# CMM TECHNICAL WORKING GROUP – OPERATIONAL SUBGROUP

# MEETING NOTE

*Thursday 21 July 2022 (2-4pm AEST)*

**Chair:** Neil Gibbs

**Attendees:** Anthony Rossiter (Powerlink), Cameron Potter (Fortescue Future Industries), David Heard (ECA), Emma Fagan (Tesla), Jonathan Myrtle (Hydro Tasmania), Manas Choudhury (Edify Energy), Sarah Jane Derby (Origin), Tom Gibson (OnLine Power), Dave Smith (Creative Energy Consulting), Anthea Harris (ESB), Ben Davis (ESB), Amanda Sinden (ESB), Jess Hunt (ESB), Josephine North (ESB), David Swift (ESB), Kirsten Hall (ESB), Arista Kontos (ESB)

**Apologies:** Dan Mascarenhas (Alinta Energy), Brian Spak (ECA), Gordon Leslie (Monash University)

| Time | Topic | Key points/action items |
|---|---|---|
| **2:00** | Welcome, objectives & agenda | • Meeting objectives:<br>  ○ Clarify the project plan for the TWG over the next 1-2 months<br>  ○ Ensure TWG members have a shared level of understanding for the two operational models<br>  ○ Capture TWG feedback on the presentation of the models and initial issues raised e.g. achieving efficient outcomes, bidding behaviours, incentives for storage/load. |
| **2:05** | Project plan | • The ESB provided an outline of the key milestones, draft timetable and scope of targeted questions for TWG consideration in July – August 2022 (slides 4-5).<br>• **Action**: *ESB to confirm dates and send TWG meeting invites from 11 August 2022 onwards.* |
| **2:15** | Operational models | • Dave Smith (Creative Energy Consulting) presented on the operational models (slides 6-34) including:<br>  ○ Access fundamentals<br>  ○ Simple reference scenario<br>  ○ Congestion management model (CMM)<br>  ○ Congestion relief market (CRM)<br>  ○ Conclusions<br>• **Action:** *Refer to key points and actions below this table.*<br>*Note slides 28 and 30 were inserted after the workshop based on TWG feedback to show cost and profit outcomes for market participants.* |
| **3:50** | Next steps | • The ESB confirmed upcoming TWG sessions and focus topics (slide 35). |
| **4:00** | Meeting close | |

**Operational models – key points and actions**

The notes below accompany the presentation slides shared with the TWG. Questions raised by the TWG during the workshop have been integrated with these notes for ease of review.

Readers should note that the reference scenario is a highly simplified looped network but it does allow the user to explore some key design concepts and issues. Some of these key issues do not 2materialize in a radial network.

**Terminology and definitions**

- A number of congestion models have been considered over time – FTR, OFA, CMM, CRM etc. Each model is normally expressed in a different way but they all use the same set of mathematical expressions.
    - The CEC has used different terminology of the 'energy market' and 'congestion relief market'.
    - The ESB refers to the energy market as 'access dispatch' and the CRM as 'physical' dispatch
    - The paper does not change the CEC's approach but it standardises terminology to clarify the comparisons between the CMM and CRM.
- 'Access' is a key field for determining revenue and profit outcomes for the generators
    - In the CMM, 'Access' determines the quantity of rebates awarded to the generator to offset the congestion charge
    - In the CRM, 'Access' determines the quantity MW on which generators are paid RRP.
- Access dispatch must be feasible, irrespective of the model – CMM, CRM, FTR (COGATI model)
- The 'side payment' at LMP encourages generators to bid cost reflectively.
- Congestion price reflects the intensity of congestion on the constraint
- Congestion charge is similar to a 'toll' for using that piece of infrastructure.

**Outcomes for market participants**

TWG Q: Is there a windfall gain from the CMM rebates allocation? Are there any instances where generators lose?

- In status quo, there are 'winners' and 'losers' to the disorderly bidding strategies and physical dispatch outcomes.
- In the CMM, there will be 'winners' and 'losers' depending on the rebate allocation method and the participants' bidding strategies.
- ***Action:*** *The ESB will share outcomes of modelling to demonstrate the impact of the model options and the allocation methods for different market participants.*

**Outcomes for RRP**

TWG Q: Will the LMP always be lower than RRP? Will the rebate always be positive?

- The simplified scenario keeps the RRP at $15/MWh (Gen 4 is the marginal generator at the RRN) and LMP is always less than RRP. The simplified scenario illustrates an efficient cost outcome, rather than an efficient price outcome.
- In more complex real-life examples, there may be pockets of the network where LMP is higher than RRP. This is particularly true for inter-regional prices and outcomes of the spring washer effect. Prices upstream of the constraint will be lower than RRP (LMP<RRP) and prices downstream of the constraint will be higher than RRP (LMP>RRP). Where RRP is lower than LMP, there will be benefits flow through to consumers.
- NEMDE does not 'know' RRP when it dispatches. It is designed as a least cost dispatch and factors in local prices of the generator to its algorithm.
- There may be increased instances of unexpected price outcomes with the construction of EnergyConnect, which will establish the first looped network between regions (NSW, SA and VIC connected via the current VIC-NSW and SA-VIC interconnectors and future NSW-SA EnergyConnect).
- ***Action:*** *The ESB will consider RRP outcomes as part of the scope for detailed modelling.*

**Treatment of out-of-merit generators**

TWG Q: Will some of the rebate allocation methods potentially sway investment decisions for new OOM generators to capture value from congestion rebates?

- Depending on the rebate allocation method, out of merit generators may benefit from being granted 'Access' and paid a congestion rebate at the expense of other in-merit constrained generators.
- The ESB noted that this is not a desired policy outcome and raises a question as to how the model design should prevent it. It is very unlikely to be sufficient incentive to make the investment case for a new OOM generator, but it will be a consideration for incumbents.
- Slides 20-21 introduce an out-of-merit generator, Gen 5 to the scenario.
    - With its cost at $100/MWh and RRP at $15/MWh, it would not want to dispatch at RRP. It would more likely bid unavailable or at cost.
    - Gen 5 would not feature in a WTA or efficient physical dispatch.
    - But some of the rebate allocation methods (such as pro rata method) do not look at prices when determining the access dispatch. Gen 5 would not be physically dispatched, but it would get paid congestion rebate (at the expense of the other generators).
- ***Action:*** *The ESB will facilitate further discussion of out of merit generators in a future TWG session.*

**Incentives for scheduled load**

TWG Q: Does scheduled load face a risk of paying a higher price to consume energy compared to its offer price? i.e. in the event that it is constrained-on.

- Under status quo, the market design at RRP prevents trade between Load and Generators where a lower local clearing price behind the constraint would benefit both parties.
- Access reform provides a significant opportunity to enable these types of trades. If load is located in a constrained area – e.g. batteries, pumped storage, electrolysers etc – it can benefit from accessing lower local prices and has the opportunity to relieve congestion. This opportunity exists so long as there is congestion.
- Slides 22-23 introduce a scheduled load to the reference scenario.
    - When scheduled load submits a bid, it's a value / opportunity cost rather than a direct cost.
    - Scheduled load offers to buy at a maximum price whereas a generator offers to sell at a maximum price.
    - To avoid getting scheduled, it is safest to bid unavailable. Even if load bids at -$1,000/MWh, it may still be dispatched because of NEMDE's optimisation algorithm and its reference to local price (not RRP). This is termed a mis-pricing event where the load is constrained-on and pays RRP of $15/MWh despite its max price to charge of -$1,000/MWh.
- **Action**: *The ESB will consider the impact of negative mis-pricing events on bidding strategies for participants, including scheduled load / storage.*

**Architecture**

TWG Q: Is one of point of comparison between the model options that the CRM involves complexity in establishing bidding strategies and participation and the CMM handles this on behalf of market participants?

- In the CMM, today's physical dispatch systems are unaffected. The physical dispatch identifies which constraints are binding and the value of the congestion rebate. The access allocation can be calculated later as part of the settlements process. CMM access allocation is feasible, but can be complex to calculate in reality.
- In the CRM, access is calculated first (similar to today's physical dispatch). A second physical dispatch is run with separate bids.
    - This is a deliberate feature of the CRM to opt-out of LMP exposure e.g. a participant may need to manage its contract positions and/or avoid the commercial complications.
    - CRM access allocation is physically feasible because it is subject to the same NEMDE logic and constraint equations.
    - The CRM does involve establishing bids and bidding strategies but current participants are well versed and adept at developing these as part of their trading teams.

**Incentives to participate in the CRM**

TWG Q: Does the CRM achieve efficient dispatch? If participants opt out of the CRM, does this leave the currently disorderly bidding problem unresolved?

- Disorderly bidding may still be a feature of the 'access' market. The CRM achieves efficient outcomes by enabling profit maximising trades to reach a net cost efficient position.
- The CRM does not mandate participation but participants are incentivised to buy/sell in the CRM between parties that value access more/less i.e. they will pursue CRM bids if there is 'money on the table'.
- Opting out of the CRM is a valid and economic choice to the extent that the participant is assessing transaction costs, its contract position, LMP exposure risk, alongside the CRM benefits. NEMDE will optimise dispatch costs based on the bid offers.
- **Action:** *The ESB has inserted slides 28 and 30 to show cost and profit outcomes for the market participants in the CRM (and why they are incentivised to participate). This material was previously shared with the TWG in a separate CRM working paper and consolidated into the presentation slides for convenience.*
- **Action**: *ESB to share report on strategic bidding under an access model.* Refer to link: Transmission-Frameworks-Review-Technical-Report-Optional-Firm-Access Relevant sections are 11.4 – 11.6.

TWG Q: Is 'bidding at cost' a working assumption for the CRM?

- It's based on economic theory that in a competitive generation market, where every generator is small and without significant transaction costs, the parties will bid at cost to maximise profit. There is game theory explanation on which it is based.
- TWG members were interested to explore the game theory in further detail in order to confirm whether the bidding strategies will
- **Action:** *ESB to share report on strategic bidding under an access model (refer above).*

TWG Q: Is the CRM structured to bid in terms of MW increments / decrements and/or bid MW?

- The CEC methodology allows for either approach.
- It appears preferable to bid MW in access dispatch and physical dispatch and the CRM will calculate the differential. Otherwise market participants will not know the results of access dispatch to calculate the appropriate increment / decrement.
- This can be explored more fully in future TWG sessions.

TWG Q: How will the CRM affect the solve times for NEMDE?

- The ESB is aware that the CRM needs to be 'workable' for NEMDE including its solve times. The ESB will consult with AEMO to resolve this query.
- **Action**: *(in progress) ESB will consult with AEMO on the implementation of the model option/s. AEMO will be best placed to answer once some of the key design choices have been explored further by the ESB and TWG.*