28 SEPTEMBER 2021

OVERVIEW

# Renewable Energy Integration – SWIS update

Transformation of Western Australia's (WA) South West Interconnected System (SWIS) is accelerating. Renewable generation in the SWIS, both utility scale and on consumer premises, is growing faster than expected.

AEMO's report updates the challenges posed by this transition, and lists 13 recommendations to ensure the transformation of the SWIS is orderly and delivers secure, reliable and affordable energy with enhanced consumer choice.

**Two years of collaboration across the industry has made WA's SWIS more resilient. Actions identified in 2019 have benefited consumers. Now, further actions are required to address new risks as the physical characteristics of the power system continue to change.**

## SWIS FACTS

- **18 million megawatt hours of electricity delivered to over 1.1 million households and businesses annually.**
- **7,800 kilometres of transmission lines, 67,300 km of overhead distribution lines and 25,000 km of underground distribution lines**
- **Collectively, rooftop solar is the largest generator in WA, with one in three households with rooftop solar installed (1,740 MW).**
- **Commercial and residential solar is expected to reach an estimated 4,069 MW of installed capacity by 2030-31, providing around 40% of total generation!**

## SNAPSHOT OF PROGRESS FROM 2019 TO 2021:

**2019**

The 2019 report outlined the emerging risks to power system security and reliability, and market efficiency posed by the rising proportion of variable non-traditional generation, which has challenged delivery of essential system services.

**Since 2019, various initiatives, investments and reforms have provided the critical platform of change for a more secure and resilient power system.**

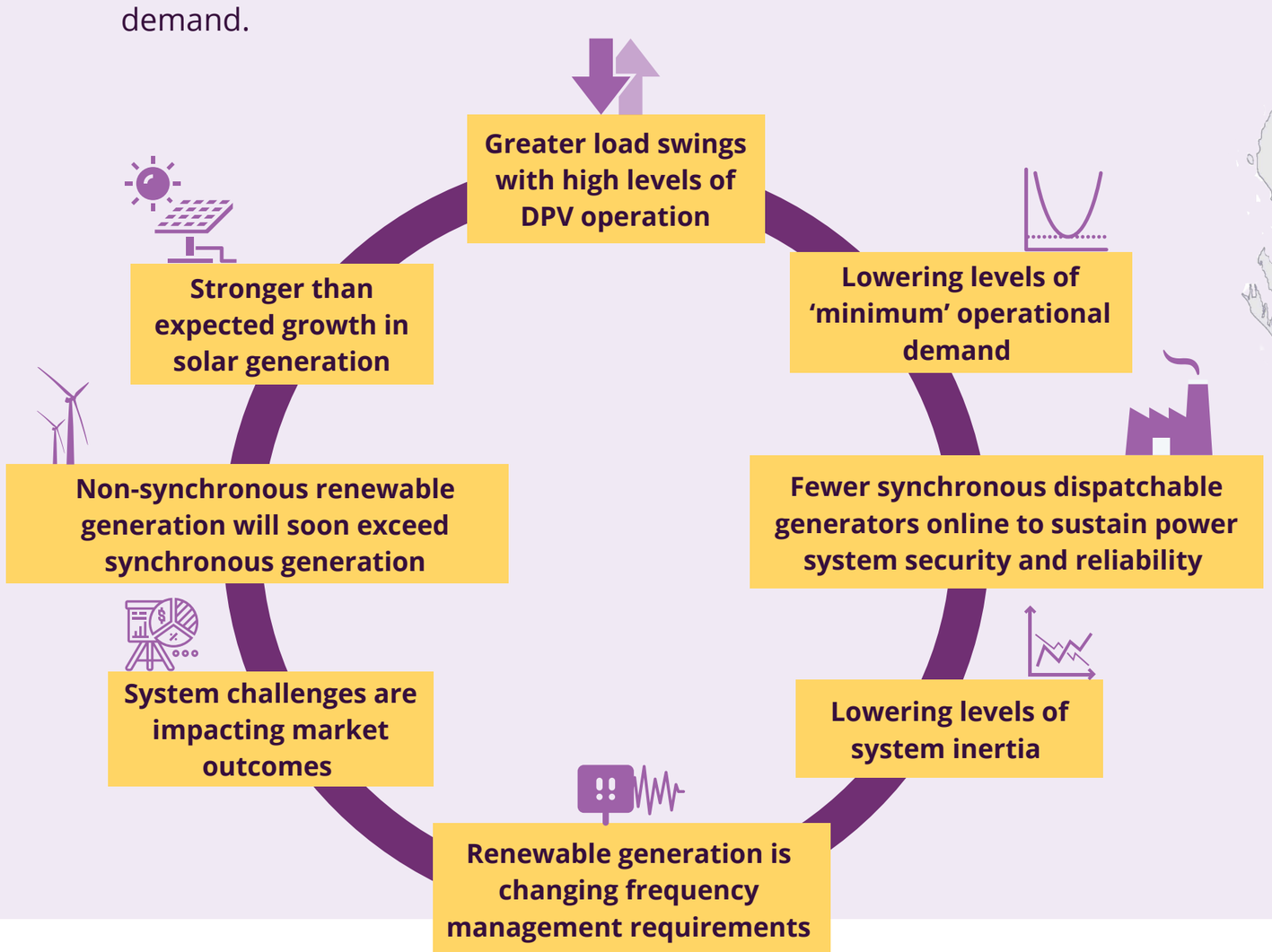
- **WA Government's Energy Transformation Strategy (ETS)**
- **DER Roadmap**
- **Investments in infrastructure**
- **WEM improvements**
- **Operational improvements**

**2021**

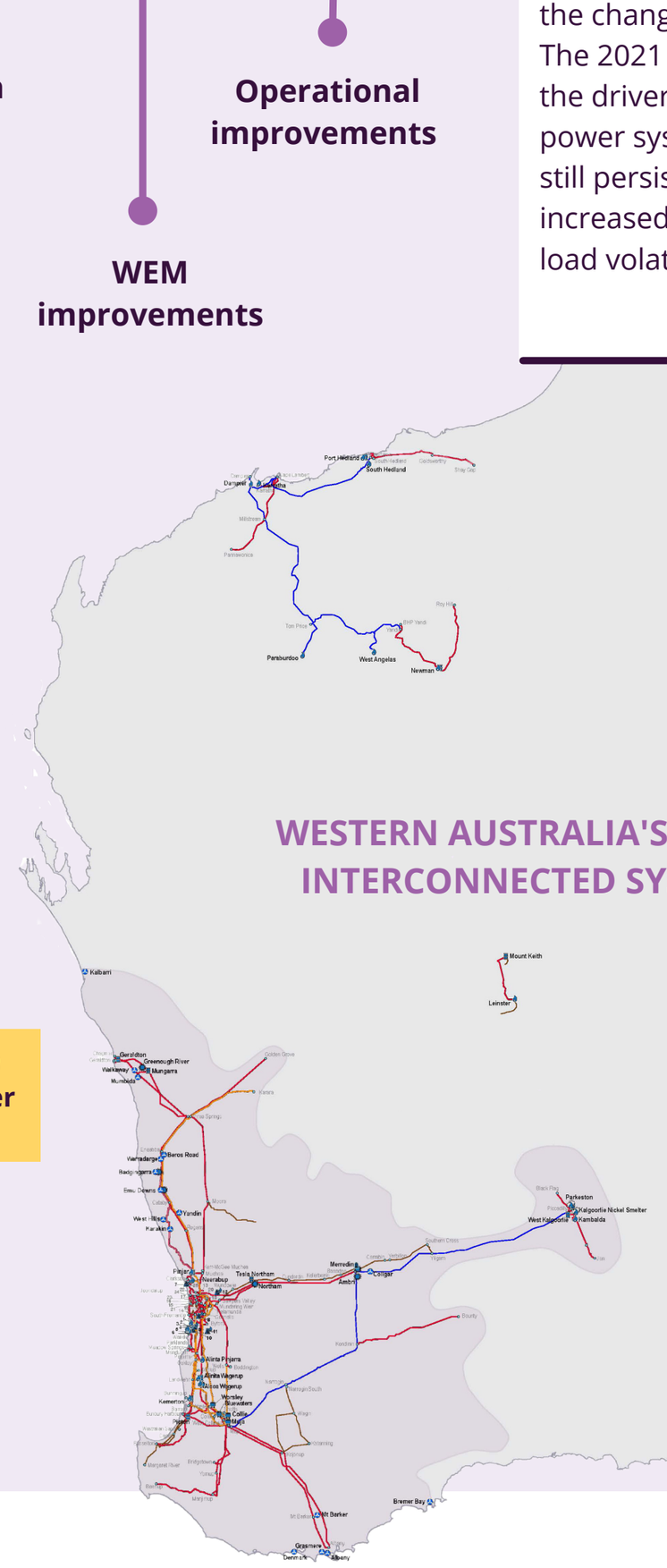
Since the release of AEMO's 2019 report, WA's major power system is in a stronger position due to the changes implemented. The 2021 report finds that the drivers of change in power system conditions still persist, causing increased generation and load volatility.

## DRIVERS OF CHANGE:

The drivers of change in power system conditions are causing increased generation and load volatility and a decline in operational demand.




## WESTERN AUSTRALIA'S SOUTH WEST INTERCONNECTED SYSTEM (SWIS)



## KEY RECOMMENDATIONS

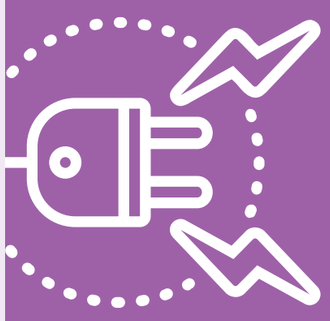
Additional operational tools, new standards, further investments, system services, and regulatory arrangements are needed to ensure power system security and resiliency.

AEMO recommends the following 13 critical actions to provide additional resiliency before 2024 and secure the power system for the medium term, in the majority of cases as elaboration or extension of already announced WA Government reforms:

> **AEMO considers that it can now operate the power system securely below the 700 MW minimum operational demand threshold, as identified in the 2019 report. However as load drops below 600 MW there is a zone of 'heightened security threat' as ever-diminishing options are available to provide the essential system services necessary for secure operations.**

## CATEGORY 1: TECHNICAL STANDARDS, SERVICES AND MECHANISMS

### 1 Ongoing inverter monitoring and compliance



**Recommendation:** Mandate ongoing compliance to the new standards (AS/NZ 4777.2:2020), which comes into effect from December 2021 for all new (and upgraded) Distributed Photovoltaic (DPV) installations.

PRIORITY

### 3 Fast Frequency Response (FFR)

**Recommendation:** Explore whether an alternative means to inject energy quickly (called Fast Frequency Response) is required in the short term before the new reformed wholesale energy market arrangements are introduced, and if so take steps to contract those services.

### 2 Under-frequency Load Shedding (UFLS)

PRIORITY

**Recommendation:** Implement more dynamic UFLS arrangements, allowing the scheme to adapt to changing power system operational arrangement to meet its emergency backstop requirements.

### 4 Ramping Service

**Recommendation:** Explore whether prior to ETS Stage 2 a ramping service is required to meet those maximum forecast ramps, and if so take steps to contract those services.

## CATEGORY 2: DISTRIBUTION-SYSTEM RELATED

PRIORITY

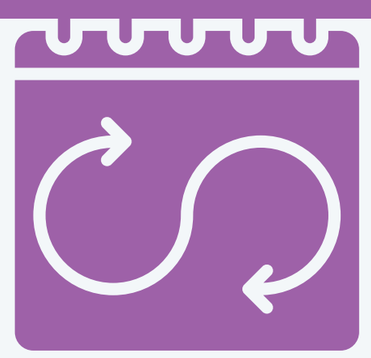
### 5 Management of DPV systems

**Recommendation:** As soon as practicable, implement a mandatory requirement for all new (and upgraded) DPV to be capable of remote curtailment from a third party under AEMO instruction, as a last resort backstop capability.

### 6 Market and incentive frameworks for distributed energy resource (DER) participation

**Recommendation:** Implement policy arrangements for the coordinated delivery of services from DER via wholesale energy market and non-market mechanisms identify the role that new and legacy incentives that apply to DER could play in determining the scope and prospect for market-based solutions to manage challenges such as minimum demand.

### 7 Flexible loads

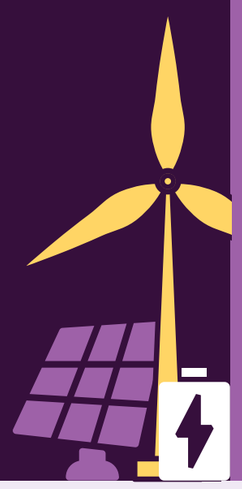


**Recommendation:** Develop options for increasing the visibility of loads and for incentivising load behaviour to release the value of flexible load to the power system through multiple participation pathways.

## CATEGORY 3: WHOLESALE ENERGY MARKET RELATED

### 8 Changing the approach to hybrid facilities

**Recommendations:** Determine whether enabling the option of offering each of the component parts of a hybrid facility into the market will provide improved services.



### 9 Improving market incentives to address system variability

**Recommendation:** Amend the Wholesale Energy Market Rules to create incentives for renewable generators to achieve their dispatch forecast.

## CATEGORY 4: REGULATORY ARCHITECTURE AND FUNCTIONALITY RELATED

### 10 Framework for contingency planning and management for power system resilience

**Recommendation:** Develop arrangements that focus on short-to-medium term planning activities to address high impact / low probability events, system strength shortages and other stability related issues, and ultimately facilitate the making of a case for investment.

### 11 Prioritise the development of a centralised SWIS reliability standard and supporting frameworks

**Recommendation:** Develop a contemporary reliability standard reflective of the new energy system encompassing new technologies, such as batteries.

### 12 Build on the utility of the inaugural Whole of System Plan (WoSP)

**Recommendation**: Build on the achievements of the inaugural WoSP through the consideration of a centralised case approach to system planning in which WoSP processes guide investment decisions and opportunities for market participation. Examine power system operability outcomes achieved with the least cost supply mix and market outcomes (across all markets and services), including considering a carbon emissions policy.

### 13 Embed requirements for interoperability and cybersecurity

**Recommendation:** Implement policy arrangements that will support the improved capability of all relevant supply chain participants to actively engage and coordinate activities focused on embedding interoperability and cybersecurity.