

# Executive summary

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## Distributed Energy Resources (DER) are transforming our electricity system, presenting both challenges and opportunities.

*Distributed Energy Resources, or 'DER', are smaller-scale devices that can either use, generate or store electricity, and form a part of the local distribution system, serving homes and businesses.*

DER can include renewable generation such as rooftop solar photovoltaic (PV) systems, energy storage, electric vehicles (EVs), and technology to manage demand at a premises.

### DER is a great opportunity

Customers in the South West Interconnected System (SWIS) are installing DER at unprecedented rates. Now, almost one in three households in the SWIS have a rooftop solar PV system installed, with around 2,000 households adding a new system each month.

Customers choosing to install DER are already enjoying the benefits of lower electricity bills, and are contributing to de-carbonising the power system. As DER capabilities improve and technology costs continue to fall, customers will be able to enjoy new and greater benefits from their DER.

DER also offer additional opportunities that complement and amplify the benefits of customer investments. These opportunities include services that help ensure the security and reliability of the power system, and innovative business models that offer new value for customers.

### But it's causing problems that need to be solved

However, the speed and scale of the uptake of DER is presenting serious risks to the power system.

If not properly managed, high levels of DER, most notably rooftop solar PV, will impact customers by eroding the security and reliability of the electricity system, higher costs, and an emerging divide between those that can afford to install DER and those that cannot.

The continued uptake of rooftop solar PV will see daytime demand fall to levels at which there is significant risk that the stability of the SWIS will be compromised – this is forecast to occur around 2022.<sup>1</sup> In response, the the Australian Energy Market Operator (AEMO) will be required to intervene more frequently and to a greater extent to maintain system security, increasing costs for customers.

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<sup>1</sup> AEMO, March 2019, *Integrating Utility-scale Renewables and Distributed Energy Resources in the SWIS*, available at [https://www.aemo.com.au/-/media/Files/Electricity/WEM/Security\\_and\\_Reliability/2019/Integrating-Utility-scale-Renewables-and-DER-in-the-SWIS.pdf](https://www.aemo.com.au/-/media/Files/Electricity/WEM/Security_and_Reliability/2019/Integrating-Utility-scale-Renewables-and-DER-in-the-SWIS.pdf)



DER is also contributing to technical issues at the distribution network level. The existing network was not designed to handle large amounts of generation from rooftop solar PV, which is now flowing two ways and causing problems for network operation as the physical limits of infrastructure are reached. Without improving DER integration in the network, resolution will require costly infrastructure investment by Western Power, or imposition of limits on the size and number of rooftop solar PV systems customers can install on the network. Neither outcome is good for customers.

If DER is to become a central component of the power system, it needs to be fully integrated into the operation of the power system and actively provide support, in a manner similar to larger generators.

As well as low demand in the middle of the day causing system security issues, the system load profile also features high peak demand and associated costs to service that peak. Existing flat electricity tariff structures are increasingly unsuitable because they do not reflect the true cost of electricity supply, particularly as more DER is installed. There are minimal incentives under these existing tariff structures for customers to use their energy in a way that helps keep supply costs at a minimum and ensures the system is stable and secure.

Further, customers who install DER contribute less than their share of system costs and are disproportionately benefiting from lower bills. This means customers who are unable to access DER are cross-subsidising those who can. In short, the current tariff structures are incompatible with a high-DER energy system.

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## **The Taskforce has a vision to solve these problems now and set the system up for the high-DER future**

Addressing these challenges through integration and orchestration of DER involves measures to manage the risks and realise new opportunities across the entire electricity supply chain.

The Energy Transformation Taskforce's vision for DER by 2025 is:

**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.**

There are three parts to this vision:

- 1. A safe and reliable electricity system where customers can continue to connect DER and where DER supports the system in an efficient way.**
- 2. DER capability can offer value throughout the electricity supply chain.**
- 3. DER benefits are flowing to all customers, both with and without DER.**

## **The DER Roadmap is how to get there**

The DER Roadmap is the set of actions, action owners and timeframes required to realise this vision. The Roadmap outlines the way to achieving key milestones on the journey, and will:

- 1. Address the imminent danger of system stability issues occurring as soon as 2022.**

Upgrades to DER functions and settings (like those for inverters) will see DER automatically help mitigate network and system disturbances, rather than exacerbate them.

Grid support measures by Western Power will assist in maintaining system security and reliability, particularly in the short term. Improved visibility of DER for Western Power and AEMO will further support this.

Distribution battery storage deployment, provided by a range of parties, will provide a cost-effective way to manage network and system issues caused by DER, and offer customers new opportunities to access storage.

## **2. Pilot tariff structures that support the high-DER future.**

Current electricity tariffs are contributing to inefficient and inequitable outcomes for customers, and the power system. A high-DER future is not sustainable under current tariff structures.

It is important to pilot potential new tariff structures that are more sustainable, reflecting the underlying cost of energy services and incentivising efficient use of the system. That is, pilots for tariff structures that incorporate time-based price signals with low rates during the day when there is excess rooftop solar generation, while signalling for peak demand and the associated costs to support the peak.

This will provide insights into how customers respond to alternative tariff structures, including how they use and invest in DER (e.g. battery storage) under those tariffs.

- 3. Ensure customers are protected and are provided with clear and simple information.**

Customers can continue to install DER, and access information that helps them make choices about how they use electricity and better manage their costs.

The protection of customers, including data protections, will be maintained even as changing business models provide new electricity services and customer offerings.

- 4. Build a future where DER is an active participant in the power system.**

The Roadmap sets out the requirements for the integration of DER into electricity markets, so that customers may eventually provide services that support the system and are rewarded for doing so. This will lead to the natural evolution of Western Power and AEMO's roles and the introduction of innovative 'DER aggregators' to the system.

The coordination of many individual customer DER by aggregators will allow customers to participate in the provision of services that benefit the power system, but in a simple way. The development of mechanisms that allow DER to provide these services and receive payment will open up new value streams for customers, and lower system costs.

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.**

## The DER Roadmap

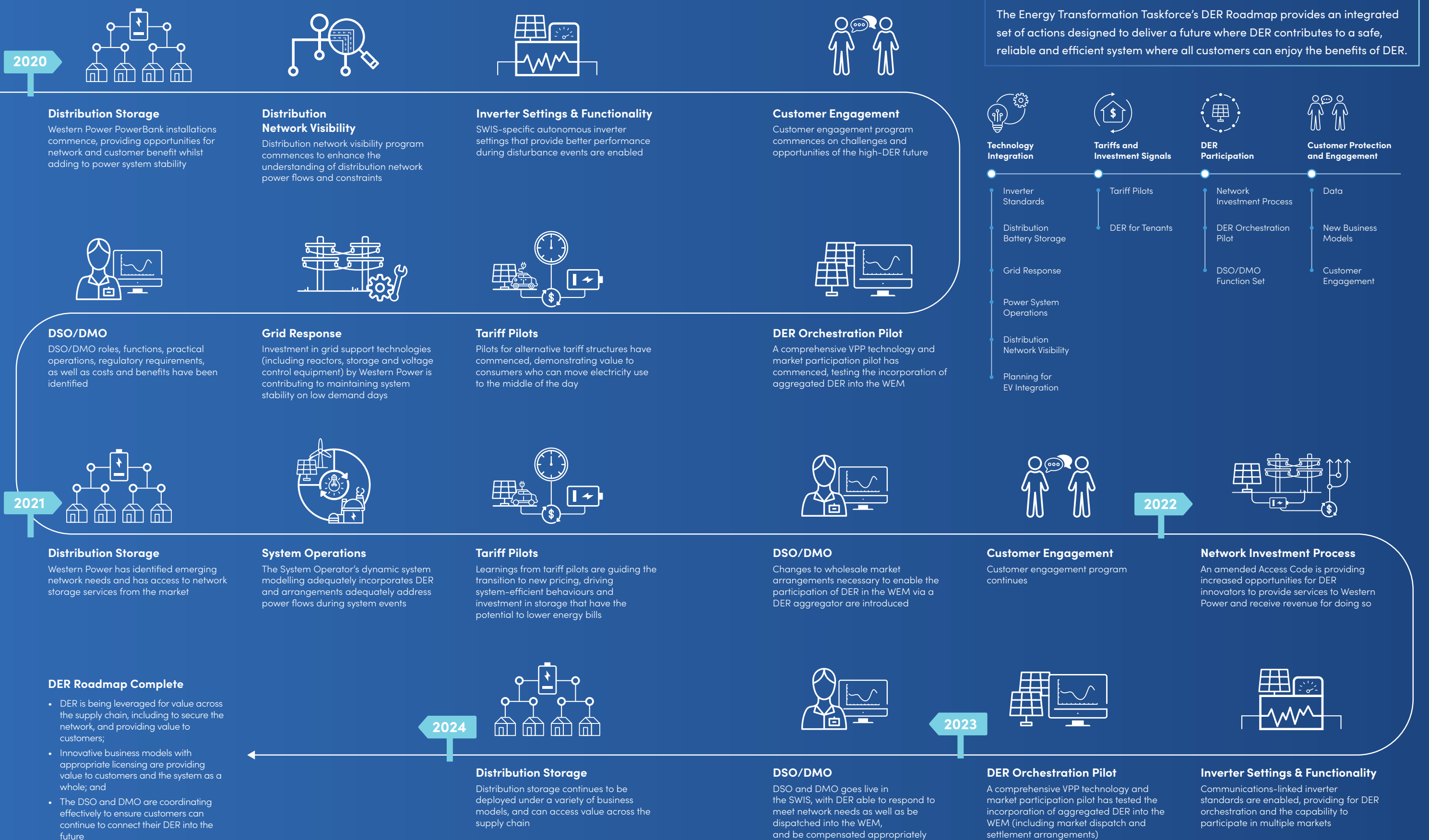


Figure A: the DER Roadmap workplan and priority actions