OPTIONS EVALUATION REPORT (OER)

Strengthening Far West NSW Network

OER 000000001698 revision 2.0

Ellipse project no(s):
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Project category: Prescribed - Augmentation

Approvals

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Change history

Revision	Date	Amendment
0	28/10/2015	Initial Issue
1	22/11/2016	Update Risk and NPV
2	27/09/2021	Update to new template; align with the updated NOSA and revised NPV analysis

Executive summary

The City of Broken Hill is the largest regional centre in the western half of New South Wales, with a long history of mining. The area has a wealth of exploited and untapped mineral resources and significant new mining opportunities have been identified including iron ore and cobalt.

There is demand growth in the Broken Hill area, which is forecast to increase significantly over the next 10 years. New mine loads planning to connect to the Broken Hill area have been identified, with the forecast load expected to increase by [redacted].

Studies have shown that connection of these additional loads will result in under-voltage conditions (< 0.9pu) and voltage step change exceeding the acceptable limit of 10% at Broken Hill 220kV and 22kV busbars as well as the proposed 220kV connection point of the mine loads during N-1 conditions. In addition to the voltage constraints, it has also been noted that the loading on 220 kV Line X2 would exceed the nominal rating with the additional load supplied at Broken Hill during N-1 conditions.

As a consequence, there is a need to reinforce the supply network in the far west of NSW in order to supply the forecast load increases and to ensure the network continues to operate within design and regulatory limits.

As the transmission network services provider in New South Wales, TransGrid is obliged to comply with the relevant Clauses of the National Electricity Rules to facilitate connection of loads while operating the network in secure and satisfactory state. Non-investment would result in non-compliance due to the potential voltage violations under N-1 conditions. Additionally, the value of unserved energy due to load shedding to maintain voltages within compliance is an economic cost that can be avoided through network augmentation.

The assessment of the options considered to address the need/opportunity appears in Table 1.

Table 1 - Evaluated options

Option	Description	Direct capital cost ($m)	Network and corporate overheads ($m)	Total capital cost[1] ($m)	Weighted NPV (PV, $m)	Rank
Option B	Install a third SVC (+60/-40MVAr) at Broken Hill	26.5	0.9	27.4	15,477	2
Option C	Install 2 x 30 MVAr 220kV capacitors at Broken Hill	14.6	0.8	15.4	15,486	1

The final preferred option will be determined through the RIT-T process based on detailed network analysis, market modelling, and the assessment of technical and economic feasibility. However, based on the evaluation of the options in this report, the preferred network option is Option C – Install 2 x 30MVAr 220kV capacitors at Broken Hill.

Option C has been selected as the preferred option based on the following reasons.

- It delivers the highest Net Present Value for all scenarios considered compared to the other options evaluated;
- It is technically feasible and addresses the identified Need;
- It is deliverable with a shorter project duration than the other options;
- Requires less capital expenditure compared to the other technically feasible options; and

[1] Total capital cost is the sum of the direct capital cost and network and corporate overheads. Total capital cost is used in this OER for all analysis.

> The required area of the additional property acquisition is comparatively less than that of the other options.

It is therefore recommended that the project be approved to proceed to a RIT-T assessment, with a view to the preferred option being implemented by 2028/29.

Based on the options listed in Table 1, it is expected that this Project would incur a capital cost of approximately $15.4 million (non-escalated 2020/21 dollars).

1. Need/opportunity

The City of Broken Hill is the largest regional centre in the western half of New South Wales. It has a long history of mining, being Australia's longest continually mined city and the birthplace of the BHP and Rio Tinto. The area has a wealth of exploited and untapped mineral resources like lead, zinc, silver, iron and cobalt ore deposits and significant new mining opportunities have been identified including iron ore and cobalt.

There is demand growth in the Broken Hill area, which is forecast to increase significantly over the next 10 years.

Figure 1: Transmission network in far west NSW

The existing transmission network in the far west New South Wales is shown Figure 1. TransGrid's Broken Hill 220/22kV substation is supplied from a single 220 kV Line X2 from Buronga. The 53 MW Broken Hill Solar Farm is connected to Broken Hill via two dedicated 22 kV lines, and the 200 MW Silverton Wind Farm is connected to Broken Hill via 220 kV Line X6. The Line X2 has a Summer Day conductor rating of 419 MVA but currently the operating rating of the circuit is limited to 252 MVA due to terminal equipment rating limitations at Buronga.

New mine loads planning to connect to the Broken Hill area have been identified, with the forecast load expected to increase by [redacted] Table 2 provides a summary of the spot loads identified. The development status of the two mine loads is as follows:

- The Hawsons Iron Ore Mine load development is currently at development stage where approval and bankable feasibility studies are being undertaken. The mine load would require power supply to be available on the site towards [redacted]. The ramp up to full production then will take about 6 months so the full plant capacity will be required in [redacted].

TransGrid understands that the Secretary's Environmental Assessment Requirements (SEARs)[2] was reissued for the project on 7 February 2020, and hence the project is at "prepare EIS" status.

> Preliminary discussions conducted with the Cobalt Blue Mine have confirmed that the full load capacity is required in [redacted], although it is noted that final approvals have not yet been obtained for the mine's development. TransGrid understands that the SEARs has been issued 18 February 2020, and hence the project is at "prepare EIS" status[3].

Table 2: Summary of the spot loads

Load	Peak demand	Proposed Connection point	Planned year to connect	Status of the project
Hawsons Iron Ore Mine	[redacted] at 220kV	220kV Line X2; 18 km from Broken Hill	[redacted]	Prepare EIS Connection application to be revised/re-submitted
	[redacted] at 22kV	Broken Hill 22kV bus	[redacted]	
Cobalt Blue Mine	[redacted]	Broken Hill 220 kV bus	[redacted]	Prepare EIS Preliminary connection enquiry

As a consequence of these projected load increases, there is a need to reinforce the supply network in the far west of NSW in order to ensure the network continues to operate within design and regulatory limits hence meeting the NER compliance requirements.

Two load scenarios have been assessed: a central scenario that considers the connection of Hawsons Mine only, and a high scenario that considers the connection of Hawsons Mine and Cobalt Blue Mine. Specifically, studies have shown that connection of these additional loads will result in under-voltage conditions (< 0.9pu) at Broken Hill 220kV and 22kV busbars as well as the proposed 220kV connection point of Hawsons Mine at times when Silverton Wind Farm is out of service or constrained off, or during contingent of trip of 220kV Line X6 (Broken Hill to Silverton). Further, the voltage step change for a contingent trip of X6 would exceed the acceptable limit of 10%. Figure 2 suggests that there is a potential for the total demand in Broken Hill area to exceed the maximum permissible load limit (identified by the voltage constraint) if the proposed loads develop up to their maximum capacities. For the central scenario, the identified voltage constraint is emerging in year 2028/29. Under the high scenario, the need would likely occur earlier.

As the transmission network services provider in New South Wales, TransGrid is obliged to comply with the relevant Clauses of the National Electricity Rules to facilitate connection of loads while operating the network in secure and satisfactory state. As per NER Clause 4.2.2 TransGrid must operate the network in a *satisfactory operating state* where:

> *"The power system is defined as being in a satisfactory operating state when:*
>
> *(b) the voltage magnitudes at all energised busbars at any switchyard or substation of the power system are within the relevant limits set by the relevant Network Service Providers in accordance with clause S5.1.4 of schedule 5.1;*

[2] Major Projects Department of Planning, Industry and Environment, Status of the application SSD-5537

[3] Major Projects, NSW Department of Planning, Industry and Environment, Status of application SSD-10426;

(c) the current flows on all transmission lines of the power system are within the ratings (accounting for time dependency in the case of emergency ratings) as defined by the relevant Network Service Providers in accordance with schedule 5.1;"

Figure 2: Load growth in Broken Hill area (peak demand illustrated)

In addition to the voltage constraints emerging as noted above, it has also been noted that the loading on 220 kV Line X2 would exceed the nominal rating with the additional load supplied at Broken Hill during times where both Silverton Wind Farm (SWF) and Broken Hill Solar (BHS) Farm are out of service[4]. However, this can be remediated by removing the terminal equipment limitation at Buronga and therefore matching the conductor rating of Line X2.

It has been identified that establishment of large block loads of the magnitude proposed in the Broken Hill area would cause operation of the network outside of the *satisfactory operating state*. System analysis has shown that the voltage issues at Broken Hill substation and rating issues on line X2 require remediation if the projects were to occur within the current planning horizon as noted above. Therefore, under these circumstances, TransGrid would not be able to supply the required level of demand of the proposed mine(s) unless network upgrades were completed.

As above, a Need has been identified to increase the voltage support in Broken Hill area to provide the necessary network capability to connect these large block loads while maintaining and operating the network in *satisfactory operating state.* The above described Need is required to be addressed to meet or manage the demand for prescribed transmission services and to be compliant with the regulatory obligations, with a Need Year of 2028/29.

If TransGrid does not proceed with this project, there will be voltage violations at Broken Hill 220kV busbars outside the acceptable limits as discussed above resulting in non-compliance with NER due to the increased demand in the area and network being operating outside the satisfactory operating state and potential impact on customers through the risk of unserved energy.

2. Related needs/opportunities

> 1754: Broken Hill Supply Reinforcement

[4] Scenario considered: Night time operation where Broken Hill area is supplied from X2 and Silverton Wind Farm (SWF) followed by a contingent trip of X6 or trip of SWF.

This Need is investigating the backup supply arrangements to Broken Hill area loads and is currently undergoing RIT-T assessment process. If similar reactive support is installed to address Need 1754 and associated projects, it could provide a solution to this Need, i.e. the requirement for reactive support to facilitate the safe and reliable connection and supply for the mine loads (Hawsons and Cobalt Blue). In this event the requirement for this need is to be reviewed.

- 1570: Reinforcement of South Western Network (SA-NSW Interconnector)

  This project is Project Energy Connect (PEC), the new transmission link increasing between NSW and SA. The scope of the preferred option involves building new 330kV double circuit line from Buronga to Wagga via South of Darlington Point Dinawan) and installation of dynamic reactive plants including synchronous condensers at Buronga and Dinawan. For the context of this Need and the requirements presented in this document, it has been assumed that the PEC project is committed and will be delivered by year 2024.

- 1193: Broken Hill Broken Hill Secondary Systems Renewal

  The scope of this project renewal of the Broken Hill 220kV Substation assets by in situ replacement of the 22kV switchgear, in situ 22kV and 220kV secondary systems within the existing auxiliary services building.

- N2324: Increase 220kV busbars capacity at Broken Hill

  This project investigates the fault current capability of the existing 220kV disconnectors.

- N2318: Fault level increase and Broken Hill busbar upgrade

  Project initiated to address the fault level increase on the 22kV side.

3. Options

3.1 Base case

The Base Case under this Need is to “do nothing” with the present day network to operate as it currently is. On this basis, if the Hawsons mine load and/or Cobalt Blue mine loads connects as planned, the Broken Hill 220kV busbar voltage can be outside the acceptable limits during contingency conditions. Depending on the timing of these connections in order to maintain the voltages within allowable limits these mine loads would be need to be limited so as not supply the mines up to their respective increased maximum demands.

Hence the base case under this Need TransGrid will not be compliant with the NER requirements to maintain the voltages within required limits while operating the network in a secure and satisfactory state, and there could be risk of unserved energy.

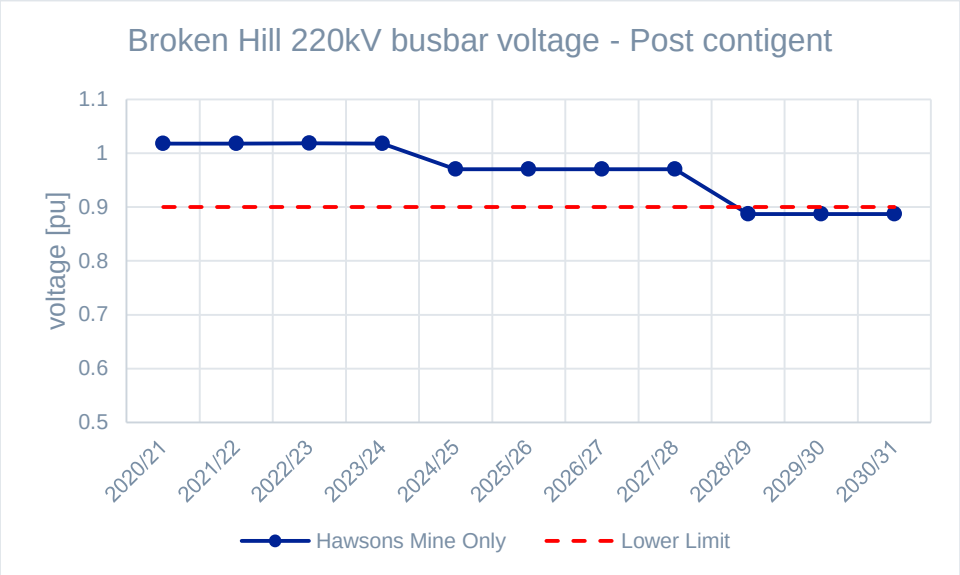

Figure 3: Post contingent voltage at Broken Hill 220kV busbar (Central Scenario – Hawsons Mine ONLY)

Figure 3 shows the post contingent voltage at Broken Hill 22kV busbar for the central scenario. It is evident that non-compliance could occur in 2028/29. The corresponding forecast load duration curves for the illustrated in Figure 4.The energy at risk at Broken Hill is the area between the LDC curves and the “limit” line shown in the graphs. The expected unserved energy throughout the period of analysis is illustrated in the Figure 5 .

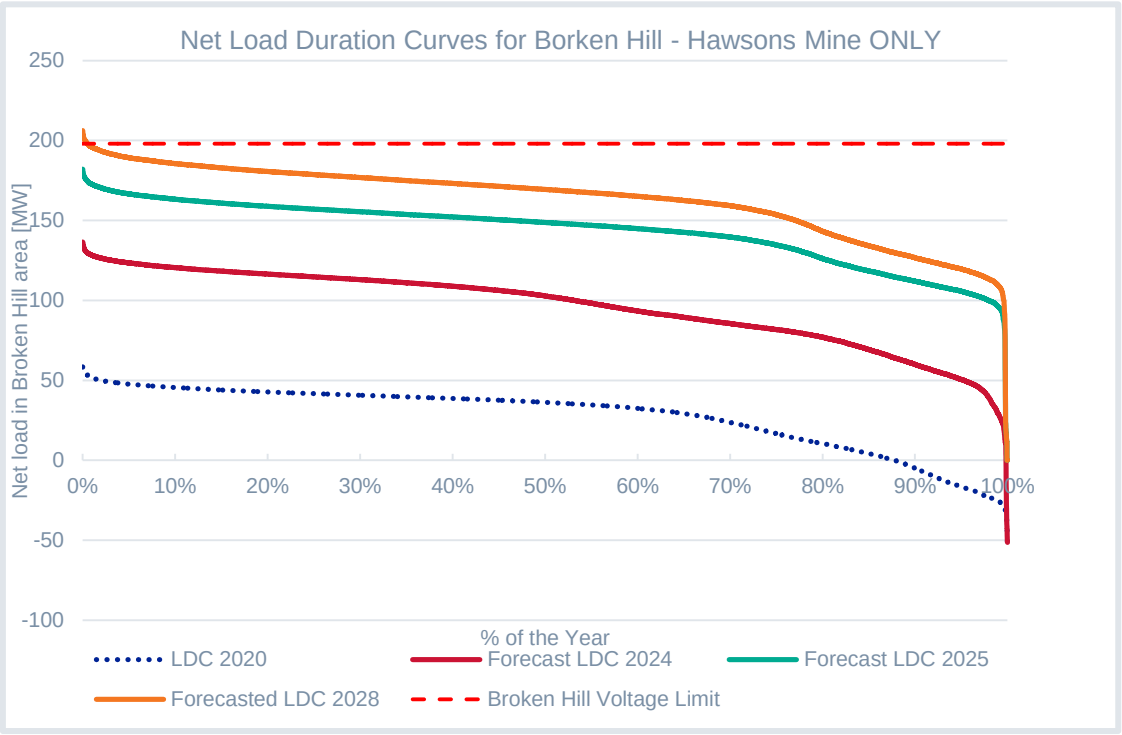

Figure 4: Net load duration curves at Broken Hill (historical and forecast)

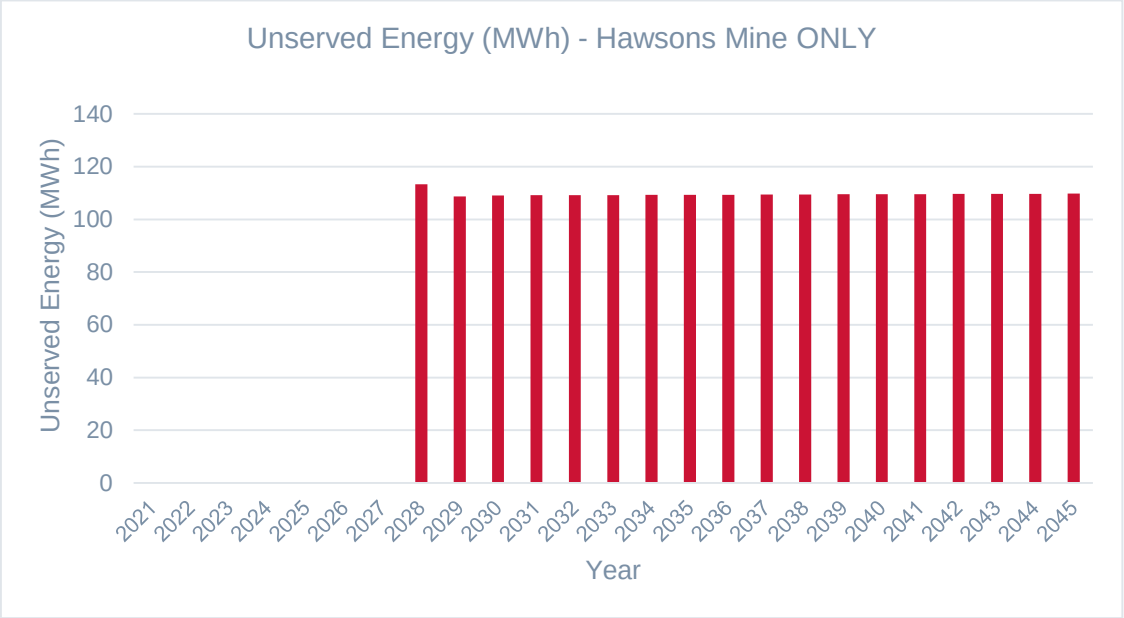

Figure 5: Expected Unserved Energy at Broken Hill if ONLY Hawsons Mine is considered

Table 3: Unserved energy and the Risk Cost[5]

Description	Value
Unserved Energy	1,973 MWh
NPV of the Risk Cost [$m 2020/21]	$42 million

In the base case, the voltage non-compliance would need to be managed by shedding loads when the voltage capacity of the network is exceeded. Table 3 summarises the estimated value of unserved energy in present value terms due to load shedding for the central scenario over the next 25 years.

3.2 Options evaluated

Option B — Install a third SVC (+60/-40 MVAr) Broken Hill

This option investigates the feasibility of installing and operating a new SVC at Broken Hill to provide additional reactive power support required for the mine loads.

The scope of the works identified at Broken Hill 220kV Substation under this option includes following:

> Extend the existing switchyard by 9350m^2 including earthgrid, earthworks and drainage

1. [5] The unserved energy calculated for a 20 year period with a discount rate of 4.8%; a Value of Customer Reliability (VCR) of $43,031.56/MWh based on the AER's VCR review released in December 2019.

- Installation of a new +60/-40 MVAr 220kV Static VAr Compensator (SVC)
- Installation of a new 220/22kV 100MVA SVC Transformer including associated civil, and secondary systems
- Installation of new terminal poles, lines and busbar palms for extension of the No.1 Bus Section
- Installation of a new 220kV and 22kV SVC Transformer switchbay and associated secondary systems
- Relocation of the existing containment dam
- Update the existing Substation Automation System (SAS) to include the new 220kV switchbay and SVC
- Interfacing of the new SVC with the existing SVC equipment on site
- Updating the secondary systems to accommodate the control and operation of the new SVC and Reactive Plant Control (RPC)

Further, this Option will require property acquisition towards the South-Eastern side of the existing switchyard to extend the substation bench space.

In order to address the thermal constraint identified, it is proposed to upgrade the limiting equipment at Buronga and Broken Hill to increase the rating the Line X2 up to its conductor rating.

- Modify the existing Broken Hill No.1 & No.2 busbar protection CT ratios to accommodate the increase to 1050A (400MVA)
- Replace the existing No.1 & No.2 Line protection schemes of Line X2 at Buronga Substation

The expected commissioning date for this option is 2028/29.

The expected expenditure profile for this option has been obtained using TransGrid's Standard Cost Estimating System. The estimates are listed in Table 4 below with an uncertainty of ± 25%.

Table 4 – Option B expected expenditure

	Total Project Cost ($M)	2025/26	2026/27	2027/28	2028/29
Estimated Cost – non-escalated ($M 2020-21)	27.4	1.5	7.3	18.5	0.1

It is estimated that an amount up to $2 million is required to progress the project from DG1 to DG2 and this cost is included in the expected expenditure in Table 4. This is to cover activities such as site assessments, the development of concept design, the commencement of project approvals and the early procurement of long lead-time items as required.

This project is expected to be completed in an estimated 41 months following the approval of DG1.

Option C — Install 2 x 30MVAr 220kV capacitor at Broken Hill

This option involves installation of two 30MVAr capacitor banks at Broken Hill Substation to provide additional voltage support as necessary. The works required include:

- Extend the existing switchyard by 5427m^2 including earth grid, earthworks and drainage works
- Relocate the existing containment dam
- Extension of the existing 220kV busbar using terminal poles and overhead lines
- Installation of 2 x 220kV 30MVAr Capacitor Banks including associated switchbays and secondary systems
- Update the existing secondary systems and modify the existing Broken Hill Reactive Plant Control to include the new Capacitor Banks

Further, the proposed layout of the new Capacitor Banks at Broken Hill will require property acquisition towards the South-Eastern side of the existing switchyard.

In order to address the thermal constraint identified, the following scope of works is proposed to increase the rating of Line X2 up to its maximum conductor rating.

- Modify the existing Broken Hill No.1 & No.2 busbar protection CT ratios to accommodate the increase to 1050A (400MVA)
- Replace the existing No.1 & No.2 Line protection schemes of Line X2 at Buronga Substation

The expected commissioning date for this option is 2028/29.

The expected expenditure profile for this option is obtained from TransGrid's Standard Cost Estimating System. The estimates are shown in the Table 5 below with an uncertainty of ± 25%.

Table 5 – Option C expected expenditure

	Total Project Cost ($M)	2026/27	2027/28	2028/29
Estimated Cost – non-escalated ($M 2020-21)	15.4	1.1	7.3	7.0

It is estimated that an amount up to $1.5 million is required to progress the project from DG1 to DG2 and is included in the expected expenditure in Table 5. This is to cover activities such as site assessments, the development of concept design, the commencement of project approvals and the early procurement of long lead-time items as required.

This project is expected to be completed in an estimated 36 months following the approval of DG1.

Option F — Non-network options

Potential non-network options may include but may not be limited to the following, or may include a combination of:

- procurement of demand management services in the Broken Hill area during the times of peak demand and/or outage conditions to alleviate the network constraints;
- procurement of reactive power support from renewable generation in the area (i.e. Broken Hill Solar Farm);
- support from embedded generation or energy storage; and
- voluntary under voltage load shedding schemes associated with industrial loads in the area.

It is expected that investigation of potential non-network options will be undertaken during the RIT-T process.

3.3 Options considered and not progressed

Other options were considered but not progressed as they was considered not technically or economically feasible. These options are outlined in the table below.

Option	Reason for not progressing

Option A — Upgrade the existing No.1 and No.2 SVCs at Broken Hill	As per the preliminary advice from the OEM[6] of the existing SVCs, it has been identified that the expansion of the capacitive range of the SVC would require installation of mechanically switched capacitors outside the SVC. In effect the outcome of this approach would be same as Option C hence this option has been excluded from the further analysis and the commercial evaluation.
Option D — Install a 100MW/200MWh BESS at Broken Hill	A preliminary review indicated that the expected footprint of the BESS would require additional property acquisition of approximately 4150m^2. The supply only cost of the BESS requested in this option is indicatively $108 million, excluding the cost of the additional property and the associated additional plant and substation augmentation works. Based on the above, the expected cost estimate for this option will be well in excess of $108 million. Hence this option is considered commercially not viable.
Option E — Establish a second 220kV single circuit between Buronga and Broken Hill	This option is technically feasible but has an estimated cost of $170 million which renders this option commercially not viable.

4. Evaluation

4.1 Commercial evaluation methodology

The economic assessment undertaken for this project includes three scenarios that reflect a central set of assumptions based on current information that is most likely to eventuate (central scenario), a set of assumptions that give rise to a lower bound for net benefits (lower bound scenario), and a set of assumptions that give rise to an upper bound on benefits (higher bound scenario).

Assumptions for each scenario are set out in the table below.

Table 6: Assumptions used in scenarios

Parameter	Central scenario	Lower bound scenario	Higher bound scenario
Discount rate	4.8%	7.37%	2.23%
Spot loads	100% of Hawsons Mine [redacted]	70% of Hawsons Mine [redacted]	100% Hawsons Mine [redacted] 100% Cobalt Blue Mine [redacted]
BSP Demand Growth[7]	Medium (POE50)	Low (POE90)	High (POE10)
Capital cost	100%	125%	75%
Operating expenditure	100%	125%	75%

[6] Original Equipment Manufacturer: ABB for the existing SVCs

[7] BSP demand growth

VCR	AER Latest VCR[8] (escalated) 100%	70%	130%
Scenario weighting	**50%**	**25%**	**25%**

As indicated in Table 6 in the Central scenario assumed only Hawsons mine will connect at its full load capacity as planned. The Cobalt Blue mine was excluded in the Central scenario as it is still in early stages of the connection process compared to the Hawsons mine which has lodged a connection application with TransGrid. Hence the likelihood of connecting the Hawsons mine by 2025 is assumed to be greater than that of the Cobalt Blue mine.

The Low scenario assumed Hawsons mine will connect only up to 70% of the quoted full load capacity. The High scenario assumed both mine loads will connect at their full load capacity. In all scenarios, the timing of these load connections were assumed as per the forecasts indicated by the proponents.

Since the central scenario represents the most likely scenario to occur, it has been weighted at 50%. The other two scenarios reflect extreme combinations of assumptions designed to stress test the results. Accordingly, these scenarios are weighted at 25% each.

Parameters used in this commercial evaluation:

Parameter	Parameter Description	Value used for this evaluation
Discount year	Year that dollar values are discounted to	2021
Base year	The year that dollar value outputs are expressed in real terms	2020/21 dollars
Period of analysis	Number of years included in economic analysis with remaining capital value included as terminal value at the end of the analysis period.	25 years

The capex figures in this OER do not include any real cost escalation.

4.2 Commercial evaluation results

The commercial evaluation of the technically feasible options is set out in Table 2. Details appear in Appendix A.

Table 7 - Commercial evaluation (PV, $ million)

Option	Capital Cost PV	OPEX Cost PV	Central scenario NPV	Lower bound scenario NPV	Higher bound scenario NPV	Weighted NPV	Ranking
Option B	16.2	4.9	6.1	-24.0	61,919	15,477	2
Option C	8.7	2.8	15.7	-12.8	61,927	15,486	1

[8] AER 2019 December VCR value escalated by CPI to 2020/21 dollars.

4.3 Preferred option

Amongst the options considered, only Option B and C have been identified as technically and commercially feasible, and hence assessed in the commercial evaluation. For the Central scenario where only Hawsons mine is considered both options B and C yield positive Net Present Values (NPV) whilst Option C results in a NPV twice the value of Option B. In the High scenario where both mine loads were considered, both options yield comparatively large amounts of NPV due to the large quantities of expected unserved energy associated with the aggregated load increase. The preferred option has been selected based on the Central Scenario where the most likely load increase is assessed. Therefore Option B which yields the highest NPV has been selected as the preferred option. In addition to the higher positive NPV, Option C provides the following benefits:

- It can be implemented in a shorter duration than Option B.
- Although Option C requires property acquisition for switchyard extension, a smaller area is required compared to Option B.

The following investments will be undertaken under the preferred option:

- Install 2 x 30MVAr 220kV capacitors at Broken Hill.

The scope of the work under the preferred option includes:

- Extend the existing switchyard by 5427m^2 including earth grid, earthworks and drainage works
- Relocate the existing containment dam
- Extension of the existing 220kV busbar using terminal poles and overhead lines
- Installation of 2 x 220kV 30MVAr Capacitor Banks including associated switchbays and secondary systems
- Update the existing secondary systems and modify the existing Broken Hill Reactive Plant Control to include the new Capacitor Banks
- Modify the existing Broken Hill No.1 & No.2 busbar protection CT ratios to accommodate the increase to 1050A (400MVA)
- Replace the existing No.1 & No.2 Line protection schemes of Line X2 at Buronga Substation

Capital and Operating Expenditure

The preferred option requires capital expenditure of $15.4 million. The operating expenditure is estimated as 2% of the capital expenditure for the assessment.

The base case requires no capital or operating expenditure.

Regulatory Investment Test

As the estimated cost of the project is above the Regulatory Investment Test (RIT-T) threshold of $6M, a RIT-T will be required.

5. Optimal Timing

The test for optimal timing of the preferred option has been undertaken. The approach taken is to identify the commissioning year for the preferred option where the demand level increases causing the non-compliance and net benefits (including avoided costs and safety disproportionality tests) of the preferred option exceeds the annualised costs of the option. The commencement year is determined based on the required project disbursement to meet the commissioning year based on the OFS.

The results of optimal timing analysis is:

- Optimal commissioning year: 2028/29
  - The optimal commissioning year has been selected based on the Central Scenario where only Hawsons Mine connects, hence when the demand is forecast to exceed the voltage limit.

- Commissioning year annual benefit: $1.6m
- Annualised cost: $874k

Based on the optimal timing, the project is expected to commence in the 2023-2028 Regulatory Period.

6. Recommendation

The final preferred option will be determined through the RIT-T process based on detailed network analysis, market modelling, technical and economic feasibility. However, based on the option evaluations in this report, the preferred network option is Option C – Install 2 x 30MVAr 220kV capacitors at Broken Hill.

It is therefore recommended that the project be approved to proceed to a RIT-T assessment, with a view to the preferred option being implemented by 2028/29.

Based on the options listed in Section 3.1, it is expected that this Project would incur a capital cost of approximately $15.4 million non-escalated 2020/21 dollars.

Appendix A – Option Summaries

Project Description	**Supply to Far West NSW Network**		
Option Description	Option B — Install a third SVC (+60/-40 MVAr) at Broken Hill		
Project Summary			
Option Rank	*2*	Investment Assessment Period	25
Asset Life	40	NPV Year	*2021*
Economic Evaluation			
NPV @ Central Benefit Scenario (PV, $m)	*6.1*	Annualised CAPEX ($m)	*1.6*
NPV @ Lower Bound Scenario (PV, $m)	*-24.0*	Network Safety Risk Reduction ($m)	*N/A*
NPV @ Higher Bound Scenario (PV, $m)	*61,919*	ALARP	N/A
NPV Weighted (PV, $m)	*15,477*	Optimal Timing	*2028/29*
Cost			
Direct Capex ($m)	26.5	Network and Corporate Overheads ($m)	0.9
Total Capex ($m)	27.4	Cost Capex (PV,$m)	16.2
Terminal Value ($m)	15.1	Terminal Value (PV,$m)	4.9

Project Description	Supply to Far West NSW Network		
Option Description	Option C — Install 2 x 30MVAr 220kV capacitors at Broken Hill		
Project Summary			
Option Rank	*1*	Investment Assessment Period	25
Asset Life	40	NPV Year	*2021*
Economic Evaluation			
NPV @ Central Benefit Scenario (PV, $m)	*15.7*	Annualised CAPEX ($m)	*0.9*
NPV @ Lower Bound Scenario (PV, $m)	*-12.8*	Network Safety Risk Reduction ($m)	*N/A*
NPV @ Higher Bound Scenario (PV, $m)	*61,927*	ALARP	N/A
NPV Weighted (PV, $m)	*15,486*	Optimal Timing	*2028/29*
Cost			
Direct Capex ($m)	14.6	Network and Corporate Overheads ($m)	0.8
Total Capex ($m)	15.4	Cost Capex (PV,$m)	8.7
Terminal Value ($m)	8.5	Terminal Value (PV,$m)	2.8