# NEM Engineering Framework

April 2021

FOR Q&A and polls:
SLIDO.COM
CODE: #NEMEF

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

We acknowledge the Traditional Owners of country throughout Australia and recognise their continuing connection to land, waters and culture. We pay our respects to their Elders past, present and emerging.

# Objectives of this session

- To inform attendees of the March 2021 report
- To update on a more detailed definition of operational conditions
- To explore where to from here and how to get involved
- To gather your views and feedback on the process and operational conditions

# Before we begin

## Slido.com

Please access this event in slido.com with **#NEMEF**

**Audience Q&A** tab: Use this to ask/ upvote any questions throughout the session

**Live polls** tab: We will launch a number of polls to gather your views throughout the event and a survey to gather written feedback

A **survey** will also be sent out during the break to provide feedback, comments and suggestions for AEMO to consider after the session (*note we are note seeking formal written submissions as part of this process*).

slido

# Why did you attend this event today? Please choose the one that most applies.

ⓘ Start presenting to display the poll results on this slide.

# Welcome and Introduction

Alex Wonhas, Chief System Design Officer

FOR Q&A: **SLIDO.COM | CODE: #NEMEF**

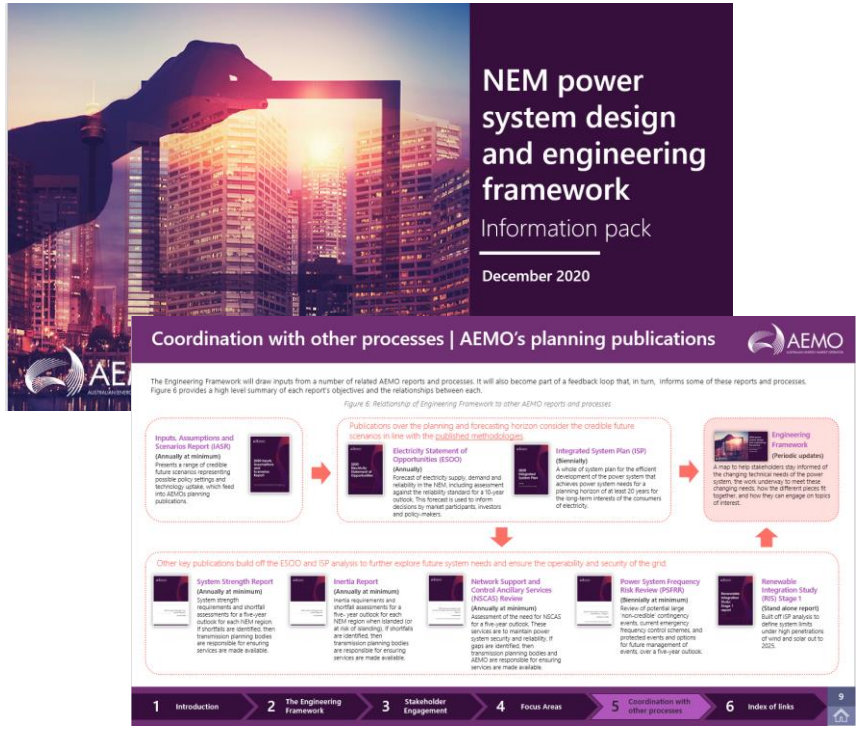
AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

# Engineering framework March 2021 Report

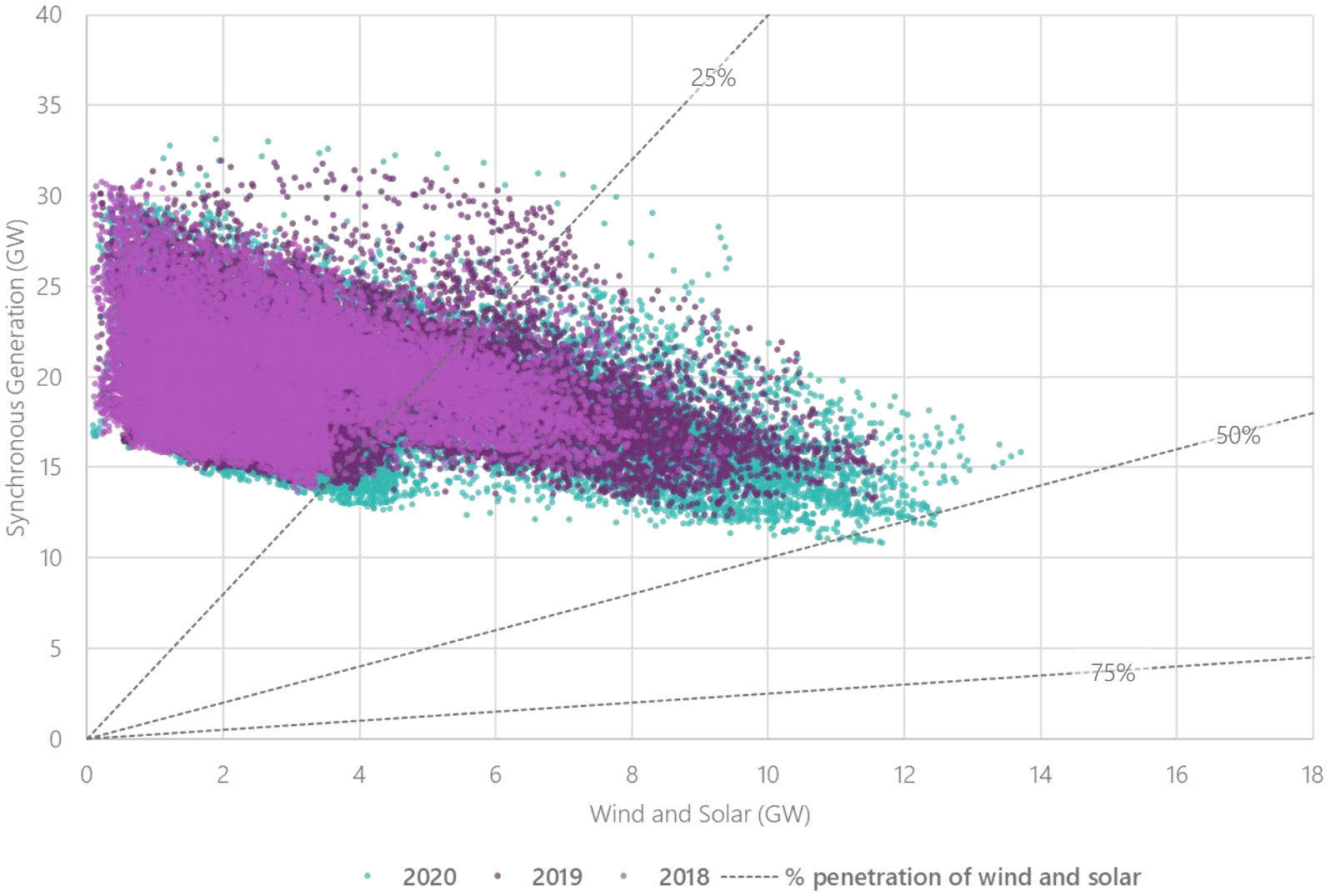
AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

# Background

- Renewable Integration Study published in April 2020
- Early feedback from stakeholders in Nov 2020
- In December 2020 AEMO published an information pack outlining our desire to start working with industry on the development of an Engineering Framework
- In December 2020, an update was published on the status of Renewable Integration Study actions, and how these will be tracked going forwards as part of the Engineering Framework
- In February 2021, an industry workshop was run on the information pack




# Historic change

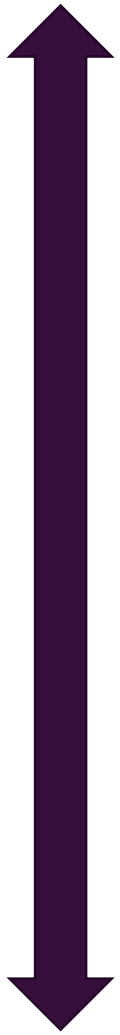



- More frequent operation at high penetrations of wind and solar
- Lower minimum synchronous generation
- Already in the realm of new and challenging operational conditions
- Also on a rapid trajectory towards new operating conditions
- Need to actively plan and consider what changes are needed, so we're prepared to operate during these periods

The Engineering Framework takes a holistic view of the changing characteristics of our energy system to help ensure the operability of the NEM throughout its transition.

# Where the Framework Fits

*Planning*



*Real Time*

**Scenarios** are inputs to planning and forecasting publications (e.g. ESOO, ISP)

**Integrated System Plan** is an actionable roadmap for eastern Australia's power system to optimise consumer benefits through a transition period of great complexity and uncertainty.

**Engineering Framework** takes a holistic view of the changing characteristics of the energy system to help facilitate an orderly operational transition of the NEM.

**Planning for Operability** includes declaration of need for services to ensure a secure and operable system over the next five years (NSCAS, inertia, system strength)

**Operational Planning** includes a range of preparatory actions for the system and control room personnel, leading up to real-time.

**Real Time Operations** involves running the system securely and reliably day-to-day.

# March 2021 report | Feedback from Stakeholders

Early engagement with stakeholders yielded a strong level of support for the proposed concept.

Suggestions on how the Framework could be modified to provide maximum value going forwards, included:

- Ensuring clarity on how the framework fits with other processes
- Greater visibility on how goals will be set and progress measured
- Greater transparency on AEMO activities and development of future AEMO priorities
- A desire for collaboration on the development of future industry plans and future AEMO priorities

# Engineering Framework | What is it?

**A** Facilitate a discussion to identify possible **future operational conditions** for the NEM power system

**B** Consolidate a common view of the **current work underway** to adapt the system and existing avenues for **engagement**

**C** Collaborate on **identifying where increased industry focus is needed** to bridge the gap between current work and future operational conditions

# Engineering Framework | March 2021 Report

A Facilitate a discussion to identify possible **future operational conditions** for the NEM power system

B Consolidate a common view of the **current work underway** to adapt the system and existing avenues for **engagement**

C Collaborate on **identifying where increased industry focus is needed** to bridge the gap between current work and future operational conditions


**Consolidating** information about the major efforts already underway across industry

**Consulting** on future operational conditions

# March 2021 report | Work underway

- Resource Adequacy
- Frequency Management
- System Strength
- Voltage Control
- System Restoration


- Control Room and Support
- System Analysis

- Resilience
- Performance Standards
- Distributed Energy Resources

# Operational conditions

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

# Using operational conditions

Operational conditions are a tool to help us, as an industry, map a pathway to an operable future

# Identifying conditions

**Distil combinations of generation and load to a short list of conditions that you can test against key risks**

## GENERATION MIX

- High DPV
- No synchronous units
- Other

**and/or**

## LOADING

- Low underlying demand
- Price responsive demand management
- Other

## OPERATIONAL CONDITIONS

- Operating with high DPV and low underlying demand
- Operation with no synchronous units
- Other



## KEY OPERATIONAL RISKS

- Network configuration *(normal, abnormal, extreme abnormal)*
- Weather events *(cloud cover, wind, other)*
- Cyber attack
- Price events *(negative price event, other)*
- Other

# Example condition | Past

**GENERATION MIX**

High DPV

&

**LOADING**

Any

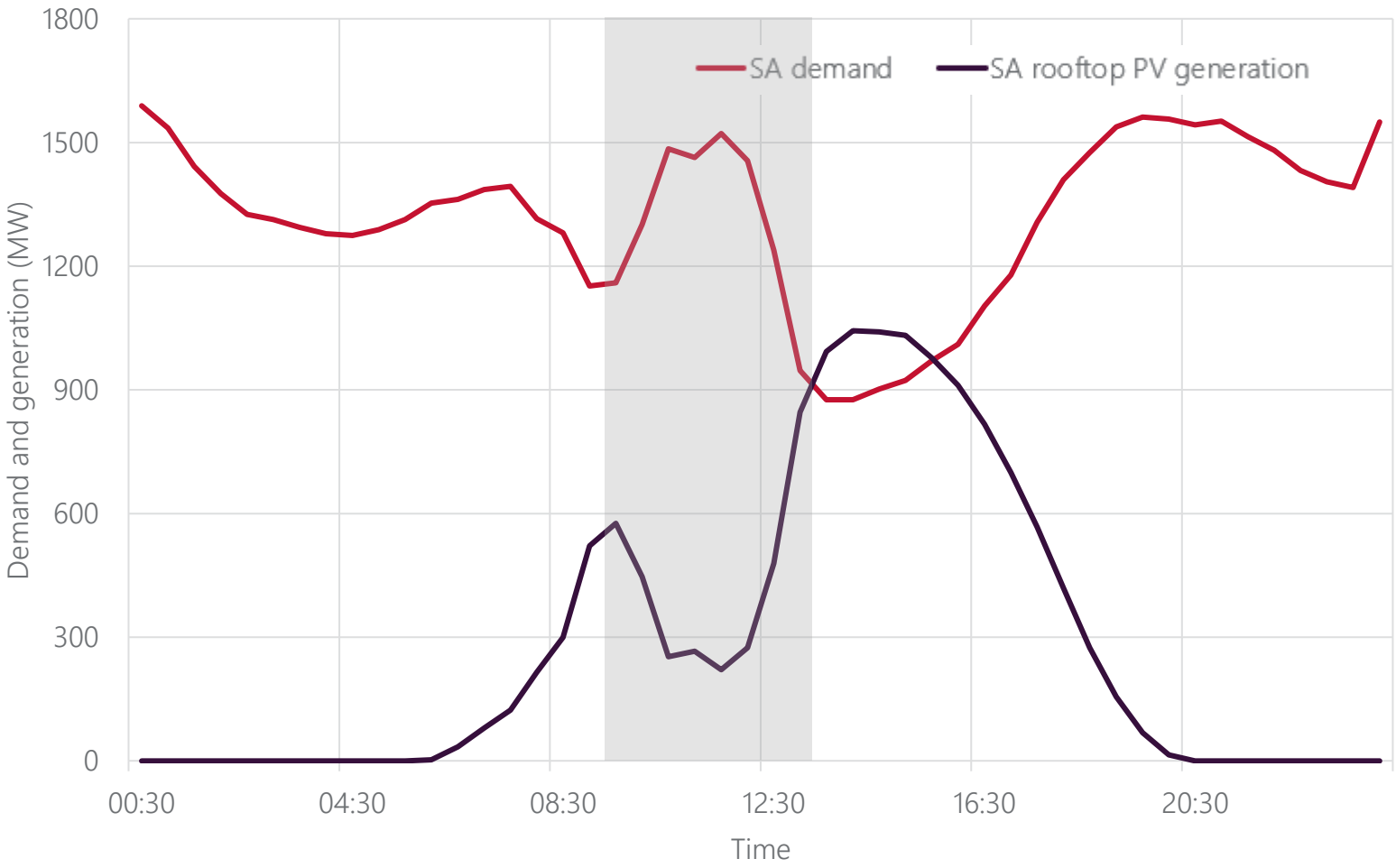
**OPERATIONAL CONDITION**

High DPV at any load

**KEY OPERATIONAL RISKS**

Weather event (cloud cover)

Normal network conditions



# Example condition | Future

**GENERATION MIX**

2 x DPV
No sync. units

&

**LOADING**

Low load

**OPERATIONAL CONDITION**

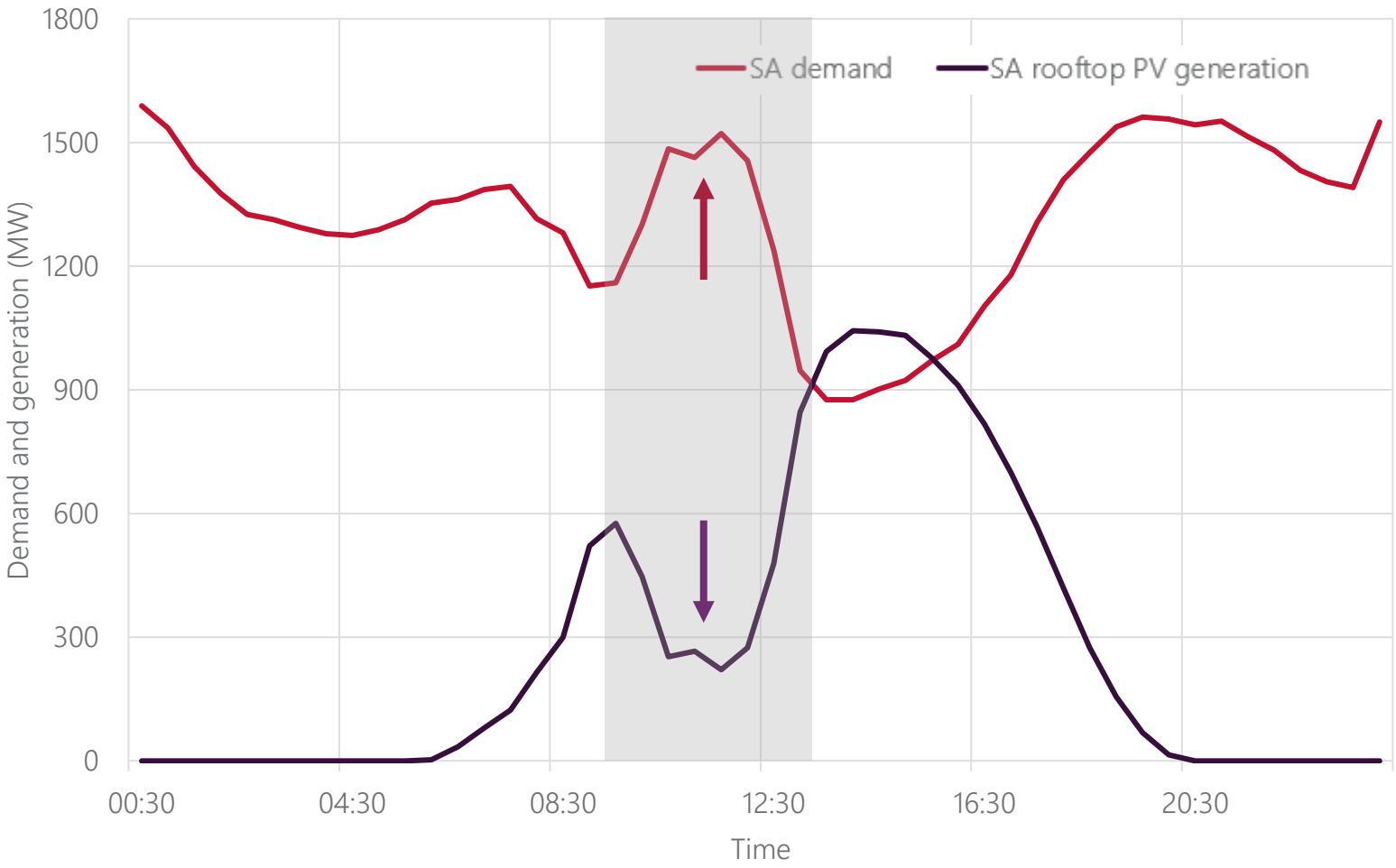
High DPV at any load

**KEY OPERATIONAL RISKS**

Weather event (cloud cover)

**Abnormal or extreme** network conditions

Cyber attack



# Next steps

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

# Opportunities, gaps and the operational pathway

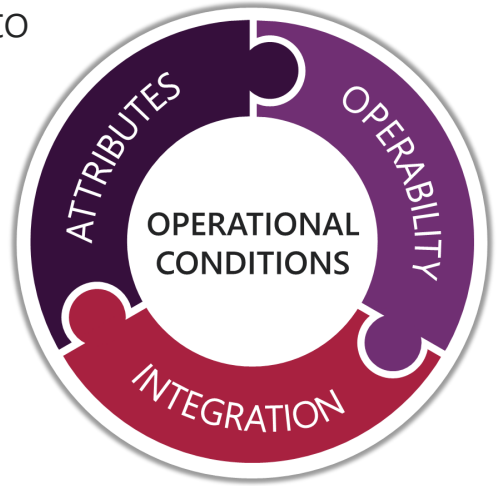
## Operational conditions

- What is the operational condition and any transitional conditions?
- Why does it matter?
- Where will this condition occur?
- What focus areas does this condition touch?

## Bridging the Gap

### Gaps and opportunities

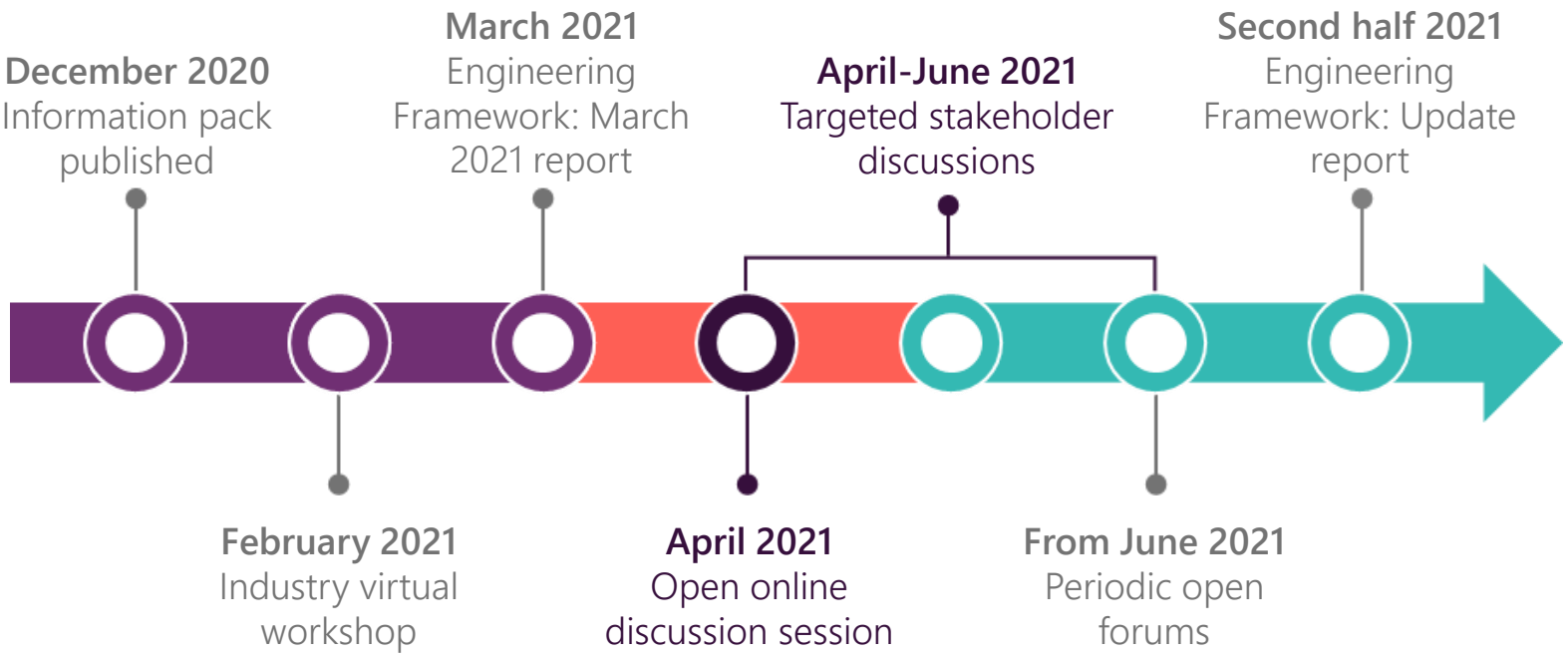
- What is required to operate under each condition?
- What are the gaps and opportunities compared to today?




### Operational pathway

- How do we prioritise identified activities across all operational conditions *(materiality, cost, timing)*?
- Who should lead the work on the gaps and opportunities identified?

# Stakeholder Engagement | Get involved



# Break

Please head over to slido.com #NEMEF to start asking and upvoting questions

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

slido

# Audience Q&A Session

ⓘ Start presenting to display the audience questions on this slide.

slido

# Exit Poll

ⓘ Start presenting to display the poll results on this slide.

*For more information*

please visit our project page on AEMO's website

contact us at FutureEnergy@aemo.com.au

AEMO

AUSTRALIAN ENERGY MARKET OPERATOR