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Additional Information Economics

Volume 4 Attachment H

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Response to Office of Co-Ordinator General Request for Further Information

Economic Matters

JULY 2021

COMMERCIAL IN CONFIDENCE

CUSTRING PTY LTD

REQUEST FOR FURTHER INFORMATION - Q33

33. In response to submissions, please provide updated information in relation to economic matters including:

a) further detail on the predicted impacts on electricity pricing associated with this project

b) a demand analysis for the project, including updates on expressions of potential customer interest or connection with renewable energy proposals

c) alternatives to the project that have been considered and justification for why the project proposed is the preferred option

d) a sensitivity analysis for changes in future gas costs and energy consumption in the NWMP in addition to that provided in the draft EIS

e) whether the Australian Energy Regulator's standard regulatory investment test for transmission (RIT-T) process will be undertaken for the project and if so the timing for this

33 (A) FURTHER DETAIL ON THE PREDICTED IMPACTS ON ELECTRICITY PRICING ASSOCIATED WITH THIS PROJECT

CuString is working with the Queensland Government to finalise the outstanding items under the Implementation Agreement (IA) executed with the State on 1 October 2020. Once these outstanding items are finalised, updates to the Financial and Economic models will be run in the lead up to Commercial Close and Financial Close, and once final assumptions are agreed with the State.

As part of the IA process, updated project information was provided to the State in June 2021 and is subject to further consideration by State agencies (and potentially Government / Cabinet consideration) and also subject to further amendments. This includes updated analysis of the impacts of the CopperString Project on electricity pricing across Queensland. The following slides are an extract of that information which addresses the impacts on electricity price impacts.

The financial modelling had its input assumptions updated to the latest information as at June 2021. ACIL Allen have tested these updated assumptions in the economic model which was run in May 2020. ACIL Allen have noted that the May 2020 reported economic benefits are still valid, and the updated assumptions would produce outputs which are with ± 10%, which is within the range of sensitivities reported at the time the EIS was published in December 2020. As outlined above, updates to the Financial and Economic models will be run in the lead up to Commercial Close and Financial Close, and once final assumptions are agreed with the State.

33 (A) FURTHER DETAIL ON THE PREDICTED IMPACTS ON ELECTRICITY PRICING ASSOCIATED WITH THIS PROJECT

The impact on Queensland electricity customers is dependant on numerous project assumptions, and the level of financial contribution made by State and Federal governments in respect of the forecast economic benefit from CopperString. Changes in delivered electricity prices paid by existing NEM customers are estimated by taking into account the net change in transmission cost and the forecast change on the wholesale price of electricity due to CopperString as forecasted by ACIL Allen (May 2020). The input assumptions for this analysis have been derived from Powerlink's annual transmission report and the Energex and Ergon RIN Statements.

DEMAND ASSUMPTIONS

- Based on PLQ forecast (*Transmission Annual Planning Report 2019 - 10% POE Medium growth delivered summer maximum demand*)
- Adjusted by applying -0.70% annual growth PLQ June 2023 forecast demand resulting in 46,382,000 MWh in 2023
- Energy demand is split between Ergon, Energex and Direct (*Economic benchmarking RIN (3.4 Operational data - 2019-2020*))

QLD NEM CONNECTED CUSTOMERS YEAR ENDING JUNE 2022	Energex	Ergon
Total Regulated Revenue allocation from PLQ Forecasts	47.68%	36.74%
Total Consumption allocation from PLQ Forecasts*	41.33%	23.99%
Total Consumption (MWh)	21,140,000	13,567,000
Average Residential Consumption (kWh p.a./household)	5,808	6,167

ANALYSIS NOTES

- The CopperString transmission unit price has been calculated assuming the same $/kWh charge for all load, irrespective of connection voltage:
  - The transfer from the east coast (excluding PLQ charges paid by CopperString) are divided by total PLQ energy and allocated pro rata to consumption to Ergon / Energex
  - The PLQ locational charges paid by CopperString are allocated pro rata based on Revenue to Ergon and Energex and netted off from the transfers to give the total cost
  - The total cost from CopperString is added to the net change in the LWP to give the impact $/kWh
- Transmission and distribution losses are captured through the retail energy price
- Assumes that total system losses are unaffected by CopperString
- Note, due to the CSO arrangements, CopperString would not directly reduce/increase the Ergon household prices, but would reflect impact to Government via lower CSO payments. The reductions for Ergon are for illustrative purposes, should those CSO arrangements not exist. The exact changes in the CSO payments have not been determined as this requires additional information unavailable to CuString/KPMG.

*Excludes direct connected customers (33.97%)

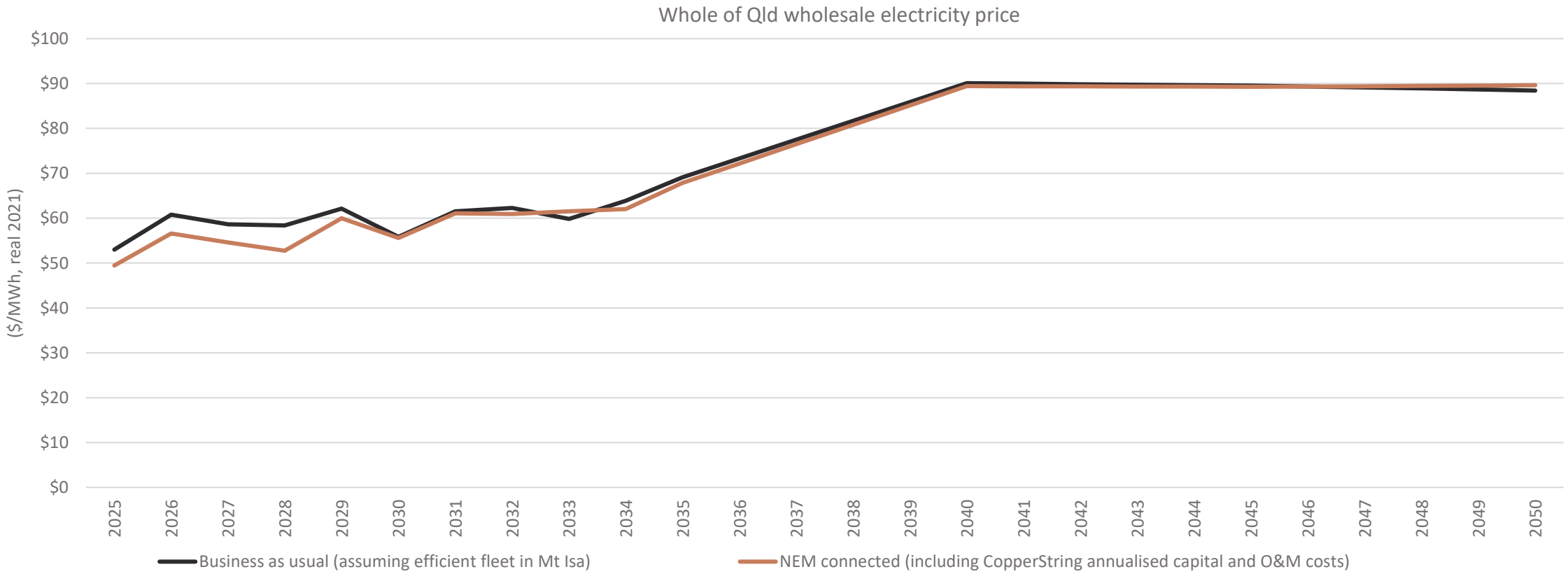
https://www.aer.gov.au/system/files/DORIS%20-%20D18-159893%20Powerlink%202017-18%20-%20Economic%20Benchmarking%20RIN%20-%20template%20-%20%28locked%29%20-%20Consolidated%20-%20PUBLIC.XLSM

https://www.aer.gov.au/system/files/DORIS%20-%20D18-158679%5Bv2%5D%20Ergon%20Energy%202017-18%20-%20Economic%20Benchmarking%20RIN%20-%20Templates%20-%20Consolidated%20-%2031%20October%202018%20-%20PUBLIC.XLSM

https://www.aer.gov.au/system/files/DORIS%20-%20D18-159080%20Energex%202017-18%20-Economic%20Benchmarking%20RIN%20-%20TEMPLATES%20%20Consolidated%20PUBLIC.XLSM

WHOLE OF QLD WHOLESALE ELECTRICITY COST ($/MWH, REAL 2021) (AS AT JUNE 2021 & SUBJECT TO FINAL COST ALLOCATION APPROVED BY THE STATE)

Connecting the Mount Isa region to the NEM via CopperString 2.0 reduces wholesale electricity prices across the whole of Queensland by about $1.50/MWh on average over the longer term. The NEM connected (includes CopperString annualised capital and O&M costs) wholesale electricity is compared to the BAU (assuming efficient fleet in Mt Isa) is below. [1]



[1] Source: ACIL Allen, CopperString Economic Technical Report: Assessment of Electricity Market And Economic Impacts , Dec 2020.

ESTIMATED RELATIVE IMPACT PER HOUSEHOLD – CHANGE IN NETWORK CHARGES (AS AT JUNE 2021 & SUBJECT TO FINAL COST ALLOCATION APPROVED BY THE STATE)

- ACIL Allen (December 2020) projected CopperString 2.0 to increase Queensland's real income equivalent to a one-off increase of $16,000 per household or an average of $660 per household per year over the period to 2050. This means householders will be better off with an increase in their real income under the CopperString 2.0 NEM connected scenario compared to the business as usual scenario without CopperString 2.0 being constructed and becoming operational.
- By comparison the impact on network charges for an average Energex customer is estimated to be an annual cost increase in the range of $2.75 to $6.42 per household (based on an average to 2050 $0.50/MWh).
- Ergon Customer household is estimated to be an annual network cost increase in the range of $2.07 to $6.24 (based on an average to 2050 of $0.36/MWh)[1]
- For scenarios where the North West Minerals Province electricity demand is higher due to the global demand for critical minerals resulting in increased production from the region, the increase in network charges to all other customers will be lower than the impacts shown.

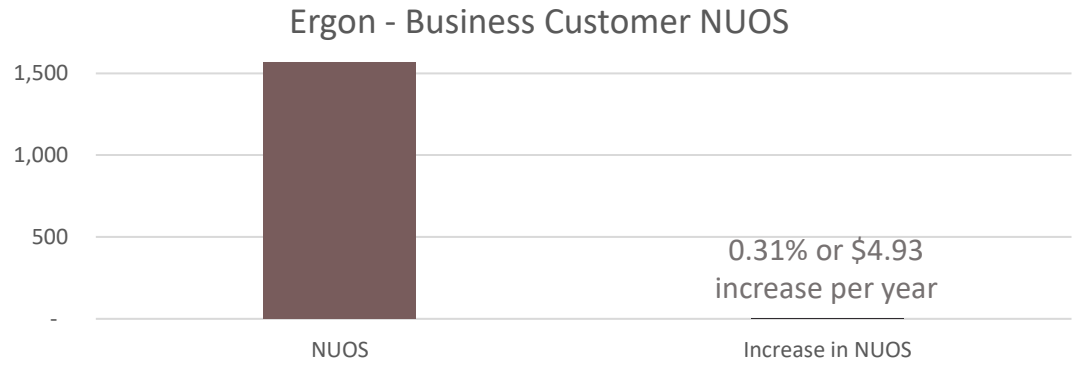
  Note this analysis assesses the impact of CopperString on network charges. The additional demand in the NWMP that is added to the Queensland NEM region is, under the assumptions used for ACIL Allen's Reference Case, forecast to result in an average reduction in wholesale electricity prices in Queensland of $1.50/MWh over the period to 2050. The precise impact of a change in demand on the Queensland wholesale NEM electricity price is difficult to predict and hence this is considered an immaterial impact on wholesale prices over the period

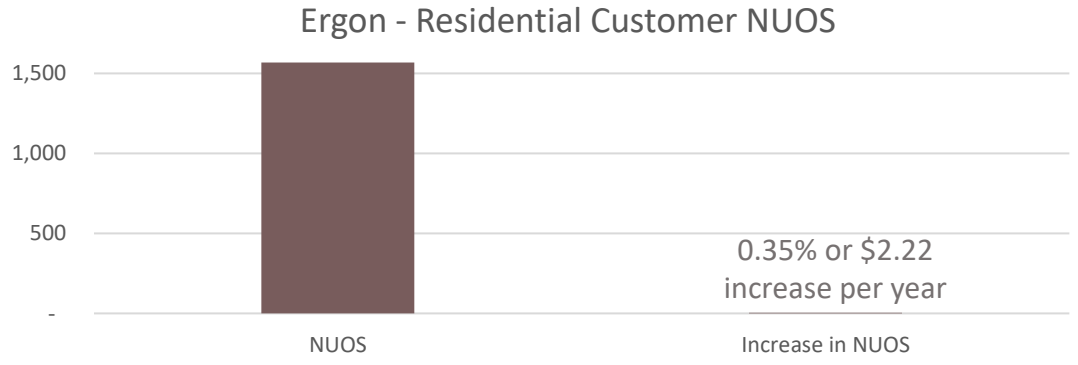
CUSTOMER IMPACTS – ERGON (WITHOUT WHOLESALE ELECTRICITY PRICE IMPACT) (AS AT JUNE 2021 & SUBJECT TO FINAL COST ALLOCATION APPROVED BY THE STATE)

A 100% passthrough of CopperString charges of $0.36/MWh **(average to 2050)** is expected to result in a 0.31% and a 0.35% increase in an Ergon Business and Residential customer's Network Use of System (NUOS) charges, respectively.

Element	Impact
Customer Type	Ergon – Business Customer
Assumed consumption	13,681 kWh p.a.
Tariff	Small Business Inclining Block (IBT) (2021)
NUOS	$1,567
% passthrough of CopperString transmission charges	100%
CopperString passthrough charge	$0.36/MWh
Increase in customer NUOS	**0.31% or $4.93 per year**

Element	Impact
Customer Type	Ergon – Residential
Assumed consumption	6,167 kWh p.a.
Tariff	Residential Demand East (2021)
NUOS	$644
% passthrough of CopperString transmission charges	100%
CopperString passthrough charge	$0.36/MWh
Increase in customer NUOS	**0.35% or $2.22 per year**



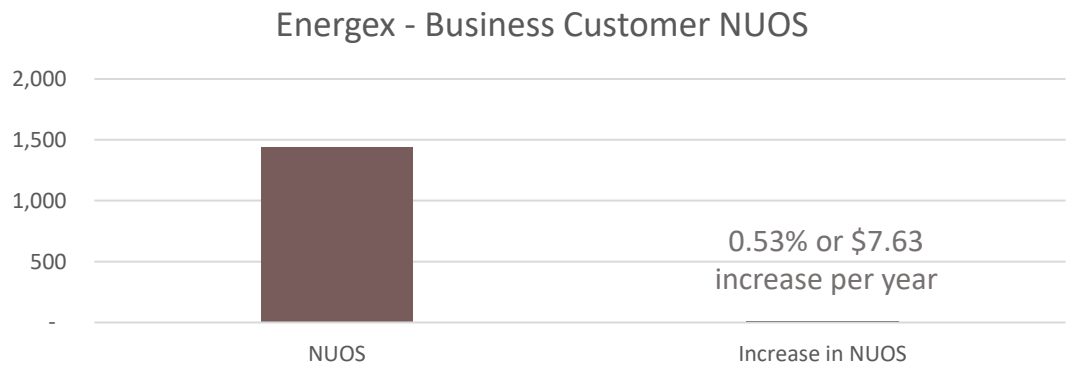


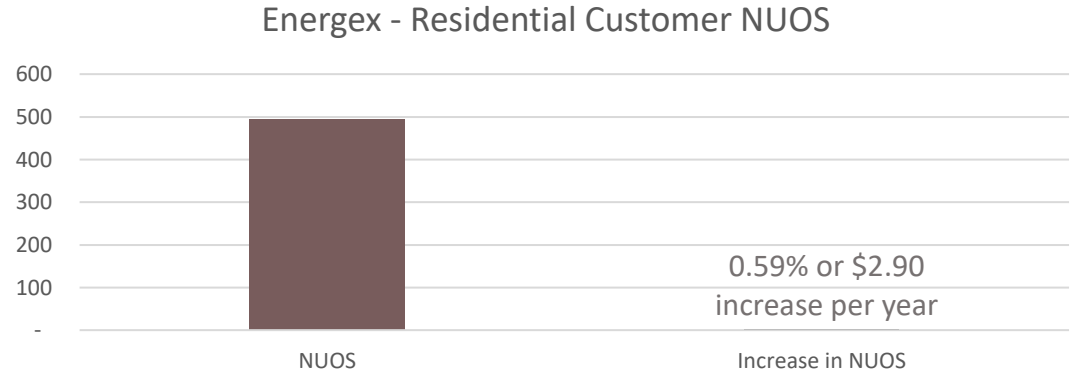
ESTIMATED CUSTOMER IMPACTS – ENERGEX (WITHOUT WHOLESALE ELECTRICITY PRICE IMPACT) (AS AT JUNE 2021 & SUBJECT TO FINAL COST ALLOCATION APPROVED BY THE STATE)

A 100% passthrough of CopperString charges of $0.50/MWh **(average to 2050)** is expected to result in a 0.53% and a 0.59% increase in an Energex Business and Residential customer's Network Use of System (NUOS) charges, respectively.

Element	Impact
Customer Type	Energex – Business Customer
Assumed consumption	15,266 kWh p.a.
Tariff	Small Business Band 3 (Small Business Capacity Tariff)
NUOS	$1,442
% passthrough of CopperString transmission charges	100%
CopperString passthrough charge	$0.50/MWh
Increase in customer NUOS	**0.53% or $7.63 per year**

Element	Impact
Customer Type	Energex – Residential Customer
Assumed consumption	5,808 kWh p.a.
Tariff	Residential Band 1 (Residential Capacity Tariff)
NUOS	$496
% passthrough of CopperString transmission charges	100%
CopperString passthrough charge	$0.50/MWh
Increase in customer NUOS	**0.59% or $2.90 per year**

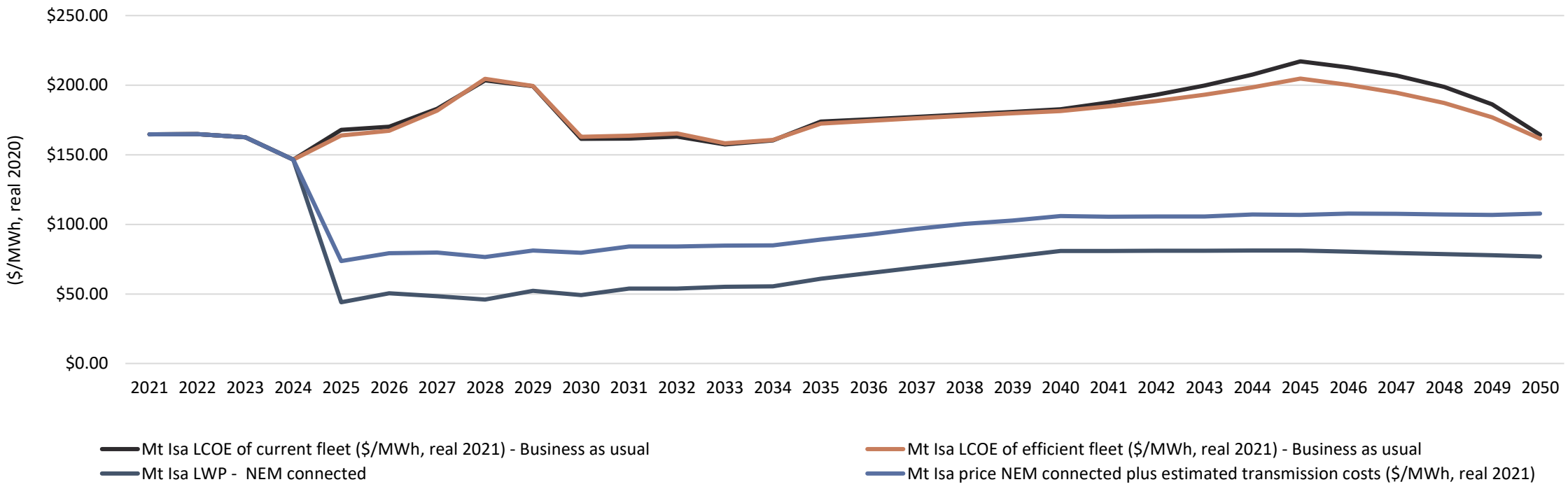




COMPARATIVE ELECTRICITY PRICE - MT ISA (AS AT JUNE 2021 & SUBJECT TO THE FINAL COST ALLOCATION APPROVED BY THE STATE)

Connection of the Mount Isa region to the NEM via CopperString 2.0 decreases wholesale electricity prices from about $160-$180/MWh to about $50/MWh in 2025 – an average difference of over $107/MWh. This difference remains throughout the projection period. When accounting for the transmission charges in the NEM connected case, the decreases is approximately $85/MWh to 2050.

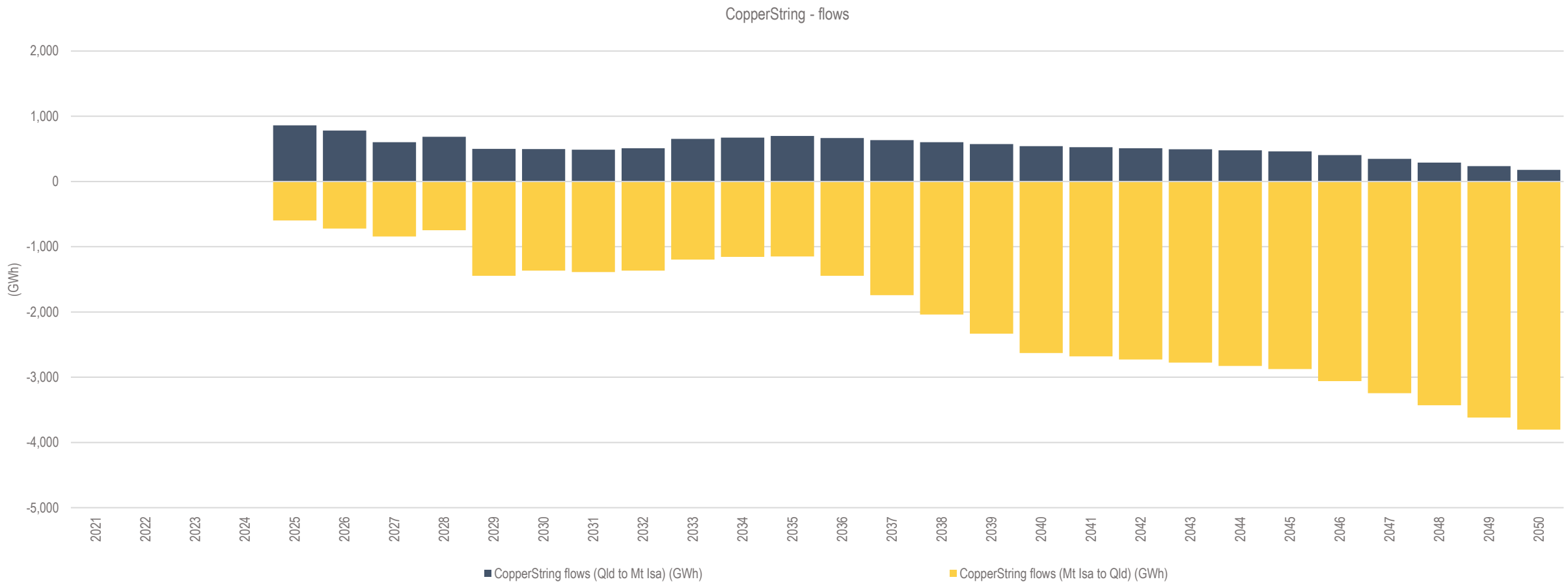
PROJECTED ANNUAL WHOLESALE ELECTRICITY PRICE (REAL 2020 $/MWh) – MOUNT ISA REGION – BAU, AND NEM CONNECTED CASES



[1] Source: ACIL Allen, CopperString Economic Technical Report: Assessment of Electricity Market And Economic Impacts , Dec 2020.

COPPERSTRING FLOWS (AS AT JUNE 2021 & SUBJECT TO FINAL COST ALLOCATION APPROVED BY THE STATE)

At the start of the project, there is expected to be greater flows from Queensland to Mt Isa. Over the project life, flows are expected to significantly increases from Mt Isa to Queensland. *Note; for this analysis "Mt Isa" reflects any generation west of the connection point between CopperString and Powerlink at Woodstock.*



[1] Source: ACIL Allen, CopperString Economic Technical Report: Assessment of Electricity Market And Economic Impacts , Dec 2020.

33 (B) DEMAND ANALYSIS FOR THE PROJECT, INCLUDING UPDATES ON EXPRESSIONS OF POTENTIAL CUSTOMER INTEREST OR CONNECTION WITH RENEWABLE ENERGY PROPOSALS

- Customer negotiations are advancing with the Foundation Customer group of Glencore, MMG, IPL, New Century Resources and Chinova. Applications to connect are also progressing with other resource companies / projects.
- Expressions of interest and discussions are progressing with a number of development projects.
- South 32 (Cannington Mine) have advised they would not be in a position to connect to the southern leg of CopperString due to current mine life and existing electricity supply contracts.
- There is a large contingent of explorers active in the NWMP at present and very positive drilling results for a number of them increasing the previously reported resources as they advance their projects towards development. Of note are Hammer Metals (Kalman/Elaine/Trafalgar) and Castillo Copper (Mt Oxide/Big One).
- The NEM modelling projects the development of 1,000 MW of wind farm capacity in the Hughenden area in the NEM connected case based on economic signals (that is, the 1,000 MW of projected wind farm development is an outcome of the modelling, not an input) – driven by a slightly stronger capacity factor compared with other options in the Qld region of the NEM – this represents less than half of the current known capacity under project development in the region (Forsayth Wind Farm 165 MW; Kennedy 1,200 MW; Kidston Wind 150 MW; Mt James Wind Farm 1,000 MW).
- CopperString is progressing Applications to Connect wind farm proponents who are advancing project developments.
- It is important to note that, should the Queensland Government decide to implement CopperString this will have, by-default, the effect of integrating the entire North West Power System into the National Electricity Market and the Ergon Energy Corporation Limited distribution network will become a regulated network under the same regime as EECL's network in the rest of Queensland. As a result, any customer that is connected to the North West Power System will become a user of the CopperString network and will therefore be a customer of CopperString and Powerlink and will pay network charges in accordance with the National Electricity Rules and any bespoke arrangements approved by the Queensland Government. Customers currently connected to the North West Power System, that are represented in the majority by the Foundation Customer group, are all on the public record as being supportive of CopperString.

33 (C) ALTERNATIVES TO THE PROJECT THAT HAVE BEEN CONSIDERED AND JUSTIFICATION FOR WHY THE PROJECT PROPOSED IS THE PREFERRED OPTION

- There is no alternative to the NEM, or any alternative that provides access to a flexible and competitive energy market with mature regulation across tech, economic, market aspects, and strong government oversight of prices. Copperstring has considered the technical and economic characteristics of projects that provide alternative power supply options including gas and gas + renewables configuration. ACIL Allen modelled a forecast cost of isolated generation in the economic impact report and found that is was materially more expensive than the delivered wholesale price of electricity via CopperString. There is no other electricity supply option that delivers such substantive macro economic benefits, and provides benefits across all of northern Queensland, including ancillary benefits such as a dramatic increase in broadband infrastructure capacity and being a catalyst facilitator of a north Queensland hydrogen industry. Providing the North-West Queensland community, and particularly the North West Minerals Province mining and minerals-processing sector with access to the NEM is a significant economic reform that has no substitute. There are substitutes to generate and supply electricity in the NWMP, however they do not provide the same economic, market and infrastructure framework of the NEM and are clearly deficient relative to the NEM based on the analysis undertaken for CuString, including feedback from major energy users in the NWMP.

- CuString has considered alternative methods of connecting the NWMP to the NEM, including different transmission voltages (e.g., 275 kV) and technologies (e.g., Direct Current) and found that on-balance the proposed corridor route and technology is the least-cost and achieves other important objectives such as unlocking the wind energy resources around Hughenden and integrating efficiently with the east-coast and North West Queensland Alternating Current (AC) transmission systems.

- The CopperString 2.0 project has been identified by both the State and Commonwealth Governments as a suitable project to be provided with development funding as part of the COVID19 economic recovery strategies for both governments. This funding and support have been provided on the basis the project aligns with the infrastructure, economic, social and strategic policy objectives of both governments and more importantly because the project has a well-developed case with economic benefits of state and national significance, particularly when compared to other alternative infrastructure projects. CopperString has also undertaken the relevant technical and other assessments as required and is progressing towards construction in late 2021. CopperString and the NEM connection are forecast to deliver broad benefits and is critical to economic growth and the development of NWMP to drive Queensland's global competitiveness and to maximise opportunities from the growing global demand for the resources in the NWMP.

- CopperString provides the NWMP with a connection to the NEM which is structured to provide electricity customers with high reliability, a competitive market driven by economic dispatch and flexibility in contracting supply. The NEM also provides strong government oversight and regulation of technical, economic and market aspects. Access to the NEM for the North West Queensland community creates a "level playing field" with respect to market structure and regulatory oversight that is currently absent in the NWMP and of particular significance to major energy users. This electricity supply reform of access to the NEM will lower barriers to the new economy minerals sector and clean energy investment and is superior to any alternative electricity supply arrangement in this regard.

33 (C) ALTERNATIVES TO THE PROJECT THAT HAVE BEEN CONSIDERED AND JUSTIFICATION FOR WHY THE PROJECT PROPOSED IS THE PREFERRED OPTION

- Alternatives for the NWMP are limited to local generation options which –
  - lock in the current high cost structure based on gas/diesel generation, smaller unit sizes with higher unit capex and lower efficiency
  - Are based on bilateral contracting with no market structure to drive economic, competitive supply (currently **only one** supplier), adding significant complexity and risk that can only be borne by a customer
  - Renewable energy development has not progressed despite the abundant resource. A flat demand profile, high cost of firming with no market structure, technical issues with high penetration of renewables in an isolated grid are issues impacting.

- One alternate project has proposed (with information in the public domain) 400 MW of supply based off 400 MW solar farm+600 MW windfarm and gas fired firming. No project cost information was provided but indicatively the capital cost of such a development would be in excess of $1.7 billion, assuming existing gas fired generation could be used for firming the renewable generation. Overcoming technical issues of intermittency and stability when supplying to large industrial 24x7 loads would likely increase the capital cost of such a project. A project of this type would reduce the carbon intensity of supply to NWMP, but with the high capital cost and operating cost for firming, the delivered electricity price is unlikely to be lower than current.

- In addition to connecting the NWMP, CopperString also connects some of Queensland's highest quality renewable energy resource regions to the NEM. These regions are currently sterilised by lack of connection to the major load centre in the NWMP or the NEM and so can not assist in delivering the State's QRET target of 50% renewable energy by 2030.

- NEM connection through CopperString increases the opportunity for development of generation opportunities in the NWMP, any new generation can be at a larger scale (e.g., wind, solar, solar-thermal, gas) provided it can compete with other generation sources in the NEM. This market mechanism ensures new generation investment is efficient and in the best interest of customers
- Local generation proposals can, and are attempting to, contract with selected customers in a way the creates a barrier to establishing a connection to the NEM. The cherry-picking of customers in a manner that could be detrimental to other customers (current and future) in the NWMP is a key risk for CopperString and for development in the NWMP. It highlights the importance of implementing a reform of the electricity supply arrangements, with integrating the NEM being the first step.

- Revised project modelling forecasts delivered NWMP wholesale electricity prices below the $100/MW hour and is consistent with the notional @40% electricity cost reduction target identified by Soren/Izmin resources economics study and minerals production forecast. Given there is no basis for assuming a material change in the forecast minerals production increase as a result of CopperString, the macro economic benefits forecast by ACIL Allen also remain appropriate.

33 (D) A SENSITIVITY ANALYSIS FOR CHANGES IN FUTURE GAS COSTS AND ENERGY CONSUMPTION IN THE NWMP IN ADDITION TO THAT PROVIDED IN THE DRAFT EIS

- ACIL Allen has not run a sensitivity with lower gas prices. Indicatively, a reduction in gas cost of $1/GJ will reduce the cost of gas fired generation in Mt Isa in the BAU case by about $7.20/MWh. But gas fired generation represents about 70-80% of total generation in the Mt Isa region (the remainder is liquid fuel, and we conservatively assume development of some solar in the BAU case. For a reduced gas-price the average electricity price impact in the region would be about $5.50/MWh. However, lower gas prices will also reduce the wholesale prices in the current Qld region of the NEM since gas plant tend to set prices during the evening peak. In the NEM it is the less efficient gas plant that tend to set the price in the evening peak, and their costs would decrease by about $10/MWh. Assuming these plant are influencing the price outcome in the NEM for 3-4 hours per day (during the evening peak) then the NEM wholesale price reduction might be about $1.70/MWh. Hence for a $1/GJ gas cost reduction, the net differential in energy costs between the BAU and NEM connected case for Mt Isa might reduce by about $3.80/MWh ($5.50 – $1.70).
- ACIL Allen has done a Gas Market Update in March 2021 of the broader gas market and how that is likely to impact Mount Isa gas supply costs. The update takes account of market developments and Covid impacts on the broader gas market. There has been a slight reduction in the forecast gas price in the short term but the trend for medium and long term prices is largely unchanged.
- The gas market remains inherently volatile, noting the ECGM prices in Victoria have experienced peaks of over $30/GJ in recent weeks (to 12 July 2021).
- Gas commodity and gas transport procurement is complex for a buyer, particularly a small buyer such as a mid-tier or small mining company in the NWMP. Efficiently managing this high value procurement and contract management task is a significant drag on resources and a lack of expertise increases the risk associated with such procurement.
- In a macro economic context, gas should be used for domestic purposes where it creates most value and these uses are for very high value generation such as peaking capacity when the cost of alternatives is very high, or where gas is an essential element for industrial manufacturing such as heating in minerals processing, fertiliser production, etc. Using gas as a dominant fuel for power generation where this is not essential is contrary to the macro economic signals of gas being a high-value domestic production input, and being a high-value export. These higher value uses will maintain upward pressure on domestic prices.

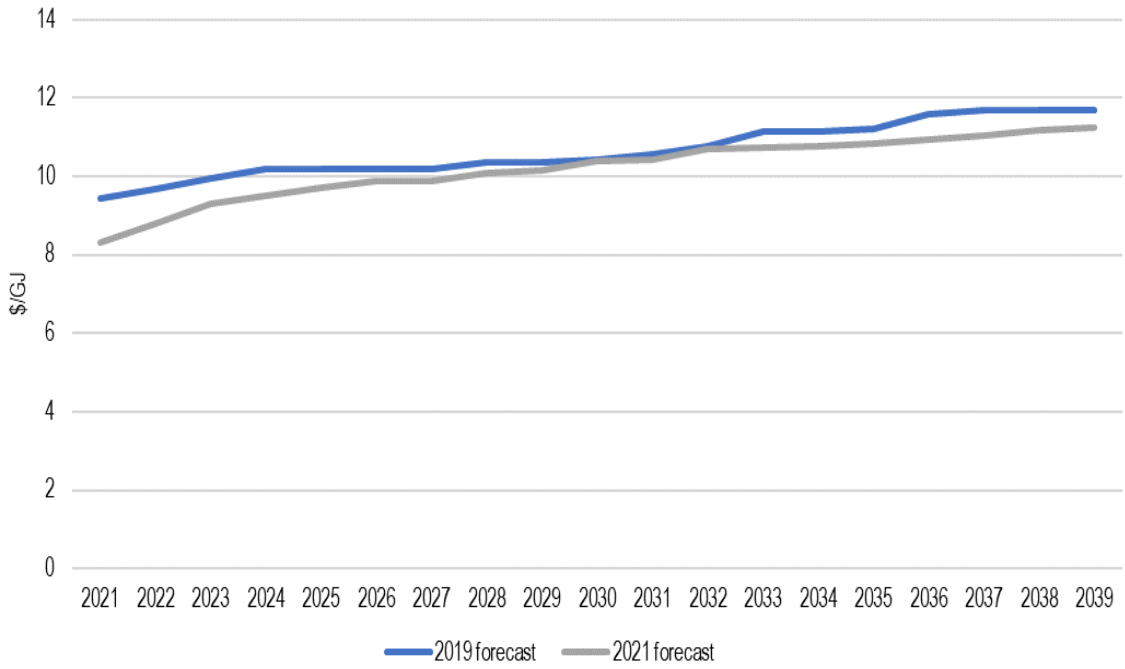
33 (D) A SENSITIVITY ANALYSIS FOR CHANGES IN FUTURE GAS COSTS AND ENERGY CONSUMPTION IN THE NWMP IN ADDITION TO THAT PROVIDED IN THE DRAFT EIS

- ACIL Allen's projection for long term contract gas prices in the Mount Isa region is shown opposite. Contract gas prices are expected to hover between $8-9.50/GJ over the next few years before climbing above $10/GJ by the mid-to-late 2020s. Beyond 2030, contract prices will be in the $10.50-11.50/GJ range without any additional supply coming online.
- The ACCC's last report indicates that contracts being offered much closer to the LNG netback. It appears that the vast majority of contracts being offered, particularly by producers, has been within a $1/GJ of the forecast LNG netback. Before 2020, contract prices were commonly priced $2/GJ above the LNG netback.

Long term supply

- Long term contract prices are still expected to rise over the long term as the demand/supply balance will remain tight. The decline of the Bass Strait and some risk around long term CSG supply in Queensland still means the market will be tight for gas. To satisfy both long term and domestic supply, large sources of supply will need be discovered and brought online over the next couple of decades.
- For Mount Isa in particular, supply could be largely reliant on Surat/Bowen conventional and unconventional gas and larger supply from the Northern Territory over time. Production costs will only increase without a significant technological development in gas extraction technology and techniques. As a result, rising production costs and relatively high transmission costs to transport gas to Mount Isa will mean rising costs for gas in the long term.

Forecast long term contract Mount Isa gas price ($/GJ, real 2020)



Source : ACIL Allen Gas Market Update March 2021

33 (E) WHETHER THE AUSTRALIAN ENERGY REGULATOR'S STANDARD REGULATORY INVESTMENT TEST FOR TRANSMISSION (RIT-T) PROCESS WILL BE UNDERTAKEN FOR THE PROJECT AND IF SO THE TIMING FOR THIS

- The requirement to undertake a RIT-T is imposed on entities that are registered as an Transmission Network Service Provider (TNSP) in the NEM. CuString will not be registered as a TNSP until the Project is commissioned and is therefore not required to do a RIT-T.
- Even if a CuString was obliged by the NER to conduct a RIT-T the process of the RIT-T would not be able to take into account the benefits that would accrue to customers of the Project who are not currently customers in the NEM. Indeed, there is no precedent since the NEM was established where a transmission network was constructed to link two power systems where one of those power systems is not currently part of the NEM (i.e.,- the North West Queensland Power System) and hence the RIT-T has never considered an investment of this nature, nor is it designed to consider this circumstance.
- An assessment of the benefits of the CopperString Project will instead, be undertaken by other means.
- In considering the decision to implement the CopperString transmission network, the State is and will continue to make detailed financial and economic assessments including the direct benefits and costs to electricity customers. Importantly, this consideration will include customers in the NWMP that are not currently represented under the NEM framework or of the concern of the AER.
- An Environmental Impact Statement will have been prepared and subjected to a public consultation process, an Independent Expert will have considered the efficiency of capital costs. The accompanying ACIL Allen economic report will provide an economic assessment of the Project.
- The standard NER RIT-T process involves the AER determining the prudency of proposed projects (i.e. the option which maximises net value to customers to address an identified need) for projects covered by the NER. In the case of the Project, the prudency of the proposed investment for the initial Opening Asset Base and for Forecasted Projects (in the MAR Submission) will have already been accepted by the State as evidenced by the passage of the required derogations into law that allow the project to connect the North West Minerals Province to the NEM.
- As an alternative to the RIT-T process, but consistent with the objectives of that process, the proposed process involves an Independent Expert verifying the calculation of the MAR Values and ensuring alignment with the Efficiency Test as set out in the agreed MAR Methodology for the initial opening asset base. The State will also have completed a Regulatory Impact Statement process, and the legislation (the Act) required to implement the CopperString transmission network, including the regulated revenue entitlement will have been created by the Parliament

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