

# Future Network and customer solar journey

## Customer Advisory Panel Pre-read

October 2020

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# Future Network

# The future is already here

## Current state

- Customers want greater control of their electricity supply, to lower their costs and utilise cleaner energy sources
- The Victorian Government's Solar Homes program, and the decline in the cost of renewable technology is fast-tracking customers' ability to achieve these goals. This is evidenced by solar rooftop connections continuing to grow despite the impact of COVID-19
- We've heard that spending more time at home has led to even greater investment in rooftop solar due to faster pay-back from more self-consumption and the ability to reduce bills

## Need for change

- Throughout three years of customer engagement and research, we have heard repeatedly that **doing nothing to promote / assist / enable greater renewable integration is not an option**
- The network today however can not accommodate the quantity of distributed energy resources (**DER**) being installed. In the absence of further action, customers can expect to see:
  - more frequent tripping of customers' solar from unmanaged voltage problems
  - electricity peak demand may grow rapidly due to the uptake of electric vehicles
  - more supply outages as more intermittent renewables connect (both large and small)
- Now is the time to make 'least regrets' decisions on how we transition the network to this new future

# We've been talking to our customers and stakeholders about this since 2017

Overall, our customers expect us support renewables on the network and enable customers' to make better choices about how their usage impacts on their costs

This includes enabling new technologies but also providing financial incentives for demand response

They want us to do this effectively and not spend a dollar more than necessary

| Year    | Type of engagement                 | Topics and options considered   | CitiPower   | Powercor   | United Energy  |
|---------|------------------------------------|---|---|--|--|
| 2017    | Surveys                            | Intention to get solar PV (if not already installed)  | 36%   | 43%  | 41%  |
| 2017    | Surveys                            | Support for the network to be upgraded to accommodate renewables<br>Interest in participating in demand response  | 80%<br>69%  | 82%<br>66%   | 76%<br>64%   |
| 2018    | Citizen-led deliberative workshops | What investment option do you prefer for enabling solar exports, including estimated bill impact:<br>Option 1 - limiting exports to manage the network<br>Option 2 - Build capacity to cope with more exporting<br>Option 3 - Implement Flexible Grid Technology (no change to network capacity)<br>Option 4 - Both options 2 and 3/ something in-between<br>Option 5 - None of these<br><br>Interest in participating in demand response for financial incentives: | 78% for option 3<br>9% for option 4<br>9% for option 5<br>3% for option 2<br>0% for option 1<br><br>85% | 59% for option 3<br>30% for option 4<br>8% for option 2<br>3% for option 5<br>0% for option 1<br><br>80%                   | 74% for option 3<br>18% for option 2<br>5% for option 4<br>3% for option 1<br>0% for option 5<br><br>73% |
| 2019    | Future Networks Forum (deep dive)  | What is the most effective solution for enabling solar exports:<br>Option 1 - Customers can export up to 5kW 'at all times'<br>Option 2 - Customer can export up to 5kW 'most of the time'<br>Option 3 - Most customers can export up to 5kW 'most of the time'   |   | 48% for option 1<br>18% for option 2<br>32% for option 3   |  |
| 2019    | Surveys                            | What investment option do you prefer for enabling solar exports, including estimated bill impact:<br>Option 1 - No change<br>Option 2 - All can export up to 5kW<br>Option 3 - All can export unlimited   | 30% for option 1<br>29% for option 2<br>41% for option 3  | 34% for option 1<br>27% for option 2<br>40% for option 3   | 36% for option 1<br>35% for option 2<br>30% for option 3   |
| 2019    | Solar enablement options paper     | What is the most effective solution for enabling solar exports:<br>Option 1 - Unmitigated tripping<br>Option 2 - First come, first served<br>Option 3 - Tariff reform<br>Option 4 - Connection charge<br>Option 5 - Quasi export tariff<br>Option 6 - Dynamic export control<br>Option 7 - Solar enablement   |   | 60% for option 7<br>20% for option 3<br>20% for option 5<br><br>Dynamic export control deemed as best complementary option |  |
| 2017-19 | Surveys and deliberative workshops | Who should pay for the cost of solar exports:<br>Option 1 – Costs should be shared between customers<br>Option 2 – Solar customers<br>Option 3 – Unsure   | 30% for option 1<br>51% for option 2<br>19% for option 3  | 34% for option 1<br>42% for option 2<br>24% for option 3   | 29% for option 1<br>46% for option 2<br>25% for option 3   |
| 2019    | Local government open house        | Solar enablement options paper  | Consensus support for solar enablement  |  |  |

# Most recently stakeholders have told us...

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## Enabler

Empowering and supporting customers to take actions in line with their preferences and values.

Stakeholders expected networks to continue delivering in their **ongoing operational capacities** pertaining to asset and vegetation management and responding to outages. These were expected to be continually conducted with efficiency and **safety** as a top priority.

Into the future, stakeholders expected the networks to be an **enabler of customer choices**. This included providing technologies and behavioural interventions that enabled customers to make the decisions relating to their energy supply and consumption that were in line with their values. This included a greater ability of customers to uptake solar PV and storage by better facilitating exports from personal systems.

**Regardless of how active or passive customers** were with their energy, it was expected that the networks would be *supportive* of customers and provide flexibility of options regardless of their level of engagement.

*“Networks should be facilitating exports from the systems so that they can get the most out of their personal investment out of DER.”*

Workshop Stakeholder

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On 23 September 2020 we ran a workshop with around 25 industry stakeholders on **Energy Market Transformation**

Their feedback has been included throughout the slides

This feedback is consistent with what we've heard to date

# Our proposed programs in January 2020

Our original proposals proposed to two projects to meet the challenges of energy market transformation:

- Solar enablement
- Digital network

## Solar enablement

We proposed:

- Enabling our customers to connect a 5kW system with export capability
- Committed to our customers that going forward, instead of constraining them when we normally would, 95% of the time we will enable their 5kW systems to be allowed to export. The remaining 5% of the time was deemed uneconomic
- We defined economic as only investing when the benefits—the wholesale generation cost savings and carbon emission reduction—exceeded the costs of the investment

| \$ million            | CitiPower | Powercor | United Energy | Total |
|-----------------------|-----------|----------|---------------|-------|
| Operating expenditure | 1.3       | 6.2      | 4.2           | 11.7  |
| Capital expenditure   | 31.5      | 60.1     | 42.4          | 134.0 |

## Digital network

We proposed:

- Invest in innovative technology to facilitate sophisticated analytical, monitoring and management capabilities in order to run the network more dynamically at the lower voltage (LV) level, including the integration of DER through operating envelopes
- This initiative leveraged off the already significant benefits of AMI meter data
- Benefits included reducing peak demand and network costs through optimised load control, smart electric vehicle uptake and better asset utilisation

| \$ million          | CitiPower | Powercor | United Energy | Total |
|---------------------|-----------|----------|---------------|-------|
| Capital expenditure | 16.6      | 15.8     | 26.2          | 58.6  |

# Technology leading the way

Our proposal was to utilise innovative technology to minimise the need for network upgrades

We assessed 38 billion actual data points from our smart meters to pinpoint the least cost way to address a constraint, including by:

- applying smart settings to customers' solar inverters
- leading the industry development of **Dynamic Voltage Management System (DVMS)** to 'tap' down voltages

## DVMS

This is a combined IT and network system that monitors voltages and if they are too high, it automatically lowers them.

This is very effective at improving solar outcomes across a large number of customers, but also has limitations due to the voltage spread within large areas.

**We are leaders in developing and deploying this technology**

Digital network can get the most out of solar on the network via the development of a low voltage **distributed energy resources management system (LV DERMS)** and developing dynamic operating envelopes:

## LV DERMS

This is an IT system that monitors the network to identify DER constraints.

When they are found, through this tool we can actively manage the constraint to provide better and more certain outcomes to customers and aggregators.

## Dynamic operating envelopes

Sends out signals to DER devices on the networks' limits. Customers and aggregators can operate DER with these local and time varying network limits.

## How it works

With smart inverter settings combined with a DVMS and targeted interventions will get unlock a minimum 5kW of solar for most customers.

We can then use the operating envelope (using LV DERMS) to offer some customers greater than the minimum 5kW exports for certain periods of time.

We can also use the operating envelope concept significantly expand demand management opportunities.

For example, we can engage third party (market led) demand management provides to operate across our entire network, reducing peak load, particularly in light of expected EV uptake.

# Stakeholders supported the need for change but questioned the proposed approach

## Victorian Government

- In its submission to the AER, the Victorian Government expressed support for ICT investments that improve low voltage network visibility, builds on smart metering capabilities and helps networks transition towards the dynamic management of DER
- This includes moving away from a 'first come, first served' approach on new solar connections and allow solar electricity exports most of the time, with restrictions imposed only when networks exceed their operational limits
- The Government also expressed strong support for distributors implementing more demand management to reduce the need for generation and network infrastructure, and expressed expectation that distributors increase their use of non-network solutions

## Energy Consumers Australia (ECA)

- The ECA questioned the assumed costs behind the programs, whether it was based on an appropriate mix of possible solutions (i.e. tapping and phase rebalancing v network upgrades), and how the costs had been calculated. The ECA were more supportive of a phased approach to manage costs
- There was an expectation from the ECA, and most other stakeholders, that the program would be reduced due to the impacts of COVID-19
- While it was acknowledged the digital network program would support equitable solar exports through dynamic control, the program was not seen as a 'must have'

## Victorian Community Organisations

- In principle, the Victorian Community Organisations supported investment to accommodate rooftop solar PV on the distribution network, but in the interests of all consumers, it is important that this reflects the consumer priority for lower network costs
- However there was a question around whether investment in augmentation should be more conservative given rapid developments in technology

## Consumer Challenge Panel (CCP17) feedback

- The CCP17 encouraged the AER to consider investment in core data core analytics capability in basic levels in Digital Network, but did not support the majority of the proposal, and did not consider the benefits sufficient
- There was support for enablement of DER, however the CCP17 limited its support to the more innovative elements of the proposal and not the system upgrades
- The balance of affordability, necessity and network innovation had not been struck

## Local governments

- The local governments expressed support for all DER enablement programs proposed by distributors, as well as expenditure in IT where distributors have provided transparency on the initiatives and visibility of benefits
- They also called for demand management to deliver societal co-benefits and a reduction in greenhouse gases



# AER draft decision

## Solar enablement

- The AER was supportive of facilitating solar PV growth on the network. However, they believe the benefits should be measured over a shorter, 20 year time horizon
- The AER provided a substitute estimate. This approach reduces the number of distribution transformers that are economic to upgrade in the forecast period and reduced the total allowed capital expenditure
- The AER did not allow cost for transformer tapping on the grounds their alternative unit cost estimate resulted in an immaterial change in our expenditure that could be managed within the operating expenditure allowance provided

| \$ million            | CitiPower | Powercor | United Energy | Total |
|-----------------------|-----------|----------|---------------|-------|
| Operating expenditure | 0         | 0        | 0             | 0     |
| Capital expenditure   | 17.0      | 32.4     | 12.8          | 62.2  |

## Digital network

- The AER approved the digital network program as an integral part of DER integration, particularly with regard to EV uptake and cost-reflective pricing
- However, the AER considers this program should be part of the solar enablement proposal. The AER would like us to update its expectations for digital network based on the further engagement we are presently undertaking

| \$ million          | CitiPower | Powercor | United Energy |
|---------------------|-----------|----------|---------------|
| Capital expenditure | 16.6      | 15.8     | 26.2          |

# Updating our program to reflect initial stakeholder feedback

## What we heard

Our solar enablement program did not get the affordability balance right and our programs lacked innovative focus

Our digital network proposal did not articulate how network benefits will be delivered and in general our proposals lacked ambition in demand management (other than United Energy)

## Opportunity to improve

**With affordability a key concern, particularly at these uncertain times, we can find a difference balance between investment and output, while maximising on technological improvements**

**There is an opportunity to re-focus digital network to be centred around facilitating greater demand management through third party participation on our network by developing a platform that allows us to:**

## What we are doing

- Rather than focusing on the 'efficient level of output' over a 30-year period, we can scale down our program to deliver the highest level of output possible using a 20 year model as per the AER's decision
- We can also refocus our program on more innovative solutions by continuing to trial and work with leading industry to enabling as much solar as possible
- Identify network constraints at LV level, using AMI data to model where electricity is flowing on the network to identify overloaded / near overloaded assets
- Publish network constraints for us and third parties to use—enabling competitive markets behind the meter and enabling customer choice
- Enable us to engage and monitor demand management outcomes rather than doing it manually
- This will result in better network utilisation and lower augmentation expenditure going forward

We presented these options to stakeholders at our forum on 23 September 2020



# We received further feedback...

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Stakeholders were **generally pleased** about the Digital Network program presented however there were some questions about the proposal and its implementation over then next period.

Most prominently, stakeholders were interested to know **how the Digital Network Program would link with other assets and infrastructure in the grid** as they are created in isolation to each other. Stakeholders wanted to ensure that the Digital Network gave consumers flexibility without creating stranded assets in the long-term.

There was also some concern that there may not be large benefit to the Digital Program as there is not a large penetration of PV in Victoria and it **may not deliver economic benefit**.

*“There’s uncertainty for all things into the future. How do we link everything together to give flexibility or else consumers will be exposed to stranded assets.”*

Workshop Stakeholder

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The acceptable level of network performance for solar if affordable is an issue was seen to be **dependent on the part of the network in question**. Given the different performance of the respective CitiPower, Powercor and United Energy networks, there were different expectations for each network.

Despite this, stakeholders agreed that the most constrained parts of the network should be a priority, and largely prioritised the most constrained parts of the network to focus attention.

It was also argued that priority should be given to accessing solar over guaranteeing that there would not be constraints.

Many also referenced the fact that due to higher levels of residential demand with Victorians working from home, networks should be cognisant that performance needs will increase as **consumers expect that solar PV will work more efficiently**.

With this being said, **effective communication with customers was seen to be of high importance** to ensure expectations are set and customers can manage their load to reduce the impact on the grid.

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Stakeholders saw **pursuing affordability as an important objective but disagreed on the trade-offs required to achieve affordable energy**.

Many did not see affordability and economic benefit to be a trade-off and instead saw economic benefit to be inherent flow-on value, which should therefore not be de-prioritised.

The assessment was seen to need to incorporate reliability, emissions and affordability as integration was seen to be a better frame than trade-off.

Many stakeholders **did not give a clear response to this prompt** and instead questioned the modelling.

Some believed that the model should have already included affordability and others argued that affordability would be an outcome of efficiency.

# Our new Future Network program

*Stakeholder want to better understand the full picture*

**Solar Enablement and Digital Network under one roof**

- We have heard our stakeholders, industry leaders and the AER calling for unification of our DER programs to better reflect the total costs and benefits of the related initiatives
- As such, we have merged all the initiatives that are related to DER integration under a single **Future Network** program
- This will allow our customers and stakeholder to better understand how all the initiatives fit together and assess the programs as a whole
- Our revised proposal will also provide a top-down overview of all expenditure, demonstrating how different expenditure / work streams operate together

*Affordability should not be traded off, rather optimised*

**Reduced costs by \$58m**

- We will accept the reduced capital expenditure allowance and will continue to shape our program such that it tackles the areas of maximum customer benefit first, delivering the best possible outcomes with those expenditure limits
- We will however continue to seek the operating expenditure allowance for transformer tapping, which we maintain is the most efficient approach to managing DER

*The need for investment depends on the part of the network*

**Optimising outcomes**

- Our focus will be on addressing the most constrained parts of the network first and working with operational envelopes to maximise customer benefit as soon as possible
- To do this we will continue to work with industry leaders, thinktanks and technology developers on various trials

# How the Future Network proposal has changed

## Original proposal for Solar Enablement

We proposed to:

- make export capable connections for the large majority of our customers
- enabling our customers to connect a 5kW system with export capability
- remove 95% of the solar constraint that would otherwise occur
- enable solar when the benefits—the wholesale generation cost savings and carbon emission reduction—exceeded the cost

## Original proposal for Digital Network

We proposed to:

- invest in IT and network communications devices to build on our existing AMI-initiatives to enhance our network efficiency and safety and provide customer's greater flexibility
- This included improving electric vehicle charging patterns, optimising load control of customer appliances, enhance cost reflective pricing and detect electricity theft

**Total cost: CP \$49m, PAL \$82m, UE \$73m over 2021-2026**



**Reduction of  
\$58m in  
expenditure**



## Joint new Future Network proposal

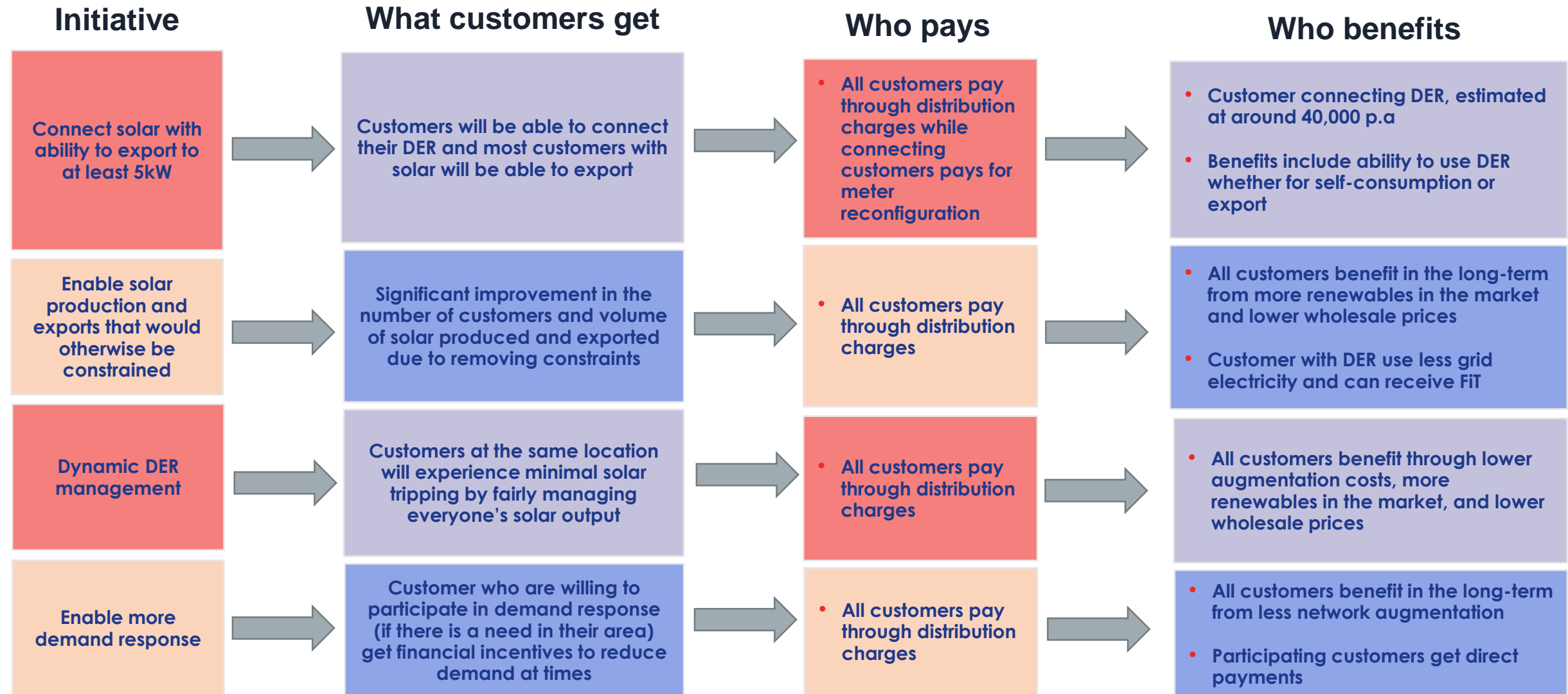
- Connecting DER for all our customers
- Minimising export constraints for as many customers as possible (we are modelling what export outcomes will be for customers with adjusted expenditure)
- Prioritising areas of high load and voltage constraints first to maximise customer benefit as soon as possible
- Dynamically managing load and DER through operating envelopes, rather than restricting customer outcomes with blanket rules
- Promoting and enabling dynamic demand response and management to reduce peak load impacts on the network

**Total cost: CP \$36m, PAL \$56m, UE \$54m over 2021-2026**

## Initiatives we will self-fund

- Bringing forward the program to start in early 2021 with already highly constrained areas
- Automation of solar and DER connections, as we are already planning this work for CitiPower and Powercor

# Who benefits from Future Network





# Demand management cost recovery

United Energy is the market leader in demand management. We have implemented more non-network solutions than any other network and plan to continue to do so

For the 2021-2026 regulatory period, we proposed a \$8.6 million step change for demand management to allow us to:

- defer \$25 million of capital expenditure at the Cranbourne Terminal Station
- continue our Lower Mornington Peninsula demand management program that is deferring a \$30 million feeder upgrade
- defer capital expenditure on HV feeders

**The AER rejected the step change** and has not provided a capital allowance for these projects

## AER's assessment framework

The AER rejected the step changes on account of falling network demand

We disagree with the AER's assessment of demand growth for the local areas where demand management is being proposed and we will provide that analysis in our revised proposal

However, the AER has also indicated they expect us to absorb the cost of demand management due to its lower cost as a % of total operating expenditure and through the trend forecast (which in itself allows 0% growth for demand-related expenditure)

Alternatively, if we had proposed a capital solution, the AER would not apply a materiality assessments nor consider the overall trend in capital expenditure in making their assessment

Effectively, the AER's assessment of operating expenditure solutions becomes a more difficult allowance to secure, creating **perverse incentives** to seek capital expenditure even when demand management solutions maybe more efficient

We are concerned with this outcome and are interested in your views

We will continue to seek the funding for the demand management step change as these solutions reflect the efficient operating / capital expenditure trade-off and we believe in the long-term interest of consumers

# What about tariffs?

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## Reactions to tariff options were mixed....

*“Communications is front, centre critical; get that wrong then whatever you do is a waste of time.”*

Workshop Stakeholder

While there was support for the new tariff options, being seen as straight forward and equitable by some, there were concerns raised by others.

**The current time of use tariff design was considered the slowest path to tariff reform and a missed opportunity.**

Interest rates were considered to be at a once-in-a-generation low point, with opportunity to design a time of use tariff with minimal price increases.

Current analysis was seen to assume normal distribution of economic stress, where an abnormal distribution was more realistic.

**Concerns were voiced regarding low-income households having to regiment energy use according to ‘odd hours’ due to the time of use premium.** A tariff model akin to that of the water corporation in Durban, South Africa was suggested, where premiums were placed on usage beyond a certain point considered efficient.

**Understanding who was going to be most impacted was raised as part of a larger consideration regarding the pathway and associated communications in transitioning to new time of use tariff model.** Communications were important; ensuring customers understood changes and what they meant from a bills perspective; impacting long-term support and success.

**External factors also needed to be considered when assessing the success of the current tariff reform.** Example was given in the availability of workplace charging for electronic vehicles; the absence of which would define when electronic vehicles were charged, regardless of time of day tariffs.

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# What about tariffs?

## What tariff assumptions does the Future Network program include?

- We have assumed that most **\*new\* DER customers will be on a time-of-use tariff**
- While stakeholders see these tariffs as slow to ignite behaviour change, the changes reflect years of stakeholder consultation and are seen to be most likely to be accepted by the average customer
- Our time-of-use tariff acts as a solar sponge with the midday rate being four times cheaper than the rate from 3pm to 9pm and within 1 c/kWh of the SAPN solar sponge rate

## Are we being innovative enough in our tariff design?

- Throughout engagement stakeholders have consistently told us that our tariff design should be more innovative and designed to minimise peak demand growth and maximise DER output
- At the same time, serious equity issues may arise through compulsorily reassigning certain customer classes to new tariff structures when they are unable to modify their behaviour
- Large changes to our tariff design need to, at the minimum, be subject to a transition period. We will continue to participate in and drive tariff and demand management trials over the next few years

## What will happen if export tariffs are introduced?

- If introduced, exports tariffs will change how the costs are recovered
- There will be a significant amount of modelling and stakeholder engagement required to find the most equitable solution under the new rules
- There may be a transition to mitigate bill impacts on any particular class of customer

# How Future Network fits within our proposal for 2021-2026

| Initiative  | Tariff assumption   | Priorities expenditure   | Network expenditure   |
|---|---|--|---|
| Making export capable connections and enabling our customers to connect a 5kW system with export capability | <b>Tariffs</b> <ul style="list-style-type: none"> <li>New DER customers are put on time-of-use tariffs when connecting</li> <li>The time of use tariff is expected to shift some usage to a period before 3pm and after 9pm</li> <li>It may also encourage more self-consumption for solar electricity during 3pm and 9pm</li> <li><b>Exports:</b> in our forecasts we assume that solar exports will be mostly between 11am and 3pm—with dynamic voltage management this will be higher than without it</li> <li><b>EVs:</b> We also assume that new EVs will be charging mostly at night as a result of our initiatives and the tariff</li> <li><b>Most existing customers:</b> without DER and remain on the flat tariff until 2026</li> </ul> | <b>Operating expenditure</b> <ul style="list-style-type: none"> <li>To accommodate growing exports, there will be a significant increase in tapping of transformers and compliance obligations, which we are proposing as an operating expenditure step change</li> <li>This is the most efficient solution for enabling solar exports where possible, and is an efficient trade off operating and capital expenditure</li> <li>There will also be an increase in demand response and demand payments. We have only forecast for known cost increases, acknowledging they are likely to be higher by 2026</li> </ul> | <b>Network augmentation</b> <ul style="list-style-type: none"> <li>There will still be need for augmentation of distribution transformers, however with tapping and IT solutions we have reduced the need for augmentation by <b>at least half</b></li> </ul> |
| Removing solar constraint that would otherwise occur for majority of customers                              |   |  |   |
| Enabling more dynamic LV network management through operating envelopes                                     |   | <b>ICT investment</b> <ul style="list-style-type: none"> <li>Investment in DVMS and LV DERMS</li> <li>Investment in IT systems that allow for LV network analytics of AMI data and managing local constraints to determine opportunities for demand response</li> </ul>  | <b>Network replacement</b> <ul style="list-style-type: none"> <li>Through better management of exports and demand, it is likely some replacement expenditure will be deferred, albeit at immaterial levels compared to upgrades and augmentation</li> </ul>   |
| Enabling dynamic demand response and demand management programs on the network                              |   |  |   |

# What we are already doing

## **We have established a task force to implement the program**

- The implementation of the Future Network program is a key priority for the business and requires a dedicated task force under our Network Strategy
- The task force includes a combination of network and non-network engineers, data analysts, modellers as well as customer and stakeholder contact points

## **Bringing forward the program**

- We have already started working with the Victorian Government and committed to bringing forward works in areas of high solar constraints

## **Investigate operational envelopes**

- We are also working with SA Power Networks and ARENA to better understand the work they are doing on operational envelopes and dynamic load and DER control, to ensure industry learning is captured and allow for faster and more effective implementation on our network
- We have identified areas in Northern Victoria that can benefit from dynamic load control of pumps

## **Seeking out innovation trials**

- We are speaking to C4NET, ARENA, universities and technology developers to seek out opportunities for innovative trials on DER integration, demand management and tariff design

# How we are communicating with our customers

## Improved online information

- In July 2020 we launched a new website service called #lineylessons which aims to help customers feel confident in making decisions about their energy choices
- In the first five weeks, this campaign reached 258,000 people through social media resulting in 1.1 million impressions. This generated 5,120 visits directly to information and advice on solar connections at our website supported by the Clean Energy Council, Australian Energy Foundation and Solar Victoria
- Our website also provides a practical checklist to inform customer decision-making on the size of solar system that is best suited to their needs
- Our objective is to encourage customers to seek information on their potential export capacity before they purchase the system and seek a Solar Homes Victoria grant

## Clean Energy Council advice to installers

- Following the adoption of the smart inverter settings for Victorian solar PV, we conducted an education program for accredited installers through the Clean Energy Council
- Subsequently, our #Lineylessons information is also empowering customers to make sure their installers are using the right inverter settings as this is essential to optimising exports

## Improving solar customer experience

- In 2020, we will launch a new process through our digital, eConnect service, which automatically assesses solar pre-approval
- This improved tool has been developed to support the Solar Enablement program while also ensuring we are sustaining the security and stability of the distribution network
- We are also in the process of establishing a dedicated Embedded Generation team within our Customer Group to be a single point of contact for solar customers
- As a result of these changes we confirm we will no longer be charging a fee to customers seeking to export up to 5kW and requiring further technical assessment
- With both advanced digital resources and dedicated service advisers, we aim to improve the overall customer experience

## Increasing customer communication touch points

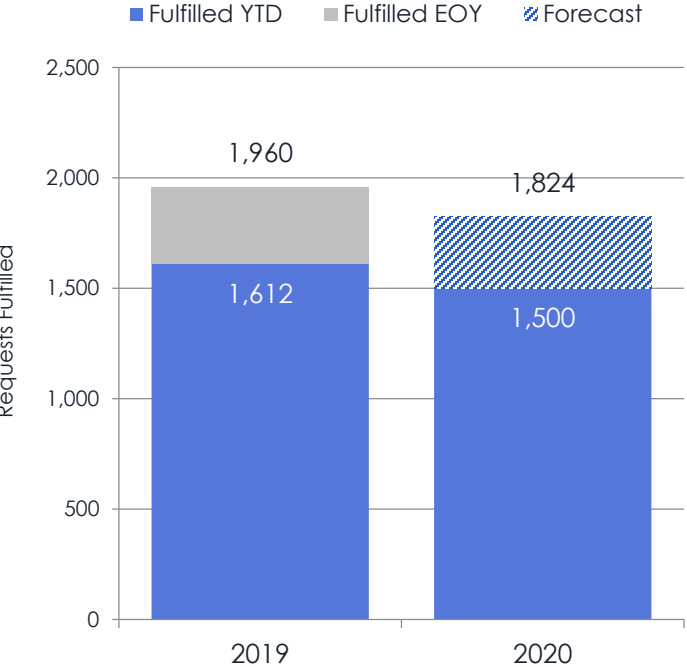
- For customers whose solar exports are either constrained or not permitted due to network issues, we are developing a customer communication program that will notify customers of improvements to network conditions
- Specifically, we are preparing information which again, informs customer choices on when it is best to install solar PV taking into consideration the planned improvements to network capacity as a result of the Solar Enablement program
- For example this includes:
  - providing customers with data on their home consumption profile to inform financial decisions about the size of their solar PV and potential exports
  - notification of when network investments to improve capacity are planned and being conducted
  - Invitations to re-apply for solar pre-approval when network investments are completed

# Customer solar journey

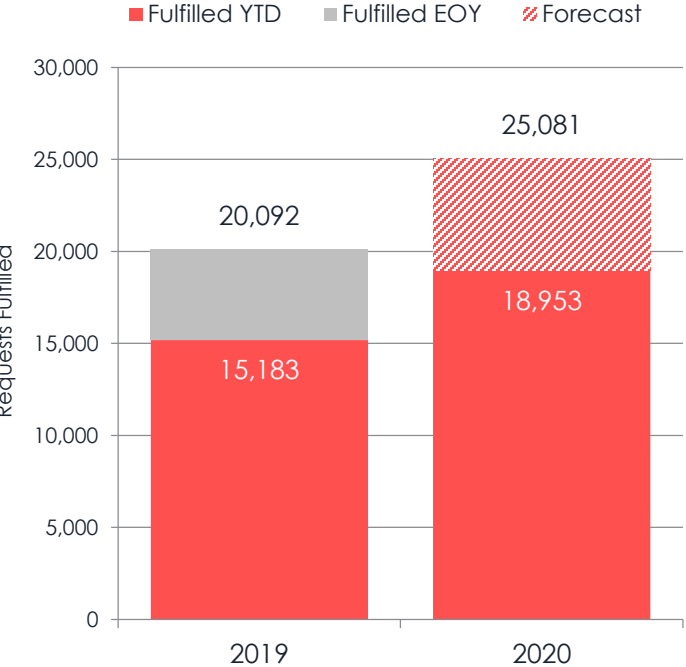
# Solar PV Connections

There has been an 18% growth in solar alteration requests fulfilled across our three networks when compared to the same period in 2019

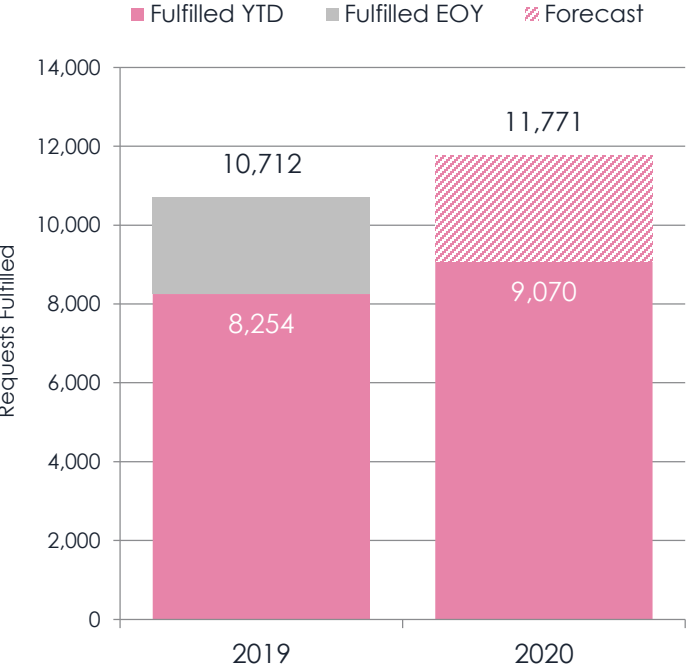
CitiPower (-7%)



Powercor (+25%)













United Energy (+10%)



Source – solar alterations fulfilled 01/01/2020 – 30/09/2020 (meter reprogrammed)

# Customer Journey – Residential Solar Installation

The customer's journey starts when they decide to install solar, and ends when they have received their first bill

|   | PLAN  |   |  |   | EXECUTE  |  |   |   | REVIEW  |   |
|---|---|---|--|---|--|--|---|---|---|---|
|   |                                        |    |   |    |   |                                   |    |    |  |    |
| Customer Action   | Receive high electricity bill   | Research Solar Options  | Assess Options & Seek advice   | Engage REC & Sign Contract  | Pre-Approval (CP/PAL)  | Proceed with physical installation   | REC submits paperwork   | Meter Reconfigured  | Retailer updates Tariff, REC Advised  | First bill received   |
| Thoughts / Feelings   | <b>Concern</b><br>I need to take control of my energy spend   | <b>Confusion</b><br>There is a lot of conflicting information   | <b>Overwhelmed</b><br>Can I trust this info; is it right for me?   | <b>Certainty/Resignation</b><br>This is the right partner for my home   | <b>Frustrated</b><br>I didn't realise I may not be able to export  | <b>Excitement</b><br>The process is kicking off  | <b>Confusion</b><br>What is this; why does this take long?  | <b>Confusion</b><br>What is this; why does this take long?  | <b>Relief</b><br>Can't wait to get my first bill to see the difference!             | <b>Disappointment</b><br>Bill is reflecting the change, but it wasn't quite what I expected   |
| Stress Points   | <ul style="list-style-type: none"> <li>Bill literacy</li> <li>Mistrust of industry</li> <li>Financial outlay</li> </ul> | <ul style="list-style-type: none"> <li>Not knowing where to start</li> <li>Not knowing which companies are credible</li> <li>Not understanding enough about solar in general and process</li> </ul> | <ul style="list-style-type: none"> <li>Uncertainty the system is the 'right one'</li> <li>Cost to install a suitable system</li> <li>Payback period</li> </ul> | <ul style="list-style-type: none"> <li>Not knowing if eligible for rebate</li> <li>Not knowing if eligible for export</li> <li>Am I getting the best deal?</li> <li>Do I understand all of the contracts/processes</li> </ul> | <ul style="list-style-type: none"> <li>Impact on daily life</li> <li>Impact to payback period</li> <li>Why can my neighbours export when I can't?</li> </ul> | <ul style="list-style-type: none"> <li>Timeliness of installation process.</li> <li>Impact on daily life.</li> </ul> | <ul style="list-style-type: none"> <li>REC is required to submit further information regarding inverter</li> <li>Retailer contacts end-customer to negotiate solar agreement</li> </ul> | <ul style="list-style-type: none"> <li>Timeliness of payback realisation</li> <li>Uncertainty and knowledge of this part of the process.</li> </ul> | Process is completed  | <ul style="list-style-type: none"> <li>Bill not reduced by as much as expected</li> <li>Pay back period will take longer</li> </ul> |
| Distributor Opportunities   | Educate on our objective position in the supply chain.  | Become top of mind early in the process for customers.  | Promote tools to support investment decision.  | Manage end-customer expectations by ensuring steps in process are explained and understood  | Simplify process, Make information regarding process and possible outcomes readily available to end-customer   | Ensure end-customer has obtained pre-approval before purchase and knows what to ask                                  | Active communication with end use customer through eConnect and myEnergy.   | Ensure customer is expecting this step.   | Provide update to end-customer via e-notification                                   | Survey customer on process to determine satisfaction / improvement opportunities  |
| The information on process and products is not easily understood and there is a reliance on other parties 'to do the right thing' |   |   |  |   | Customers often commit to having solar installed before being preapproved  |  |   | Generally communications to the end-customer is via a third party and therefore it is difficult to 'control the conversation'                       |   |   |



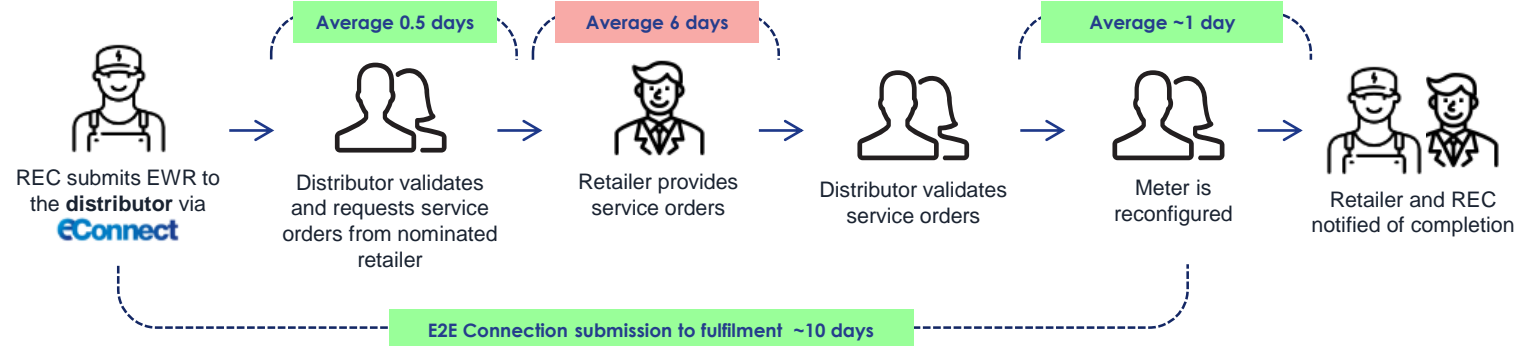
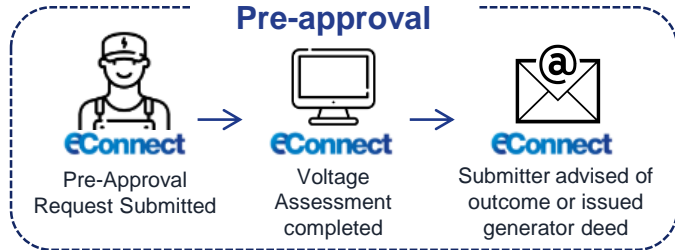
# Approval and Connection Processes

The approval and connection processes differ between CitiPower / Powercor and United Energy

## CitiPower & Powercor

### Pre-approval

Generation up to 200kW



- In some instances parts of the network may not support new solar connection exports as it cannot be ensured that the network will operate reliably for all customers if additional feed in occurs. A solar preapproval provides customer's with details on how much they can export without affecting the quality of supply
- If a generator deed has been issued via eConnect (>30kW) the deed must be signed and processed prior to the alteration request being submitted. There is no fee for this service.

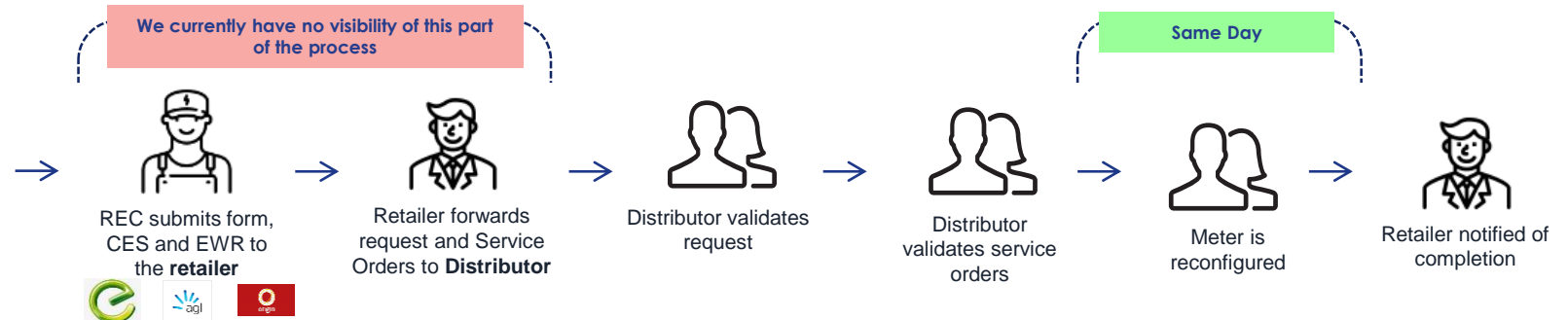
## United Energy

### Pre-approval

#### Generation <10kW per phase

All basic micro embedded generation applications will be approved to connect to the network in United Energy

#### Negotiated Connection Application Process

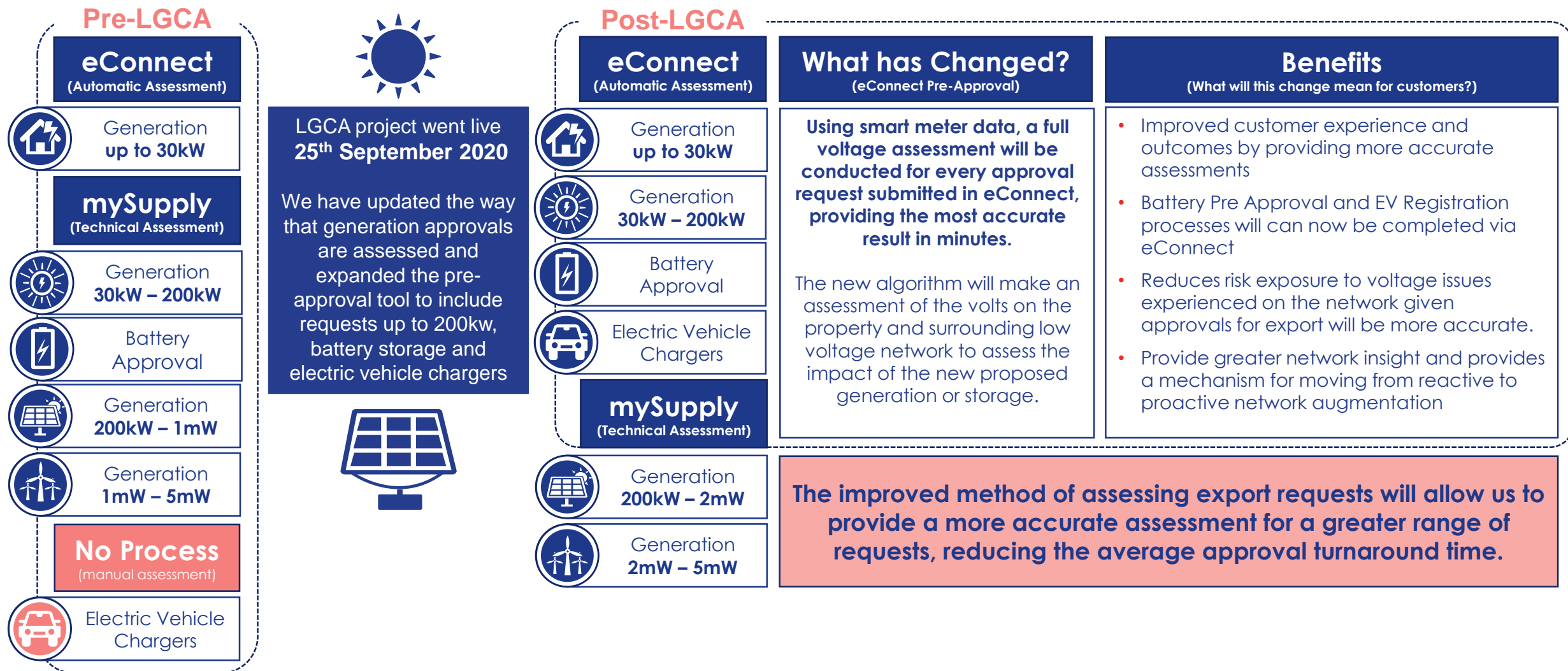


- LV Generation exporting >10kW per phase (Unregistered) must follow the Negotiated Connection Application Process. The systems of negotiated connections have a higher potential to impact the distribution network, hence they require a more rigorous application process to ensure the network is not adversely impacted. There is a fee for this service.



# Local Connections Generation Approval (LCGA)

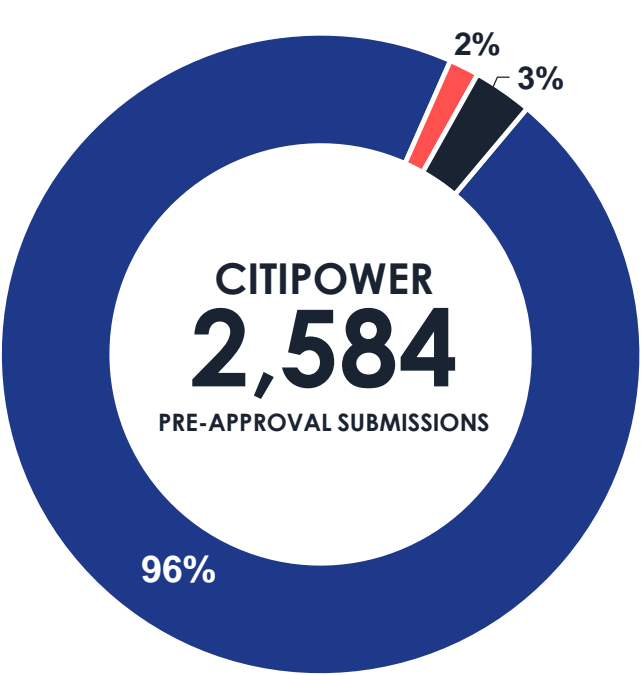
We have worked hard to improve the pre-assessment process in order to address increasing demand and better manage voltage issues that impact the network



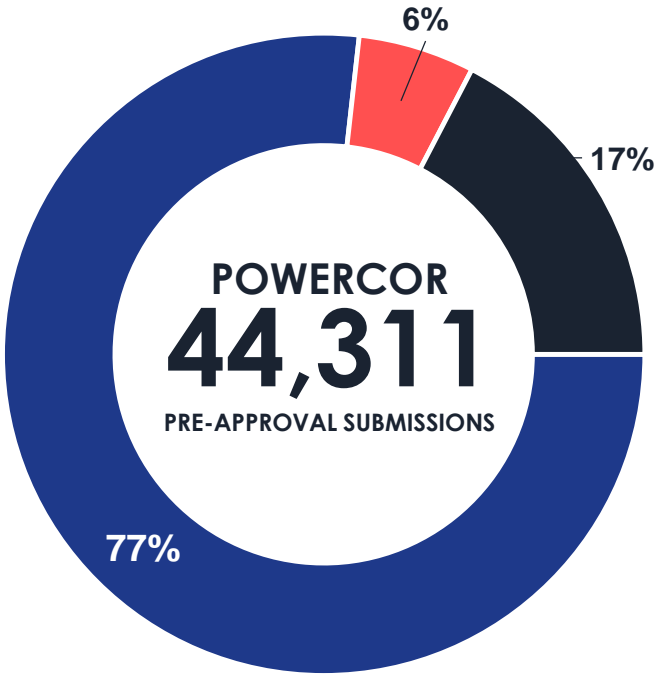
# Solar Generation Pre-Approval

There has been 46,895 requests for generation pre-approval submitted via eConnect this year

## Generation Pre-Approval Outcomes

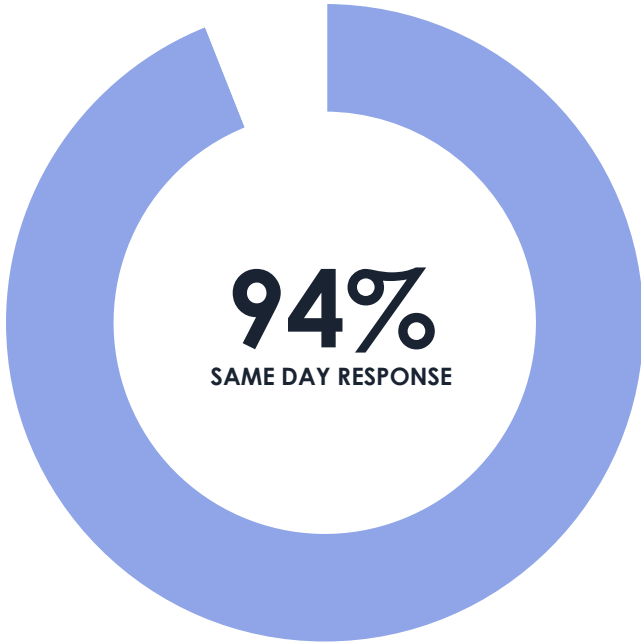


■ Fully Approved ■ Reduced Export ■ Zero Export



■ Fully Approved ■ Reduced Export ■ Zero Export

## Processing Time



83% of requests are approved to export back to the grid, with 78% of requests approved with full export

Source – eConnect SPA's submitted 01/01/2020 – 30/09/2020  
Excludes approval for Battery Storage and EV Chargers  
Includes non-residential requests