Explainer – **Transmission Access Reform**

Unlocking new clean energy investment in Australia means we need to fix grid congestion.

Congestion occurs where physical limits on the grid mean generators aren't able to export their power to customers. This makes it harder to invest in new renewable generation, at precisely the time when we need to replace ageing and expensive coal and gas generation.

The Clean Energy Council (CEC) has led the clean energy industry's development of a better way to manage congestion. Working with officials and the Energy Security Board (ESB) we have proposed practical solutions which will also maintain a stable investment environment.

Finding a pragmatic way forward has not been easy. This is a controversial debate, so finding ways to address everyone's concerns has been difficult. However, we believe **we have found a solution.**

Our proposal builds on ideas from some of the brightest minds in the clean energy sector, and has been endorsed by the ESB. Our proposed approach is to:

- Introduce a Congestion Relief Market, to help manage congestion in real time. This new mechanism allows generators and batteries to trade energy that would otherwise be lost, because it sits behind congestion.
- Develop a new Information Flow model, to help investors to make the best investment decisions. This will help avoid congestion in the first place, as investors are unlikely to build assets where congestion is expected to cause problems.

The Congestion Relief Market represents an innovative solution to the policy impasse of the last two decades. Originating from the renewable energy sector itself, the Congestion Relief Market makes better use of the existing network, and allows otherwise wasted energy to be used.

The Congestion Relief Market offers great promise however, **more design and testing work is required** before it could be implemented. Industry is therefore **calling on Ministers to give officials and the ESB more time** to work closely with industry to ensure the solutions being implemented will be successful, and will not inadvertently slow down the transition.

Industry is also calling for the **Congestion management mechanism (CMM),** and any other form of **locational marginal price (LMP), to be removed from consideration** as part of transmission access reform.

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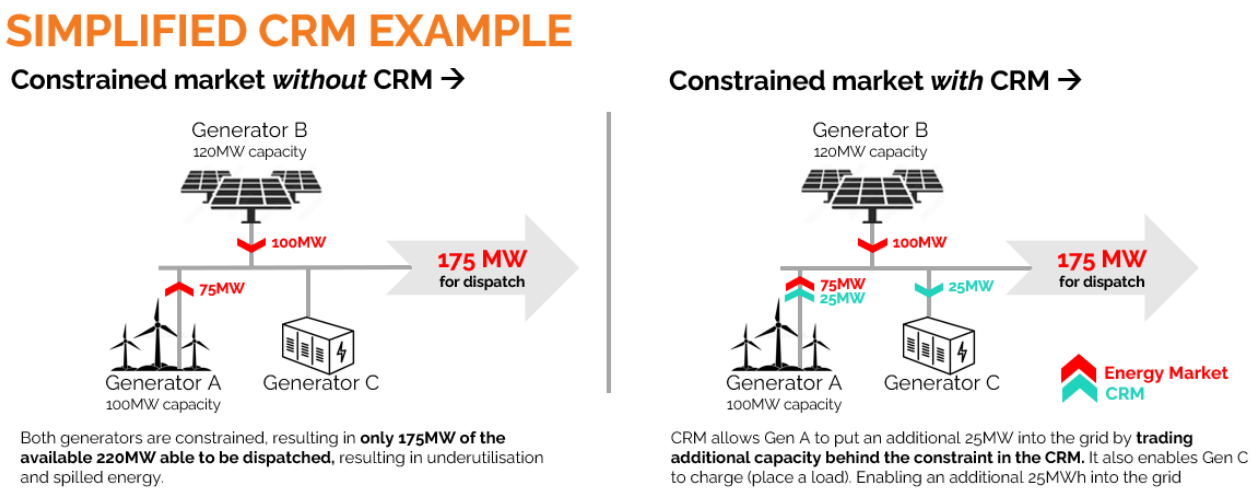
The below diagram and description provide a simplified example of how the Congestion Relief Market would work.



1. On the left, multiple generators and a battery sit behind a constraint – a physical limit on the system which means that only 175MW of power can flow to consumers. Generators A and B compete to use this limited network capability, so they can sell their power at the high wholesale market price. Generator C is a battery and is not charging, as it would need to pay the high wholesale market price to charge.
2. On the right, the Congestion Relief Market allows the battery (Generator C) to trade with the two other generators, to consume some of their power. The battery ***pays*** the Congestion Relief Market price to charge, which is a much lower price than the high wholesale market price. This allows Generator A to produce an extra 25 MW, which it ***sells*** to the battery at the Congestion Relief Market price. The battery stores the power for later use.

This represents a much better outcome to the status quo. The battery can store power for export at a later time, when the wind and solar generators are not producing power. This meets consumer demand for power, helping to keep the lights on and prices down. It also means that **the existing network is used more effectively**, helping to avoid the need for further investment in new network.

We have worked closely with the ESB and officials to get to the point where the Congestion Relief Market is reasonably well developed. However, there is a lot more work to be done. We need to understand exactly how this mechanism will work in practice. We also need to understand all of the costs associated with its introduction, such as changes to the market operator's systems.

To allow industry to focus on this task, the CMM and any form of LMP must be removed from consideration as part of transmission access reform. All variations of LMP have been highly contentious and prevented industry from making progress and reaching consensus.

The rest of this explainer provides a more detailed overview of access reform, the impacts of the proposed models, and the CEC's approach to addressing this issue**.**

Transmission Access Reform – Extended Explainer

What is Access reform and congestion?

Access reform is about creating different investment and operational signals. It's a debate that's been raging since the National Electricity Market (NEM) was established in the 90's.

The term 'congestion' is often used interchangeably with access reform. Congestion occurs where physical limits on the power system stop generators from being able to export their power. This can distort price signals, impacting the way that generators make operational and investment decisions.

Congestion is a problem. Of course, the best way to manage it is to build more transmission. However, there are also other things we can do to relieve it. Which is why we proposed a new way forward – the Congestion Relief Market – which harnesses the capability of new technologies like batteries to solve the congestion problem.

What is the story so far?

Following multiple efforts by the AEMC in access reform, the ESB took responsibility for this work a few years ago. The ESB proposed the introduction of a Congestion management mechanism (CMM). The fundamental mechanics of the CMM model were not new, being based on earlier work by the AEMC as part of the Coordination of general and transmission investment review (COGATI) in 2018.

The CMM is basically an example of a locational marginal price (LMP) model, or ***nodal pricing***. In these models, generators face different prices depending on where they are located in the network.

Under the CMM, these prices change not only due to supply and demand, but also depending on complex interactions in the system, such as system strength and voltage stability.

This makes those prices very unpredictable. While a 'rebate' will be available to partly manage that unpredictability, it will still be extremely difficult to forecast what these rebates will be. The CMM will therefore make it very hard to make investment decisions.

What did the CEC do in response?

The CMM was originally proposed by the ESB would have caused a lot of problems for the clean energy industry and would drastically slow down NEM decarbonisation.

The CEC therefore took the initiative and proposed an alternative to the CMM. Working with key organisations in the clean energy industry, we developed a better operational model – the Congestion Relief Market.

The Congestion Relief Market is just that – a flexible marketplace where generators and batteries enter 'trade around' congestion. Because its open and transparent, it a lot more predictable. It also enables generators and storage providers to contract each other, which manages risk and sends even stronger investment signals.

The Congestion Relief Market is explained in more detail below.

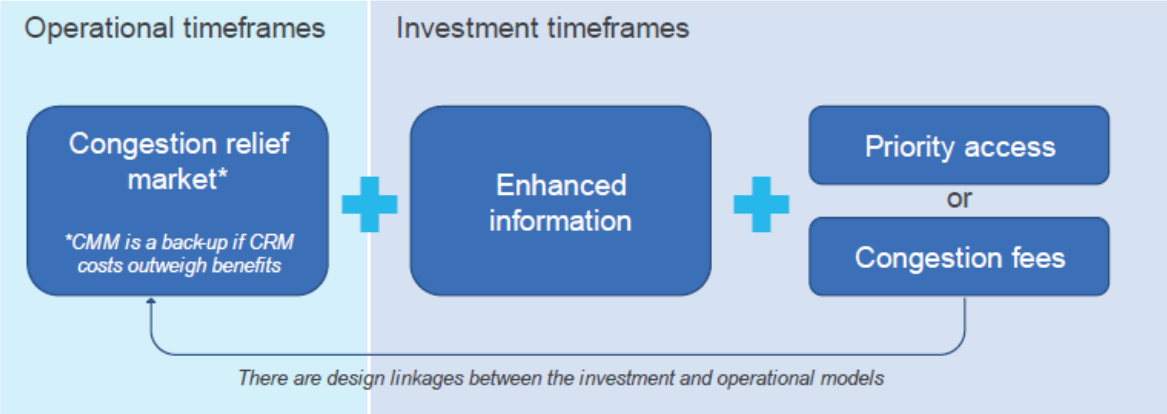
We have also proposed changes to improve information flows. Better information allows generators to make better investment and operational decisions, which is key to relieving congestion. It also allows networks to build the grid in a more nimble and effective manner.

What have the ESB now proposed?

The ESB responded to our proposals by introducing a 'Hybrid Model' in a 2022 Directions Paper. This model comes in two parts.

An '**operational timeframe'** part proposes interventions which impact how the market operates in real time and are intended to change the way generators operate their assets. The ESB largely adopted our Congestion Relief Market model as their preferred solution. However, they have kept the CMM in the background, as a 'fall back' measure.

The '**investment timeframe'** part changes the way that generators connect to the system, and are intended to change the way investors make decisions about where they build new assets. Alongside a version of the information flow model, the ESB proposed two other options – the 'Priority Access' and 'Congestion fees' models, both explained in more detail below.



Source: Energy Security Board, Transmission access reform Directions Paper, November 2022

The Hybrid Model proposed introducing the Congestion Relief Market in combination with one of two proposed 'variants.' In total, the Hybrid Model combines the following:

- **Congestion Relief Market:** a new market that allows excess energy to be traded in the market, which otherwise would be unable to due to congestion.
- **Enhanced Information:** an information sharing process to enable better information flows during the planning process between market bodies, transmission network service providers (TNSPs) and investors.
- **Priority Access variant:** establishes a 'queue' position for new generators who would be adding congestion to the market. When there is congestion, they only get to sell energy into the market based on their place in the queue.
- **Congestion Charges variant:** a fee for new connecting projects based on the location they wish to connect to the grid, and the impact they would have on congestion in that location.

Both investment variants are intended to send signals to investors of where they should or should not build new generation, with poor queue positions or higher charges to direct investment to areas with stronger access.

Both variants require further development and there is no industry consensus on if they will actually help or hinder investment.

What has the CEC been doing?

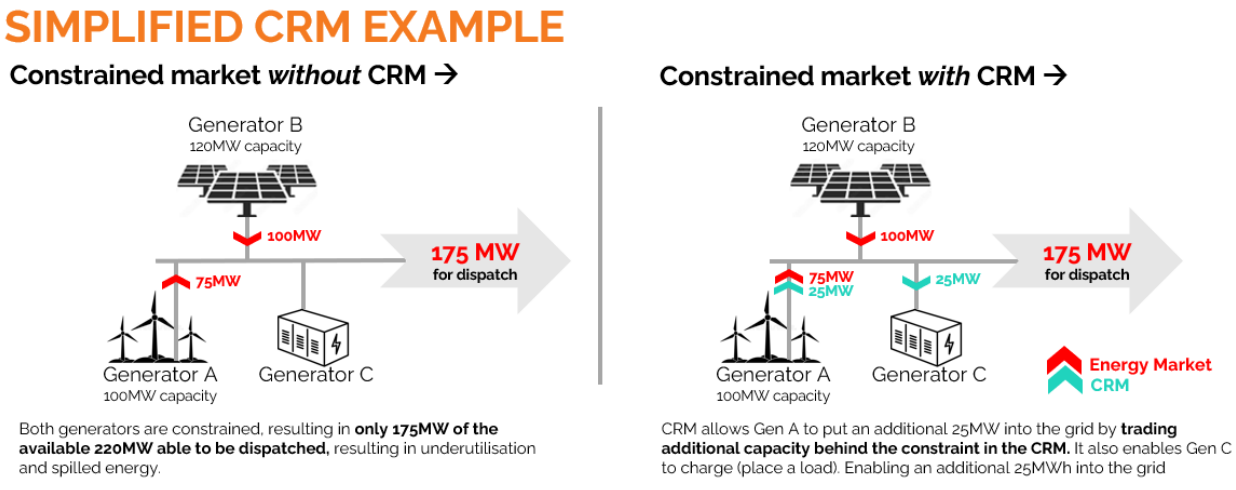
Over the last 18 months, the CEC has worked extensively with Members, the ESB, and Senior Government Officials to develop and champion delivery of the industry consensus, specifically:

- Implementation and further development of the Modified Congestion Relief Market model
- Acceleration in delivery of an Enhanced Information model
- Removal of the Congestion management mechanism (CMM) and any for of locational marginal price from consideration

Why has the CEC proposed the Congestion Relief Market?

The Congestion Relief Market represents a sensible compromise. It has the support of a large number of industry players, as it is ***voluntary and flexible*** and works well to support efficient investment signals.

The Congestion Relief Market allows parties to trade excess energy that would otherwise be wasted, as it sits behind a network constraint. Not only does this go some way to really managing congestion, but it also creates additional revenue streams for storage assets, reduces spilled energy, and helps reduce the need to build more transmission infrastructure.



Most importantly, the Congestion Relief Market largely leaves the existing energy market alone – the market will continue to settle in the same way it currently does. This minimises impact on existing investments, which is crucial to encouraging the next round of required investments to occur.

All of this makes it easier to invest **in more clean energy in the Australian market, helping to keep the lights on and reduce costs to consumers.**

The Congestion Relief Market was originally designed and proposed by Edify Energy in June 2021. The CEC further developed the model into the Modified CRM, debunking initial concerns with the model and creating prototypes of how the dual markets would solve in reality.

This developed model elevated the Congestion Relief Market from concept to feasible design. The Modified CRM is now the preferred model by the ESB, who continue to engage closely with the CEC and our Members to guide their work.

Although industry and the CEC have done a lot of work to get the Congestion Relief Market to where it is now, there is still a lot of work to do. We still don't really know how it will interact with the overall market, and we don't know whether AEMO can integrate it into their systems. We are calling for the ESB to do this work, to really test out the Congestion Relief Market, before it is introduced.

Why do we need Enhanced Information?

The CEC also proposed an Enhanced Information model in our June 2022 submission, calling for greater sharing of information between Market Bodies, TNSPs and Investors during the planning process, as this would enable better locational decisions for where to build new generation.

This 'no-regrets' model has been expanded on by the ESB and is now the only model that has complete industry support, with many calling for it to be accelerated for immediate implementation.

We also proposed that planning processes be amended to take account of the opportunities presented by already existing renewable generation. Sometimes described as 'black spots', these limits on the existing network can mean existing generators aren't able to export their power. Better planning processes can relieve these blackspots, unlocking low-cost renewable power for consumers.

How are these models different to what we currently do?

While the Congestion Relief Market model and Enhanced Information would complement the current market, moving to an LMP model would represent a major overhaul from how the market currently operates. Currently:

- Generators are paid based on a ***regional price*** calculated where they are located proximate to one of the five regional reference nodes (RRN), which is a notional reference point within the National Electricity Market (NEM) used to determine the ***regional reference price (RRP)***. These RRPs are usually set at major nodes in each state – in NSW for example, the RRN is a major substation in the Western Suburbs of Sydney.
- Generators in each region of the NEM are then paid for the volume they dispatch, multiplied by the RRP. Pricing is established by the NEM dispatch engine (NEMDE), which finds the lowest cost mix of generators to ensure supply meets demand, subject to security constraints (such as congestion), every 5 minutes.
- The wholesale electricity spot market is settled at the same interval, creating the spot price.

Why is LMP a problem for investment in renewables?

Shifting the entire NEM to an LMP would see prices become more granular and more heavily impacted by congestion in a set area. It would make investment riskier and more time consuming, increasing the cost of building renewable generation and storage. For these reasons, the introduction of any form of LMP has been strongly rejected by industry since COGATI.

Ultimately, introducing LMP would make it harder to get more clean and low-cost energy to customers.

Why does it all matter?

We need to urgently accelerate the delivery of clean generation, storage, and transmission into the NEM to achieve an emissions reduction of 43 per cent by 2030 and net zero emission by 2050. However, we must ensure that all new generation built is ***adding*** more renewable energy to the grid, not simply displacing existing clean energy.

The ambition of TAR is to create a clearer structure of ***where*** is most suitable for generators to connect to the grid by enabling clear market signals of where has strong (or weak) access.

> **Strong access:** when a generator connects at a point in the grid with **strong access**, it means the physical and electrical properties of the network where the energy is supplied by the generators to the customers is stable, secure, and relatively free of electrical congestion. This is optimal for a new generator as it will result in a larger amount of the energy they generate being dispatched into the grid.
>
> **Weak access:** when a generator connects to a point in the grid with **weak access,** it is an area of the grid with high or inefficient levels of congestion. The area will have increased supply, with generators unable to sell their generated energy into the grid, even at a lower price, as it cannot be securely dispatched. This will result in spilled or wasted energy, or a plant operating at lower capacity.

As more variable renewable energy (VRE) generators (such as wind and solar farms) join the grid which was historically designed to support fewer large-scale plants (such as thermal coal and gas plants), congestion is inevitable.

While there is an expected level of healthy congestion, understanding where is optional to connect in the grid will ensure strong return on investment for generators, but most importantly it will ensure more clean and lower cost energy is available for Australian households.

There is currently no clear analysis showing where and when congestion will occur, and how recently announced Commonwealth and State projects – such as Renewable Energy Zones (REZs), Rewiring the Nation and Marinus Link – will impact on access and congestion. This level of detail needs to be defined before any NEM-wide reform is introduced.

What's next?

In October 2022, Energy Ministers called for 'congestion management' to become a near-term priority. However, the CEC instead recommend that Senior Officials and the ESB 'hasten slowly' to prevent

rushing to introduce under-developed reform and inhibiting the delivery of achieving national emissions reductions objectives.

The ESB will be making recommendations to Energy Ministers at the next Energy minister meeting on February 24, with intention to announce a final recommendation mid-2023.

In the meantime, the CEC will continue advocating directly to Energy Ministers, Senior Officials and the ESB to:

- **Remove** any form of mandatory Locational Marginal Pricing, including CMM, from consideration.
- **Support** the accelerated implementation of the Enhanced Information Model.
- **Delay** a final decision on transmission access reform to allow for more extensive analysis, including of the Congestion Relief Market, to ensure no perverse outcomes will result from market reform.

Want to know more?

The CECs latest submission to the ESB Directions Paper can be found here.

If you would like to discuss any of the concepts or issues discussed in this paper, please contact:

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