OPENING THE GRID TO CHEAPER RENEWABLES

Complementing and supporting state government renewable energy zones: transmission and access reform

FINAL REPORT JULY 2021

ENERGY SECURITY BOARD

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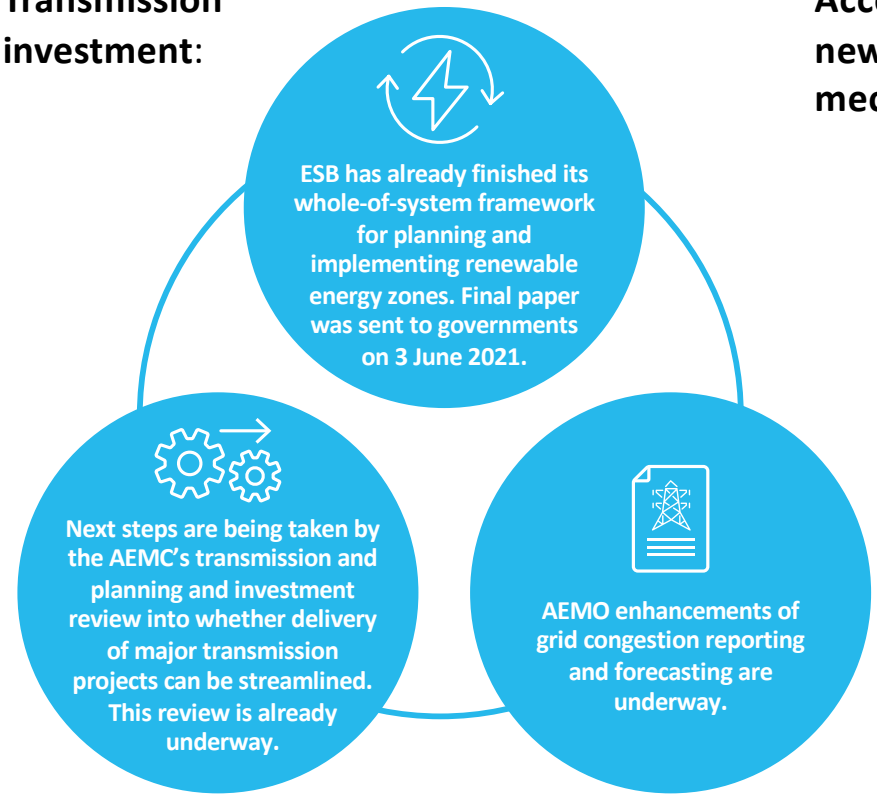
The shift to large-scale renewable generation is driving a wave of major new transmission projects - putting high-voltage power lines on the ground to carry power to market. Per capita, Australia leads the world in building renewable grid-scale generation, about 10 times the world average. Coordinating transmission, generation and storage investments will help deliver new power supplies at least cost. Particularly important as the national electricity market replaces most of its aging power stations over the next 20 years.

National coordination for new generation

Our transmission and access pathway establishes a framework for generators and storage to connect to and use the system at the lowest possible cost.

Transmission investment:



Access reform through a new congestion management mechanism:

ESB recommends a priority rule request to initiate stakeholder consultation on our proposed whole-of-system congestion management mechanism, CMM(REZ), that complements jurisdictional renewable energy zones.

Under the CMM(REZ) a dual mechanism of congestion charges and rebates would encourage generators and other large flexible loads (batteries, hydrogen) to locate in renewable energy zones to be eligible for rebates.

Generators are still free to connect where they want. But if they want to get priority access to the network, then they will need to connect in a renewable energy zone (REZ).

Further work is required to assess whether we should expand those parts of the network to be treated as a renewable energy zone beyond those currently contemplated.

Stopping wind and solar waste

The rapid shift to large-scale renewables has seen Australia outgrow the way it prices and delivers electricity.

Connection to the grid is getting difficult in many areas and congestion is a growing problem stopping the cheapest, cleanest generation from getting to consumers.

We need to fix the fact the current market doesn't give renewable generators a financial incentive to locate in the most efficient location. We need to make sure we get the full benefit of all the renewables coming into the national power system.

We also need the right financial incentives for all resources including both generation and storage, to operate in ways that work with the power system not against it.

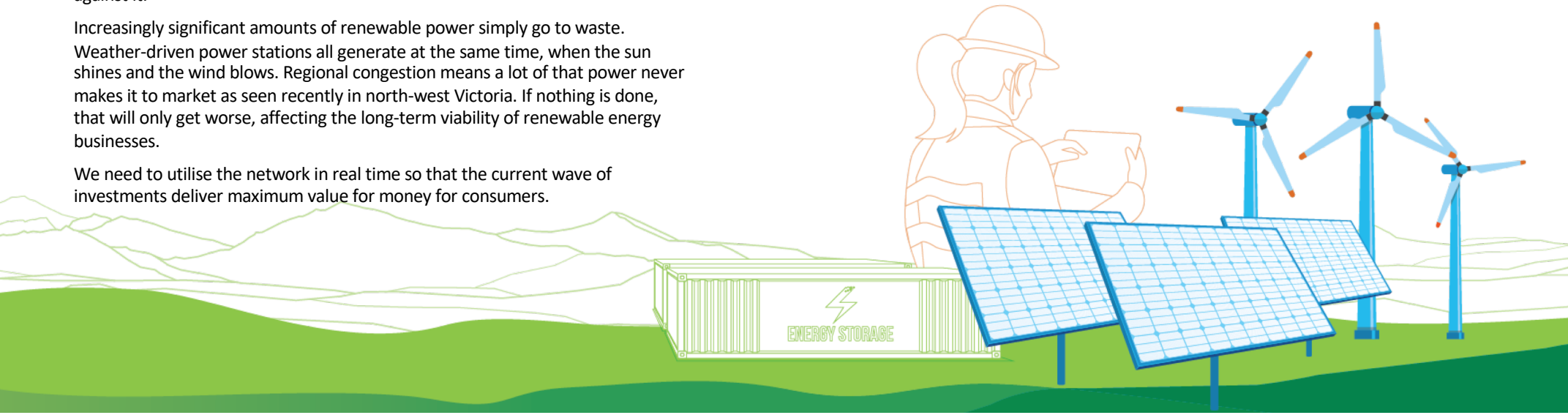
Increasingly significant amounts of renewable power simply go to waste. Weather-driven power stations all generate at the same time, when the sun shines and the wind blows. Regional congestion means a lot of that power never makes it to market as seen recently in north-west Victoria. If nothing is done, that will only get worse, affecting the long-term viability of renewable energy businesses.

We need to utilise the network in real time so that the current wave of investments deliver maximum value for money for consumers.

A new deal for batteries

We need to create the financial incentives for batteries to operate in congested parts of the grid – so more are located where they are needed most.

We want them to work as 'solar and wind sponges', storing cheap electricity when generators are generating and releasing that energy when they are not. Without the right signals, this is a lost opportunity to store cheap renewable energy so it can be used when the sun stops shining and the wind stops blowing.



Just building more transmission is not the whole answer

Congestion is a normal feature of a high variable renewable energy power system. It's inefficient and unnecessarily expensive to build a transmission system that accommodates all generation output at the sunniest or windiest of times, as we will have more than enough energy at those times.

Investing in the NEM is riskier than it should be.

The current access regime makes it profitable for new projects to proceed in parts of the network that are already full. For most of the time these projects don't add usable new megawatts – they survive by cannibalising the profits of their neighbours.

This means that existing generators are likely to exit the market faster than currently announced, raising the prospect that we might not have the right mix of resources ready in time to replace them.

In other energy markets around the world - this doesn't happen.

We need some changes to make sure that the network capacity we have now, and the new capacity we are building, is used well. If we tried to build out all the transmission capacity to accommodate all the generation to come, the cost would be astronomical.

The ESB's proposals leverage renewable energy zones being established by state governments to deliver more orderly, less risky generation investment.

Generators are still free to connect where they want. However, if they want to connect in a part of the network that is already full, they will need to bear the costs of congestion that they cause rather than imposing those costs on their neighbour.

Of course building new transmission is important and a core focus of the ESB's reforms. The energy system needs more transmission capacity to transform successfully.

- The current registration rate is 27% higher than what the Integrated System Plan (ISP) 2020 step change scenario requires, which only has 2.6 GW pa capacity additions
- AEMO has visibility of 75 GW of new generation across 343 potential projects, which is 15% more than what step change requires.

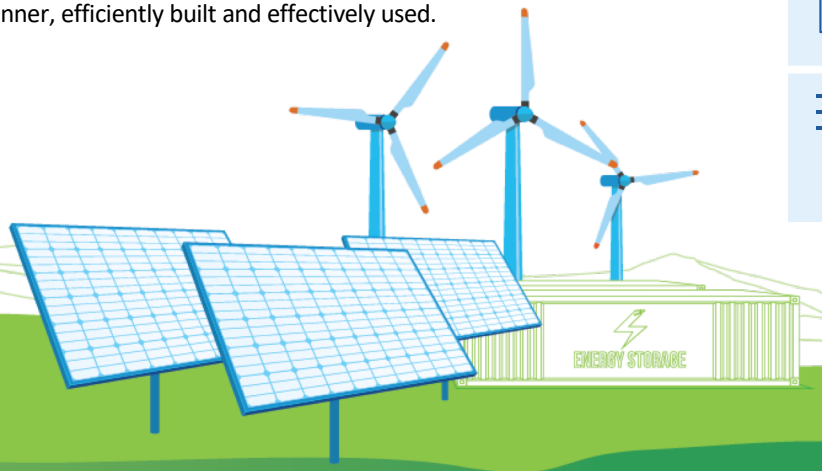
AEMO's recent inputs and assumptions scenarios report for the next ISP suggests the level of generation investment interest continues to far exceed available transmission capacity.

Unlocking benefits of change for consumers

121 new wind and solar projects have connected to the national grid in the past four years with many more on the way. These reforms are all about increasing investment efficiency – cutting the cost of generation projects and getting that new generation to homes and businesses.

We are already well progressed down this path with work underway on major transmission projects identified as priorities by the integrated system plan. In the medium term we are recommending reforms to encourage more generation into renewable energy zones where the costs of transmission can be shared and firm access to the grid secured.

Consumers are being asked to pay for new poles and wires to expand the grid so it can carry cheaper, lower emissions power to homes and businesses. So new infrastructure has to be planned in an orderly manner, efficiently built and effectively used.



We want the lowest cost way to manage transmission connections to new generation efficiently located in renewable energy zones; and realise the full environmental value of a lower emissions power system.

Affordability – will be helped by targeted investment, avoiding the vast expense of trying to build out all congestion which consumers would have to pay for in their power bills.

Emissions reduction – by supporting the large scale rollout of variable renewable energy in line with the integrated system plan and helping implement jurisdictional policies.

Keeping the lights on – providing incentives for provision of essential infrastructure needed by the community and economy by removing concerns about uncertainty and delays faced by generators and storage providers when they try to connect.

Supporting jurisdictional reforms – this work strengthens state government renewable energy zone policies to co-ordinate generation and transmission investment with national consistency.

A simpler energy market transition for users – introduces a market-wide framework that encourages investment in efficiently located renewable energy zones but also allows for investment outside of these zones if that's what generators prefer (as long as they can operate securely there).

Actions for better use of the network

The ESB's package of transmission and access reform includes measures to get transmission poles and wires, and generation, built when and where it's needed.

On the transmission side it includes work that is already complete, like the actionable ISP reforms and our interim renewable energy zone recommendations.

The ESB also identified a need for further work on changes needed to maximise the timely and efficient delivery of major transmission projects, now being progressed by the AEMC in its transmission planning and investment review which will release a consultation paper in August 2021.

NOW

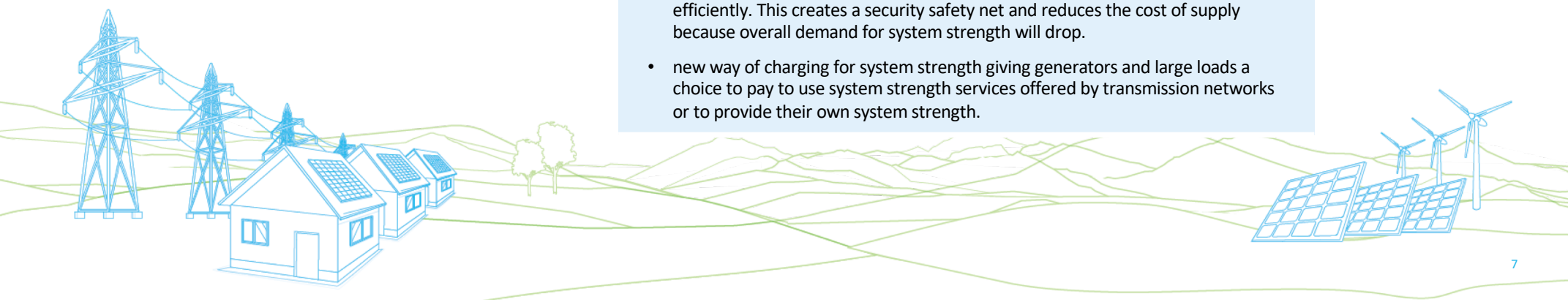
Actionable integrated system plan rules for transmission investment are in place and underway.

Planning rules and principles for the ESB's interim renewable energy zones framework are being used to progress actionable ISP projects. Separate advice was given to Ministers on 3 June 2021.

New rules on dedicated connections will encourage investment in, and better use of, transmission infrastructure by making it easier for generators to share assets like power lines.

Final rules underway on system strength are underway on a proposed three part approach including:

- new obligation on transmission networks to provide the right amount of system strength, encouraging the most innovative, least-cost approach to getting generators connected to the grid.
- new access standards for large loads like hydrogen, generators, utility-scale solar and wind farms, to make sure their equipment uses system strength efficiently. This creates a security safety net and reduces the cost of supply because overall demand for system strength will drop.
- new way of charging for system strength giving generators and large loads a choice to pay to use system strength services offered by transmission networks or to provide their own system strength.



Actions for better use of the network (continued)

NEXT

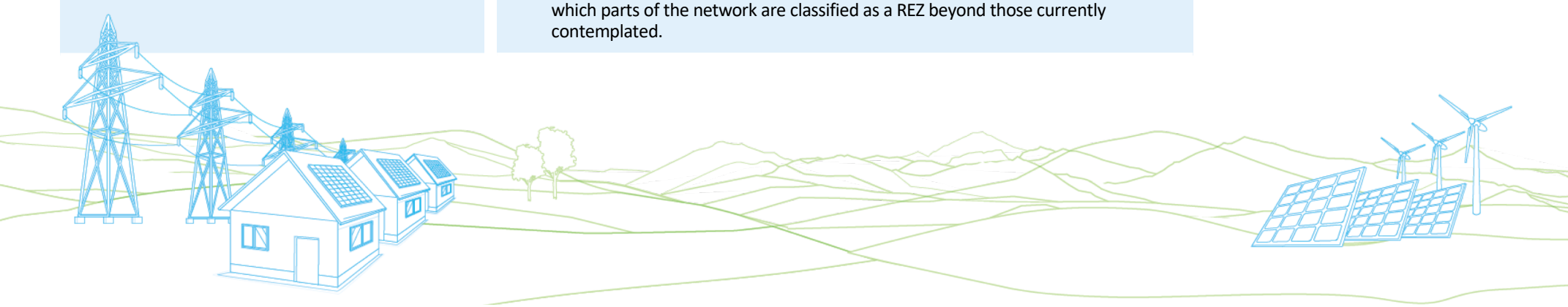
Transmission investment and planning review:

- considering whether current regulatory frameworks need to be changed in order to maximise benefits to consumers through timely and efficient delivery of major transmission projects (including ISP projects).
- further advice on necessary reforms will be provided to energy ministers following this review's conclusion.

Enhanced congestion information: AEMO currently engaging with stakeholders on options to enhance the level of detail made available about forecast congestion.

An access model that uses renewable energy zones to coordinate generation and transmission investment and deliver an orderly transmission.

- it is designed to resolve the problems associated with the current open access regime while avoiding adverse outcomes identified by stakeholders in relation to locational marginal pricing/financial transmission right model.
- introduces two changes to the settlements arrangements which work in tandem.
  First all scheduled and semi-scheduled generators would face a **congestion charge** calculated each dispatch interval on a $/MWh basis as the generator's marginal impact on the cost of congestion.
  Second eligible scheduled and semi-scheduled generators would receive a **congestion rebate** calculated each dispatch interval, funded from the collective revenue received from the congestion charges. The size of the rebate is determined in accordance with a pre-determined allocation metric, such as availability.
- Eligible generators would include incumbent generators and REZ generators. Further work is required to assess whether there would be merit in expanding which parts of the network are classified as a REZ beyond those currently contemplated.



Actions for better use of the network (continued)

Longer term reforms

A strong theme of submissions to the options paper was it would be disruptive to introduce successive access models or change the access framework after a medium-term access solution has applied for a relatively short period of time.

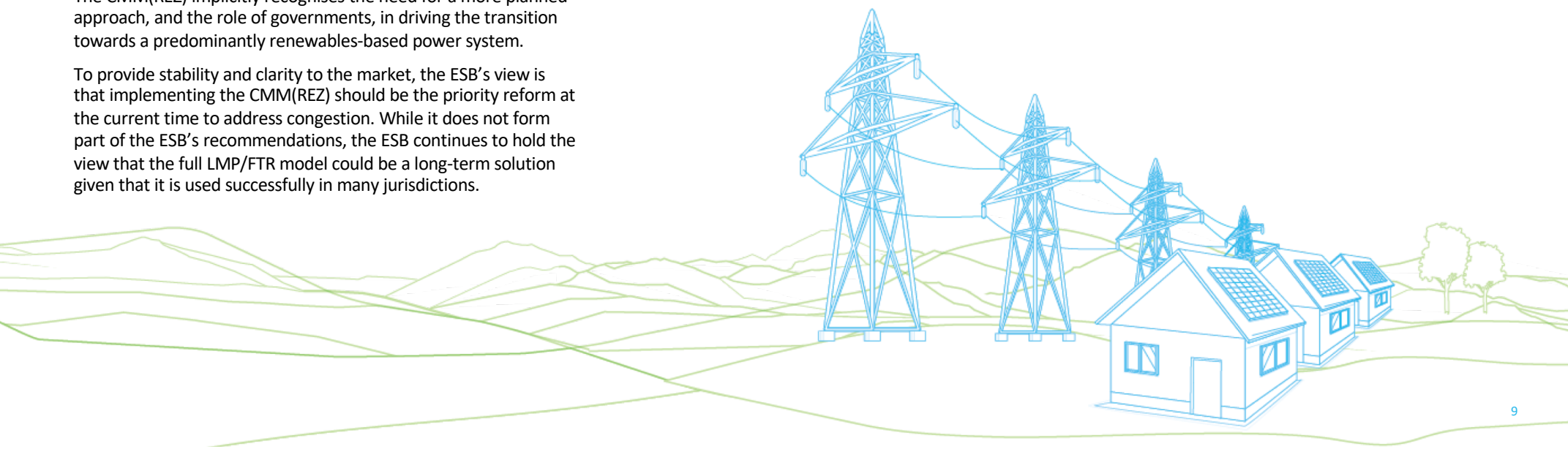
The ESB recognises it's difficult for investors to make long term investment decisions in the context of shifting sands. For this reason, the ESB has not included a long-term access model in its recommendations. Instead, the reform pathway for transmission access reform is focussed on immediate and near-term measures. In particular, the CMM(REZ) should be progressed expeditiously using a fulsome stakeholder engagement process to develop the detail.

The CMM(REZ) implicitly recognises the need for a more planned approach, and the role of governments, in driving the transition towards a predominantly renewables-based power system.

To provide stability and clarity to the market, the ESB's view is that implementing the CMM(REZ) should be the priority reform at the current time to address congestion. While it does not form part of the ESB's recommendations, the ESB continues to hold the view that the full LMP/FTR model could be a long-term solution given that it is used successfully in many jurisdictions.

FUTURE

Conditions will continue to change on the new grid. The ESB and market bodies will review and report on changes to make sure arrangements remain fit for purpose.



ESB recommendations to energy ministers

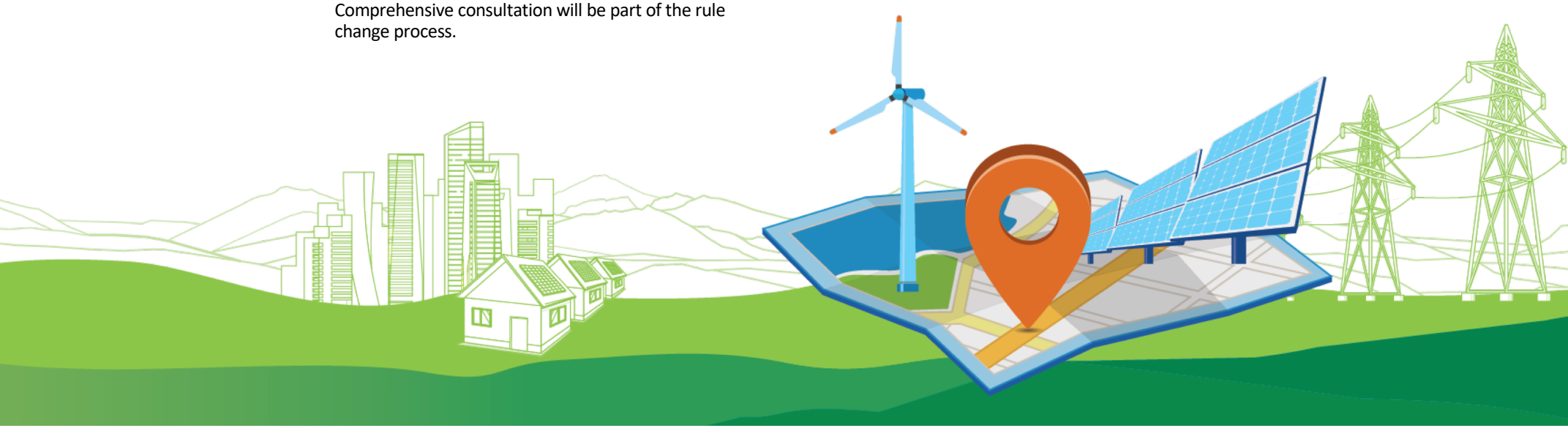
Supporting the integration of renewable energy zones and timely, efficient transmission investment

To support the integration of renewable energy zones the ESB recommends energy ministers:

a) Adopt the renewable energy zone planning rules and principles for an interim framework to address urgent planning implications. [as set out in the ESB' separate advice on the Interim REZ frameowk in June]

b) Instruct the ESB to prepare a rule change for submission to the AEMC to progress the congestion management model adapted for integration with renewable energy zones. It will address the emerging congestion management needs of the system. Comprehensive consultation will be part of the rule change process.

To support timely and efficient transmission investment the ESB recommends energy ministers seek advice from the AEMC on regulatory reforms necessary to improve the delivery of major transmission projects (including ISP projects. This advice will be prepared as part of the AEMC's transmission investment and planning review which releases its first consultation paper in August 2021.



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