

A photograph of two men in safety gear (hard hats and high-visibility work clothes) walking through a power plant or substation. The man on the left is wearing a yellow and blue high-visibility shirt and a white hard hat. The man on the right is wearing an orange and blue high-visibility shirt and a white hard hat with the ElectraNet logo. They are both wearing safety glasses. In the background, there are large metal structures and power lines. A third worker in an orange shirt and white hard hat is visible in the background, walking away from the camera. The scene is outdoors and brightly lit.

# Project EnergyConnect

Review of economic assessment

31 March 2021

## Copyright and Disclaimer

Copyright in this material is owned by or licensed to ElectraNet. Permission to publish, modify, commercialise, or alter this material must be sought directly from ElectraNet.

Reasonable endeavours have been used to ensure that the information contained in this report is accurate at the time of writing. However, ElectraNet gives no warranty and accepts no liability for any loss or damage incurred in reliance on this information.

<b>Revision Record</b>					
<b>Date</b>	<b>Version</b>	<b>Description</b>	<b>Author</b>	<b>Checked By</b>	<b>Approved By</b>
31 Mar 2021	1.0	For submission to the AER and publication	Brad Harrison	Simon Appleby Hugo Klingenberg	Rainer Korte

## Project EnergyConnect material change in circumstances assessment

### Executive Summary

On 14 September 2020, ElectraNet submitted an updated economic cost benefit analysis for Project EnergyConnect (PEC) to the AER for approval. The AER confirmed on 28 September 2020 that:

“...the AER considers that the updated cost benefit analysis provides a not unreasonable basis for ElectraNet’s opinion that PEC remains the preferred option. We expect both ElectraNet and TransGrid to submit full and complete contingent project applications for PEC as soon as possible.”

On 29 September 2020, the ElectraNet Board approved submission of a contingent project application (CPA) based on the AER’s confirmation and the CPA was submitted to the AER on 30 September 2020.

This note reviews several subsequently announced policies and other changes in the National Electricity Market (NEM) and considers the impact that these could have on the benefits of PEC. The assessment considers whether these changes could result in a material change of circumstances under the National Electricity Rules that may lead to the preferred option no longer being the preferred option, thereby requiring a reapplication of the Regulatory Investment Test for Transmission (RIT-T).

Overall, the recent policy and other changes announced are likely to have a positive impact on the modelled benefits of PEC. Our conclusion therefore is that it is not reasonably likely that there has been a material change of circumstances that could lead to the PEC no longer being the preferred option, thereby requiring a reapplication of the RIT-T.

The assessment undertaken is summarised below.

The following table summarises the assessed impact of changes that are firm enough to be included in a RIT-T assessment.

Recent development (post September 2020)	Assessed impact on benefits (PV)	Planning status - Firm
NSW Government’s Roadmap	Positive 0-\$50m	Legislated
Tasmanian Government’s Renewable Energy Target	Positive 0-\$50m	Legislation presented to Tasmanian parliament
AEMO’s IASR updated gas price assumption	Positive 0-\$50m	Draft subject to consultation
AER’s preliminary position on CPAs	Positive \$140m	Published
<b>OVERALL</b>	Positive \$140-\$290m	

The following table summarises the assessed impact of potential changes that could not be included in a RIT-T assessment because they are not firm enough to be considered.



Recent development (post September 2020)	Assessed impact on benefits (PV)	Planning Status – Non-firm
Federal Government support of Hunter Valley GPG	Zero	Publicly announced
Vic Government support for REZ development	Minimal ~ \$1m	Publicly announced
AGL battery (Torrens Island)	Negative \$50m to Zero	Publicly announced
Coal prices	Positive 0-\$50m	Preliminary
SA Government's Climate Change Action Plan 2021-25	Large >\$100m	Elements of the Plan in various stages of deployment however most significant elements to the benefits of PEC are insufficiently advanced to be considered.
Yallourn early closure	Zero	Publicly announced
<b>OVERALL</b>	\$50m to >\$150m	

## The NSW Electricity Infrastructure Roadmap 2020 – December 2020

### Impact: Small increase in market benefits

The NSW Electricity Infrastructure Roadmap 2020 (the Roadmap) builds on the NSW Transmission Infrastructure Strategy 2018 (the Strategy) under the NSW *Electricity Infrastructure Investment Act 2020* which was enacted in December 2020.

The aims of the Strategy have been to:

1. Boost NSW interconnection with Victoria, South Australia and Queensland and unlock more power from the Snowy Hydro Scheme.
2. Increase NSW's energy capacity by prioritising Renewable Energy Zones in the Central West, South West and New England regions of NSW, which will become a driving force to deliver affordable energy into the future.
3. Work with other states and regulators to streamline regulation and improve conditions for investment.

As part of the Strategy and Roadmap, the NSW Government stated it will accelerate the development of four priority transmission projects, including PEC. Other priority investments include: VNI Minor, QNI augmentation and HumeLink connecting Wagga Wagga and Snowy to Sydney.

The Roadmap extends the Strategy to include supporting investment in renewable generation directly, backed by legislation.

The major benefit of PEC comes from avoiding gas usage from gas powered generators (GPG) in South Australia through greater access to generation from the eastern states. The market dynamics that lead to this saving are not materially influenced by the NSW Roadmap.

ElectraNet's RIT-T market modelling showed generation investment in South Australia and NSW occurring during the period from 2030 to 2040 as the bulk of the coal generation fleet retires across the eastern states.

By 2040, ElectraNet modelled around 10 GW of new solar and wind development in NSW and 3 GW in South Australia. Over 95% of this investment in NSW occurred after 2030.

The intent of the Roadmap is to bring forward investment in NSW of a similar quantum – 11 GW to 2030. At the same time, there is strong interest – with active support from the South Australian Government – in new investment in South Australia which could also see this forecast investment accelerating.

RIT-T modelling showed that investments in both South Australia and NSW of this quantum are efficient and complementary investments, as a replacement for retiring plant.

There is no expectation that the NSW investment of this magnitude will crowd out the South Australian investment or vice versa. PEC allows for improved utilisation of investments in the modelling resulting in a four-year deferral of around 350 MW of renewables investment in South Australia from 2032. By 2042, with and without the NSW Roadmap, PEC allows for 800 MW more investment in renewables in South Australia.

As noted above, with active support from the South Australian Government, if additional investment in South Australia does occur, the absence of PEC would lead to increasing levels of already occurring curtailment of intermittent renewables in South Australia.

The Roadmap also seeks to strengthen transmission development for three renewable energy zones in NSW, including the south west of NSW through which PEC traverses, along with strengthening of the links between Snowy 2.0, Wagga Wagga and the Sydney load centre. The effect of proceeding with development of a south west NSW REZ would be to reduce the costs of PEC as the section from Dinawan to Wagga Wagga would be delivered in any case. This was considered by ElectraNet in the updated Cost Benefit Analysis for PEC prior to submission of the CPA with the possibility of VNI West also delivering this section of PEC based on the ISP timing of VNI West.

The Victorian Government has signalled its support of VNI West indicating that it is considering support of the project to maximise the connection of renewables as well as strengthen interconnection.

We have considered whether acceleration of investment in renewables in NSW could have the perverse effect of shifting investment in dispatchable capacity to non-renewable gas generation – especially considering the Federal Government's plan for additional gas generation in NSW. We have tested the hypothesis that the Roadmap could lead to a reduction of benefits should the removal of relatively cheap coal power in NSW be replaced with more expensive gas-powered generators, thereby preventing PEC from avoiding expensive South Australian gas generation with a cheaper interstate fuel source. Our modelling has found this hypothesis does not hold – refer to more detailed discussion below.

Overall, the Roadmap has been found to be complementary to PEC and lead to a small increase in PEC market benefits of up to \$50 million in present value terms.

## **Federal Government's announced support for 1,000 MW of gas generation in the Hunter Valley – September 2020**

### Impact: Neutral and not expected to be material

The Federal Government has announced that it would support financing Snowy Hydro to develop up to 1,000 MW of gas generation to replace Liddell Power Station if the private sector does not deliver this capacity.

The Federal Government's announcement is not expected to have any material impact on the modelled economic benefits of PEC.

PEC RIT-T modelling replaces the Liddell Power Station with an efficient level of generation investment. Whether this is underwritten by the Federal Government or not should not impact on the efficient replacement of retiring generation in the RIT-T modelling.

Importantly, replacement capacity is not expected to be provided by new investment in gas powered generation, with the RIT-T modelling identifying alternative cheaper solutions to meeting the replacement needs of Liddell Power Station.

However, we have modelled this 1,000 MW of gas plant together with the NSW roadmap and the updated AEMO gas price forecasts and found that the operation of the plant does not impact on benefits. From 2036 the generator operates with a capacity factor around 2 per cent both with and without PEC. Whilst we can mandate the model builds the plant, the model will only dispatch this plant when required. Gas plant in NSW and South Australia have closely aligned operating profiles. Whilst gas becomes more important in both states as the coal fleet retires, more gas units will not increase the need for gas generation.

Consequently, this investment has effectively zero impact on the benefits of PEC.

The status of this development is a request to Snowy Hydro to plan for 1,000 MW of gas generation at Kurri Kurri in NSW. No legislation has been introduced to support this investment or financing put aside in the Federal Budget. This project is listed as "publicly announced" 750 MW of OCGT on AEMO's Generator Information Page<sup>1</sup>. AEMO has not included this policy in the draft Input Assumptions and Scenarios Report for the 2022 ISP released for consultation.

The RIT-T framework would not consider this project sufficiently committed for it to be included in all scenarios and therefore could not be expected to change the outcome of the RIT-T.

## **Victorian Government budget announcement of new renewable energy zones and completion of tendering for the System Integrity Protection Scheme – November 2020**

### Impact: Neutral based on insufficient information

This policy will have no impact on avoided gas within South Australia and no material impact on the modelled economic benefits of PEC.

---

<sup>1</sup> AEMO Generator Information Page, January 2021

The Victorian 2020-21 Budget handed down in November 2020 has set aside \$540 million to establish six renewable energy zones (REZ) in Victoria. At this time, AEMO considers there is insufficient information to identify the specific impacts this policy will have on the power system or the ISP.

With changes in Victoria already assumed in the RIT-T modelling such as the VRET and VNI West, PEC is expected to have very little impact on the Victorian REZ developments and vice versa. Updated modelling shows that PEC defers some transmission upgrades in Victoria delivering a minimal NPV benefit of \$1 million.

This policy seeks to drive investment in storages in Victoria. This investment in storage is already occurring in the RIT-T modelling and hence is not influenced by this policy.

The Victorian Government has directed AEMO to procure a System Integrity Protection Scheme. This scheme will lead to a minor increase in the capability of the Victorian to New South Wales interconnector. This upgrade is minor and is anticipated to have minimal impact on PEC benefits. The much larger VNI West augmentation has already been included in our analysis to date and has been demonstrated to not have a material impact on the preferred option.

### **Tasmanian Renewable Energy Target to 200% renewables by 2040 – October 2020**

#### Impact: Small increase in benefits

The impact of this policy has been modelled and is leading to a small increase in market benefits estimated in the range of zero to \$50 million in present value terms. Legislation for this policy was presented to the Tasmanian Parliament on 15 October 2020.

In general, this policy has little impact on avoided gas in South Australia and therefore would not be expected to have a more material impact on the modelled economic benefits of PEC.

Tasmania is a small system. A 200% renewable target will not result in a meaningful shift in the supply and demand balance outside of South Australia.

### **Inertia shortfall and AGL announcement of intention to build 250 MW battery at Torrens Island – November 2020**

#### Impact: A small to zero reduction in net market benefits if committed

In the 2020 ISP, AEMO recommended modelling PEC as avoiding between 300 MW and 500 MW of Fast Frequency Response (FFR). ElectraNet modelled this as the benefit of avoiding 195 MW of additional battery capacity – being the mid-point of AEMO's range less 205 MW of grid scale batteries already deployed – as batteries are the best-known source of FFR. There was no cost modelled for the provision of the 205 MW of FFR from the existing batteries.

In August 2020, AEMO declared an inertia shortfall in South Australia and presented a requirement for 200 MW of FFR as the likely efficient solution to the shortfall. ElectraNet has commenced a procurement process to explore options for the provision of inertia support services and has received offers for the provision of FFR from existing batteries. The avoidance of this cost increases the benefits of Project EnergyConnect.

In November 2020, AGL announced its intention to develop a grid-scale battery at Torrens Island in South Australia as part of its plans to roll out 850 MW of energy storage capacity across the NEM by 2023-24.

Currently the announced AGL battery is insufficiently firm to be included in a RIT-T or ISP assessment given that it has not reached the anticipated or committed status required for this purpose.

AGL's media release on 24 March 2021 included that AGL is still working to select a provider for this project to begin construction. Similarly, it is unclear if all planning approvals have yet been finalised. However, while the project does not meet the RIT-T requirements for a committed project, the likelihood of this project progressing is increasing.

AEMO's Generator Information Page has yet to record this project<sup>2</sup>. As per AEMO guidelines, Generator Information Page information is sourced directly from proponents. We expect that in future updates the status of this project would change based on advice from AGL.

Should the AGL battery be committed, PEC would no longer avoid this investment, reducing the modelled benefits of PEC. However, as has been demonstrated by AEMO's inertia shortfall declaration, the cost of providing inertia support activities will be required irrespective of the commitment of the battery.

In total, the cost of providing inertia support services is expected to be less than the avoided capital cost of the battery modelled previously.

This means the net impact of the announced AGL battery development is likely to be neutral to slightly negative with the composition of benefits changing, from avoided battery capital investment to avoided inertia support activities.

## **AEMO consultation on gas prices – December 2020**

### Impact: Small increase in market benefits

The main source of benefit of Project EnergyConnect is avoiding expensive gas usage in South Australia for electricity generation. Gas price forecasts are the most material input to the estimation of benefits of PEC.

AEMO has commenced consultation on the Inputs, Assumptions and Scenarios report (IASR) for the 2022 ISP, including gas prices. In December 2020 AEMO published draft gas price forecasts from Lewis Grey Advisory. These forecasts are higher initially until 2030 and then are marginally lower, compared with the previous forecasts applied in ElectraNet's updated cost benefit analysis.

ElectraNet has tested the proposed gas price forecasts and found that they do not have a material impact on the economic benefits of PEC – the higher gas prices initially more than offset the lower gas prices later accounting for discounting, increasing market benefits by a small amount – in the range of zero to \$50 million in present value terms.

Essentially the updated gas price forecasts are materially the same as the previous forecasts.

---

<sup>2</sup> AEMO's Generator Information Page, January 2021



More recently, international gas prices have reached the highest levels ever since the east coast LNG terminals began operation. Asian benchmark prices have reached \$US32.50 per MMBTU (around \$31/GJ) in January 2021 coming off the June 2020 low of \$2 per MMBTU.<sup>3</sup>

The ACCC's LNG netback price series has prices for February 2021 at \$19.6/GJ.<sup>4</sup>

Whilst this is a seasonal event driven by a cold northern hemisphere and shipping shortages, it highlights the potential impact of gas prices. Extreme seasonal prices could result in such extreme electricity market outcomes that PEC could rapidly deliver much larger benefits than accounted for in the IASR inputs.

AEMO's 2021 GSOO has highlighted that material risks remain in the gas market to ensure that sufficient gas is available to meet customer requirements. AEMO states that "southern supply scarcity risks have emerged for winter 2023 under certain conditions such as ... events in the National Electricity Market (NEM) that increase demand for gas-powered generation of electricity".

This indicates both the credible risk to extremely high gas prices, and the influence of NEM developments such as PEC in mitigating these risks.

## Declining international thermal coal prices – December 2020

### Impact: Increase in benefits and not expected to be material

Thermal coal prices in the Eastern States have declined over the previous 12 months. BHP has reported export price declines of 24% over the second half of 2020 compared to 2019. BHP expects to recognise an impairment of between US\$1.15bn and US\$1.25bn for NSW Energy Coal (the Macarthur coal mine in the Hunter Valley), resulting in an impairment of around 75% of the pre-impairment value.

Such a significant impairment suggests an expectation from BHP that the downturn in prices will not be transient in nature.

The price BHP received for exported thermal coal equates to around \$2/GJ. Building on BHP's expectation that prices will stay subdued for the long-term challenges the validity of current coal price forecasts of around \$3/GJ by 2030.<sup>5</sup>

The primary benefit of PEC comes from substituting relatively expensive gas use in South Australia with less expensive fuels outside of South Australia. A reduction in the coal price in New South Wales will further increase the benefits of PEC by reducing the costs of the replacement fuel, estimated in the range of zero to \$50 million in present value terms.

---

<sup>3</sup> A MMBTU is around 1.055GJ

<sup>4</sup> ACCC, [LNG netback price series](#), 18 January 2021

<sup>5</sup> [BHP Operational Review for the half year ended 31 December 2020](#)

## South Australian Government Climate Change Action Plan 2021-2025 – December 2020

### Impact: Expected large increase in net market benefits

The South Australian Government is committed to a state-wide reduction of greenhouse gas emissions of more than 50% by 2030<sup>6</sup> and achieving net zero emissions by 2050. To achieve these goals, the South Australian Government Climate Change Action Plan 2021-2025 (the Action Plan) has been published with seven focus areas.

The first focus area is the clean energy transformation with the objective of accelerating the renewable energy economy in South Australia including developing a world-class renewable hydrogen industry. A key plank of the transition to a clean energy economy is fast tracking PEC.

As a result, the clean energy transformation will enable the State Government to support development of new industries in South Australia such as green steel manufacturing and international hydrogen exports, whilst investing in the electrification of transport through the 2020s. The South Australian Government has also forecast the potential for South Australia to be generating 500% of existing domestic demand in electrical renewable generation by 2050.<sup>7</sup>

This focus area will increase renewables uptake in South Australia beyond what has been considered in the PEC modelling to date as well as facilitate increased demand for electrical energy in South Australia.

In addition to an increasing number of grid scale developments, distributed rooftop PV continues to be deployed at increasing rates. AEMO's August 2020 Electricity Statement of Opportunities (ESOO) has increased the forecast average generation from rooftop solar by 75% in South Australia compared to previous input assumptions in the 2020 ISP.

PEC is a key enabler of this potential future and the benefits of PEC would be expected to increase significantly under this vision of the future driven by increased electricity demand due to electrification of South Australian industry, the attraction of new energy intensive industries and renewable exports and corresponding additional fuel cost savings.

The South Australian Government is also seeking to increase investment in electrical storages in South Australia, both distributed and grid scale storages. This indicates the complementary nature of storage and transmission investment to enable a renewable future.

## Early closure of Yallourn Power Station – March 2021

### Impact: Expected neutral impact in net market benefit

On 10 March 2021, Energy Australia announced its plan to close the Yallourn Power Station in mid-2028, four years ahead of schedule, and partially replace Yallourn's capacity with a 350 MW battery facility with four hours of storage.

---

<sup>6</sup> From 2005 emissions

<sup>7</sup> South Australian Government Climate Action Plan

ElectraNet's market modelling has already adopted the early Yallourn retirement assumption sourced from the optimal development path scenario in the 2020 ISP along with the subsequent development of the conditionally actionable ISP project: VNI West.

Further, in our modelling 792 MW of battery storage is invested in Victoria in 2036 for both the base case and PEC. As PEC does not impact on the magnitude of battery investments in Victoria, it can also be concluded that battery storage investments will not impact on the benefits of PEC.

The 350 MW of battery storage announced by Energy Australia would bring forward some investment in storage that is forecast for later during the planning period. Given PEC does not influence the timing of storages, a difference in timing of assumed storage investments will not impact on the benefits of PEC either.

## AER Preliminary Position on contingent project costs – December 2020

### Impact: Increase in net market benefits

The AER proposed cost reductions in its preliminary position paper in December 2020 of \$210.7 million (\$2017-18) across the Contingent Project Applications of TransGrid (\$198.9m) and ElectraNet (\$11.8m), resulting in a total project cost estimate of \$2.16bn (\$2017-18).

The proposed cost reductions would increase the net benefits of PEC for the ISP Central Scenario from the \$148m in ElectraNet's Updated Cost Benefit Analysis<sup>8</sup> to \$289m (an increase of \$141m) in present value terms.

ElectraNet's updated cost benefit analysis dated September 2020 found a breakeven project cost of \$2.7bn (\$2018-19) beyond which the project would no longer have a positive net market benefit. Based on the changes discussed above, total benefits have increased by \$190m to \$325m or more, resulting in a higher breakeven project cost of up to \$2.9bn compared to the AER preliminary position cost estimate of about \$2.2bn (\$2018-19).

## Conclusion

Overall, the recent policy and other changes announced are assessed as likely to be positive to the modelled benefits of PEC.

- The New South Wales Roadmap is expected to increase the net market benefits of Project EnergyConnect as the accelerated development of renewable projects increases access to lower cost generation.
- The Victorian Government policy is assessed as neutral as PEC has little impact on transmission developments in Victoria.
- These State Government policies are designed to support timely transmission investments, particularly to unlock further renewable energy development, which is expected to be complementary to PEC.

---

<sup>8</sup> Project EnergyConnect Updated Cost Benefit Analysis, 30 September 2020

## Project EnergyConnect Review of economic assessment

- While not yet a committed project, the Federal Government's announced support for a gas plant in New South Wales is assessed as having a neutral impact on the net market benefits of PEC.
- The Tasmanian Government's Renewable Energy Target has a small increase in benefits of PEC but is of insufficient size to meaningfully impact on benefits.
- The announced AGL battery in South Australia is insufficiently firm to be included in an ISP or RIT-T assessment given that it has not reached the anticipated or committed status required for this purpose. If committed, this project would result in a small to zero reduction in the benefits of Project EnergyConnect.
- The latest gas price assumptions published by AEMO are not materially different to those assumed in ElectraNet's previous modelling and appear to have minimal impact on market benefits based on check studies, while coal price movements marginally increase benefits.
- The South Australian Government's Climate Change Action Plan 2021-25 strongly supports increased expected market benefits from PEC.
- The announced early Yallourn Power Station closure is already captured in the modelling.
- The AER's preliminary position on reduced costs would increase net market benefits by PV \$141m.

The assessment undertaken is summarised in the following table.

Recent development (post September 2020)	Assessed impact on benefits (PV)	Planning Status
NSW Government's Roadmap	Positive 0-\$50m	Legislated
Federal Government support of Hunter Valley GPG	Zero	Publicly announced
Vic Government support for REZ development	Minimal ~ \$1m	Publicly announced
Tasmanian Government's Renewable Energy Target	Positive 0-\$50m	Legislation presented to Tasmania parliament
AGL battery (Torrens Island)	Negative \$50 to zero	Publicly announced
AEMO's IASR updated gas price assumption	Positive 0-\$50m	Draft subject to consultation
Coal prices	Positive 0-\$50m	Preliminary
SA Government's Climate Change Action Plan 2021-25	Large >\$100m	Elements of the Plan in various stages of deployment.
Yallourn early closure	Zero	Publicly announced
AER's preliminary position on CPAs	Positive \$140m	Published
<b>OVERALL</b>	Positive >\$190-\$440m	

The conclusion of our assessment is that it is not reasonably likely that there has been a material change of circumstances that could lead to PEC no longer being the preferred option, thereby requiring a reapplication of the RIT-T.



