Government of **Western Australia**
Energy Policy WA

Emergency Solar Management Forum

7 December 2021

Working together for a **brighter** energy future.

We acknowledge and respect the Whadjuk people as the Traditional Owners of their ancestral lands, waters and skies.

Agenda

Welcome

Energy Transformation – Energy Policy WA

- Coordinator of Energy, Kate Ryan

Emergency Solar (or DPV) Management – Energy Policy WA, Synergy

- Low load risks
- Emergency Solar Management as a solution
- Emergency Solar Management requirements
- Supporting implementation

Q&A: Energy Policy WA, Synergy, AEMO, Western Power

Government of **Western Australia**
Energy Policy WA

Energy Transformation

Kate Ryan

Coordinator of Energy

7 December 2021

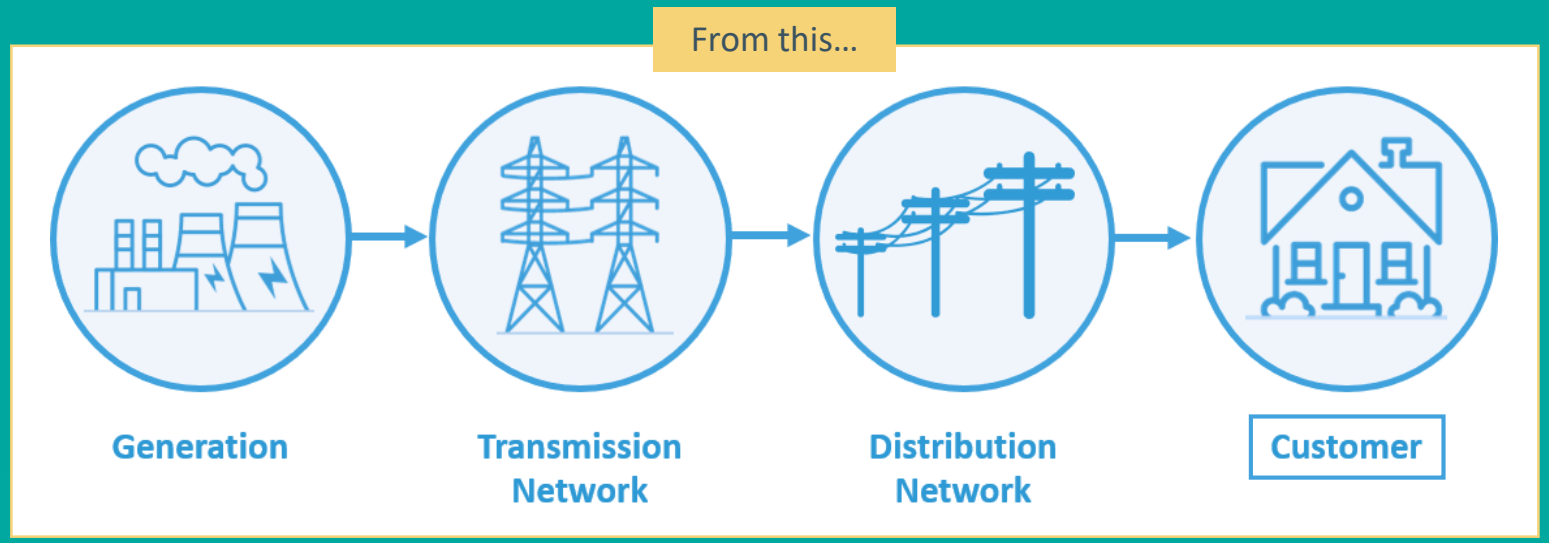
Working together for a
brighter energy future.

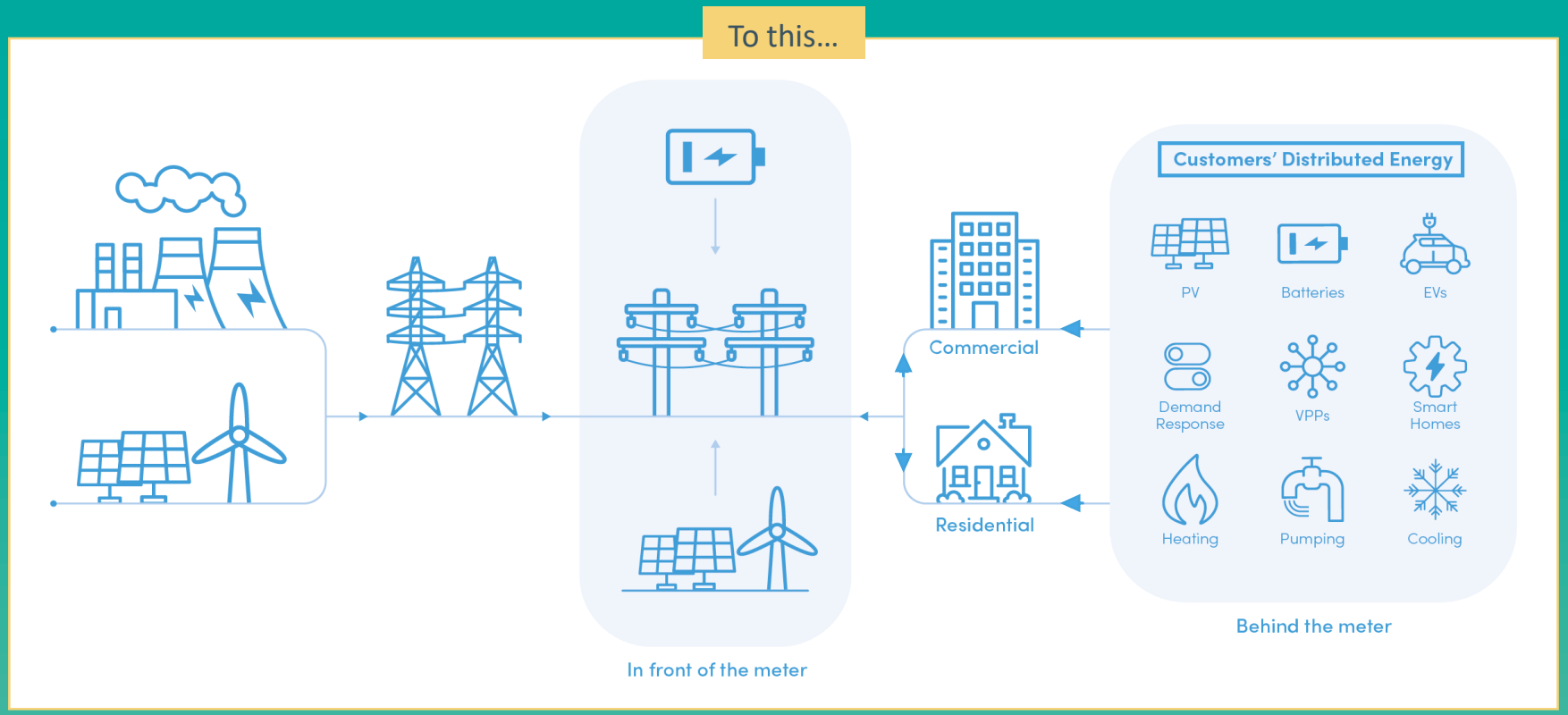
Western Australia is moving towards a renewable energy future

Synergy – Albany Wind Farm

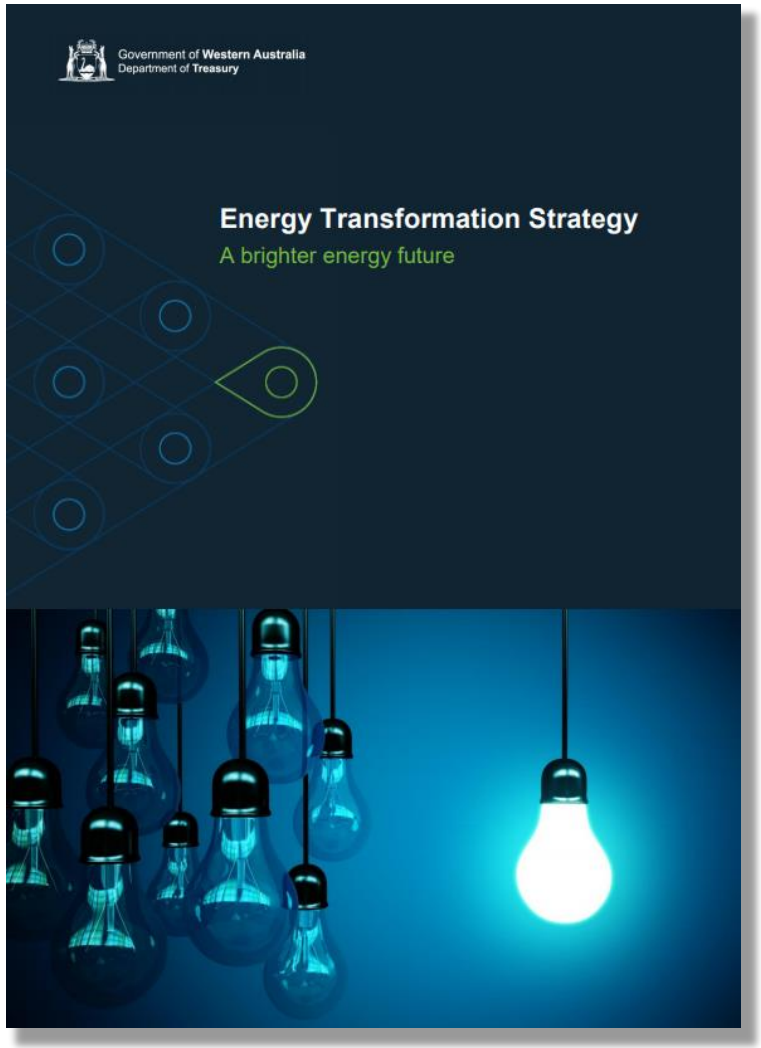
Driven by households and industry

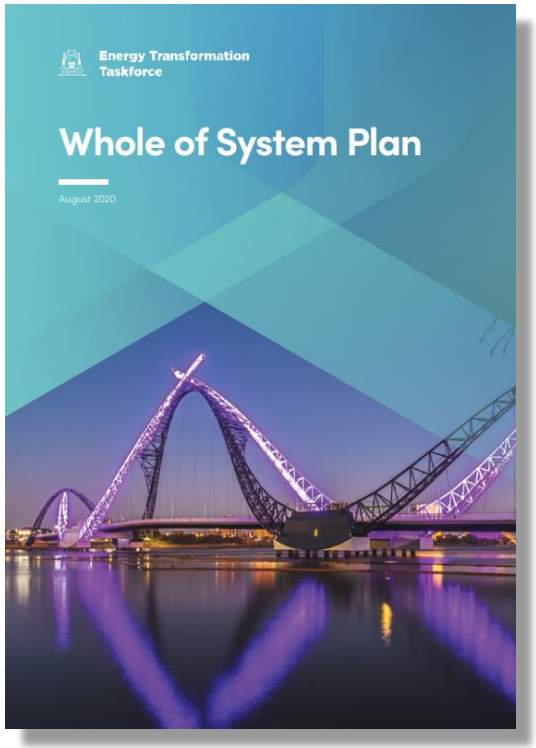
We are transforming **at pace** to a system with distributed and variable low-emissions energy sources

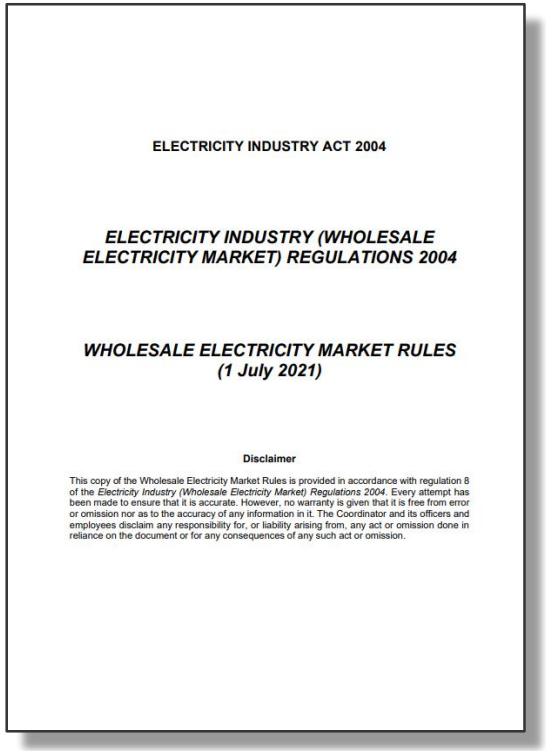




The Energy Transformation Strategy





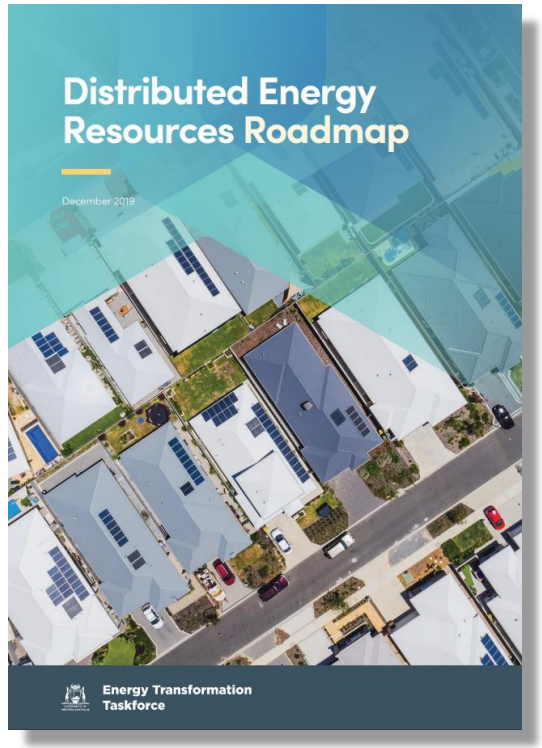

ELECTRICITY INDUSTRY ACT 2004

ELECTRICITY INDUSTRY (WHOLESALE ELECTRICITY MARKET) REGULATIONS 2004

WHOLESALE ELECTRICITY MARKET RULES (1 July 2021)

Disclaimer

This copy of the Wholesale Electricity Market Rules is provided in accordance with regulation 8 of the *Electricity Industry (Wholesale Electricity Market) Regulations 2004*. Every attempt has been made to ensure that it is accurate. However, no warranty is given that it is free from error or omission nor as to the accuracy of any information in it. The Coordinator and its officers and employees disclaim any responsibility for, or liability arising from, any act or omission done in reliance on the document or for any consequences of any such act or omission.



- The first stage of the strategy was led by the Energy Transformation Taskforce from 2019-2021 and had three core deliverables

The DER Roadmap future

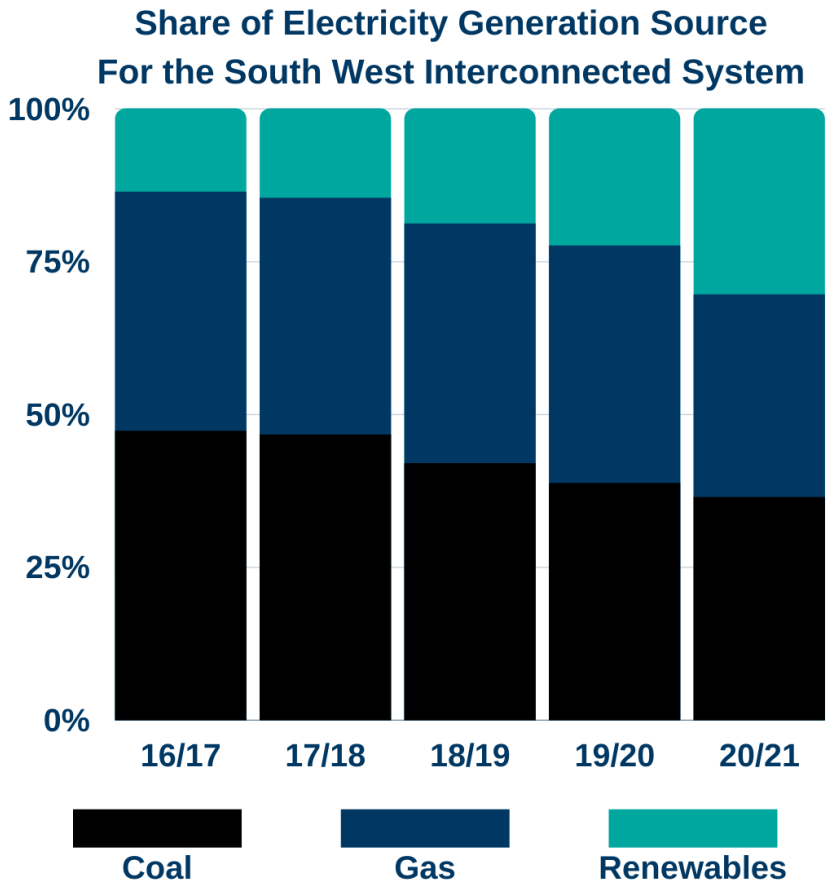
A future where DER is integral to a safe, reliable and efficient electricity system, and where the full capabilities of DER can provide benefits and value to all customers.

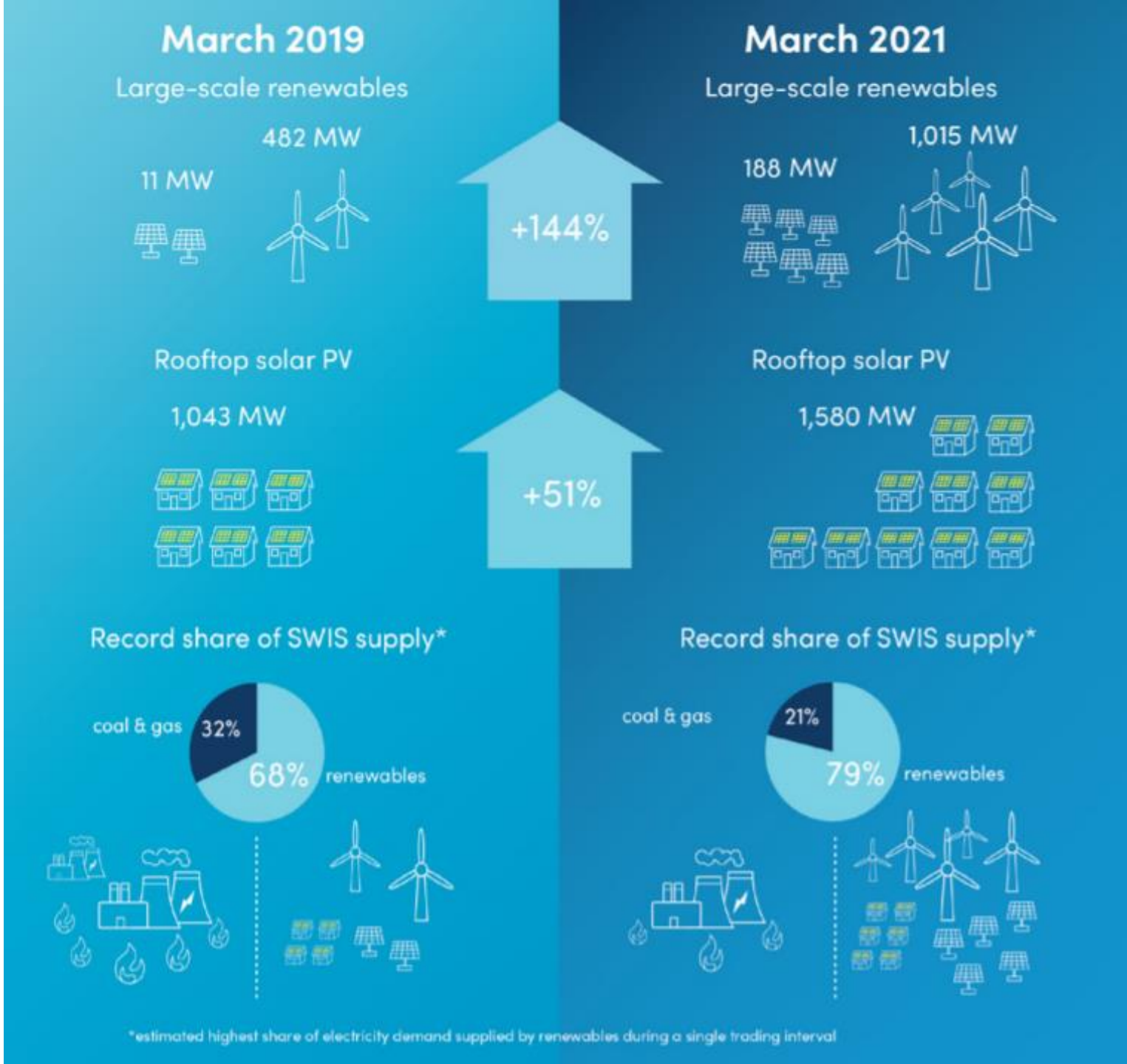
1. Secure and reliable supply

2. DER are active and delivering value

3. Customers are benefitting and protected

SWIS renewables are growing rapidly



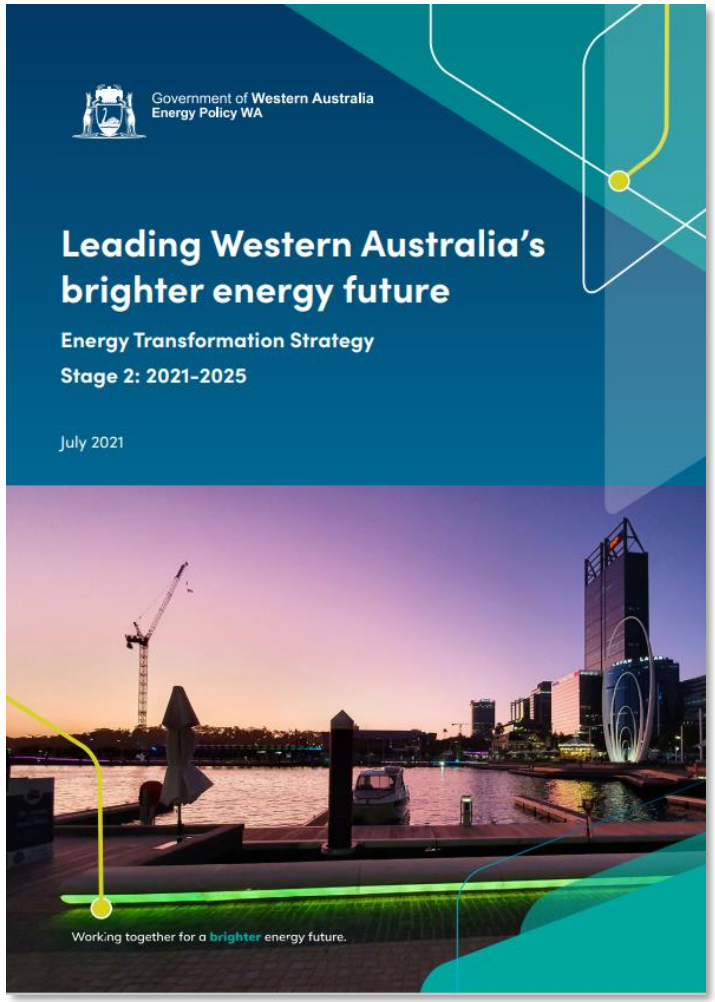


The transition to renewables will continue

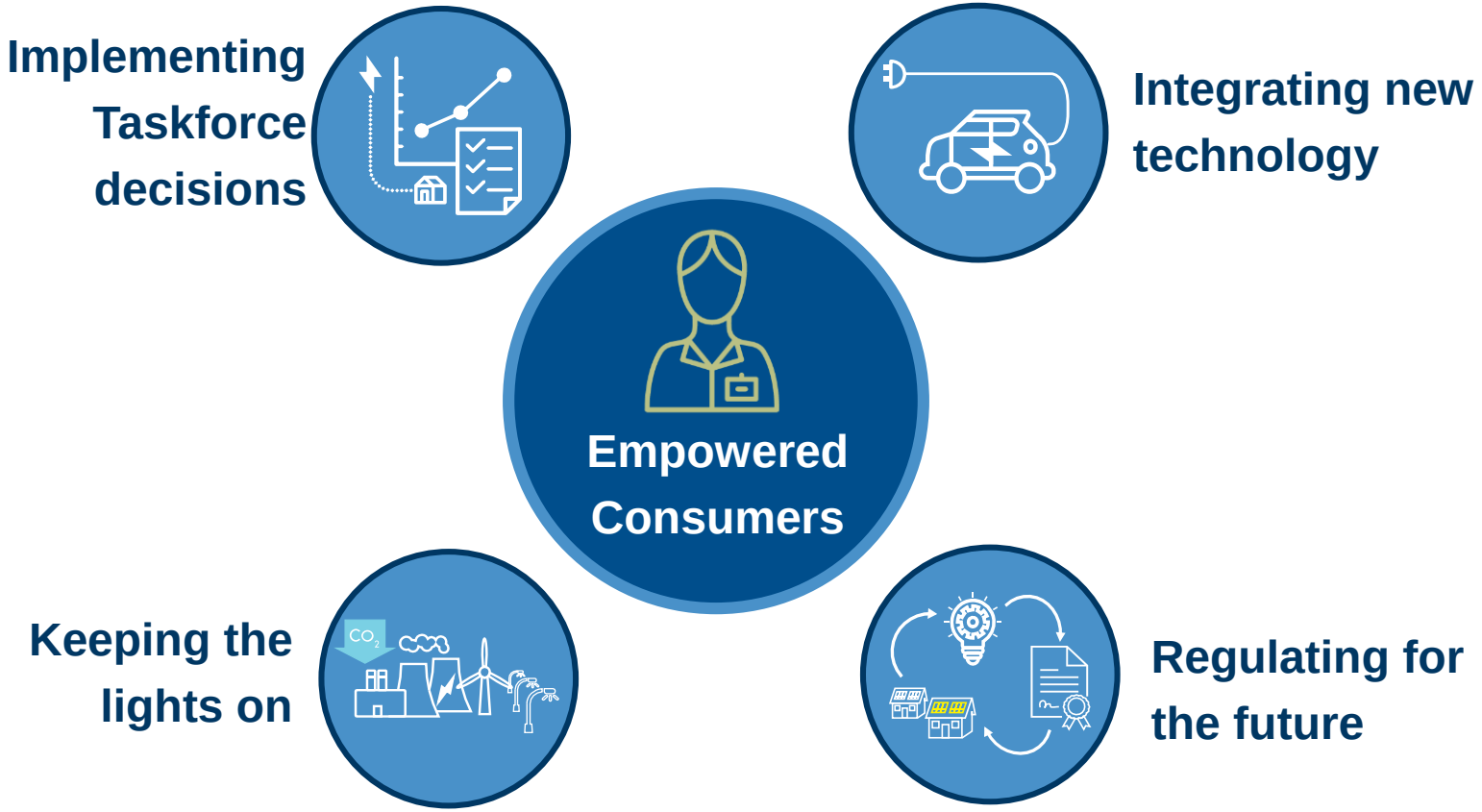
- The Whole of System Plan predicted over 70% renewable penetration by 2040.

- Before we've even factored in the Western Australian Climate Policy

The Energy Transformation Strategy



- Stage 2 launched in July 2021, led by Energy Policy WA



Working together for a **brighter** energy future.

Government of **Western Australia**
Energy Policy WA

Emergency Solar Management

Kieran Rayney – Energy Policy WA

James Giblin – Synergy

7 December 2021

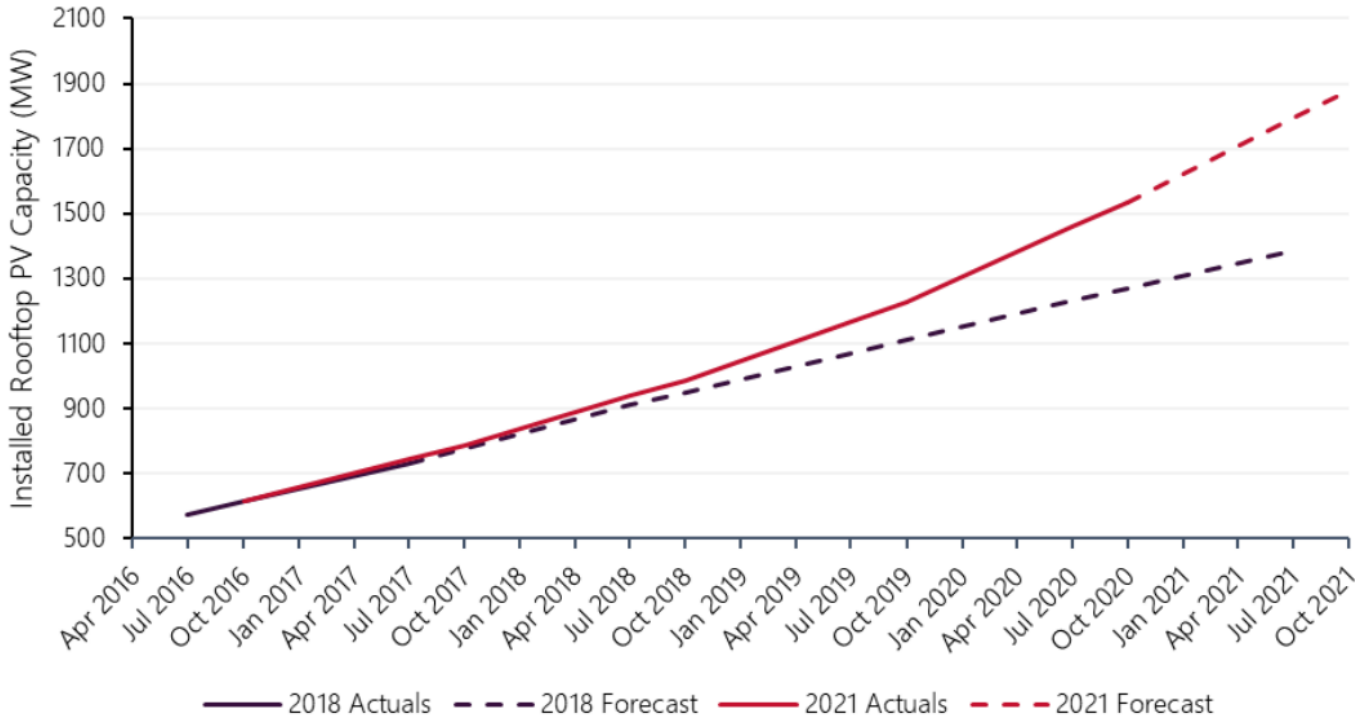
Working together for a **brighter** energy future.

Accelerating growth of DPV

Distributed photovoltaic – **DPV** – refers to the smaller rooftop solar systems on homes and businesses on the distribution network

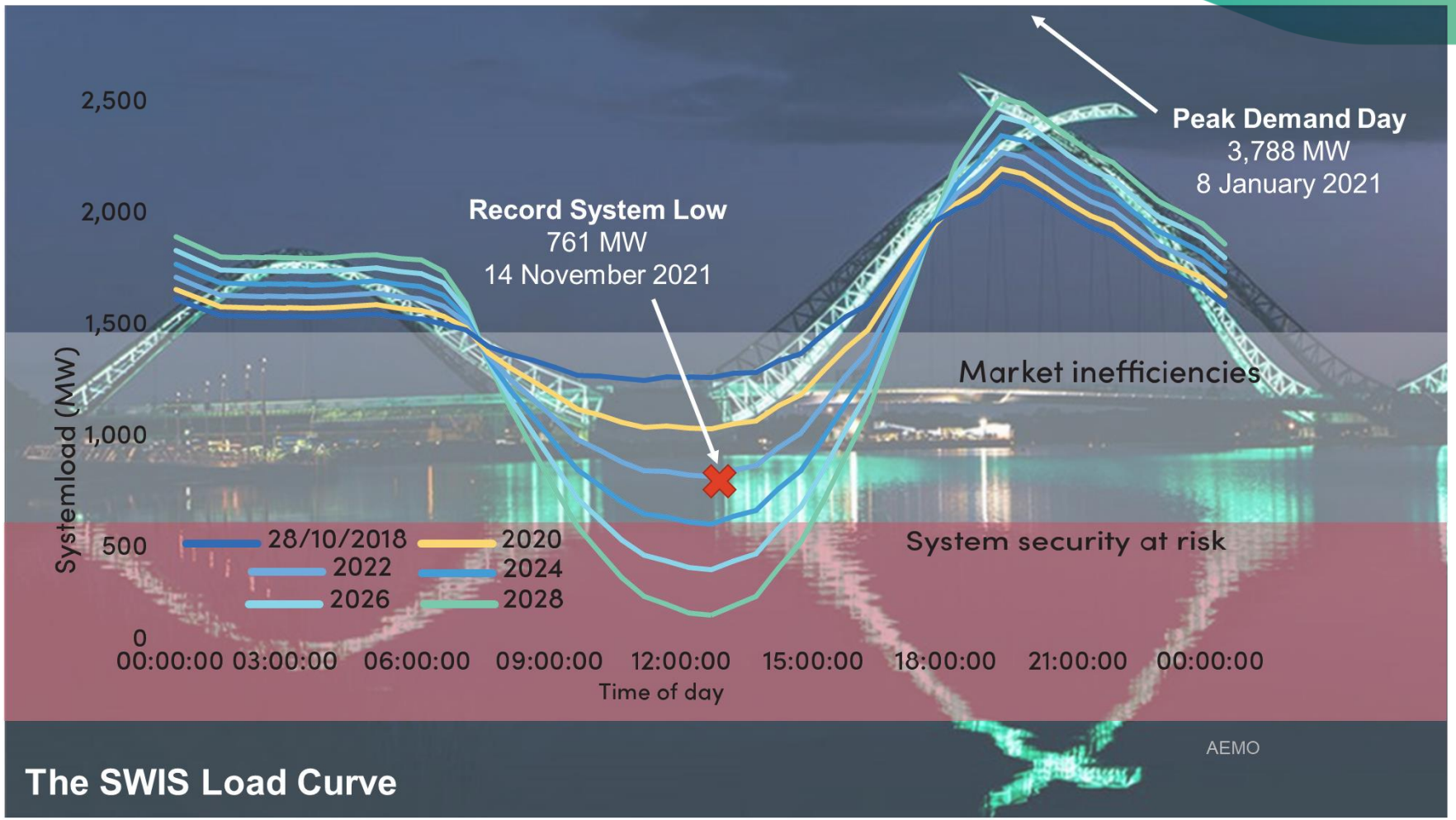
- DPV is being installed at rapid, accelerating rates
- A record amount of DPV was installed in 2020, and new forecasts predict this to continue
- It's offering significant opportunities for customers, and the sector, for low cost, low carbon energy
- As the transformation towards greater levels of renewables continues, we need to manage the risks

Figure 4 **Installed DPV capacity is increasing at faster than expected rates**



Source: AEMO, Renewable Energy Integration – SWIS Update, 28 September 2021

What is low load?



At times of very low load (demand from the grid), the power system becomes increasingly vulnerable to unexpected events – these risks are increasing as more rooftop solar is installed

AEMO Update – Power System Consequences

Changing power system conditions

Work across industry has improved resilience of the power system, including by AEMO, Western Power, and implementation of the Energy Transformation Strategy.

Despite this, AEMO's September 2021 report finds the accelerated installation of DPV is contributing to system risks sooner than expected.

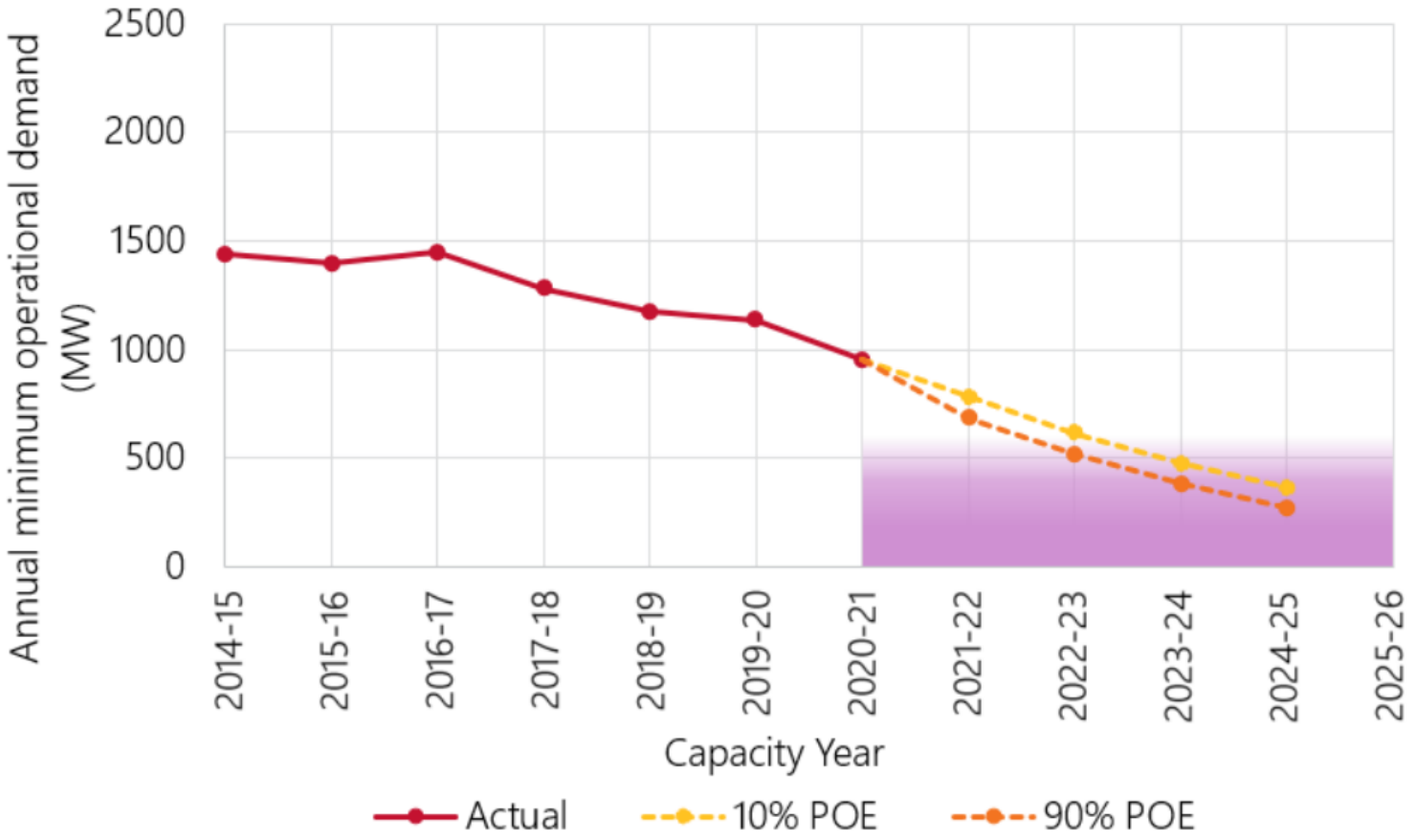
Impacts include:

- Increased generation and load volatility
- Increasing impact on market outcomes
- Decreasing minimum load, coinciding with higher levels of DPV output
- Displacement of traditional generation sources by DPV and utility-scale renewable generation

AEMO Update Report – Low Load Risks

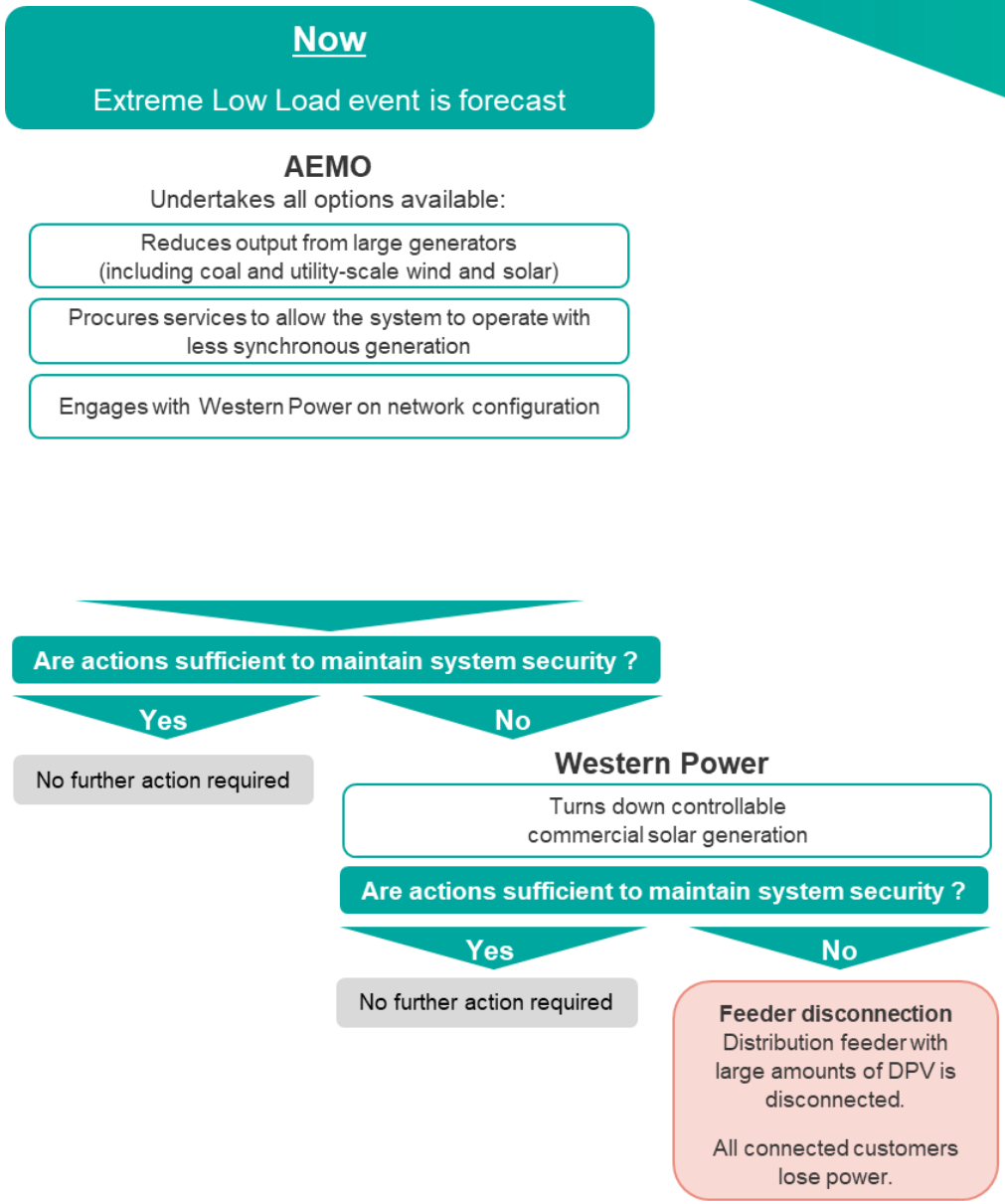
- As minimum load decreases, there are fewer combinations of facility dispatch which can keep the power system secure.
- AEMO says that below levels of around 600MW, these options materially decrease to a point that the system enters “a zone of ‘heightened security threat’”.

Figure 13 Zone of heightened system security threat and reduced operational flexibility in relation to minimum operational demand levels[A,B]



Source: AEMO, Renewable Energy Integration – SWIS Update

Responding to low load events - now



AEMO Update Report Recommendation

Recommendation 5 (PRIORITY):

Management of distribution-connected photovoltaic (DPV) systems

As soon as practically possible, **enable the capability to manage newly installed and upgraded DPV (i.e., for output reduction and/or curtailment) on instruction from AEMO to a third party to assist in managing power system security and reliability** in all emergency operational conditions, including during extreme low system load conditions and black start, as a measure of last resort (i.e., backstop capability).

Government's response

Our approach and consultation

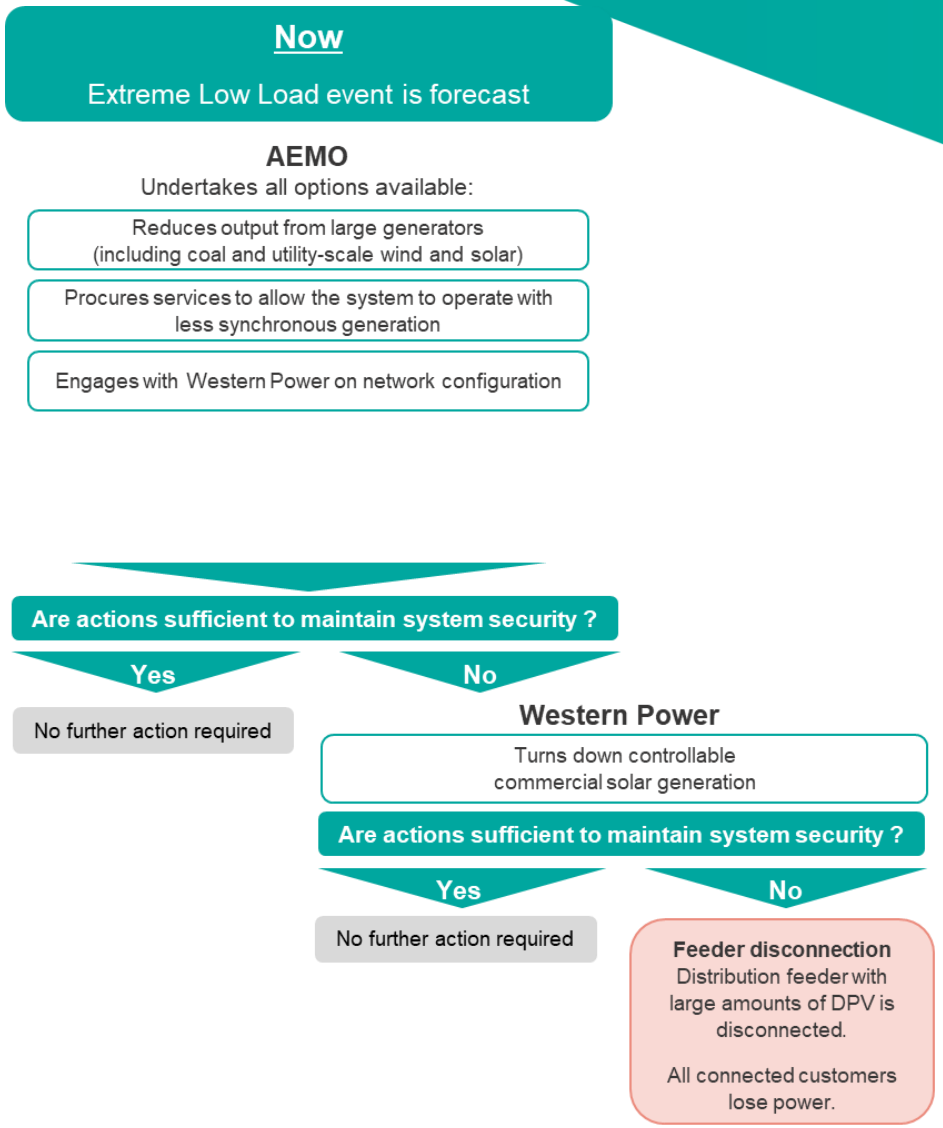
- Multi-agency working group to develop a DPV Management implementation approach, including assessment of DPV Management in South Australia
- Discussion Paper released, presenting proposed implementation approach and requesting feedback

- **Consultation saw almost 140 submissions received, including over 120 members of the public**

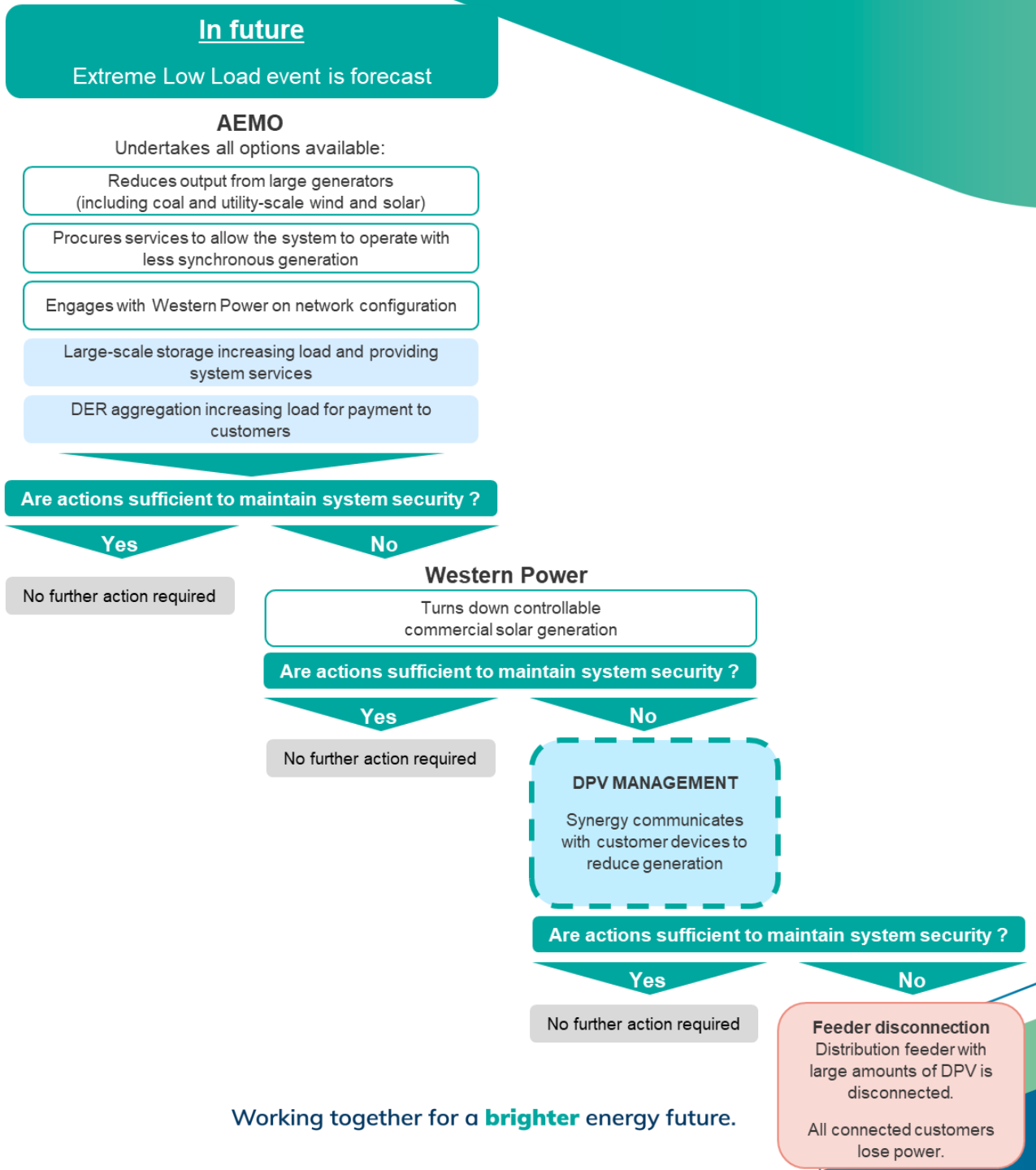
- **Key feedback from stakeholders:**
  - Extensive information for customers – at time of installation, and around possible events
  - Adequate and timely information available for industry, including relevant training
  - For use during emergencies only
  - Alternative solutions should also be considered and progressed

Emergency Solar Management

Responding to low load events - now

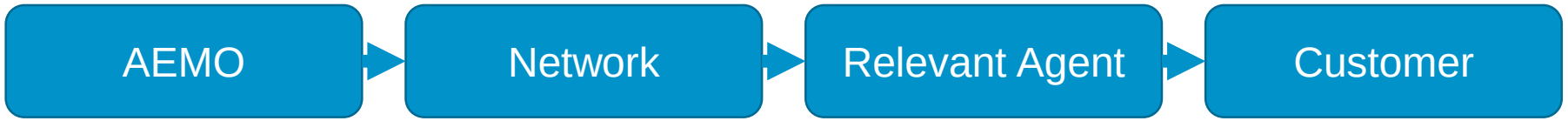


Responding to low load events – in future

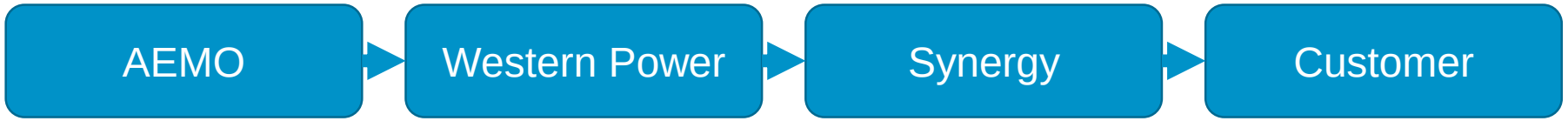


Emergency Solar Management implementation model

South Australian model



Emergency Solar Management in Western Australia



Responding to low load challenges

Emergency Solar Management is only part of the response

1. Implementation of the Energy Transformation Strategy

- The State Government's plan for integrating renewables and managing the energy transformation
- This remains the focus, and the long-term solution to low load risks

2. Manage small-scale DPV output in emergency conditions

- Progress work to meet AEMO's recommendation and mitigate near-term risks

3. Export limits for larger systems

- New Western Power connection requirements require systems not subject to DPV Management to be export-limited at all times (unless providing power through an offtake agreement)

New requirements for rooftop solar

Key details

- All new and upgraded systems with inverters capable of generating 5kW or less will need to be capable of being remotely turned down or off in response to direction from AEMO
  - These requirements are in section 4.3.4 of the Western Power connection technical requirements, released last week
- These requirements will apply to all new applications made from 14 February 2022 (and all new systems installs from 14 March 2022)
- Existing customers with rooftop solar will not be affected

Emergency Solar Management

Managing short-term risks

- **Mitigating near-term risks of extreme low load events**
- **Participation of customer devices is central to our future power system**
  - Remote communication is a stepping-stone to this future, where DER provide electricity services for payment
- **Extreme low load events are forecast to occur infrequently and for short periods in the SWIS**
  - South Australia has deployed DPV Management only once, for “about one hour”
  - The cost per small-use customer for such an event is estimated at $1-2
  - Customer power supply will not be impacted as a result of DPV Management
- **Will allow more rooftop solar PV to be installed overall, and increase total renewable energy generation available at all other times**

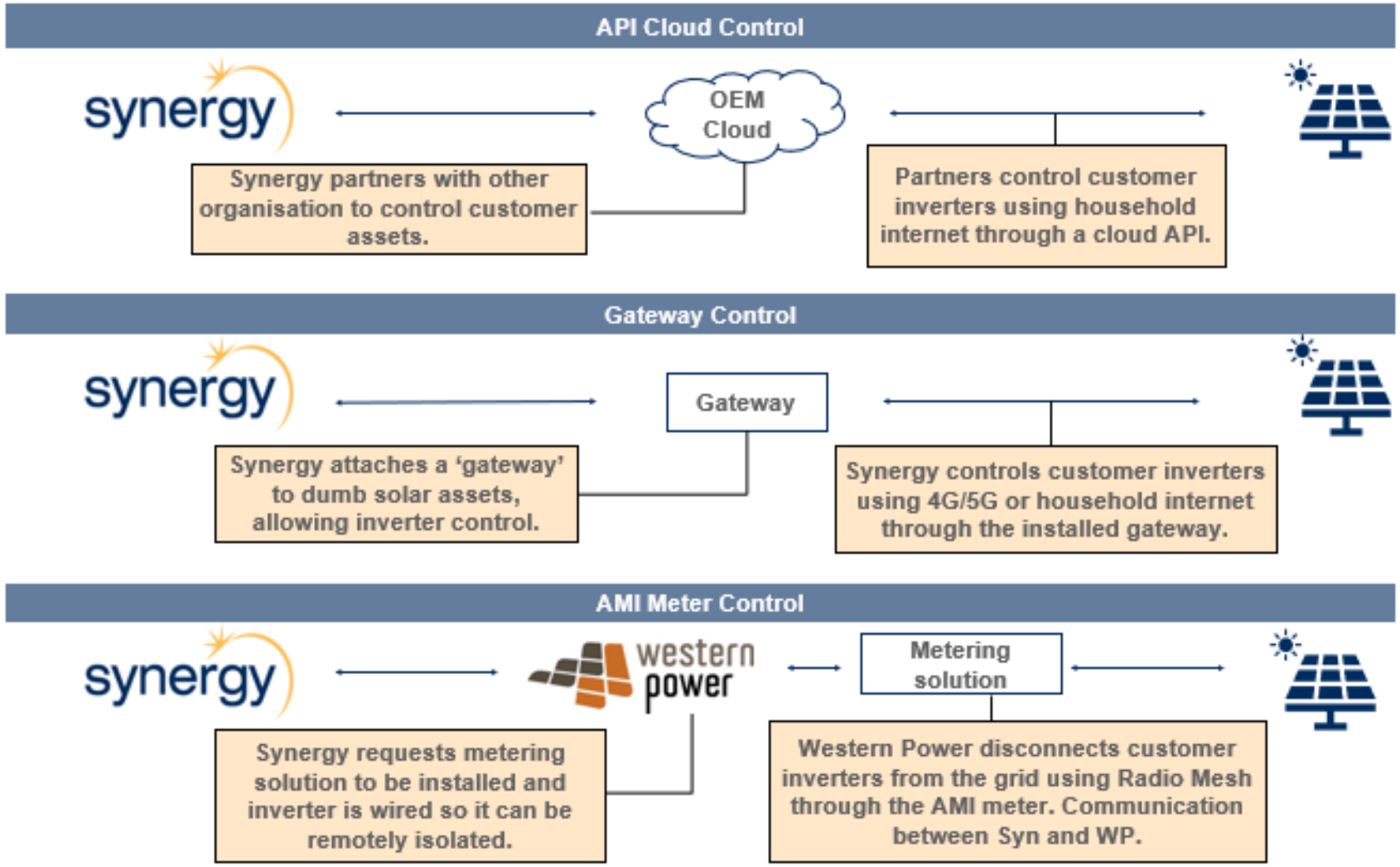
Synergy will work with customers and industry

Synergy's role will be to:

- Support all customers to ensure their new systems can meet requirements
- Engage with industry to provide all relevant information and training
- Respond to directions to deploy Emergency Solar Management during events

Emergency solar management

Three solutions have been explored



Planned solution for 14 February

There will be two ways to remotely turn down or turn off residential rooftop solar systems with an inverter capacity of 5kVA or less:

1. **Cloud solution:** connect to the inverter over the internet via an API
2. **Meter solution:** an AMI meter with communications capability can turn off the inverter

How do we choose which solution is right for our customers?

The brand and model of inverter being installed will determine whether it can be connected via Cloud API (which requires a household internet connection). If it *can't* be connected via API, the meter solution needs to be used (which may require a new meter and/or wiring to be installed by Western Power and/or the Solar Installer).

Installer role and considerations

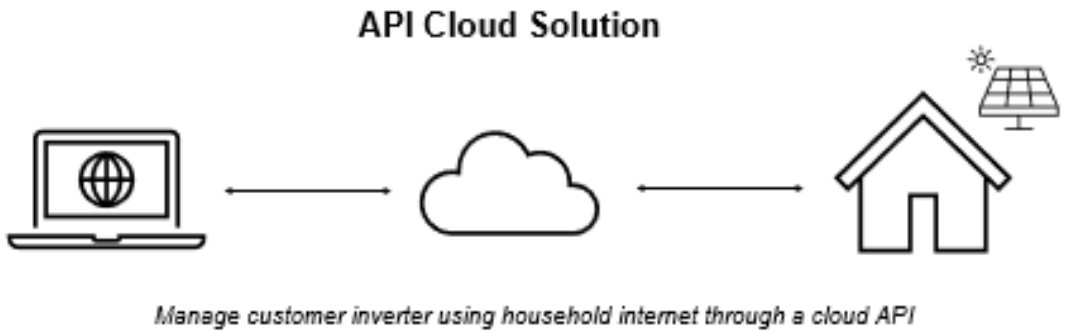
It will be the installer's responsibility to install only inverters that can be connected by Cloud API, or the meter solution (plus wiring) from **14 February 2022**. Installers should also consider the cost of metering and wire upgrades needed for the customers premise.

Cloud (API) solution

How does it work?

The cloud solution uses an Application Programming Interface (API) to turn down/off the inverter.

In simple terms, the API is essentially a messenger that sends a request (to turn off/down) from an application (an emergency solar management platform) to the equipment (the inverter).



Manage customer inverter using household internet through a cloud API

Leveraging learnings from SA

- We're leveraging learnings and experience from the South Australian model.
- Synergy has been trialling technologies over the last couple of months and we plan to announce our integration partner early in the new year.
- Reflecting on the last 12 months of installed inverters, 50% of these would already be compliant.
- We're now looking at building out our roadmap to ensure all inverters are compliant within the next year, and we're working with Western Power and a potential OEM integration partner to do this.

For more information, you can read our FAQs at: synergy.net.au/global/dpv-management

Key dates

OEM & installer communications and engagement

- Synergy, with our integration partner, will actively engage OEMs to be at target of greater than 95% by the second low load season of 2022 for emergency solar management.
- We will continue to roll out our education and engagement program for installers.

December 2021

w/c 13 Dec - OEM email update

13 Dec - Synergy installer information video

January 2022

w/c 17 Jan – Formal publication of API Compliance Framework and Compliance Self Assessments on Synergy website

17 Jan - Synergy installer information event

TBC Jan - OEM roadmap workshop session

Early February 2022

Publish Cloud Supported Devices List

14 February 2022

Emergency solar management asset onboarding begins

Ongoing

Update Cloud Supported Devices List

Register for updates at: synergy.net.au/global/dpv-management

Emergency Solar Management Summary

The new requirements will:

- **only be used in emergencies** – expected to be needed infrequently and for short periods, and will prevent loss of power for consumers during these critical times;
- **only apply to new and upgraded rooftop solar** – existing customers will be unaffected;
- **not interrupt power supply to customers** – only rooftop solar generation will be reduced, and customers will continue to receive power from the grid;
- **only impact households as a last resort** – other options to protect the power system, including turning down large-scale generators, will be exhausted first; and
- **allow more renewables overall** – by managing risks during these infrequent emergency times, greater levels of rooftop solar installation will be possible.

We have a long-term plan through the Energy Transformation Strategy to reduce the need for this measure and allow for customer devices to actively participate in our power system.

Next steps

- Synergy workshops with installers to follow, please register with Synergy

- Information is available:
  - Synergy's website, https://www.synergy.net.au/global/dpv-management
  - EPWA's page, https://www.wa.gov.au/organisation/energy-policy-wa/emergency-solar-management
  - Basic Embedded Generator Connection Technical Requirements on Western Power's website, https://www.westernpower.com.au/industry/manuals-guides-standards/basic-embedded-generation-connection-technical-requirements/

Questions