



Gas Price Forecasting Webinar

Commences at 1330

This webinar will be recorded.

Please reach out with further thoughts, ideas or comments:

Energy.forecasting@aemo.com.au

*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.*



Welcome

Nicola Falcon, GM Forecasting

Indicative Agenda

1	Welcome	1330
2	Background and key intended outcomes	1345
3	How AEMO use gas price forecasts	1405
4	Gas price modelling and methodology ^a (Dr Richard Lewis, LGA) <ul style="list-style-type: none"> • Inputs to the LGA model • Competition model • Key scenario variables • How model outputs were converted into weighted oil-indexed, industrial, residential and commercial, and GPG. 	1415
5	Gas price benchmarking	1500
<i>Additional time for further discussion as needed</i>		
7	Concluding remarks	1620
8	Meeting ends	1630

a. Reference materials:

- https://www.aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/inputs-assumptions-methodologies/2021/gas-price-projections-for-the-2021-gsoo-public-final-13-12-20.pdf?la=en
- https://www.aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/inputs-assumptions-methodologies/2021/price-projections-for-the-2021-gsoo-public-version.xlsx?la=en

Webinar guidelines

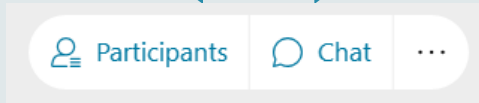
- This is intended to be a webinar environment. To get the most out of it for all parties, engagement and discussion are critical.
- An unfortunate limitation of webinars is that voice latency can cause challenges when there are many attendees. This will be handled by similar methods to the Forecasting Reference Group:
 - Raise your hand (see next slide)
 - Ask questions or make comments on Sli.do
 - www.sli.do, Event: #AEMO, *please enter your name, but no account required*
 - Please “vote up” relevant questions and comments, but we plan to have enough time to engage with all discussion.
- While there will be presentations, please raise your hand *during* the presentations. The time allowance is intended to cover discussion at breaks in the presentations.
- Lastly, this is not just a Q&A session. Please contribute your own insights, thoughts and suggestions. Please reply to comments and thoughts.

Participating verbally

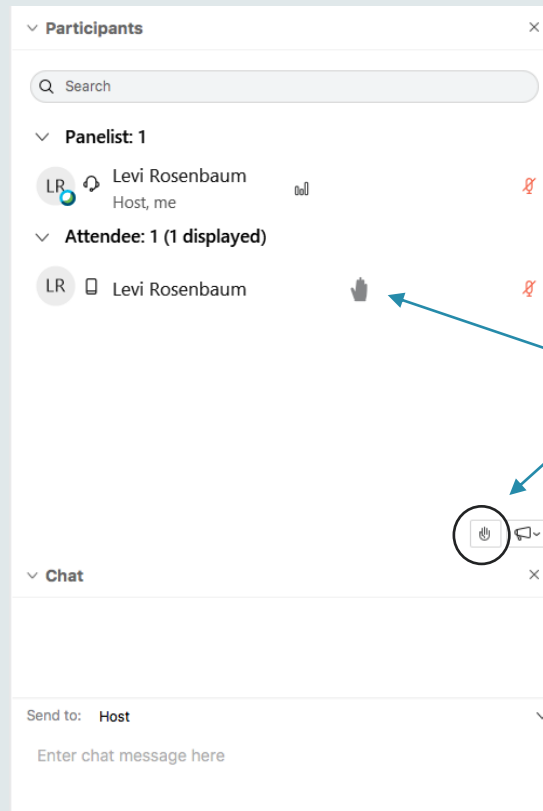
For technical assistance, chat with "host"

1

Press 'Participants' and 'Chat' Buttons



On web browser/phone:
Click the 3 dots, then:
"Raise hand"
&
"Lower hand"



2

To ask a question put your hand up



3

A hand icon will appear next to your name

4

The host will unmute you when it's your turn

5

Press the hand icon again to lower your hand

AEMO Competition Law Meeting Protocol

AEMO is committed to complying with all applicable laws, including the Competition and Consumer Act 2010 (CCA). In any dealings with AEMO regarding proposed reforms or other initiatives, all participants agree to adhere to the CCA at all times and to comply with this Protocol. Participants must arrange for their representatives to be briefed on competition law risks and obligations.

Participants in AEMO discussions **must**:

1. Ensure that discussions are limited to the matters contemplated by the agenda for the discussion
2. Make independent and unilateral decisions about their commercial positions and approach in relation to the matters under discussion with AEMO
3. Immediately and clearly raise an objection with AEMO or the Chair of the meeting if a matter is discussed that the participant is concerned may give rise to competition law risks or a breach of this Protocol

Participants in AEMO meetings **must not** discuss or agree on the following topics:

1. Which customers they will supply or market to
2. The price or other terms at which Participants will supply
3. Bids or tenders, including the nature of a bid that a Participant intends to make or whether the Participant will participate in the bid
4. Which suppliers Participants will acquire from (or the price or other terms on which they acquire goods or services)
5. Refusing to supply a person or company access to any products, services or inputs they require

Under no circumstances must Participants share Competitively Sensitive Information. Competitively Sensitive Information means confidential information relating to a Participant which if disclosed to a competitor could affect its current or future commercial strategies, such as pricing information, customer terms and conditions, supply terms and conditions, sales, marketing or procurement strategies, product development, margins, costs, capacity or production planning.

AEMO Forum and Meeting Expectations

This charter explains expectations regarding participation and behaviour in the Australian Energy Market Operator (AEMO)'s stakeholder forums.

Meeting Expectations

All participants will:

- Respect the diversity of the group.
- Speak one at a time – refrain from interrupting others.
- Share the oxygen – ensure that all attendees who wish to have an opportunity to speak are afforded a chance to do so.
- Maintain a respectful stance towards all participants.
- Listen to others' points of view and try to understand others' interests.
- Share information openly, promptly, and respectfully.
- If requested to do so, hold questions to the end of each presentation.
- Remain flexible and open-minded, and actively listen and participate in meetings.
- Abide by COVID-Safe workplace guidelines, if attending a meeting on AEMO's premises.

Roles and Responsibilities

Forum stakeholders agree to:

- Be specific and fact-based in their feedback on a specific workstream or emerging issue;
- Review and provide feedback on papers and reports;
- Relay information to their colleagues or constituents after each meeting and gather information/feedback from their colleagues or constituents, as practicable, before each meeting;
- Maintain a focus on solutions or outcomes that benefit all energy consumers.

AEMO agrees to:

- Provide technical expertise in a manner that is considerate of the audience and their level of expertise;
- Assist participants in understanding issues enough to represent their views;
- Provide all participants the opportunity to voice their views.

Background and key intended outcomes

Who is represented?

Throughout the webinar, survey responses will be shared to provide context for the discussion.

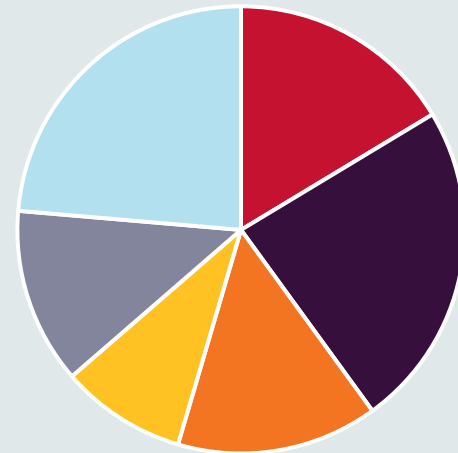
We want this to be an open discussion and intend for each agenda item to include both presentation and discussion.

Which part of the energy sector are you from?



■ Consultant / Academia ■ Customer / Consumer ■ Govt/Policy / Climate
■ Industry Body / T&D ■ Producer/developer ■ Retailer

Please describe your interest in natural gas



■ Actively developing projects ■ Consumer of natural gas
■ Modelling ■ Other
■ Policy/regulation ■ Watch and learn / personal interest

Why are we here?

- To support the Integrated System Plan (ISP), AEMO must develop and consult on the inputs, assumptions and scenarios report (IASR) that will be adopted for each ISP, in accordance with NER 5.22.8.
- AEMO provided draft gas price forecasts in the December 2020 IASR consultation. Consultation responses provided feedback that there was a need for increased engagement and transparency on gas price forecasting.
- Gas prices influence the relative cost of developing and operating gas-fired generation, and contributes directly to fuel cost savings that are a benefit class that is quantified within the ISP's cost-benefit analysis.
- Through this webinar we intend to share information to increase the transparency of AEMO's gas price forecasting process and the methodologies deployed, answer questions, gather feedback and insights and better understand any remaining issues to better inform stakeholders on our gas price assumptions.

Summary of key IASR feedback related to the gas price forecasts

Transparency of methodology: *Energy Australia, Energy Networks Australia and ISP Consumer Panel*

- There were concerns regarding the ability to understand the methodology deployed by AEMO's consultants, Lewis Grey Advisory. In particular, submissions requested greater transparency regarding key inputs, references and the limited detail available regarding the 'black box' nature of the approach.
- Some submissions also recognised that this is not a new challenge.
- Noted that the forecasts changed from the previous ISP forecasts and were concerned about the change without sufficient evidence to support that change.

Scenarios and sensitivities: *Climate Council, Energy Australia, ISP Consumer Panel*

- Feedback (on both sides) on the applicability of low gas prices in scenarios with greater levels of decarbonisation.
- Recommendation to focus more on sensitivities (how the prices are used) than on methodology given inherent challenge in accurately forecasting a globally influenced price.

GPG: *Energy Australia, Hydro Tasmania, Major Energy Users, ISP Consumer Panel*

- Feedback (on both sides) on whether there should be (transport-related) premiums, applied to GPG.
- One submission highlighted that a \$/GJ vs \$/GJ/day charge was an oversimplification, similarly noting that portfolios, contracting, utilisation and even pipeline ownership play important roles in transport costs.
 - Recommendation to test the materiality of the simplified tariff approach and see if it is introducing downward bias on gas price.
- Similarly, there was a comment on firm vs non-firm contract pricing and how that might affect GPG.

Key intended outcomes

What does AEMO hope to achieve?

- Increase transparency on the gas price forecast methodologies.
- Provide clarity on our approach to handling uncertainty and sensitivities within the ISP.
- Gather information on how others use and assess gas price forecasts.
- Identify opportunities for future improvement.

What do you hope to gain from the Gas Price Forecasting Webinar?

Based on survey responses:

- Over 90% of attendees simply wanted to better understand the forecasts.
- Around 5% wanted to increase their confidence in the appropriateness of the forecasts.
- The few remaining answers were unique in their stated aims.

Stakeholder views of gas price forecasts

All respondents

	Too narrow	Good spread	Too wide	COUNT
Too low	2%	11%	2%	15%
About right	11%	38%	13%	62%
Too high	9%	7%	2%	18%
COUNT	22%	56%	16%	95%

- The stakeholder view from the pre-survey suggests the forecasts were about right with a good spread.
- The responses that the prices were too low or too high were approximately equal, as were the responses that the spread was too wide or too narrow.

This view was largely held across all stakeholder groups.

Stakeholder views of gas price forecasts

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About right	11%	38%	13%	62%
Too high	9%	7%	2%	18%
COUNT	22%	56%	16%	95%



- Consultant / Academia
- Customer / Consumer
- Govt/Policy / Climate
- Industry Body / T&D
- Producer/developer
- Retailer

Consultant / Academia	Too narrow	Good spread	Too wide	COUNT
Too low	8%	0%	0%	8%
About right	17%	42%	17%	75%
Too high	8%	8%	0%	17%
COUNT	33%	50%	17%	100%

Customer / Consumer	Too narrow	Good spread	Too wide	COUNT
Too low	0%	25%	0%	25%
About right	25%	13%	0%	38%
Too high	13%	0%	13%	25%
COUNT	38%	38%	13%	88%

Govt / Policy / Climate	Too narrow	Good spread	Too wide	COUNT
Too low	0%	0%	8%	8%
About right	8%	38%	31%	77%
Too high	8%	8%	0%	15%
COUNT	15%	46%	38%	100%

Industry Body / T&D	Too narrow	Good spread	Too wide	COUNT
Too low	0%	0%	0%	0%
About right	0%	57%	14%	71%
Too high	14%	0%	0%	14%
COUNT	14%	57%	14%	86%

Producer / Developer	Too narrow	Good spread	Too wide	COUNT
Too low	0%	38%	0%	38%
About right	0%	38%	0%	38%
Too high	0%	25%	0%	25%
COUNT	0%	100%	0%	100%

Retailer	Too narrow	Good spread	Too wide	COUNT
Too low	0%	17%	0%	17%
About right	17%	50%	0%	67%
Too high	17%	0%	0%	17%
COUNT	33%	67%	0%	100%

How AEMO use gas price forecasts

How relevant are gas prices to the Integrated System Plan

Gas price forecasts for the ISP

Gas prices are a key input, reflecting the fuel cost of a major technology providing energy and capacity in the existing generation mix. The cost of operating gas-powered generation (GPG) may present significant savings opportunities for developments that can offset GPG.

GPG costs may influence the relative benefits of alternative firming technologies such as battery storages.

As consumers identify opportunities to reduce their emissions, gas prices may influence the timing and magnitude of existing load electrification, in residential, commercial and industrial applications.

Ultimately, the net market benefits of the ISP's optimal development path (ODP) may include fuel cost savings as an identified benefit category, with gas costs directly influencing the selection of the ODP.

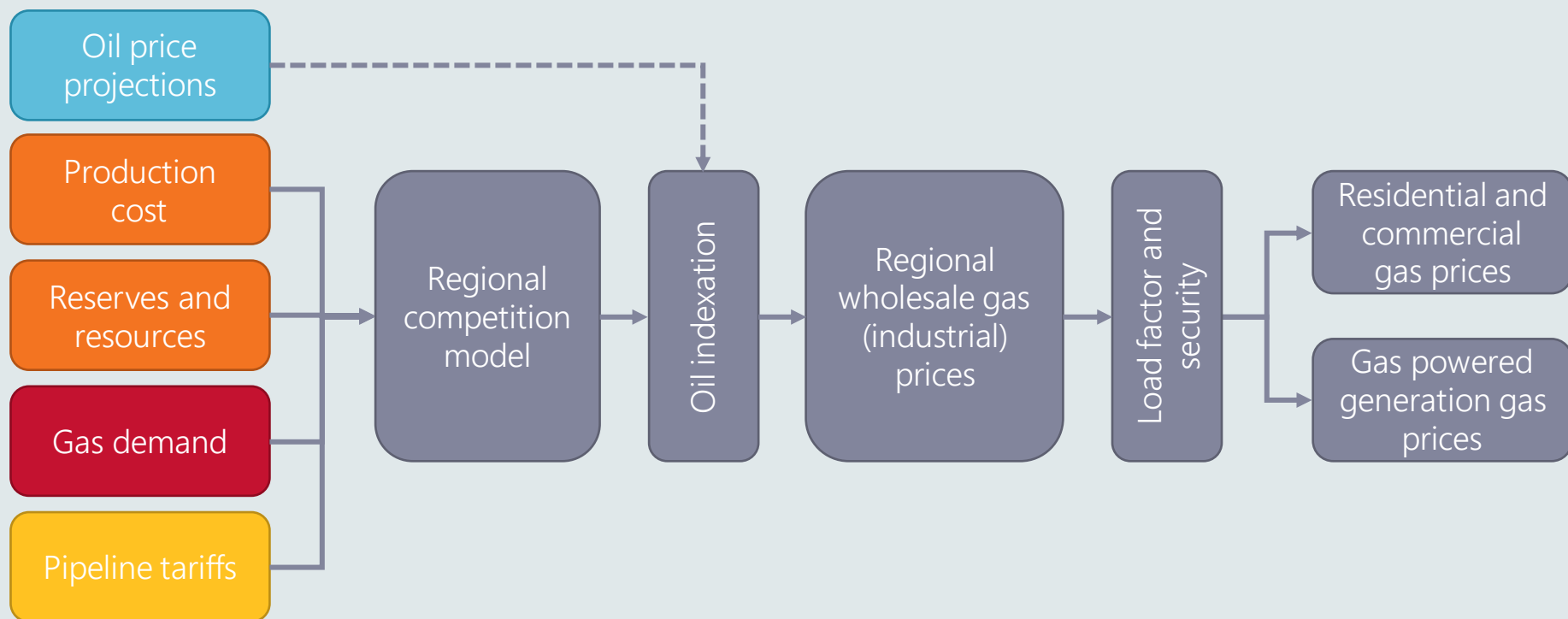
The importance of scenario and sensitivity analysis

- In developing the ISP, AEMO must test the robustness of alternative development paths to future uncertainties through the use of scenarios and sensitivities.
- **Scenarios** are consider the breadth of possible futures.
 - By considering a sufficiently broad range of inputs and assumptions, scenario analysis can provide key insights about the most appropriate investments that are robust to an uncertain future.
- **Sensitivities** provide the ability to focus on a single variable across the varying scenarios.
 - This can be used to really explore the impact of changes in highly influential areas.
 - Sensitivities are used to test the robustness of benefits to consumers and the ranking of development paths.
 - AEMO has identified through the IASR consultation to date that gas pricing is a key variable, and ensuring that investments are robust if gas prices were lower than considered will be important.

Gas Price Modelling and Methodology

Dr Richard Lewis, Lewis Grey Advisory

Clarifying the difference between production cost and gas price



Legend

Data sourced from Wood Mackenzie (via AEMO)

Forecast by AEMO

Process and data provided by Lewis Grey Advisory (LGA)

Data sourced from ACCC (by LGA)

Data sourced from EIA (by LGA)

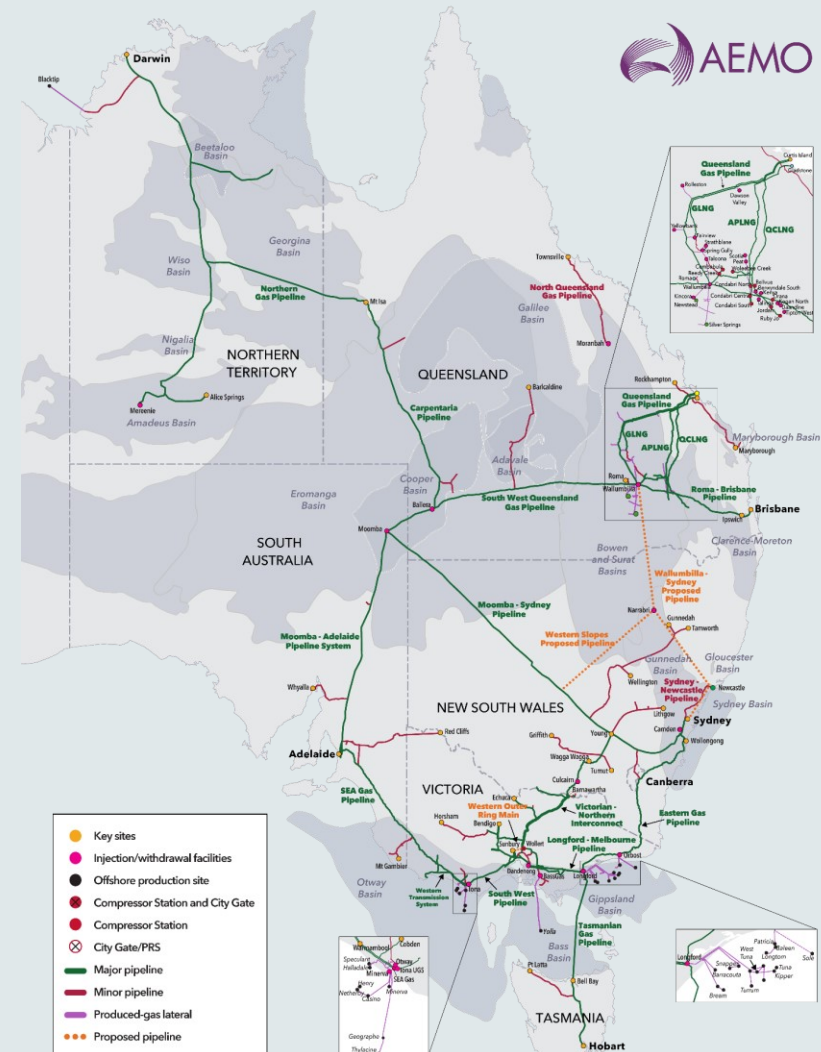
(LGA SLIDES)

Gas price benchmarking

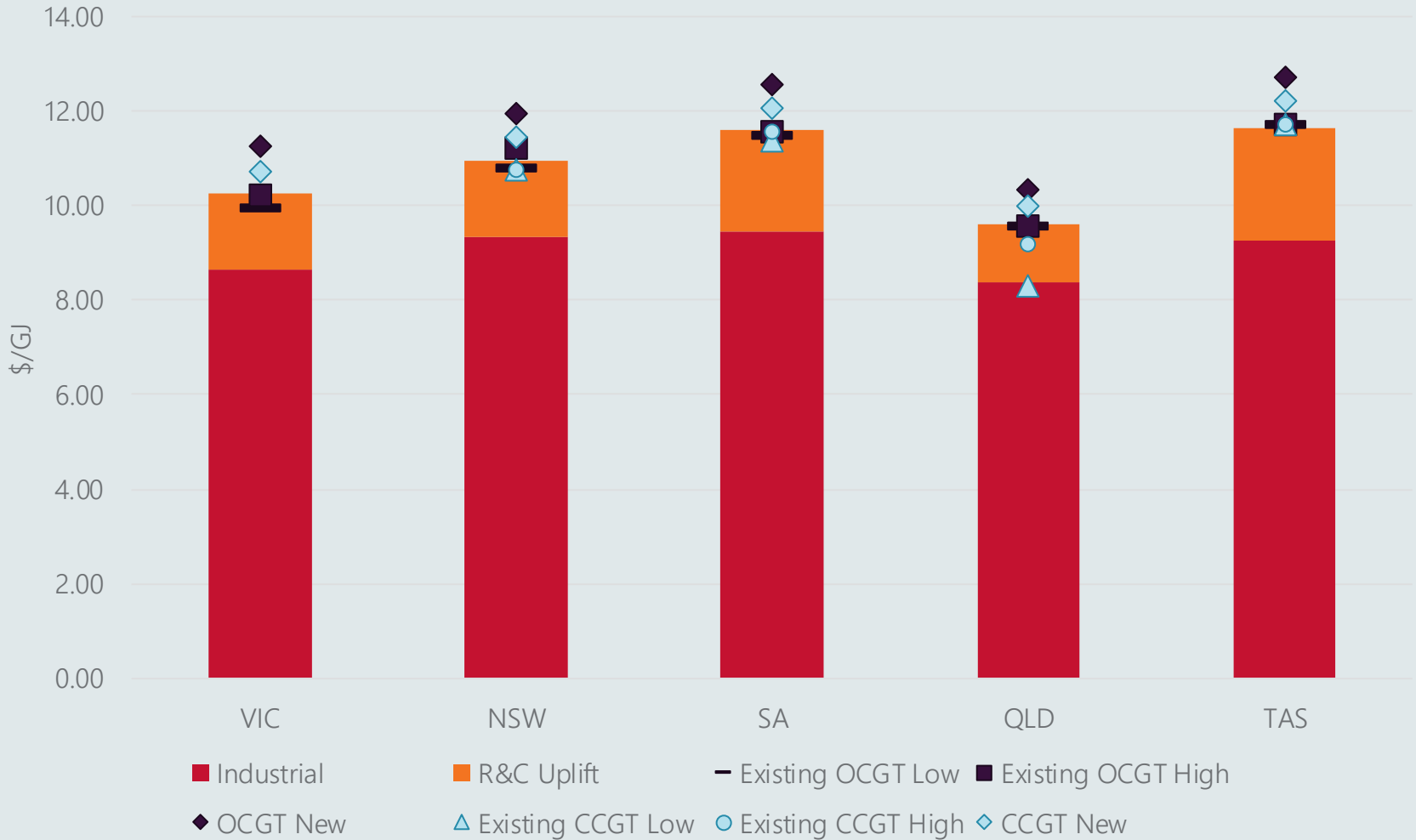
Location-specificity

- Different locations in the gas network can attract notably different prices, as tariffs incorporate the utilisation of pipeline infrastructure.
- For example, if gas was to be purchased at Wallumbilla in Queensland, the effective delivered cost of that price in other locations would be higher, reflecting the transportation charge to deliver gas from Wallumbilla to those other locations.
- \$6.00 gas at Wallumbilla, would roughly* be:
 - \$6.84 in Brisbane
 - \$8.26 in Adelaide
 - \$8.40 in Sydney
 - \$9.74 in Melbourne
 - \$11.73 in Hobart

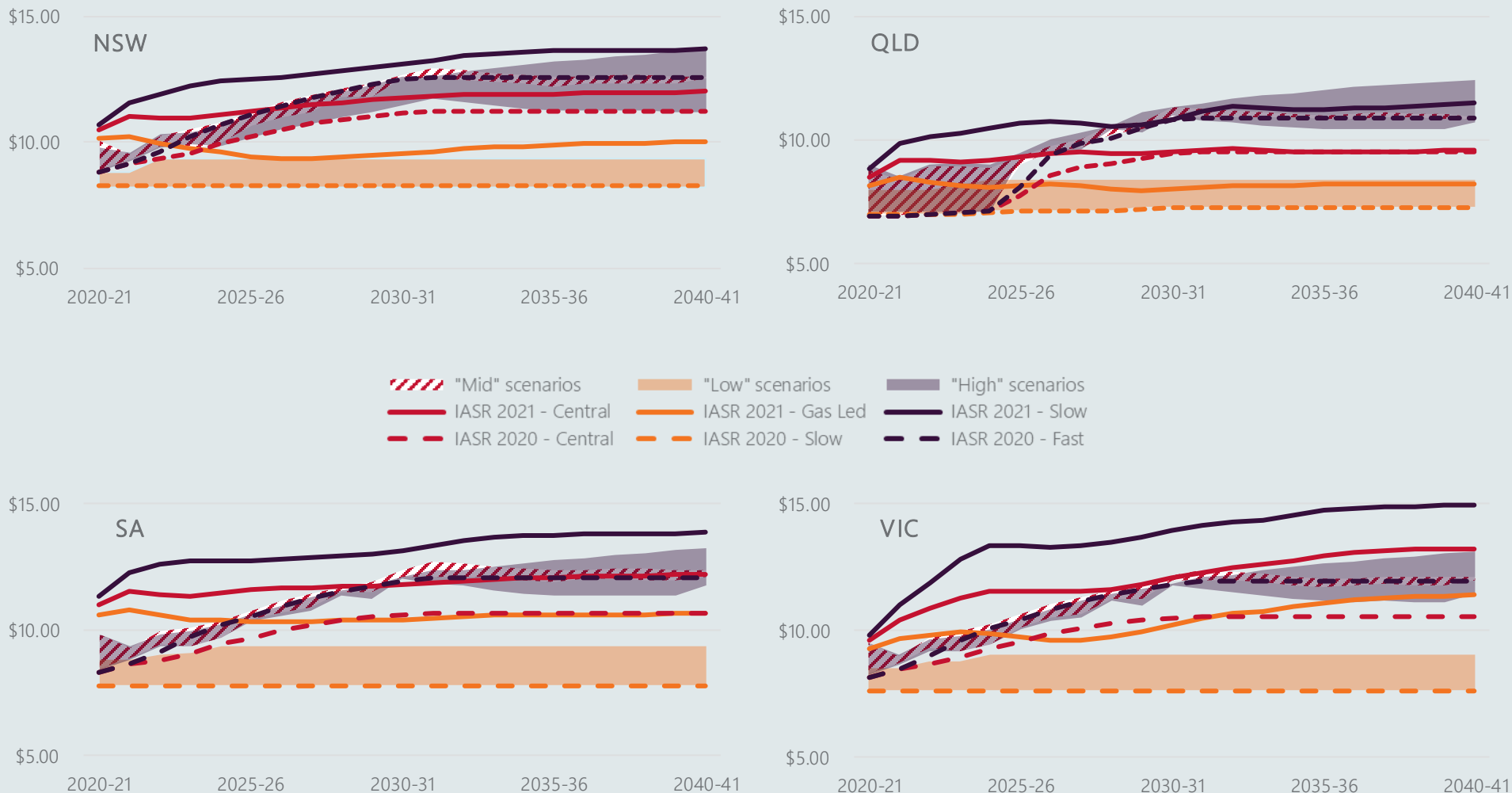
* The transport costs applied assume high utilisation industrial customers.



Comparison of sectoral pricing



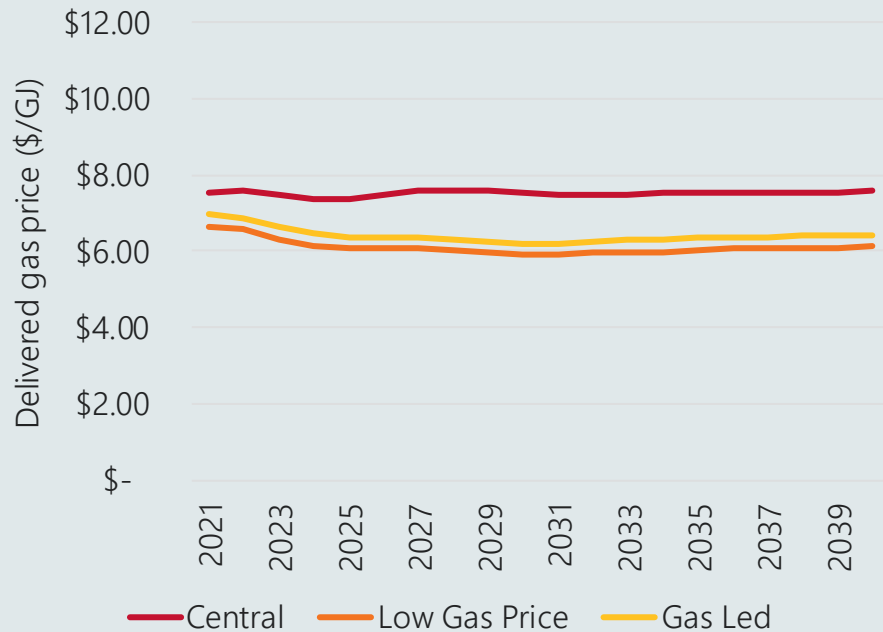
Comparison with previous GPG forecasts



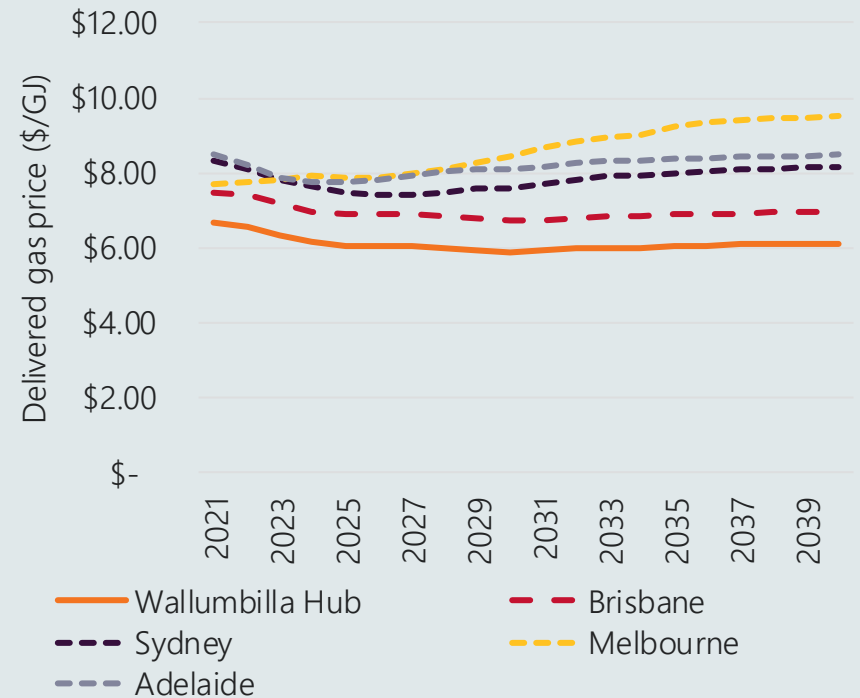
Note: Tasmania is not shown, but reflects Victorian pricing with an offset.

AEMO's Low Gas Price sensitivity

Industrial gas prices at Wallumbilla Hub



Locational costs in the Low Gas Price sensitivity



The **Low Gas Price** sensitivity will explore potential impacts of lower gas prices on consumption by residential, commercial, and large industrial consumers, and GPG.

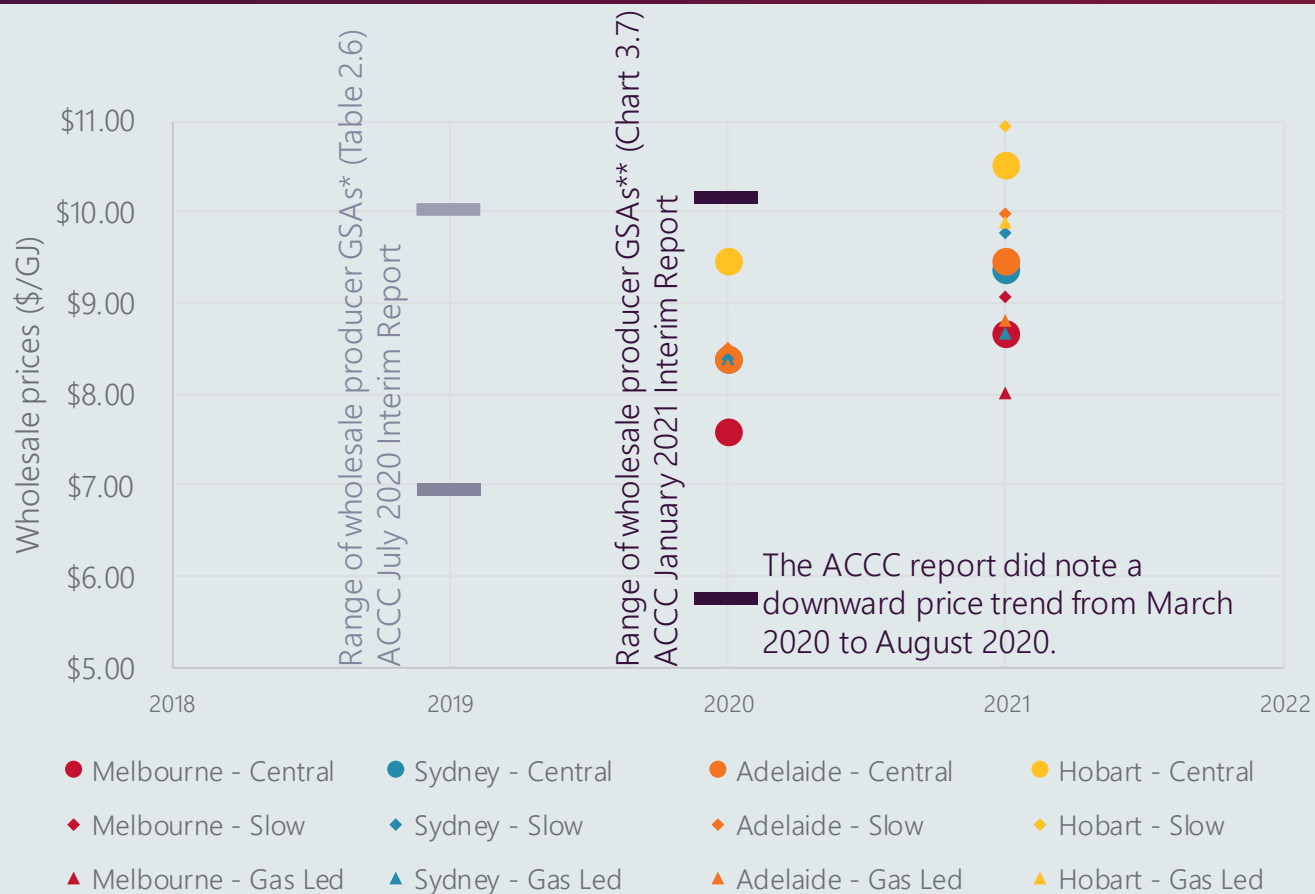
- The prices reflect long-term prices on a production cost basis, consistent with lowest estimated costs associated with 2P reserves.
- To achieve this, new resources will require commercialisation at costs consistent with the cost structures of existing reserves.

Comparison with public information on wholesale industrial gas prices

Comparison of southern Gas Supply Agreements (GSAs) from two ACCC reports with wholesale (industrial) forecasts from the 2021 IASR.

Recent data point on arbitration ruling being "well above" \$9/GJ...

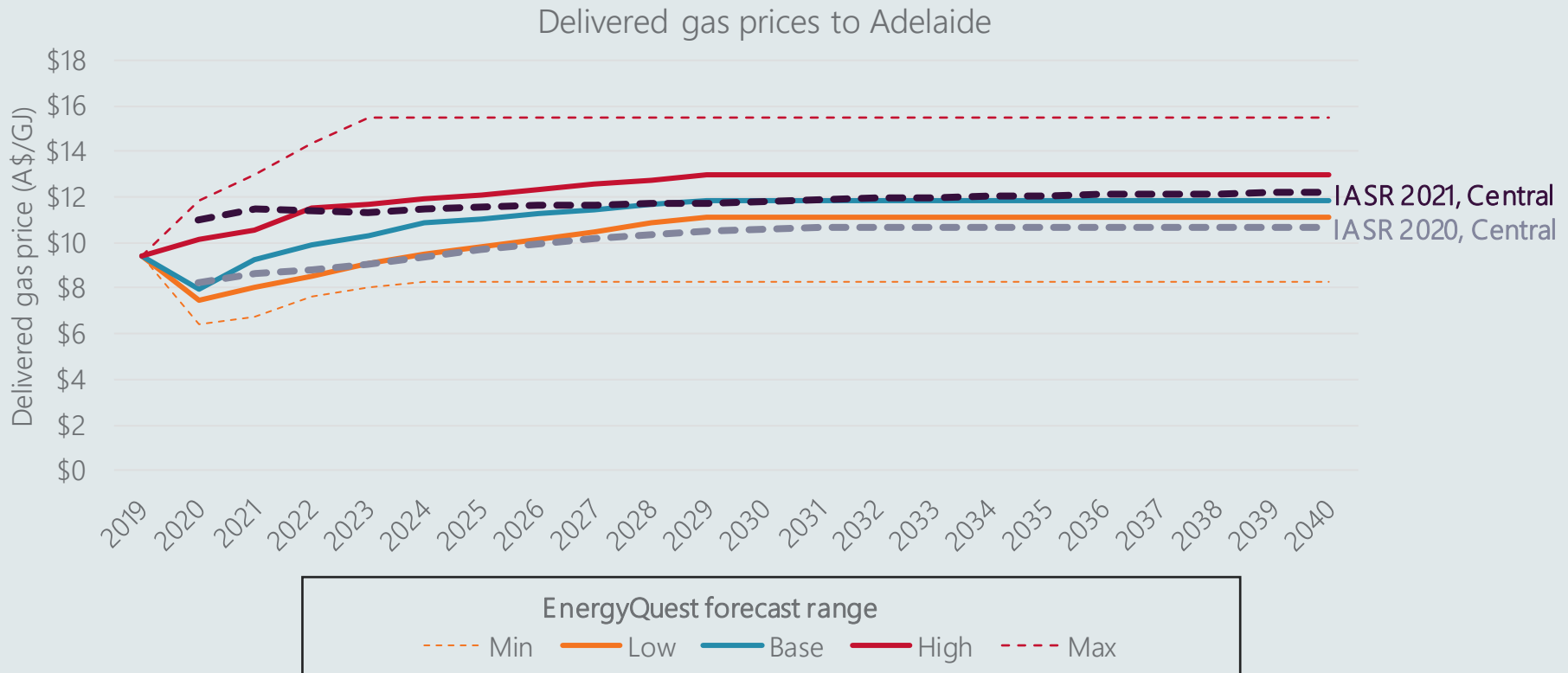
Australian Financial Review, April 17, 2021, 'Shocker' gas ruling cuts Origin's outlook



* The GSA range from the July 2020 report cover January 2019 to February 2020.

** The GSA range from the January 2021 report cover September 2019 to August 2020.

Comparison with alternative public forecasts for GPG



This information was extracted from ElectraNet's report (May 2020), published here:

<https://www.electranet.com.au/wp-content/uploads/projects/2016/11/200608-Summary-EnergyQuest-ElectraNet-Report.pdf>

Ensuring the ISP is robust to gas price uncertainty

AEMO's Low Gas Price sensitivity

Process for selecting ODP

The Optimal Development Path (ODP) is identified by applying the ISP's Cost Benefit Analysis (CBA) methodology, across a number of steps:

1. Determining the least-cost development path for each scenario
2. Building candidate development paths
3. Assessing each candidate development path across all scenarios
4. Evaluating net market benefits
5. Ranking candidate development paths
6. **Applying sensitivity analysis**
7. Finalising the ODP

6. Finalising the ODP through sensitivity analysis

- To determine the optimal development path, the ISP Methodology will examine the robustness of the various developments to key sensitivities, including gas pricing.
- Only after sensitivity analysis is completed is the draft optimal development path (ODP) identified.
- Additional analyses (distributional effects, resilience to climate risks, etc) may complement sensitivity analysis to further ensure a robust ODP.

Example: sensitivity analysis

	Net market benefits					Weighted average Net Market Benefits – scenario (ranking)	Weighted average Net Market Benefits – sensitivity (ranking)
	Scenario A	Scenario B	Scenario B (sensitivity)	Scenario C	Scenario D		
Weight	40%	25%	25%	25%	10%	-	
CDP1	144	328	302	97	201	184 (4)	177 (2)
CDP2	108	368	306	131	151	183 (5)	168 (5)
CDP3	66	333	268	167	173	169 (6)	152 (6)
CDP4	136	368	278	131	193	198 (1)	176 (3)
CDP5	115	231	189	122	192	153 (7)	143 (7)
CDP6	107	333	264	167	184	186 (3)	169 (4)
CDP7	126	351	326	141	194	193 (2)	187 (1)

Substituting the original scenario with the outcomes with the sensitivity applied identifies that the ODP preference has changed

CDP's represent shortlisted combinations of potential actionable ISP Projects, examined in detail to identify the projects that represent the optimal development path

	Original	Sensitivity 1	Sensitivity 2	Sensitivity 3	Sensitivity 4	Sensitivity 5
CDP 1	184	177	175	188	168	90
CDP 4	198	176	168	192	143	83
CDP 6	186	169	162	168	140	85
CDP 7	193	187	183	204	145	87

Applying multiple sensitivities can identify whether the CDPs are robust to a number of key variables.

Discussion...

Suggested areas of feedback

- Are the prices for the scenarios sufficiently broad, internally consistent with the scenario narrative and plausible?
- What is the role of sensitivity analysis and what is critical to test, particularly in terms of confirming selection between candidate pathways?
- Are there suggestions for future improvements to gas price forecasting?
- Has your feedback to the IASR been understood? Do you feel better informed? Have we addressed the key areas?
- Are there remaining areas of uncertainty?

Next steps and concluding remarks

Thank you for your time and engagement

A copy of the slides will be provided to all participants.

Please reach out with further thoughts, ideas or questions: ISP@aemo.com.au

