand-alone reforms and in combinations, and the CMM against an expanded range of assessment criteria to choose the best solution or solutions that remain fit-for-purpose over the course of the energy transition.

Table 2: Assessment of alternatives against ESB's assessment criteria (based on available information of each option as proposed)

	Congestion Relief Market	Transmission cost sharing	Dual floor price	Fixed shape MLFs
Locational signals	All market outcomes from CRM to be made public.	Uncertain how proposal treats plant that chooses to locate outside REZs (if allowed under this proposal)	NEMDE's locational prices would reflect changes to Market Floor Price.	Time-of-day MLFs across the network visible to the market and potential investors. Ex-ante signal.
Efficient dispatch	Congestion relief occurs when a price for congestion relief is agreed.	No change to market design in operational timeframes.	Brings negative bid prices of semi-scheduled generators closer to short-run marginal cost.	Reduces ability to increase generation during typical periods of high concurrent generation
Congestion risk allocation	Allows participants to individually value congestion relief, leading to the true marginal cost of congestion.	Efficient REZ capacity would address congestion within REZ, but not shared network congestion.	Raising MFP for semi-scheduled generation may reduce instances and severity of congestion.	True marginal loss factor of new entrants means they bear 100% of their impact on transmission losses.
Transmission cost allocation	No explicit mechanism to allocate transmission costs.	Recovery of transmission capital expenditure split between generators and consumers.	No explicit mechanism to allocate transmission costs.	Further work to determine is network augmentation funded by participants can be reflected in their MLF.
Implementation considerations	New mechanism needed, but proposal utilises existing market design as much as practically possible.	New mechanism needed; many factors required to establish capex split, connection fee.	Utilises existing market mechanisms. Easy to implement in NEMDE	Utilises existing market mechanisms. Need to consult AEMO to determine implementation costs
Jurisdictional differences	Appears to accommodate jurisdictional differences.	Detailed design stage of prospective REZs accounts for government energy and planning policy.	Market Price Floor could be modified to account for jurisdictional differences.	No impediment to jurisdictions choosing MLFs that don't reflect network losses.
Interaction with non-energy markets	CRM participants can co-optimise congestion relief, energy and non-energy service provision	Does not appear to adversely affect non-energy service provision.	Incentivises investment in dispatchable capacity.	No adverse effects on current or future non-energy markets foreseen.
Interaction with contractual arrangements	Ability to price and manage congestion expected to support contracting activity.	Uncertain impact on contracting and contract markets.	Reduce the cost of contracting and increase contract liquidity.	May increase contracting activity as new entrants will have less impact incumbents' future MLFs.

Stream 2 – Congestion Management Model

In addition to the comments on the CMM and design process detailed in the discussion above, CS Energy provides further detail specific to the CMM below.

(a) Required further analysis

The discussion of CMM to date does not outline how the reform will interact with non-energy markets and other reforms. As this work progresses, it will be critical to address the following:

- How the CMM will accommodate assets providing non-energy services without distorting market signals or imposing penalties. Co-optimisation must be explicitly considered;

- Given that the current wholesale energy price aggregates both energy and frequency control markets, the future integration of system service mechanisms may see the energy price be a further aggregation of energy and non-energy services. Appropriately valuing and compensating non-energy services may reduce both the effectiveness of an SRMC-bid based mechanism and the attractiveness of striving for the lowest energy-only cost plant mix online in any individual Trading Interval (rather than the lowest total energy and non-energy cost plant mix over time).

- How can the CMM be developed to ensure the Post-2025 Market Design Process delivers a consistent, coherent market design when key reforms it will interact with:

    - Have not had sufficient time to demonstrate their benefit nor clearly articulate the reference case (e.g. 5MS, WDRM, System Strength); or

    - Are still in early development stages (e.g., inertia, DER maturity plan); or

    - Have been delayed (e.g., system security and Primary Frequency Response have been delayed to mid-2022 and reserve services delayed to mid-2023)?

(b) Assessment of the CMM

CS Energy has provided an assessment of the CMM against the selection criteria in Table 2 alongside the initial assessment for the alternative proposals.

Table 3: Assessment of alternatives against selection criteria (based on available information of each option as proposed)

	Congestion Management Model	Congestion Relief Model	Transmission cost sharing	Dual floor price	Time-of-day MLFs
Locational signals	LMPs, congestion charges and congestion rebates made public ex-post.	All market outcomes from CRM to be made public.	Uncertain how proposal treats plant that chooses to locate outside REZs (if allowed)	NEMDE's locational prices would reflect changes to Market Floor Price.	Time-of-day MLFs across the network visible to the market and potential investors. Ex-ante signal.
Efficient dispatch	Doesn't address all reasons for "race-to-the-floor" bidding or non-energy service provision.	Congestion relief occurs when a price for congestion relief is agreed.	No change to market design in operational timeframes.	Brings negative bid prices of semi-scheduled generators closer to short-run marginal cost.	Reduce ability to increase generation during typical periods of high concurrent generation
Congestion risk allocation	No risk management tools for new investment outside REZs.	Allows participants to individually value congestion relief, leading to true marginal cost.	Efficient REZ capacity would address congestion within REZ, but not on shared network.	Raising MFP for semi-scheduled generation may reduce instances and severity of congestion.	True marginal loss factor of new entrants means they bear 100% of their impact on trans. losses.
Transmission cost allocation	No explicit mechanism to allocate transmission costs.	No explicit mechanism to allocate transmission costs.	Recovery of transmission capital expenditure split between generators and consumers.	No explicit mechanism to allocate transmission costs.	Further work to determine if network augmentation funded by participants can be reflected in their MLF.
Implementation considerations	Significant market design change will be costly and complex. Will also impact interconnectors.	New mechanism needed, but utilises existing market design as much as practically possible.	New mechanism needed; many factors required to establish capex split, connection fee.	Utilises existing market mechanisms. Easy to implement in NEMDE.	Utilises existing market mechanisms. Need to consult AEMO to assess implementation issues.
Jurisdictional differences	Appears to accommodate jurisdictional differences.	Appears to accommodate jurisdictional differences.	Detailed design stage of prospective REZs accounts for government energy, planning policy.	Market Price Floor could be modified to account for jurisdictional differences.	No impediment to jurisdictions choosing MLFs that don't reflect network losses.
Interaction with non-energy markets	No indication of how model would interact with non-energy service markets and mechanisms.	CRM participants can co-optimise congestion relief, energy and non-energy service provision	Does not appear to adversely affect non-energy service provision.	Incentivises investment in dispatchable capacity.	No adverse effects on current or future non-energy markets foreseen.
Interaction with contractual arrangements	Non-firm nature of congestion rebates expected to adversely affect contracting activity.	Ability to price and manage congestion expected to support contracting activity.	Uncertain impact on contracts and contracting markets.	Reduce the cost of contracting and increase contract liquidity.	May increase contracting activity as new entrants will have less impact on incumbents' future MLFs.

CS Energy is not convinced that the CMM provides a robust locational signal on the investment timescale. Ignoring the impact of other reforms, the key feature of the CMM is applied *ex-post* in the settlement process. It is unclear how transparent congestion charges will be as it will likely appear as a single line item in participants' weekly settlement statement. Similarly, the reliance on *ex-post* determination of congestion charges and rebates also calls into question how the CMM will influence generators' *ex-ante* bidding decisions.

It is unclear how the CMM will allocate congestion risk under real world assumptions and conditions, both within the energy market (e.g. where generators have cause to bid plant into the market above and below their estimated SRMC) and accounting for interactions with non-energy services markets.

Further work is required to clarify how the CMM satisfies the ESB's transmission cost allocation assessment criteria. There still appears to be some confusion about whether transmission investment is in scope or beyond the scope of this reform process, and how the revenue from the sale of congestion rebates that is returned to consumers can also be used to offset some of the cost of new transmission investment. [46]

Of the remaining assessment criteria, CS Energy is unable to comment on:

- The expected costs of the CMM because there have been no cost estimates to date. Given the size of the reform, it is expected that costs would be on par with those of other significant reforms, such as 5MS;

- The complexity of the CMM as there is insufficient detail to determine how it will interact with non-energy markets and contract markets; or

- The implementation of the CMM, as there is currently no proposed implementation timeframe, date or process. If consistent with previous proposed implementation dates, the CMM would be implemented three years after the final rule determination in order to reduce the impacts on contracting.

(c) Specific issues raised in the Initiation Paper

The Initiation Paper sets out issues specific to the design of the CMM that require further consideration. CS Energy provides comments on these below independent of its lack of support for the CMM.

1) Where will rebates be made available?

CS Energy is concerned that the CMM will essentially preclude investment without approval from a central planner, either through the REZ process or the potential of allocating spare capacity outside a REZ. Concerns remain about whether REZs are located in optimal positions from a developer perspective as well as location relative to load centres. REZs should be sized appropriately so as not to create congestion on the shared network, and the CMM should not be employed to address inefficient planning.

CS Energy recommends the criteria for assessing whether an area of the network has hosting capacity (and hence should qualify for rebates) should be quantified and published, so investors are able to assess potential locations across the network without seeking

[46] Energy Security Board, *Transmission Access Reform Project Initiation Paper*, November 2021, page 24

approval from market bodies. That is, maintain the market design philosophy of market signals guiding investment.

2) Methodology used to calculate caps?

CS Energy believes fewer, high-quality rebates are of more use to generators for risk management purposes than plentiful, lower-quality rebates, but acknowledges this results in a reduction in the number of rebates available for risk management. The number of rebates would presumably also be tied intrinsically to the efficient level of congestion.

The methodology of how caps are calculated must be quantified and published, to ensure adequate transparency of the process. As under CoGaTI, there is the risk TNSPs could set the caps too low to avoid incurring penalties, to the detriment of affected participants.

3) Rebate allocation scheme?

CS Energy is concerned about the timing mismatches between project development, network investment and the rebate allocation scheme. There is a range of risks investors face when attempting to connect to the network, including the quality of the connection tool provided as part of the connection process, that would see the connection process diverge from what would be considered ideal. While these risks may not stop a project from proceeding, they can materially delay and/or change a project. Any rebate allocation scheme would have to account for these risks.

A ‘first-come, first-served’ allocation scheme could result in the projects with the shortest time-to-market securing rebates rather than the “best” projects.

‘Use it or lose it’ requirements would go some way to address rebates being acquired to frustrate other potential new projects, but there are difficulties in establishing criteria to differentiate between genuine and “commercial” delays in projects proceeding.

CS Energy also questions whether there is any way to develop a robust allocation scheme without doing it in concert with state REZ schemes (which are in various stages of maturity and vary across jurisdictions).

4) Allocation of roles and responsibilities?

Any allocation of roles and responsibilities must ensure market bodies are not being tasked with responsibility for competing NEM and state-level priorities in the absence of clear separation of responsibilities in the first instance, and guidelines on how potential conflicts are managed and resolved transparently in the event those separations are inadequate.

5) Allocation metric?

While generator availability and transmission capacity availability are both reasonable inputs into a congestion rebate allocation metric, CS Energy is concerned about the potential inclusion of a generator’s contribution to the binding constraint given the absence of discussion of how CMM would interact with non-energy markets. Without a specific mechanism to account for non-energy service provision, the inclusion of contribution to binding constraint could result in a generator being penalised for the provision of non-energy services during times of congestion when the congestion management charge is such that the unit would not be generating for energy.

The impact of distribution level generation also needs to be considered, to ensure the ability of transmission connected generation to dispatch and manage risk is not adversely affected.

6) *Nature of rebate entitlements? Whether rebate entitlements can be traded, and whether use is or lose it provisions are required in the event that a project falls through or is delayed.*

Rebates purchased by new entrants should be able to be traded, but CS Energy acknowledges the market for rebates may be highly illiquid and difficult to price until there is sufficient data on congestion charges and rebates.

Rebates granted to incumbent generation under grandfathering provisions should be able to be transferred to investment in new capacity (e.g. replacing a synchronous generator with VRE) in the same location on the network. If a participant is not undertaking portfolio renewal when it withdraws incumbent generation, the rebates should be surrendered back to the responsible body for reallocation.

As detailed in 3) Rebate allocation scheme, while “use-it-or-lose it” provisions are important to address strategic hoarding of rebates, it will be challenging to differentiate between genuine and non-genuine project delays.

7) *Grandfathering arrangements?*

CS Energy suggests that while there may be a case for different classes of rebates (e.g., different rebate classifications depending on the energy and non-energy capabilities of respective plant), this delineation should not be based on length of tenure (i.e., incumbent versus new entrant). What delineation, if any, would depend on the final design of the transmission access reform.

8) *Distribution level generation?*

When establishing how the CMM would apply to distribution level generation, the ESB needs to clarify how the access regime would deal with instances where distribution level generation is displacing transmission level generation.

The access regime also needs to ensure the cap for transmission level generation is not absorbed by distribution level generation.

9) *Interconnectors and constrained on generators?*

The treatment of interconnectors and the determination of interconnector availability will be particularly challenging for the ESB given the potential for incompatible jurisdictional schemes in adjacent regions. The jurisdictional REZ schemes currently under development may result in network and generation investment that diverges from the ISP. The modelling undertaken for the New South Wales’ NSW Electricity Infrastructure Roadmap deviated from the ISP inputs:

> *Where higher levels of renewable penetration were required to meet the Infrastructure Safeguard Development Pathway, the REZ build limits were increased and additional transmission costs were included in the retail bill impact analysis. Assumptions were also made on future MLFs (Marginal Loss Factors) so that as more generation builds in a REZ, the MLFs in that region decline in line with AEMO guidance. In New England*

> *and Central West Orana REZs, it has been assumed that the additional transmission infrastructure will lead to more robust MLFs in those REZs.*[47]

Treatment of the interconnectors under the CMM will need to ensure the costs of congestion caused by one jurisdictional scheme are not borne by consumers in another region.

10) Impact on contractual arrangements

The ESB persists in dismissing the advice of industry and downplaying the impact of CMM on contractual arrangements, stating:

> *…stakeholders have suggested that there may be additional implementation costs if the reforms trigger the market disruption clause of a contract (particularly power purchase agreement), with the effect that the contract needs to be renegotiated.*[48]

For the avoidance of doubt, stakeholders are not suggesting there may be an impact; stakeholders are saying the implementation of CMM *will* trigger the market disruption clauses of many contracts, and the costs of renegotiating these contracts will be considerable. As discussed in CS Energy's submission to Consultation on Transmission Access Reform Interim Report in October 2020:

> *Contract reopening costs: Over-the counter contracts and power purchase agreements with an end date beyond CoGaTI's commencement date will need to be re-opened. As with the introduction of the carbon tax, the re-negotiations will range from straightforward to complex and drawn out (and possibly dispute resolution). For many contracts, it may give rise to a termination event (through market disruption). The AEMC's estimated average cost of between $5,000 and $20,000 is grossly understated. If compared to contract reopening costs on introduction of the carbon tax, CS Energy considers a more realistic estimate of the costs to be as follows:*
>
> - *If not contested by the parties, the average cost would be $30,000 to $50,000; and*
> - *If contested, costs on average of $500,000 (includes advice, negotiations, engaging counsel and experts and preparing to go to mediation or court).*
>
> *There is also an underlying risk that if a contract is re-opened, a party may seek to put other issues on the table which increases the complexity, risk and ultimately cost of re-opening the contract. For ISDA [International Swaps and Derivatives Association] contracts that are terminated, this will trigger calculation and payment of the termination amount.*[49]

11) In-train developments?

In order to address concerns that there could be a rush of projects ahead of CMM implementation seeking to secure incumbent generator rebates, clear criteria for what constitutes incumbent should be established and the cut-off for incumbent status should be set in the past (e.g., any project that had reached Final Investment Decision as at 31 December 2021 will be considered as incumbent for the purposes of the CMM).

[47] New South Wales Department of Planning, Industry and Environment, *NSW Electricity Infrastructure Roadmap*, November 2020, page 43
[48] Energy Security Board, *Transmission Access Reform Project Initiation Paper*, November 2021, page 25
[49] CS Energy, *Submission to Consultation on Transmission Access Reform Interim Report*, October 2020, pages 11-12