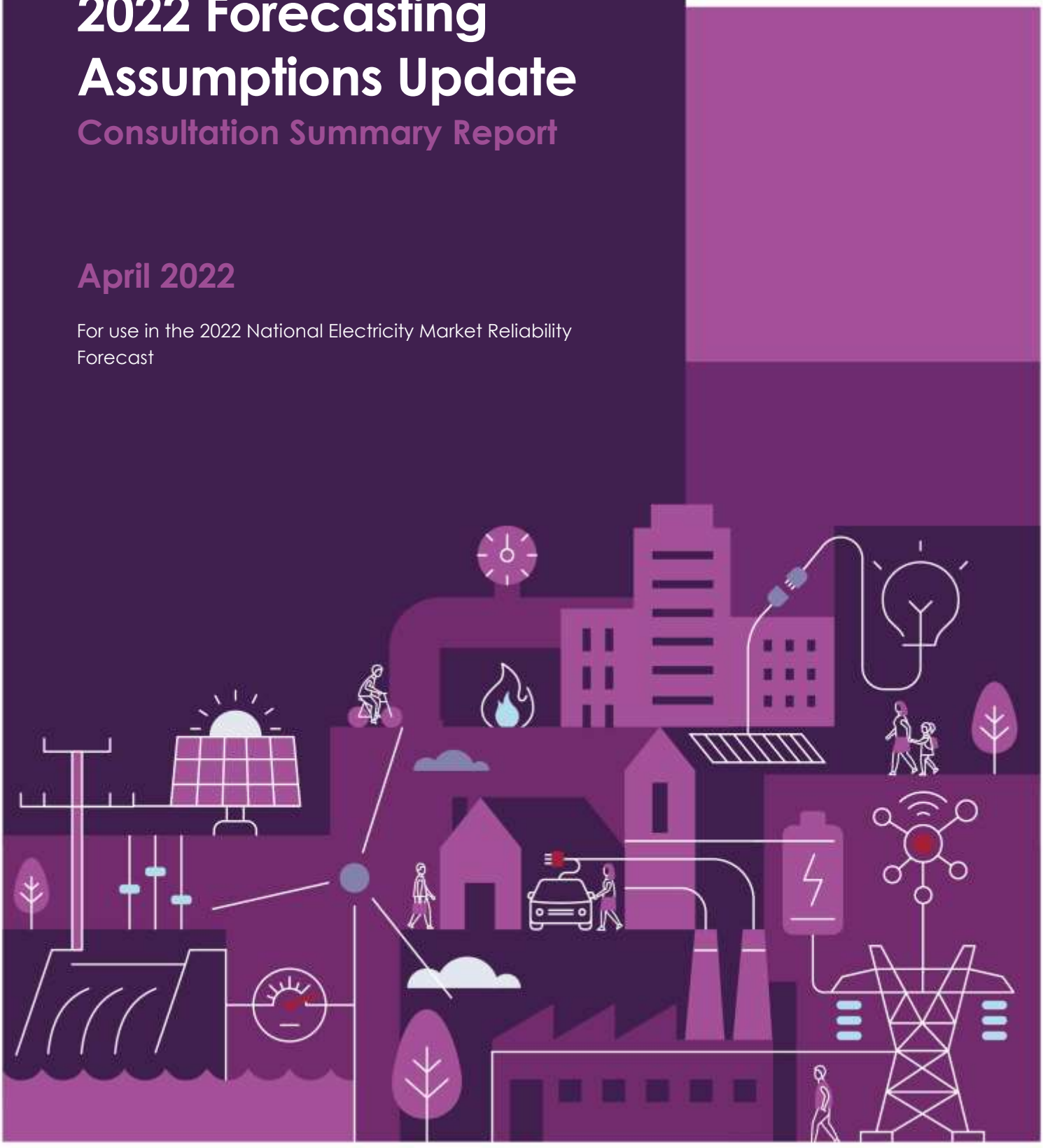
AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

2022 Forecasting Assumptions Update

Consultation Summary Report

April 2022

For use in the 2022 National Electricity Market Reliability Forecast



Important notice

Purpose

AEMO publishes the Draft 2022 Forecasting Assumptions Update pursuant to National Electricity Rules (NER) 4A.B.1(e) and the Australian Energy Regulator's Forecasting Best Practice Guidelines (FBPG). This report responds to issues raised in submissions on updated assumptions to apply in the Reliability Forecast (or other publications, as named in this report, for the National Electricity Market (NEM).

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Version control

Version	Release date	Changes
1	13/4/2022	Initial publication

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1 Introduction

AEMO delivers a range of forecasting and planning publications for the National Electricity Market (NEM), including the *Electricity Statement of Opportunities* (ESOO) and the *Gas Statement of Opportunities* (GSOO), which annually assess the adequacy of electricity and gas infrastructure to deliver to the needs of electricity and gas consumers.

The Australian Energy Regulator's (AER's) Forecasting Best Practice Guidelines[1] (FBPG) require AEMO to consult on the inputs and assumptions for the ESOO.

In general, the ESOO and GSOO publications leverage the latest key inputs as published in AEMO's *Inputs, Assumptions and Scenarios Report* (IASR)[2]. Inputs and assumptions that change between IASRs, and that are critical to the ESOO, however, are required to be updated with greater frequency, and have been consulted upon with stakeholders in this 2022 *Forecasting Assumptions Update*.

AEMO's consultation process detailed below, and this summary report, are key elements in meeting the FBPG requirements. Remaining elements include consultation on inputs to the Reliability Forecast not already consulted upon within this process or the IASR, and the subsequent publication of the ESOO and its associated assumptions.

1.1 Consultation on the 2022 *Forecasting Assumptions Update*

Consultation with consumers, market participants and all other stakeholders is a foundational element in AEMO's Forecasting and Planning activities. This update to the assumptions to be used in the ESOO was based on the single stage consultation process outlined in Appendix B of the AER's FBPG, with timelines amended to reflect AEMO's and stakeholders' involvement in other processes such as the *Draft Integrated System Plan* (ISP) and GSOO. Key dates are outlined in Table 1.

Table 1 2022 *Forecasting Assumptions Update* consultation timeline

Deliverable	Date
Publication of the Draft 2022 Forecasting Assumptions Update and call for stakeholder submissions	20 December 2021
Submissions due on Draft Forecasting Assumptions Update	4 February 2022
AEMO's consideration of issues raised	18 March 2022
Publication of the 2022 Forecasting Assumptions Update Consultation Summary Report	13 April 2022
Publication of the 2022 Forecasting Assumptions Update (Alongside the 2022 Electricity Statement Of Opportunities)	August 2022

Section 2 of this report summarises the key themes from submissions to AEMO's consultation on the *Draft Forecasting Assumptions Update*[3] and CSIRO's GenCost 2021-22 Draft Report. Section 3 details material issues raised and AEMO's responses.

[1] Available at: https://www.aer.gov.au/system/files/AER%20-%20Forecasting%20best%20practice%20guidelines%20-%2025%20August%202020.pdf

[2] Available at: https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2022-integrated-system-plan-isp/current-inputs-assumptions-and-scenarios

[3] At https://aemo.com.au/consultations/current-and-closed-consultations/2022-consultation-on-forecasting-assumptions-update.

1.2 Related materials

All materials related to the development of the 2022 *Forecasting Assumptions Update*, including reports and stakeholder submissions, are available on AEMO's website at https://aemo.com.au/consultations/current-and-closed-consultations/2022-consultation-on-forecasting-assumptions-update.

2 Summary of feedback

2.1 Submissions

This Consultation Summary addresses nine stakeholder submissions received in relation to the 2022 *Draft Forecasting Assumptions Update*. The submissions covered a range of issues; the stakeholders who provided submissions are listed in Table 2 below. The key themes in the feedback are outlined in Section 2.1.1.

Table 2 List of stakeholders who provided formal feedback to the 2022 Draft Forecasting Assumptions Update

ACF Community Geelong	Brotherhood of St Laurence (BSL)
EnergyAustralia (EA)	Energy Networks Australia (ENA)
Ergon Energy Retail (Ergon)	Hydro Tasmania
ISP Consumer Panel	Network of Illawarra Consumers of Energy (NICE)
Victorian Bioenergy Network (VBN)	

AEMO thanks all stakeholders who provided submissions to the 2022 *Draft Forecasting Assumptions Update* consultation.

2.1.1 Summary of key themes

Table 3 provides an overview of the key themes that emerged from written submissions to the 2022 *Draft Forecasting Assumptions Update* and the stakeholders who commented in those areas.

Table 3 Key themes from submissions to the 2022 *Draft Forecasting Assumptions Update*

Theme	Description	Submitter(s)
Scenarios – general	AEMO's general scenario development and use of scenarios should incorporate a wider range of possible futures. Scenarios should also be revisited to align with Draft ISP outcomes.	NICE
Potential new scenario, focusing on greater access to low-emissions gas fuels (Green gas scenario)	Further consultation before any further scenario development.	BSL, ISP consumer panel
	The green gas scenario is not necessary.	ACF Community Geelong, EA, Hydro Tasmania
	Support for a green gas scenario, with a zero-emissions endpoint.	NICE
	Support for the green gas scenario.	ENA
Additional consideration in scenarios	Adding a high hydrogen price sensitivity to hydrogen scenarios, given the poor understanding of the technology.	BSL

Theme	Description	Submitter(s)
Adding additional data to the Inputs and Assumptions workbook	Number of rooftop PV and battery installations, separated into residential and commercial categories.	Ergon
Draft 2021-22 GenCost feedback	Tasmanian Pumped Hydro Energy Storage (PHES) cost assumptions	Hydro Tasmania
	Underestimating battery costs in the GenCost report.	
	Supply Chain pressures	TasNetworks
	Biomass technology assumptions	VBN
Gas Price Forecasting	Suggestions to improve gas price forecasting methodology	EUAA

3 AEMO response to stakeholder feedback

3.1 Scenarios

3.1.1 General scenario development

Issue summary and submissions

NICE submitted feedback on AEMO's scenario development process, stating AEMO should incorporate a wider range of possible futures by defining scenarios in terms of how they reflect possible future outcomes, rather than inputs. NICE also stated that IASR scenarios should be revisited if their modelled outcomes do not reflect the possible future outcomes anticipated in the scenario specification.

AEMO's assessment and consideration

AEMO thanks NICE for the aspects of its submission focused on the general process of scenario development. Scenario development is an important process in forecasting and planning, and was a strong focus of stakeholder engagement in developing the 2021 IASR.

AEMO considers that across the broader stakeholder engagement on the 2021 IASR and the Draft 2022 ISP stakeholder support exists for the current scenarios. Therefore, AEMO will not be re-examining the scenarios to apply for the 2022 ESOO and Reliability Forecast.

AEMO will retain NICE's submission and feedback for consideration for the 2023 IASR development process.

3.1.2 Green gas scenario

Issue summary and submissions

ENA and NICE both submitted support for the proposed green gas scenario. ENA suggested additional features to consider in the scenario. NICE's support for the scenario was conditional on the endpoint being a zero-emissions (not net zero-emissions) energy system by 2050.

Hydro Tasmania, EA, ACF Community Geelong and BSL rejected the proposed green gas scenario. Hydro Tasmania interpreted the Draft 2022 ISP Delphi Panel's results as "broad industry sentiment that, while the prospects of low-emissions gases exist, they are still in the stages of early development and should not take focus away from thorough assessments of more plausible future energy scenarios". ACF Community Geelong considered that "a scenario focused on gas does not reflect a realistic future for Australia". BSL objected to the proposed scenario because a second hydrogen-based scenario (with highly uncertain hydrogen costs) could skew ISP outcomes.

EA stated that fuel-switching related issues should be explored by refining existing scenarios, and that "any changes in assumed decarbonisation pathways due to renewable or other gas sources warrant further multisectoral analysis in the lead up to the 2024 ISP".

The ISP Consumer Panel suggested that significantly greater consultation would be required on any new scenario developments prior to adoption.

BSL especially encouraged consultation with consumers, and stated that scenarios should be evaluated from a consumer, rather than industry, perspective.

AEMO's assessment and consideration

As outlined in the *Draft Forecasting Assumptions Update*, AEMO sought initial stakeholder input on the scenario narrative ahead of broader consideration in 2022, in response to stakeholder feedback that the 2021 IASR scenarios do not explore the potential use of gas infrastructure to complement electrification and provide an additional pathway towards a net zero economy.

Given the spread of responses on this topic, AEMO will consider whether further consultation is needed prior to potential inclusion of a green gas scenario in the 2023 IASR. Such consultation will consider further scoping of this scenario to explore its plausibility and whether it should be distinct from other scenarios, or considered endogenously within the existing 2021 IASR scenarios.

3.1.3 Hydrogen-related cost uncertainties

Issue summary and submissions

BSL's submission:

- Noted the high level of uncertainty relating to future hydrogen prices, and recommended an appropriately conservative learning rate for electrolyser costs. BSL further recommended that each scenario include a sensitivity analysis for higher hydrogen prices, with such prices reflecting adjusted learning rates, rather than lower uptake.
- Noted additional cost uncertainties regarding making gas pipelines hydrogen compatible, and expressed a concern that such costs could be overlooked through a high-level approach to estimating hydrogen deployment costs, and the impact to consumers.

AEMO's assessment and consideration

The Final 2021-22 CSIRO GenCost report will provide further discussion regarding alternative learning rates for hydrogen technology capital cost projections.

The modelling of emissions reductions pathways, referred to as multi-sector modelling in the 2021 IASR, considers resource usage and cost categories (such as pipeline and network conversion costs) across multiple sectors of Australia's economy. As noted on page 40 of the 2021 IASR[4], this modelling[5] simultaneously considers a range of options to meet the scenario-specific emission outcomes at the least cost. These options broadly fall under the four pillars of decarbonisation:

- Energy efficiency to improve energy productivity and reduce energy waste.
- Decreasing carbon intensity of electricity generation to near zero.
- Switching away from fossil fuels to zero or near-zero emissions alternatives, including electrification, hydrogen and bio-fuels.
- Non-energy emissions reduction and offsetting of residual emissions through sequestration (mainly in the land-use sector).

AEMO again will deploy a multi-sectoral analysis scope to inform the 2023 IASR, and the updated inputs and analysis will be consulted on within the draft 2023 IASR.

3.2 Additional data publication

3.2.1 Rooftop photovoltaics (PV) and batteries data

Issue summary and submissions

Ergon requested that AEMO publish more granular PV and battery data to include the number of forecast installations in each scenario broken down into residential and commercial categories.

AEMO's assessment and consideration

Where feasible and cost-effective, AEMO will seek to publish more granular data that can support stakeholder decision-making, including the number of forecast installations in each scenario.

3.3 Draft GenCost report feedback

The GenCost report is an important complement to AEMO's IASR, providing current cost and technical information for various generation technologies, and forecast cost change expected for Australian generation developments, considering insights from domestic and international developments for each technology.

The CSIRO finalises the 2021-22 GenCost report, with consideration of feedback provided to AEMO on the draft report. The final 2021-22 GenCost report will outline feedback received and responses to those submissions.

The following list provides a high-level summary of key themes submitted by stakeholders:

- Pumped hydro cost assumptions, particularly with regards to Tasmanian projects relative to mainland pumped hydro project costs.

[4] See https://aemo.com.au/-/media/files/major-publications/isp/2021/2021-inputs-assumptions-and-scenarios-report.pdf.

[5] In 2021, the multi-sector modelling was undertaken by CSIRO and ClimateWorks Australia.

- Battery cost assumptions, and the potential for these to be understated considering global demand for input components for these batteries, the risk of operating capacity levels being lower than modelled, and the cost implications of incorporating greater system-level support capabilities into the design of a battery solution.
- Supply chain pressures, and the inflationary effect this may have on technology costs
- Biomass assumptions, and the need for expanded sources of biomass within the category, as well as feedback that capital costs presented in the Draft GenCost report exceed real-world examples and the costs used by global bodies such as the National Renewable Energy Laboratory (NREL), International Energy Agency (IEA) and International Renewable Energy Agency (IRENA).
  - With regards to the biomass assumptions, the scope of the GenCost technologies that are investigated in the GenCost report are continuously reviewed for subsequent GenCost reports. The technology list must be limited to a subset of all potential generation technologies to enable efficient delivery of the scope of work. The choice of woodchip-based biomass was based on considerations of its broader availability and scale. Although other feedstocks are possible, their input cost structures, availability, seasonality, and logistical challenges vary considerably. Further feedstock options will be considered in developing the scope of future GenCost reports. Ultra-super-critical combined heat-and-power (CH) plants were not included in the scope of this GenCost report due to the lack of substantial demand for heat in Australia (compared to Europe for example) that could otherwise have been a driver for such plants.
  - Biomass could also be considered as key source to the green gas scenario discussed in Section 3.1.2.

3.4 Other issues

3.4.1 Publication of assumption updates

Ergon's submission requested that AEMO publish coal costs for each scenario.

The workbook published alongside the 2022 *Draft Forecasting Assumptions Update* only provided data for those elements updated since the Final 2021 IASR. The coal costs, available for the full spread of scenarios, remain unchanged in AEMO's assumptions from the 2021 IASR workbook[6].

AEMO will endeavour to clearly identify the location of the full set of information in future.

[6] Available at https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2022-integrated-system-plan-isp/current-inputs-assumptions-and-scenarios (direct download link is https://aemo.com.au/-/media/files/major-publications/isp/2021/2021-inputs-and-assumptions-workbook.xlsx).