This event will be recorded and the recording published on AEMO's website

Draft 2023 Inputs, Assumptions and Scenarios Report (IASR)

Pre-submission webinar
2 February 2023

We acknowledge the Traditional Owners of country throughout Australia and recognise their continuing connection to land, waters and culture.

We pay respect to their Elders past, present and emerging.

How to interact

www.sli.do

#AEMO

Sign in with your name

- Please ask questions using Slido. When we come to your question, we will unmute you to allow you to engage with the response.

- Written replies may be provided if appropriate.

- If you have the Webex app, the Slido Q&A will be embedded in the bottom right of your screen.

- If you are joining via a web browser, join the Slido chat via another tab or window using https://app.sli.do/event/4XCVSn8sjUj7TaR2ggBqQA.

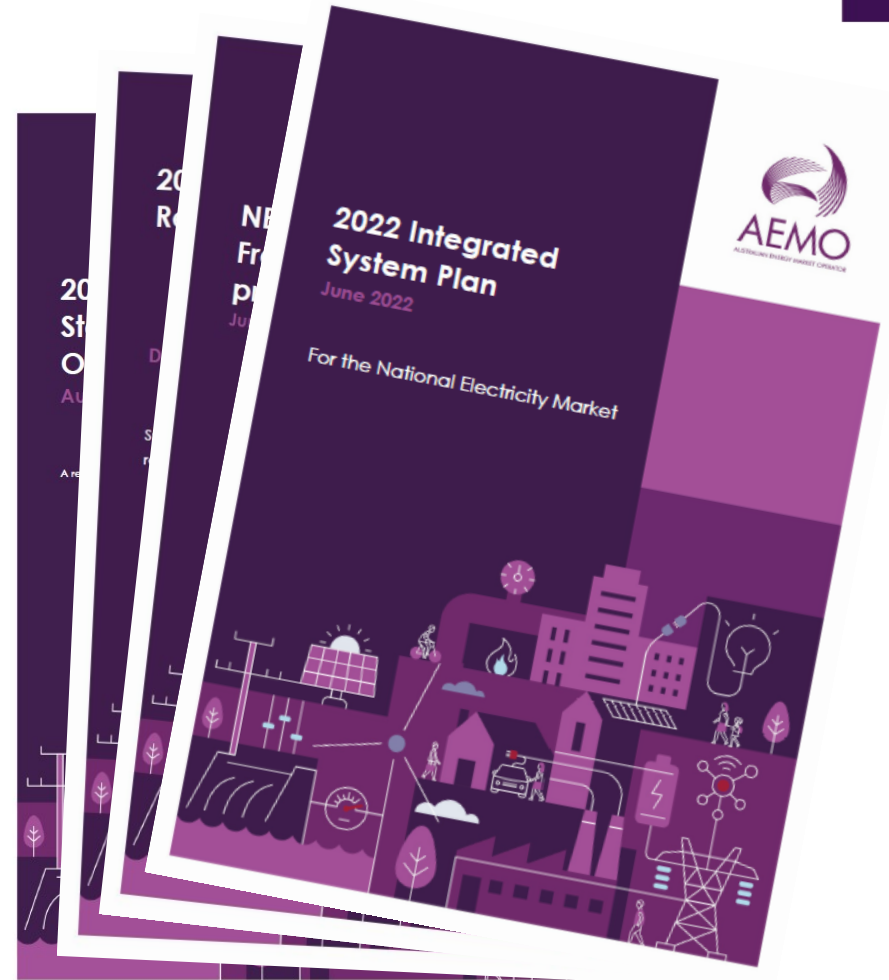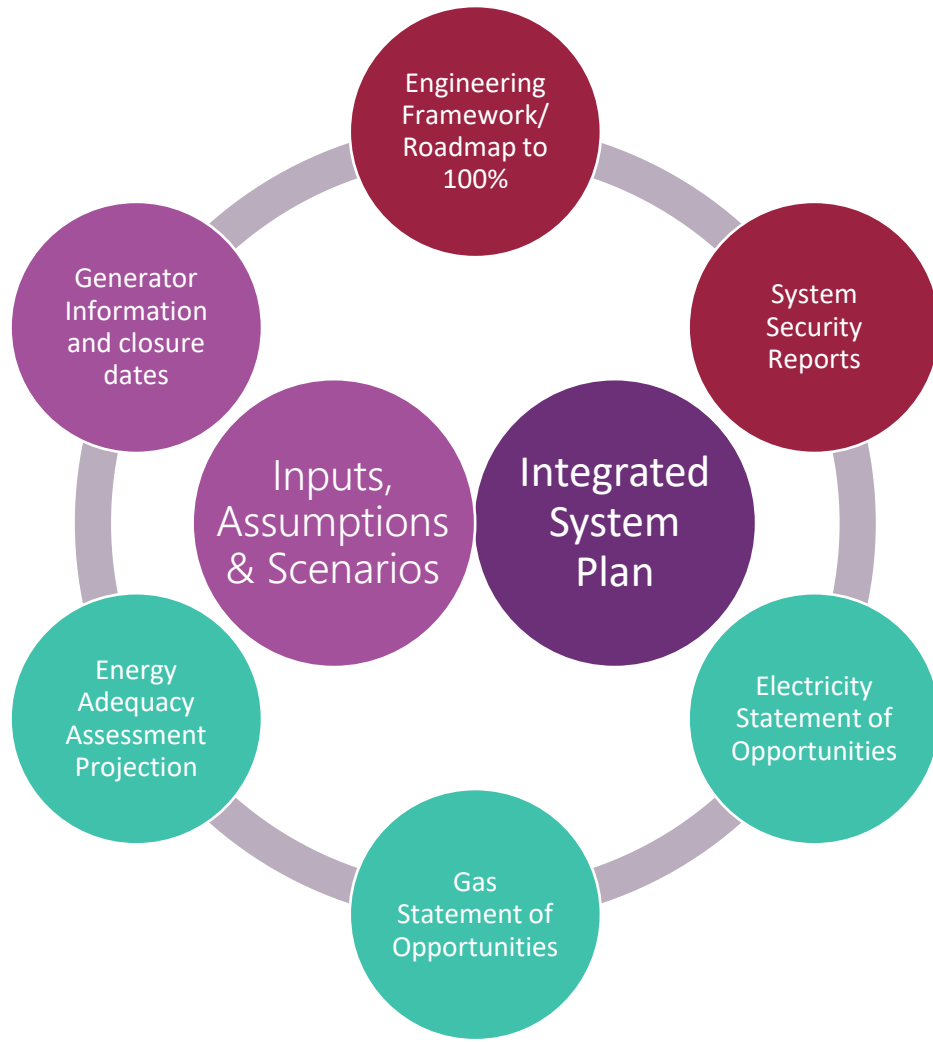# Purpose of this meeting

To provide a brief overview of the IASR

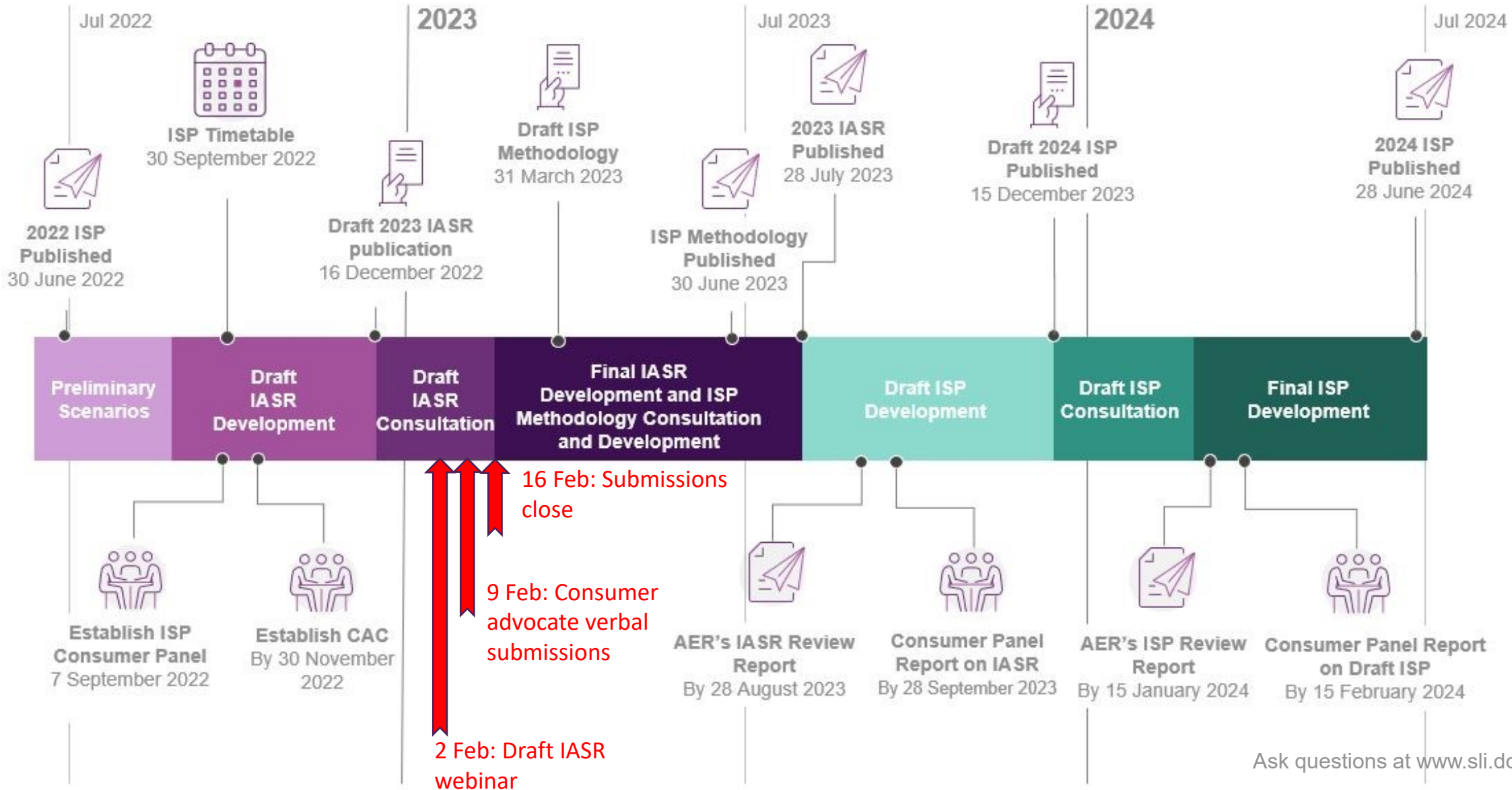To discuss matters that will support stakeholder submissions

Agenda

1. How to interact
2. Introduction – Context and timing of the IASR
3. Overview of the Draft 2023 IASR
4. Next Steps
5. Questions and discussion

Ask questions at www.sli.do #AEMO

Introduction – context and timing of the IASR

AEMO's NEM planning and forecasting publications

Engineering Framework/ Roadmap to 100%

System Security Reports

Generator Information and closure dates

Inputs, Assumptions & Scenarios

Integrated System Plan

Energy Adequacy Assessment Projection

Electricity Statement of Opportunities

Gas Statement of Opportunities

2022 Integrated System Plan
June 2022

For the National Electricity Market

- Security
- Reliability
- Data
- Infrastructure

The two-year ISP development cycle

Jul 2022

2022 ISP Published
30 June 2022

ISP Timetable
30 September 2022

Establish ISP Consumer Panel
7 September 2022

Draft 2023 IASR publication
16 December 2022

Establish CAC
By 30 November 2022

2023

Draft ISP Methodology
31 March 2023

ISP Methodology Published
30 June 2023

Jul 2023

2023 IASR Published
28 July 2023

AER's IASR Review Report
By 28 August 2023

Consumer Panel Report on IASR
By 28 September 2023

2024

Draft 2024 ISP Published
15 December 2023

AER's ISP Review Report
By 15 January 2024

Jul 2024

2024 ISP Published
28 June 2024

Consumer Panel Report on Draft ISP
By 15 February 2024

Preliminary Scenarios | **Draft IASR Development** | **Draft IASR Consultation** | **Final IASR Development and ISP Methodology Consultation and Development** | **Draft ISP Development** | **Draft ISP Consultation** | **Final ISP Development**

16 Feb: Submissions close

9 Feb: Consumer advocate verbal submissions

2 Feb: Draft IASR webinar

The IASR is a broad and deep set of energy transformation drivers

Inputs, Assumptions & Scenarios

Scenario and REZ settings
- Scenarios
- WACC
- Renewable Energy Zones

Gas system properties
- Gas expansion candidates
- Gas reserves and resources
- Gas infrastructure
- Pipeline transmission tariffs
- Gas production costs

Summary data
- Demand Input Summary
- Existing Gen Data Summary
- Fuel Price Summary
- New Entrant Data Summary
- Regional Build Cost Summary

Demand
- Value of consumer reliability
- Consumer Risk Preferences
- Energy Consumption
- Rooftop PV
- DSP
- Maximum Demand
- PVNSG
- Embedded energy storages
- Gross State Product
- Electric Vehicles
- Aggregated energy storages
- Energy Efficiency
- Electrification
- Hydrogen and other green gas

Generator technical and financial settings
- Build cost
- Capacity Factors
- Gas and Liquid fuel price
- Regional Cost Factors
- Lead times and project life
- Refurbishment
- Fixed OPEX
- Generator Regional Build Cost
- Variable OPEX
- Retirement
- Emissions
- Connection cost
- Storage properties
- Heat rates
- Marginal Loss Factors
- Build limits
- Coal and Biomass price
- Auxiliary

Policy settings
- Renewable Policy Targets
- Carbon Budgets

ST model properties
- Complex Heat Rates
- CCGT Unit Maximum Capacity
- Minimum Up and Down Times
- Maximum Ramp Rates
- GPG Minimum Stable Level
- GPG Start Cost

Generator reliability settings
- Maximum capacity
- Firm Capacity
- Seasonal ratings
- Generator Reliability Settings
- Hydro Scheme Inflows
- Reserves
- Generation limits
- Maintenance
- Hydro Climate Factor

Interconnector and transmission settings
- Transmission component costs
- Interconnector Capability
- Augmentation options
- Proportioning factors
- Interconnector representation

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Overview of 2023 scenario settings

| SCENARIO SETTINGS	1.5°C *Green Energy Export*	1.8°C *Orchestrated Step Change*	1.8°C *Diverse Step Change*	2.6°C *Progressive Change*
National Decarbonisation target	At least 43% emissions reduction by 2030. Net zero by 2050	At least 43% emissions reduction by 2030. Net zero by 2050	At least 43% emissions reduction by 2030. Net zero by 2050	43% emissions reduction by 2030. Net zero by 2050
Global economic growth and policy coordination	High economic growth, stronger coordination	Moderate economic growth, stronger coordination	Moderate economic growth, moderate coordination	Slower economic growth, lesser coordination
Australian economic and demographic drivers	Higher (partly driven by green energy)	Moderate	Moderate	Lower
DER uptake (batteries, PV and EVs)	Higher	Higher	Moderate	Lower
Consumer engagement such as VPP and DSP uptake	Higher	Higher	Moderate	Lower
Energy Efficiency	Higher	Higher	Moderate	Lower
Hydrogen use	Faster cost reduction. High production for domestic and export use	Allowed	Allowed	Allowed
Hydrogen blending in gas network	Unlimited	Up to 10%	Up to 10%	Up to 10%
Biomethane/ synthetic methane	Allowed, but no specific targets to introduce it	Allowed, but no specific targets to introduce it	7.5% blending target for reticulated gas by 2030 and 10% by 2035	Allowed, but no specific targets to introduce it
Supply Chain barriers	Less challenging	Moderate	Moderate	More challenging
Global/domestic temperature settings and outcomes	Applies RCP 1.9 where relevant (~ 1.5°C)	Applies RCP 2.6 where relevant (~ 1.8°C)	Applies RCP 2.6 where relevant (~ 1.8°C)	Applies RCP 4.5 where relevant (~ 2.6°C)
IEA 2021 World Energy Outlook scenario	NZE	SDS	APS	STEPS

Sensitivities

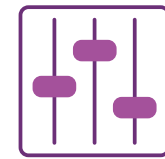Not all unknowns can or should be addressed as parameters that vary across scenarios.

The following topics are intended sensitivities for exploration in the 2024 ISP:

Higher and lower discount rates
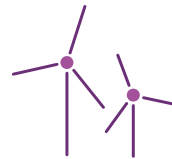
Offshore wind

Smoothed infrastructure

2023 Draft IASR outcomes – key changes

Accelerated policy support for decarbonisation and energy transformation since the 2022 ISP

Carbon Budget – all scenarios achieve at least 43% carbon reduction by 2030 and 100% by 2050, when carbon offsets are included

Economic uptick since 2022 ISP, with a range of outlooks via scenarios

Connections uptick due to post-COVID migration, with a range of outlooks via scenarios

Wind generation: +35% cost increase since 2021 GenCost

Solar farms: 9% cost increase since 2021 GenCost

Still most cost-effective for new builds

Green Energy Exports scenario assumes moderated H2 export growth (relative to 2021 IASR), but all scenarios include domestic H2

By 2030, biomethane to reach ~35 PJ/yr for 1.8°C Diverse Step Change, and 80 PJ/yr for 1.5°C Green Energy Exports

Uplift of the low-end of EV forecasts, uptick overall

Energy Efficiency increases substantially to 50-90 TWh per annum by FY2050

Consumer Energy Resources: increased distributed PV uptake, with a smoother uptake of distributed battery

2023 Draft IASR outcomes – key changes 1

Accelerated policy support for decarbonisation and energy transformation since the 2022 ISP

Carbon Budget – all scenarios achieve at least 43% carbon reduction by 2030 and 100% by 2050, when carbon offsets are included
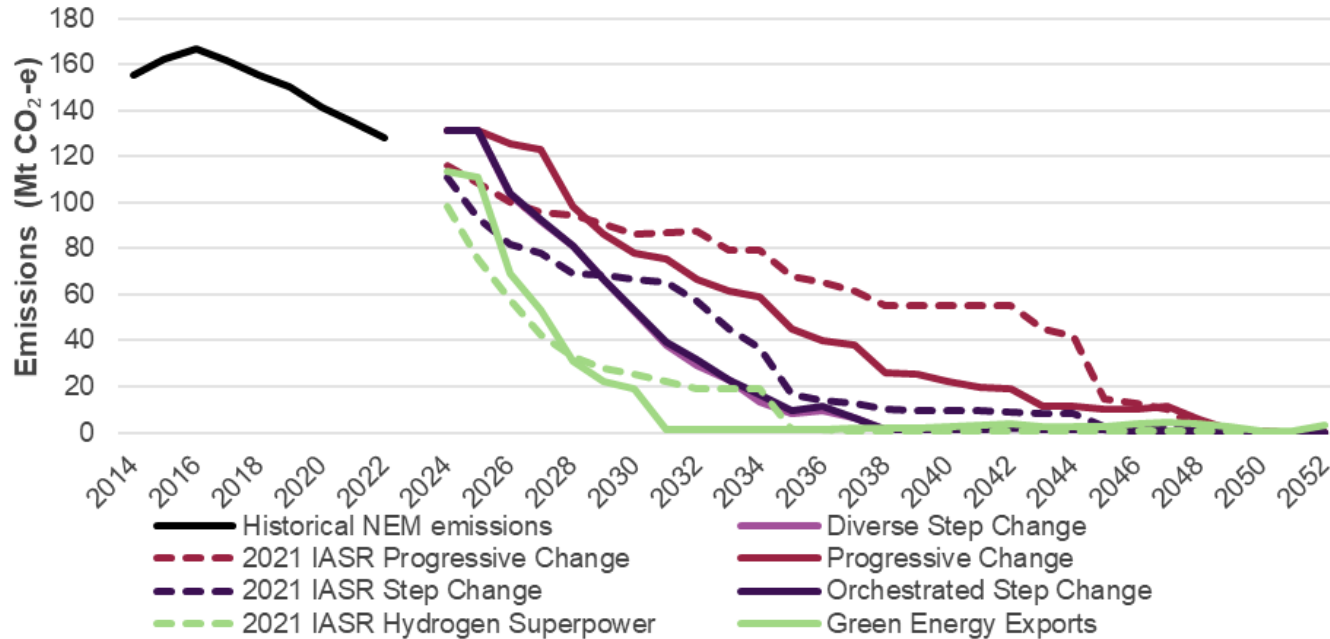
Draft 2023 IASR Figure 4: NEM emission trajectories from multi-sectoral modelling

Policies

National:
- 43% emissions reduction by 2030:
- 82% renewable generation by 2030
- Rewiring the Nation

Queensland:
- *Queensland Energy and Jobs Plan*, including expanded QRET, significant pumped hydro developments, transmission investments up to 500kV and hydrogen-ready gas developments

Victoria:
- Energy Storage development targets
- Expanded VRET
- Offshore wind developments
- State emissions reduction targets

Many other Federal, State and Territory policies continue to be included in the 2023 IASR

2023 Draft IASR outcomes – key changes 2

Wind generation: 35% cost increase since 2021 GenCost

Solar farms: 9% cost increase since 2021 GenCost
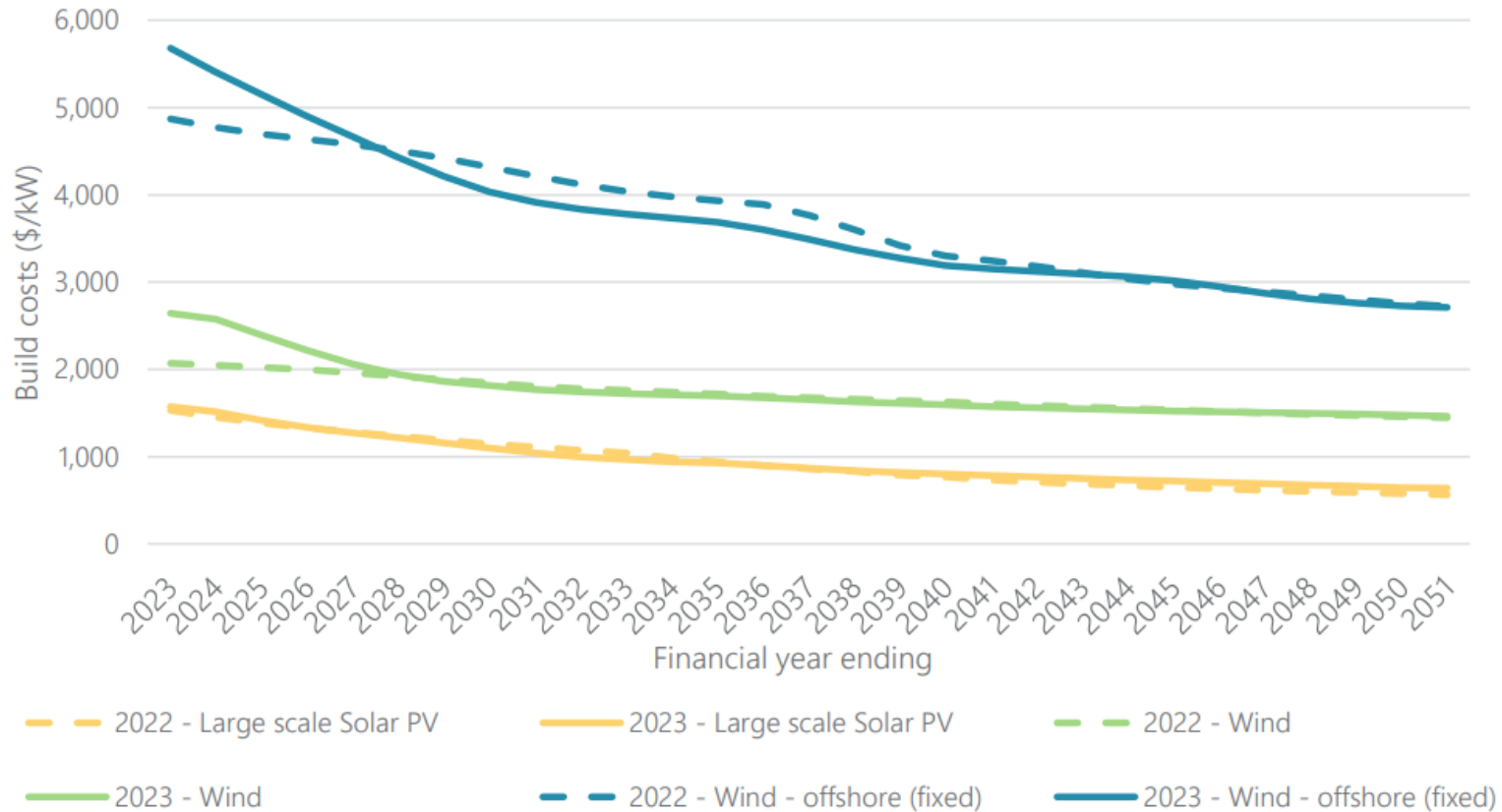
Onshore wind and solar are still most cost-effective for new builds.

CSIRO notes global inflationary pressures with impacts varying by 'differences in material inputs and exposure to freight costs.'
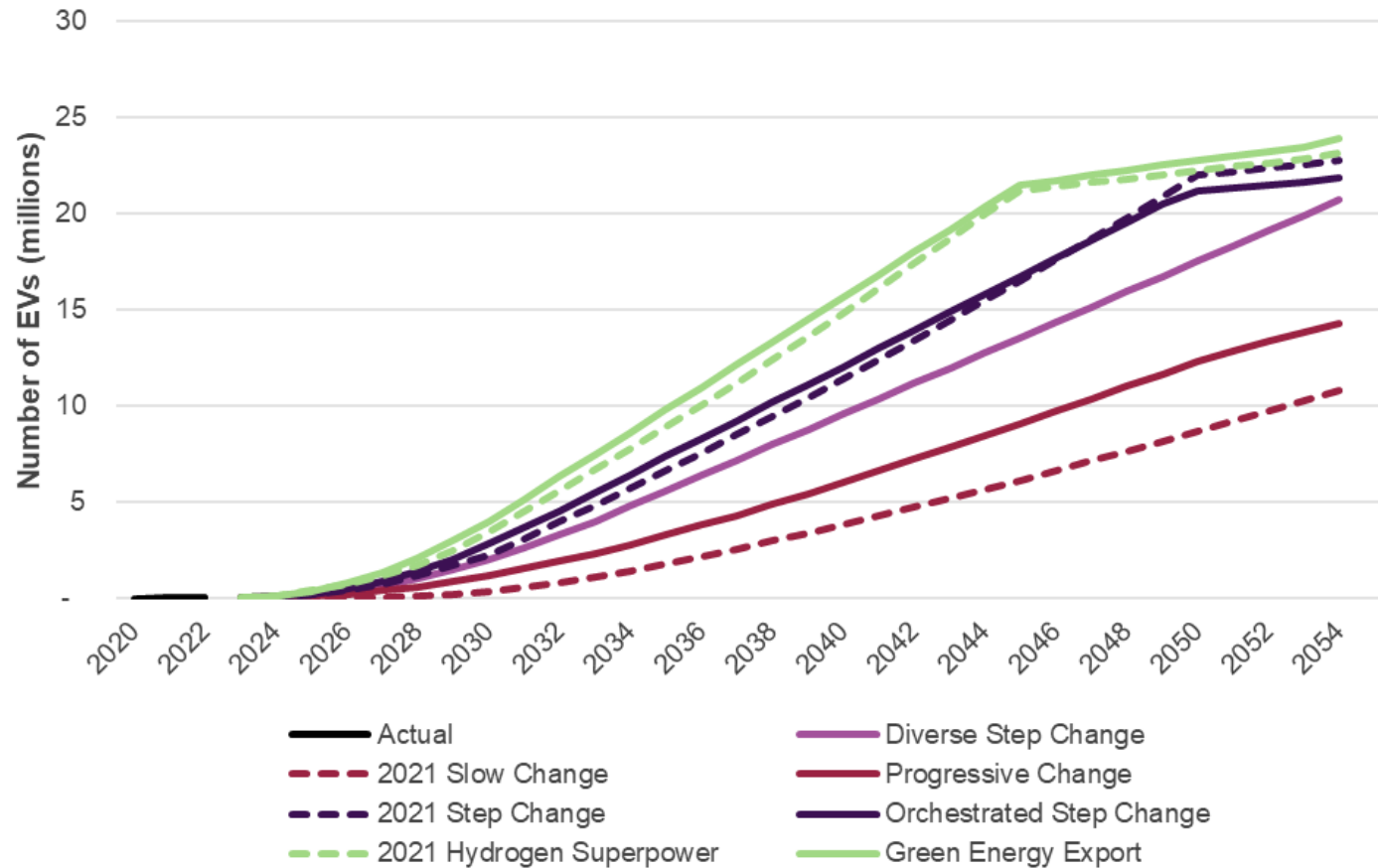
Draft 2023 IASR Figure 35: 2022 vs 2023 Global NZE post 2050: build cost trajectories forecasts for wind and large scale solar

CSIRO GenCost: see https://aemo.com.au/consultations/current-and-closed-consultations/2023-inputs-assumptions-and-scenarios-consultation

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2023 Draft IASR outcomes – key changes 3

Uplift of the low-end of EV forecasts, uptick overall

Drivers include:
- Higher than forecast uptake
- Government policies and EV strategies

Draft 2023 IASR Figure 8: Projected Battery Electric Vehicle and Plug-in Hybrid Electric Vehicle fleet size by scenario

CSIRO report: see https://aemo.com.au/consultations/current-and-closed-consultations/2023-inputs-assumptions-and-scenarios-consultation

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2023 Draft IASR outcomes – key changes 4

Energy Efficiency increases substantially to 50-90 TWh per annum by FY2050
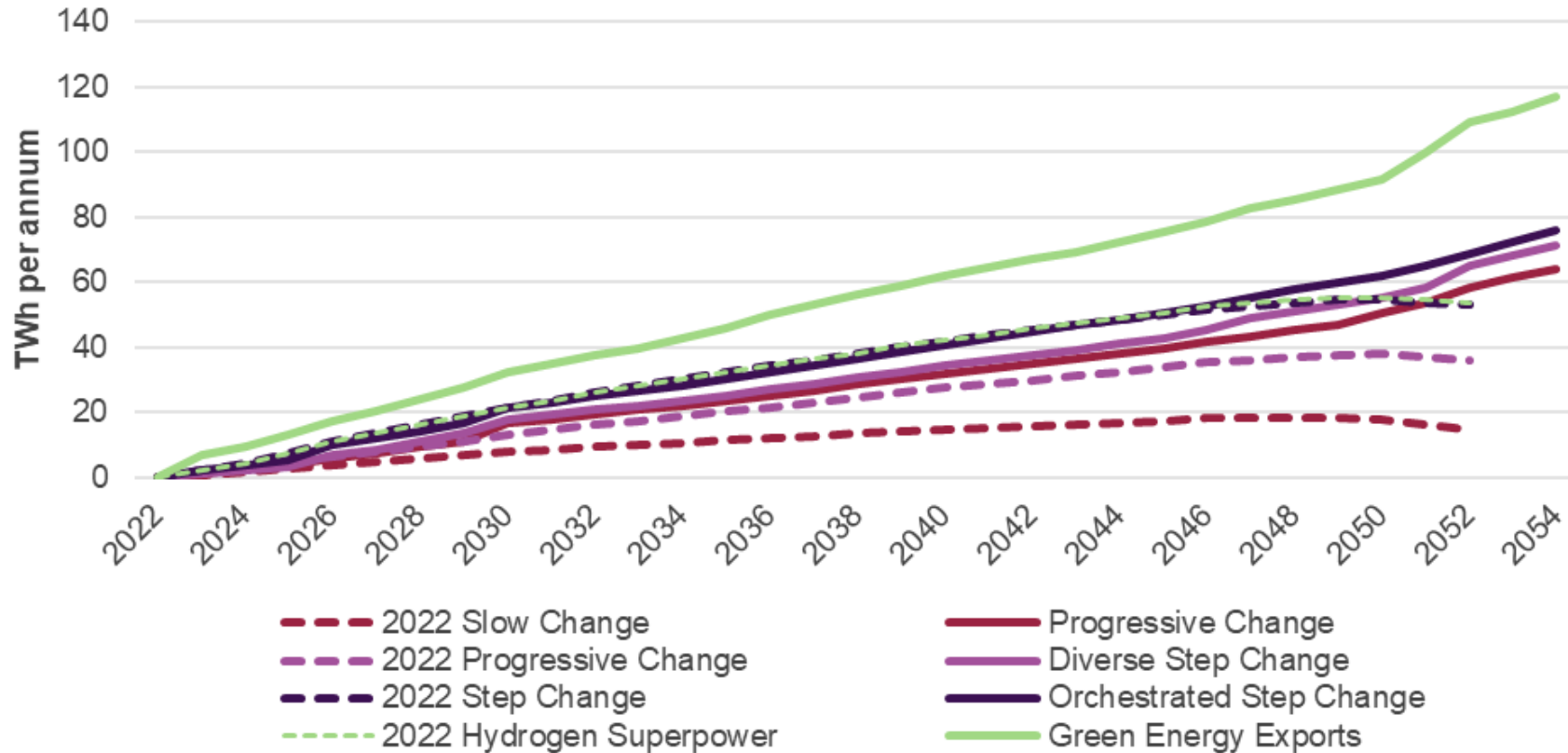
Draft IASR Figure 25: Energy Efficiency savings forecasts

Energy Efficiency forecasts consider the relative cost effectiveness of these investments relative to a range of other potential actions.
The Green Energy Export drivers include energy efficiency in commercial heating and cooling, and significant savings in mining and manufacturing.

Note: Energy Efficiency will be discussed at the March FRG meeting
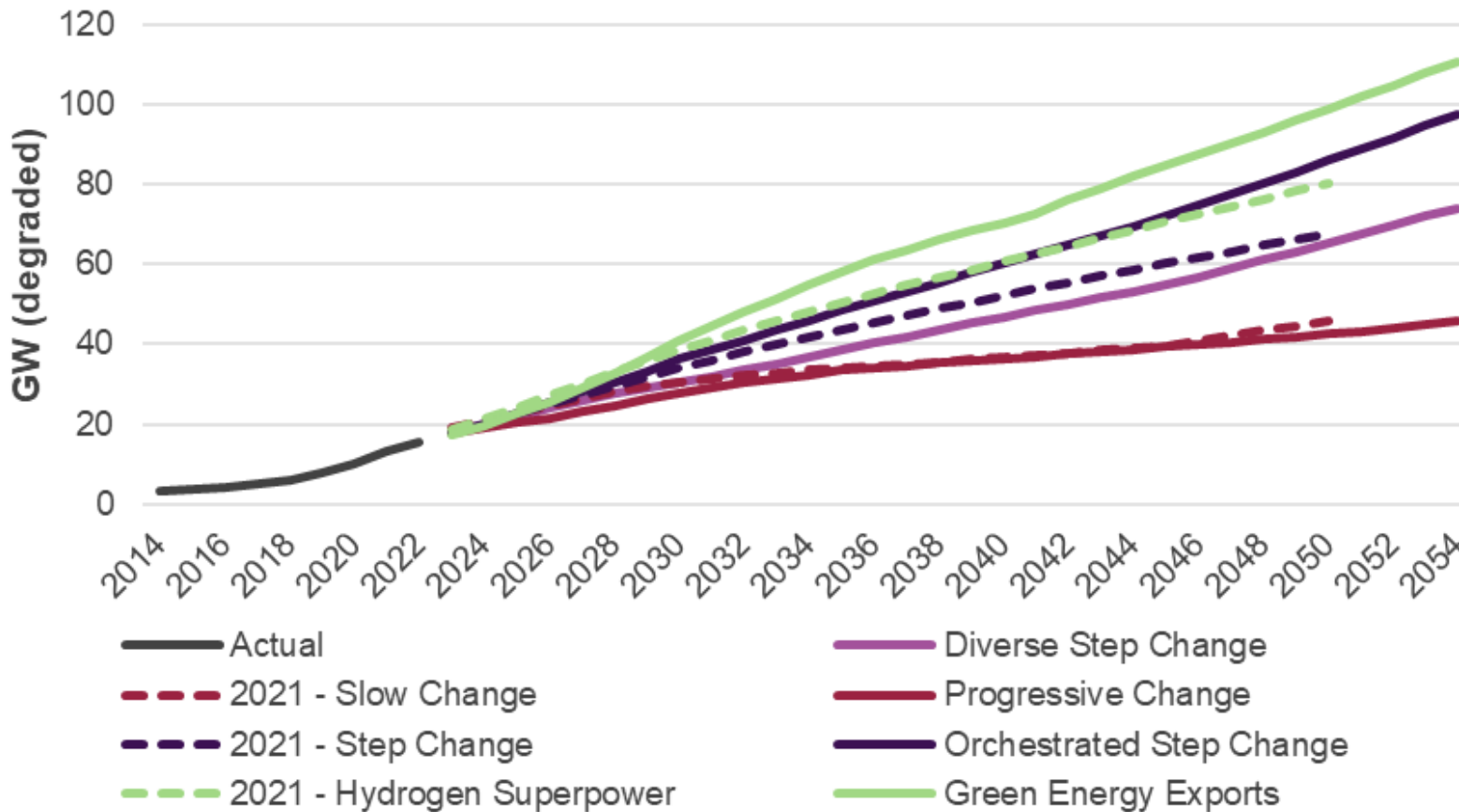
Multi-sector Modelling report: see https://aemo.com.au/consultations/current-and-closed-consultations/2023-inputs-assumptions-and-scenarios-consultation

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2023 Draft IASR outcomes – key changes 5

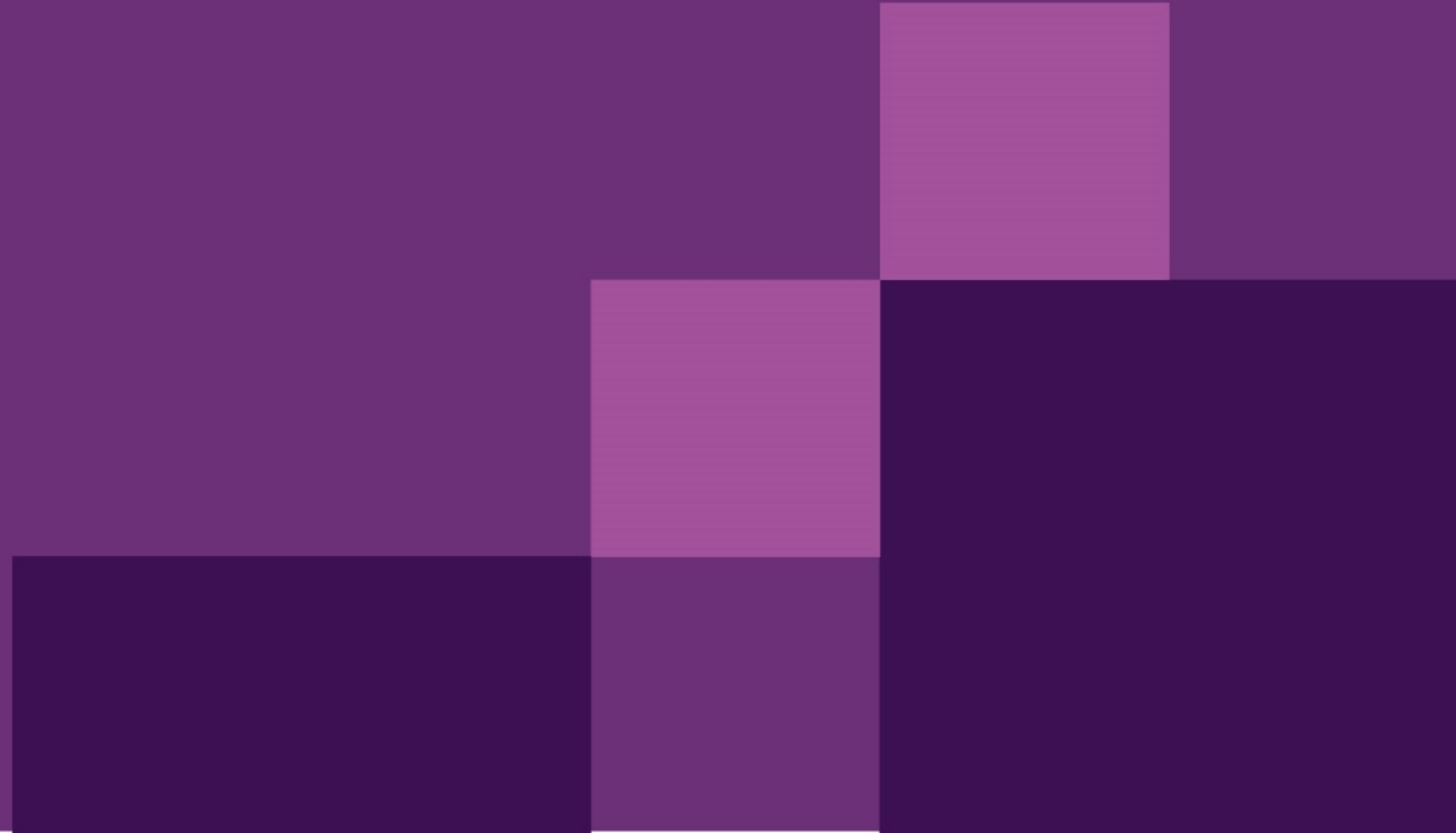Consumer Energy Resources: increased distributed PV uptake, with a smoother uptake of distributed battery

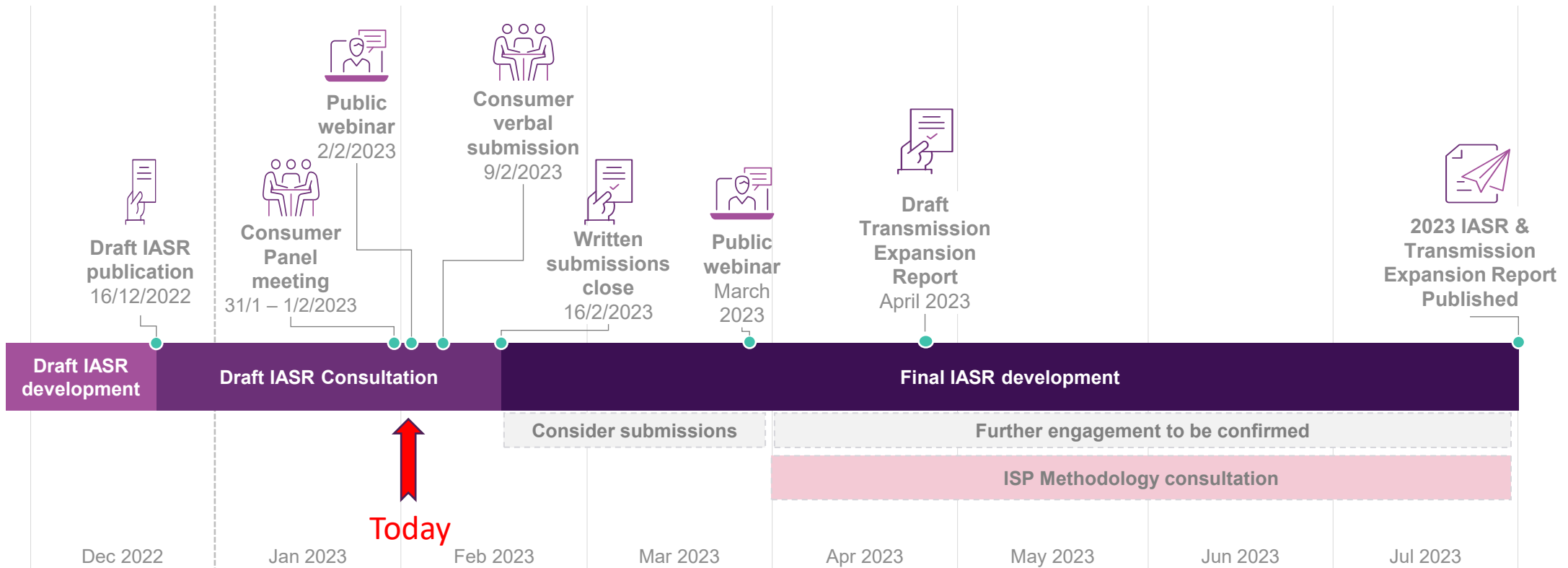Distributed PV uptake grows as costs decline, particularly in the Orchestrated Step Change and Green Energy Exports scenarios.

Distributed battery uptake (not shown) grows consistently over the forecast period, with final end-of-forecast uptake unchanged.

Draft IASR Figure 17: NEM distributed PV installed capacity (degraded)

CSIRO and GEM reports: see https://aemo.com.au/consultations/current-and-closed-consultations/2023-inputs-assumptions-and-scenarios-consultation
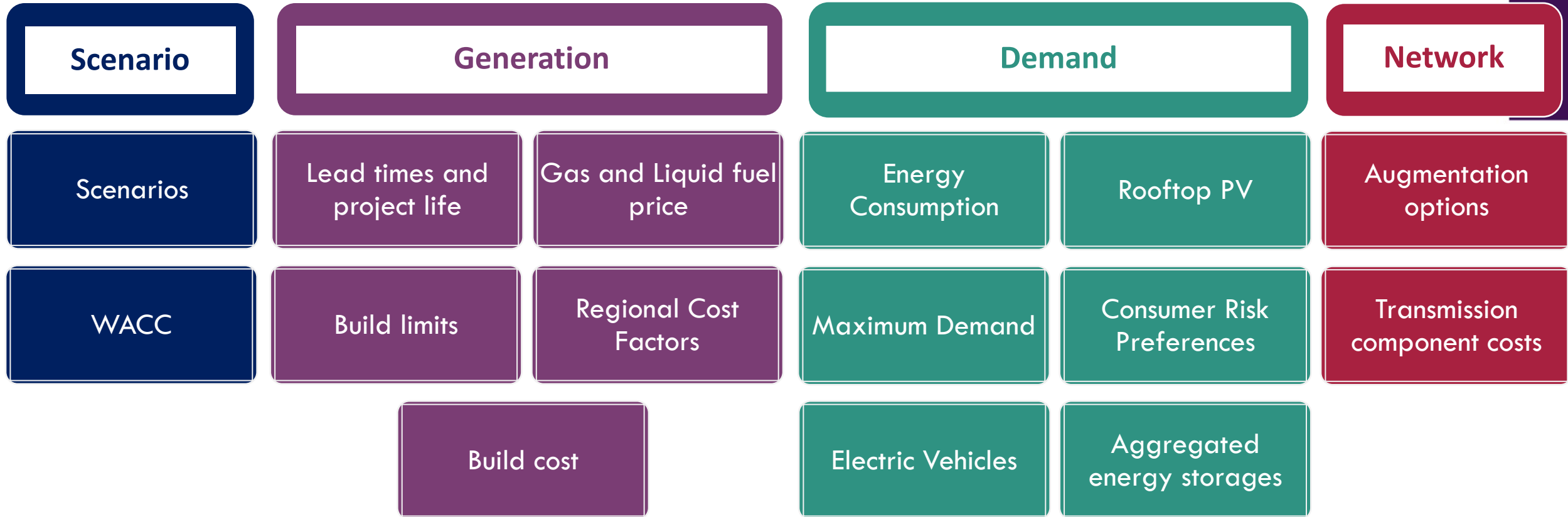
Ask questions at www.sli.do #AEMO

Next steps

Draft 2023 IASR status, strategy & timeline

- Publication: 16 December 2022
- Consultation closes: 16 February 2023
- Stakeholder engagement on submissions and any additional updates: March to June 2023
- ISP Methodology consultation: March to June 2023
- IASR is finalised in July 2023

Areas where AEMO especially welcomes feedback

Scenario	Generation		Demand		Network
Scenarios	Lead times and project life	Gas and Liquid fuel price	Energy Consumption	Rooftop PV	Augmentation options
WACC	Build limits	Regional Cost Factors	Maximum Demand	Consumer Risk Preferences	Transmission component costs
	Build cost		Electric Vehicles	Aggregated energy storages	

Questions and comments

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Sign in with your name

Survey and contact information

Please complete the post event survey for the webinar at:

https://forms.office.com/r/wvp06YCeDL (posted in sli.do).

The ISP Consumer Panel can be contacted via
ISPconsumerpanel@aemo.com.au

If you have any questions about the Draft 2023 IASR, please contact us via forecasting.planning@aemo.com.au