31 January 2023

Attachment 5.10.d - Crane borer program

Ausgrid's 2024-29 Regulatory Proposal

Empowering communities for a resilient, affordable and net-zero future.

Ausgrid

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1. Document governance

1.1. Purpose of this document

The purpose of this document is to outline a business case for Ausgrid's crane borer replacement program that may, subject to investment governance processes, form part of Ausgrid's 2024-29 regulatory proposal.

Related documents

Document	Version	Author
Fleet Strategy – 2024-29 Regulatory Proposal Support Document	V1.0	Tim Kynoch
Fleet Capital Expenditure Strategy – Benefits Assessment Approach	V1.0	Craig Calder
Ausgrid Fleet NPV Model	Final	Ernst & Young

Document history

Date	Version	Comment	Person
17/10/2022	V0.2	Initial draft	Damon Taylor

Approval(s)

Name	Position	Date
Kelly Wood	EGM Network Delivery Services	

2. Executive summary

The table below provides a summary of Ausgrid's crane borer replacement program business case. It provides a recommendation derived from analysis of four options overall, informed by Ausgrid's experience in operating crane borers over the last three regulatory periods (2019-24, 2014-19, 2009-14). The proposed program of work, if approved, would deliver net benefits of $0.2 million based on our net present value (**NPV**) modelling.

Executive summary							
Key objective(s) of the program	Ausgrid's fleet capex program is focused on improving employee safety, standardising vehicle types to obtain improved pricing, lower operating costs, and improving fleet capability, utilisation and sustainability. Ausgrid's crane borers are the primary platform for pole maintenance, and closely follow elevated work platforms (**EWP**s) in terms of critical capability. The existing fleet was predominantly purchased during the 2009-14 regulatory period to support the significant period of network capital construction that took place at that time. With a technical life of 15 years and a current average age in excess of 12 years, the 2024-29 program for crane borers will renew 33 assets that have reached end of determined useful life by a stable, powerful platform to install and remove poles safely and efficiently. Failure to replace crane borers would result in a requirement to conduct an additional major inspection (rebuild) on each asset as it reaches 15 years of service life. Adopting such a strategy is not considered acceptable due to the capital expenditure required and the immaterial benefit it would have on reliability, productivity, employee and public safety and operating costs.						
Key benefits	• Increased employee and public safety • Increased employee productivity • Reduced operating costs • Reduced carbon emissions						
Compliance requirements	Ausgrid Fleet Replacement Guidelines stipulate that the technical life for crane borer assets is 15 years. Notably, relevant Australian Standards AS 1418 and AS 2550 presribe that these assets require major inspections at 10 years and every subsequent 5 years of service life in order to remain compliant.						
Recommended Option & Rationale	Option 2: BAU Replacement • Unlocks second most net economic benefits of options assessed • Represents an appropriate balance of capital investment, operating cost reduction, and capital delivery risk						
Market NPV	$0.2 million						
Expenditure forecast	**($M Real, FY24)**	**FY25**	**FY26**	**FY27**	**FY28**	**FY29**	**Total**
	CAPEX	6.4	5.9	3.7	0.7	-	**16.7**
	OPEX benefits	0.2	0.5	0.6	0.6	0.6	**2.6**
	CAPEX benefits	0.4	0.4	0.3	0.1	-	**1.2**

3. CONTEXT

3.1. Background

Ausgrid's fleet of crane borers, which comprise both plant and underlying vehicle chassis, are the primary platform for pole maintenance. The vast majority of the crane borer fleet was purchased across a 5 year period beginning in 2010 to support the significant period of network capital construction and replacement that took place at that time.

Ausgrid's Fleet Replacement Guidelines stipulate that these assets have a technical life of 15 years. The 2024-29 program for crane borers aims to renew existing assets that have reached end of determined useful life by introducing stable, powerful platforms to install and remove poles safely and efficiently.

3.2. Problem / Opportunity

With an average age in excess of 12 years across 33 individual assets (see **Figure 1** and **Figure 2** below), a significant number of Ausgrid's crane borer assets are rapidly approaching the end of their determined useful life of 15 years.

The subsequent requirement to replace the entire fleet of crane borers, which are considered network critical assets, creates significant deliverability risk in terms of balancing Australian Standards compliance, network need and asset acquisition.

Figure 1 – Crane Borers by Age and Count

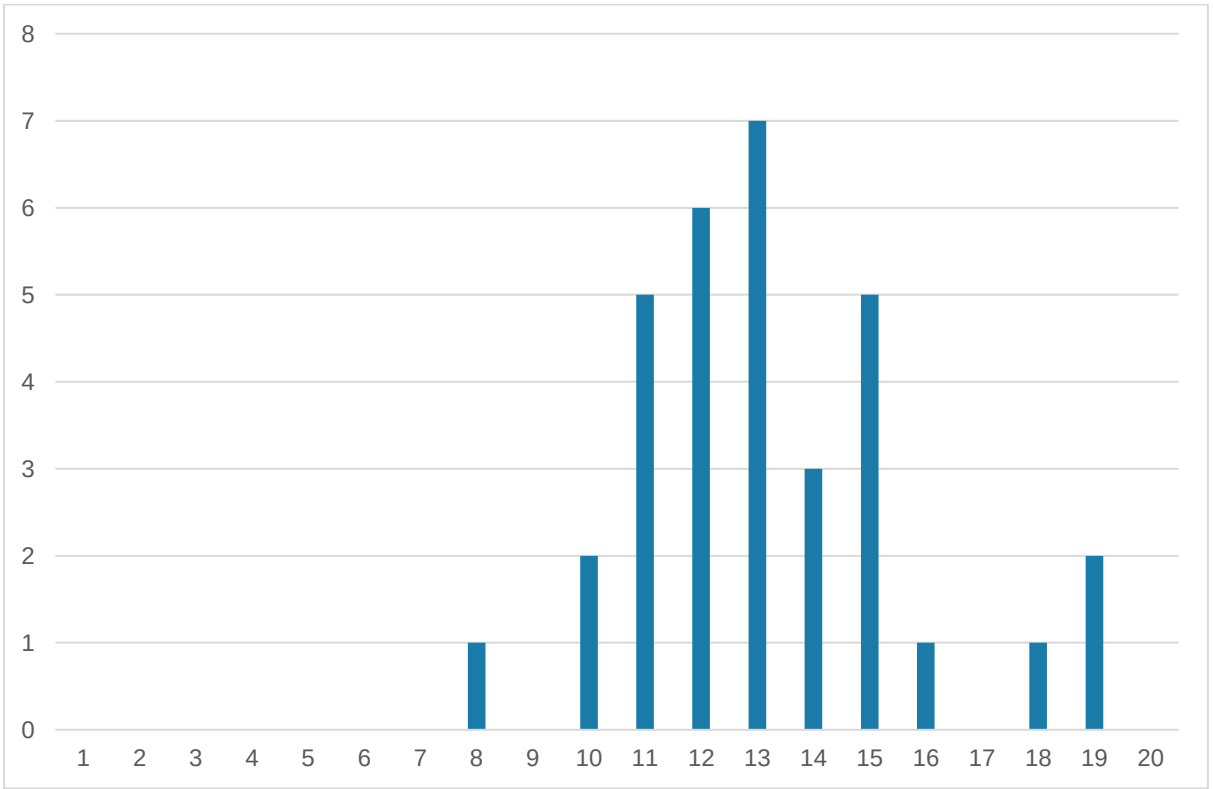
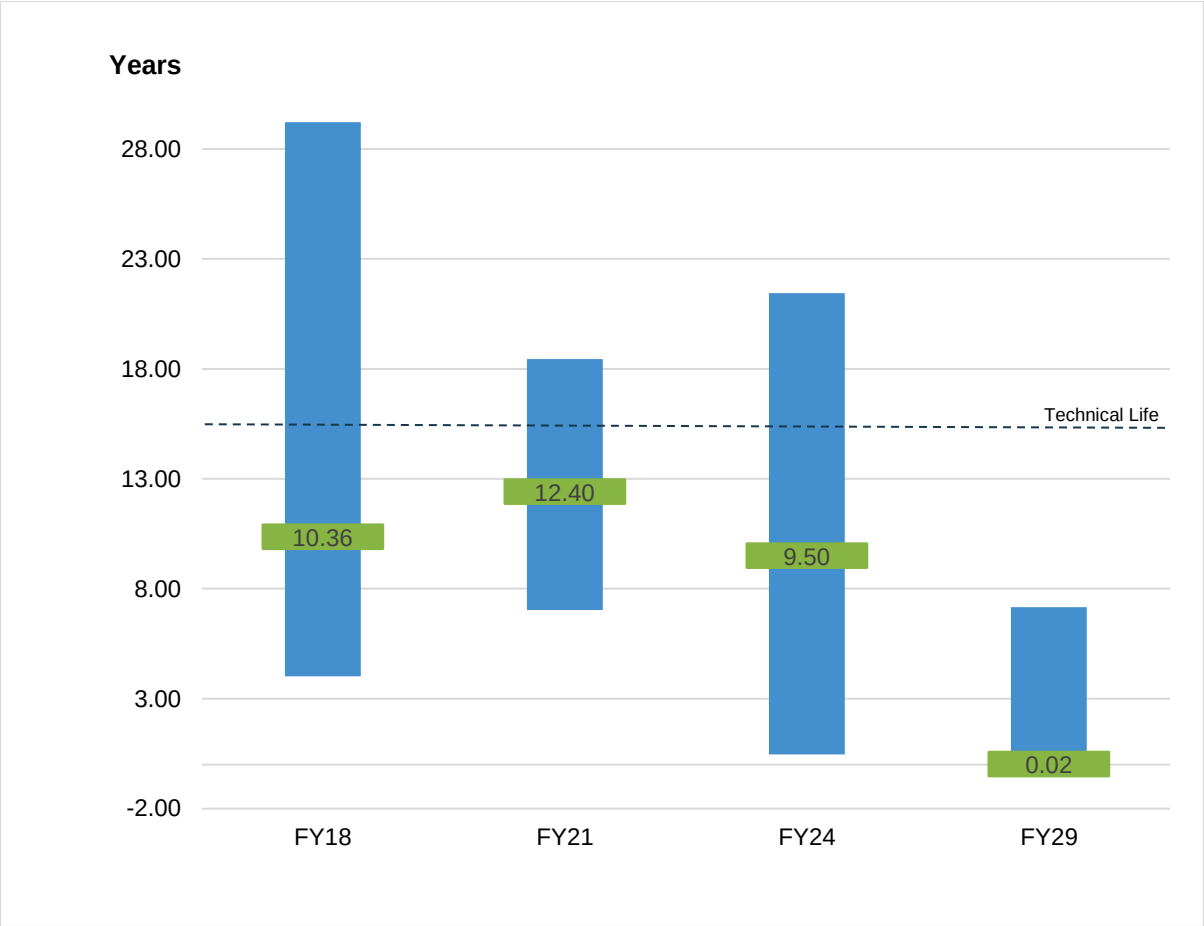


Figure 2 – Crane Borers – Historic & Projected Maximum, Minimum and Average Ages



Ausgrid's current crane borer platforms pose a number of limitations which present both a safety and capability challenge for field staff. Operators experience a number of issues with respect to pole extraction, despite several methods being tried over the last few years. Issues with grabs bending or breaking when it is used to shake or pull the pole, as well as limiters being overridden when crane capacity is reached, are also relatively commonplace.

Noting that crane borer platforms are exceptionally large and cumbersome, with difficulty accessing tight areas within suburban streets, these issues and risks will be addressed as part of Ausgrid's crane borer replacement program by:

- Evaluating current market offerings and examining alternative work practices;
- Testing alternative options for pole installation and removal; and
- Assessing options for multi-purpose platforms, such as skid-steer loaders and heavy excavators, to perform multiple tasks related to boring and pole manipulation, reducing labour effort for urban and rural tasks and delivering efficiency benefits.

Figure 3 below shows a crane borer manufactured by Ozzy cranes. This make accounts for approximately 50% of Ausgrid's crane borer fleet.

Figure 3 – Demonstration of Ozzy 6/10-16 Crane Borer in Hunter region.

As the crane borer fleet has aged, it has also been subject to a significant increase in operating costs (maintenance, repair, fuel, registration, insurance, etc) as shown in **Figure 4** below. In parallel, crane borer breakdowns which have a direct impact on network maintenance and capital delivery, have also increased as shown in **Figure 5**. These failures have a direct impact on network maintenance and capital delivery, with each incident representative of a significant indirect cost in terms of stranded labour and rework.

Figure 4 – Crane Borers: average operating cost per annum over time

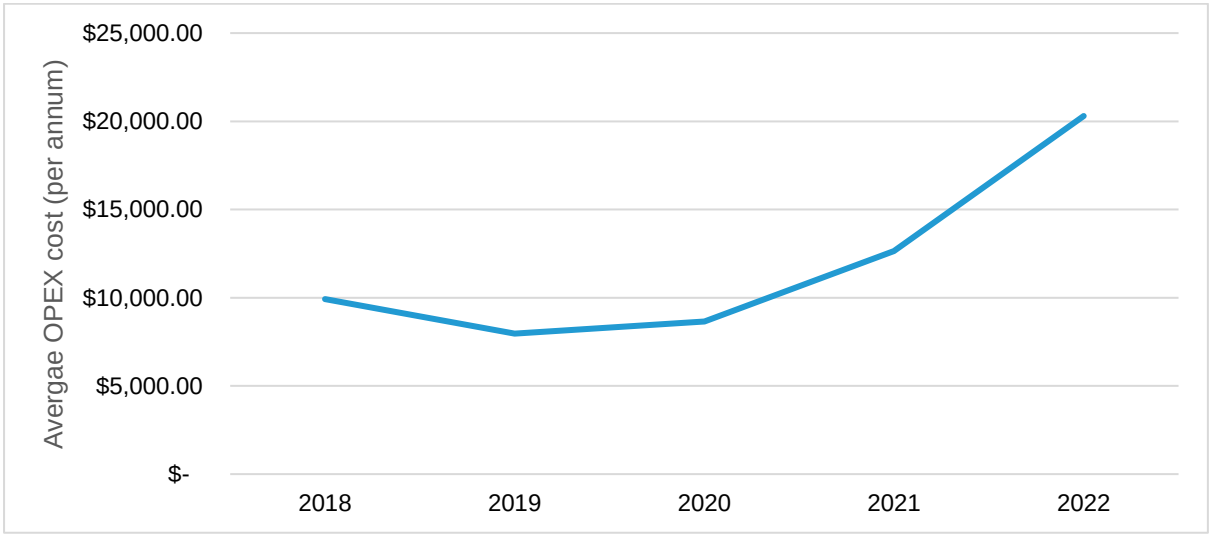
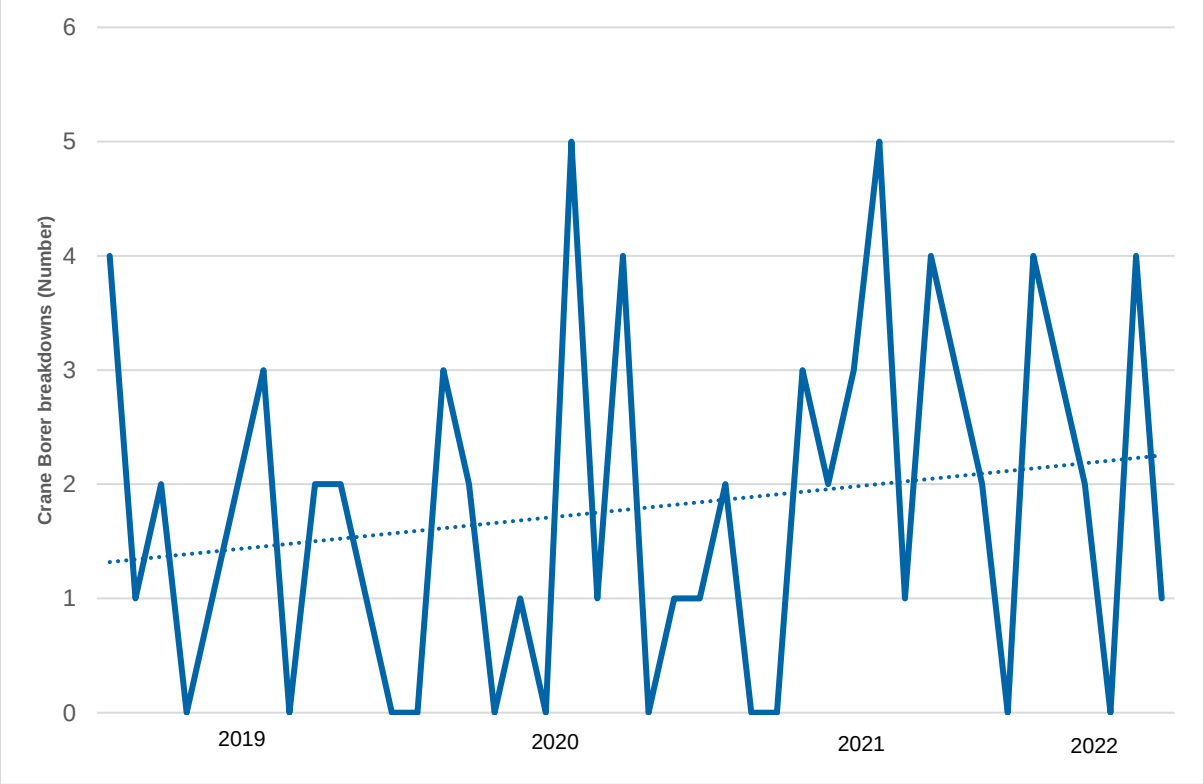


Figure 5 – Crane Borer breakdown trend: 2019 to 2022



In combination, these factors mean that the introduction of a more stable, powerful platform that addresses existing safety and capability issues has the potential to result in a significant reduction in both direct and indirect operating costs.

Conversely, failure to replace crane borers at 15 years as intended would result in a requirement to conduct an additional major inspection on each asset, as prescribed in relevant Australian Standards AS 1418 and AS 2550. This would certify the crane borer for 5 years at a capital cost equivalent to more than 50% of each asset's replacement cost without materially improving reliability or operating cost. Adopting such a strategy would forego any technology or capability benefits to be derived from new assets, while also exposing Ausgrid to increased employee and public safety risk.

3.3. Compliance requirements

Ausgrid's Fleet Replacement Guidelines stipulate that the technical life for crane borer assets is 15 years. This compares favourably when compared to other distruibution network service providers (**DNSP**s), and contractors who generally maintain their fleets to a shorter technical life as shown in **Figure 6** below.

Figure 6 – Fleet lifecycle benchmarking

Company	Passenger Vehicles	**Light Commercial Vehicles**	**Heavy Commercial Vehicles & Plant**
Essential Energy	60 months / 150,000 km	60 months / 150,000 km	10-15 years
Powerlink	48 months	48 – 84 months	8-10 years
Ergon	48 months / 100,000 km	150,000 km	10-15 years
Energex	3 or 5 years	60 months	10-15 years
SA Power Networks	60 months / 150,000 km	60 months / 150,000 km	10 years (EWP) 15 years (crane)
Powercor	60 months / 150,000 km	60 months / 150,000 km	10-15 years (EWP) 10 years (HCV)
Downer	36 months / 90,000 km	36 months / 90,000 km	7-10 years
Jemena	60 months / 150,000 km	60 months / 150,000 km	10-15 years (EWP) 10 years (HCV)
Ausgrid	**60 months / 150,000 km**	**84 months / 150,000 km**	**15 years**

Source: sgfleet (included in Jemena – Attachment 05-01 – Forecast capital expenditure report – 31 January 2020, p. 114)

Crane borer assets have regulated maintenance requirements that are prescribed in relevant Australian Standards AS 1418 and AS 2550. They are manufactured to perform for a 10 year life, at which point they must undergo a “major inspection” otherwise known as a rebuild. This process requires the plant to be stripped down completely and inspected, with worn components refurbished or replaced as needed. This certifies the plant for a further 5 years, at the completion of which it must be either rebuilt again or replaced.

Ausgrid has completed an extensive rebuild program for EWP, crane borer and vehicle loading crane (**VLC**) assets over the last 5 years, rebuilding 171 individual assets at a cost of $17 million. Based on current projections, a further 118 major plant assets require rebuild between FY22 and FY25, after which the introduction of replacement assets will mean that no further rebuilds are required until FY29.

3.4. Procurement Strategy

To support the crane borer replacement program, Ausgrid recently completed a procurement exercise to establish contracts with market-tested rates for the supply of 5/10 tonne platforms with local suppliers. This procurement was completed in early 2022 with contracts executed with Ozzy Cranes and Proline respectively.

4. NPV Methodology & Approach

4.1. Overview of Cash & Probablistic Benefits

The NPV modelling conducted for the 2024-29 Fleet Capital Expenditure Program for crane borers considers the following cash and probabilistic benefits:

- Maintenance costs;
- Repair and breakdown costs;
- Fuel costs;
- Disposal proceeds; and
- Reliability.

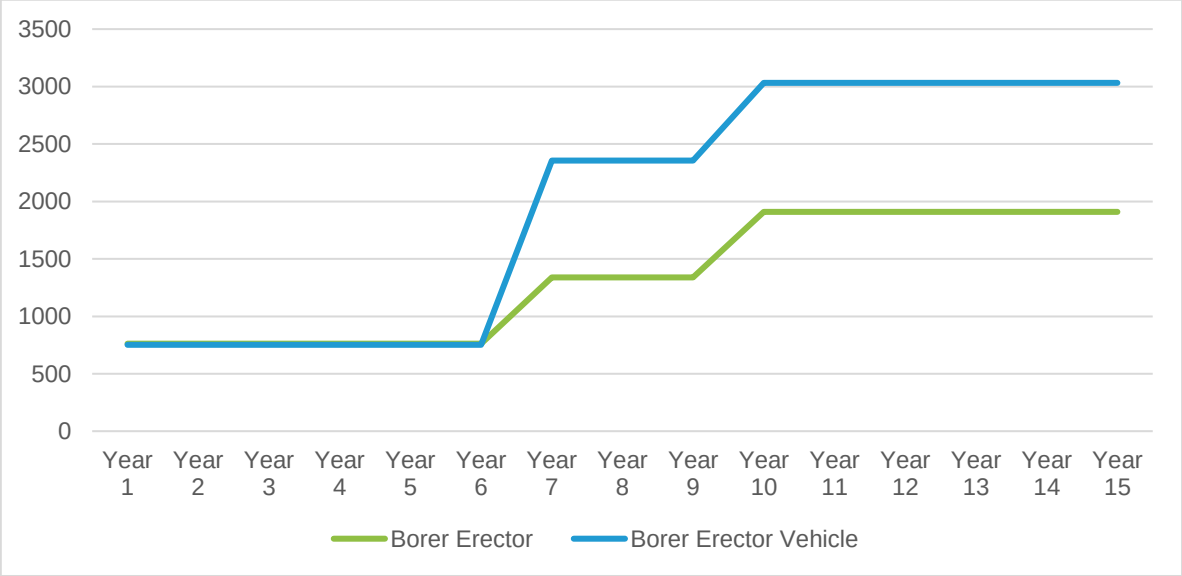
4.2. Maintenance costs

Maintenance costs for crane borers assets consider both the borer erector vehicle and the crane borer itself. Financial data sourced from the Plant Maintenance module (**PM**) of Ausgrid's Enterprise Resource Platform (**ERP**) has been used to calculate the average maintenance cost by asset age in both these asset classes and exhibits significant increases in expenditure in Year 7 and Year 10 as shown in **Figure 7** and **Figure 8** below. Notably, maintenance costs do not increase after Year 10 when major inspections / rebuilds are completed.

Figure 7 – Average annual maintenance costs by asset age ($)

Asset Class	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Borer Erector	762	762	762	762	762	762	1,339	1,339	1,339	1,909	1,909	1,909	1,909	1,909	1,909
Borer Erector Vehicle	752	752	752	752	752	752	2,355	2,355	2,355	3,032	3,032	3,032	3,032	3,032	3,032

Figure 8 – Average annual maintenance costs by asset age ($)



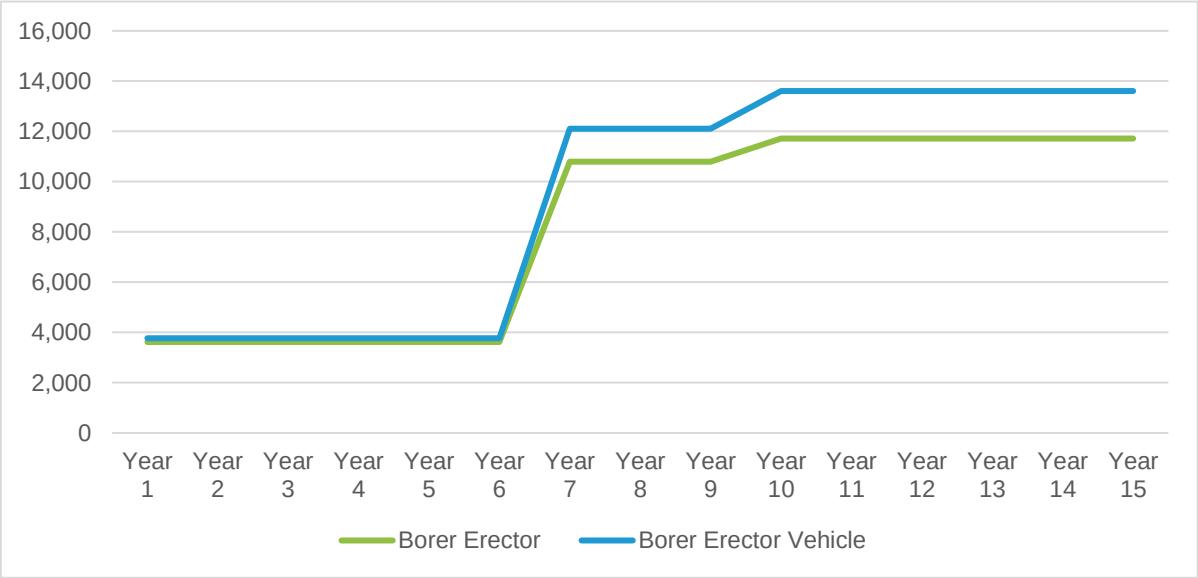
4.3. Repair and breakdown costs

Repair and breakdown costs for crane borer assets also consider both the borer erector vehicle and the crane borer itself. Data from PM has been used to calculate the average repair cost by asset age in both these asset classes and again exhibits a significant increase in expenditure at Year 7 as shown in **Figure 9** and **Figure 10** below. Significantly, particularly when compared to EWP assets, repair and breakdown costs for borer erector vehicles and crane borers increase again at Year 10 despite the completion of major inspections / rebuilds.

Figure 9 – Average annual repair costs by asset age ($)

Asset Class	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Borer Erector	3,620	3,620	3,620	3,620	3,620	3,620	10,791	10,791	10,791	11,717	11,717	11,717	11,717	11,717	11,717
Borer Erector Vehicle	5,837	5,837	5,837	5,837	5,837	5,837	21,046	21,046	21,046	16,396	16,396	16,396	16,396	16,396	16,396

Figure 10 – Average annual repair costs by asset age ($)



4.4. Fuel costs

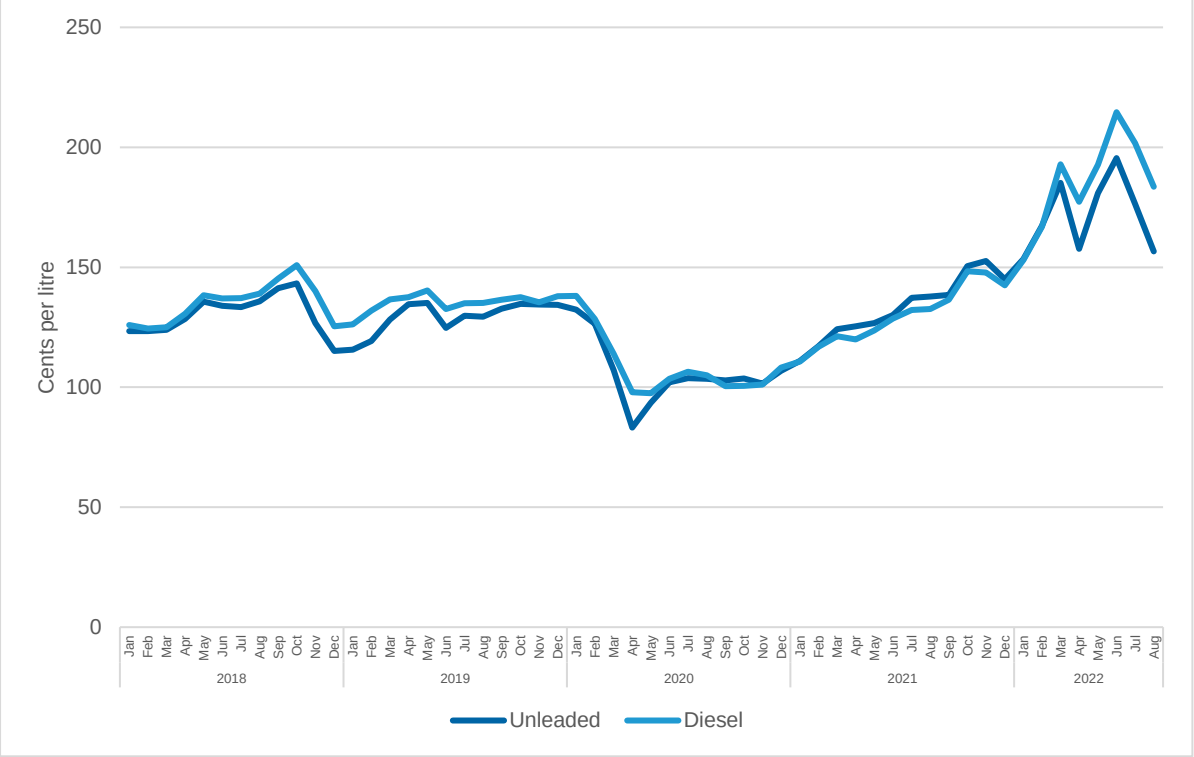
Fuel costs for crane borer assets consider only the borer erector vehicle. Data from Ausgrid's fuel account (see **Figure 11** below) has been used to calculate the average fuel consumption by asset age, with fuel costs calculated based on the estimated distance vehicles in this asset class will travel per annum.

In FY22, Ausgrid crane borers travelled an average distance of 5,405 kilometres per asset however in consideration of the proposed increase in capital expenditure for the 2024-29 period and the relatively small fleet that Ausgrid maintains for this asset class, an annual escalation factor of 5% has been applied and will take projected average travel to 7,605 kilometres per asset by FY29. A diesel price of $1.90 per litre has been used by default within the modelling conducted, however in light of the impact of conflict between Russia and the Ukraine, not to mention a well-established trend of increasing diesel costs as shown in **Figure 12**, a 5% per annum escalation factor has been applied. This will take the forecast diesel price to $2.70 by FY29.

Figure 11 – Annual fuel consumption by asset age (L/km)

Asset Class	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Borer Erector Vehicle	0.29	0.29	0.29	0.29	0.29	0.29	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41

Figure 12 – Average monthly fuel cost trend – January 2018 to August 2022



Source: Australian Institute of Petroleum – Historical ULP and Diesel Terminal Gate Price Data

4.5. Disposal proceeds

Disposal proceeds for crane borer assets consider current sale methods, which combine both the borer erector vehicle and the crane borer. Proceeds vary greatly depending on asset condition and borer erector vehicle make, however for the purposes of modelling an average per asset proceed of $50,000 has been used. This figure is a conservative estimate that has been calculated using a small number of historic sales for this asset class which occurred between FY21 and FY22.

4.6. Reliability

Crane borer reliability contemplates the indirect cost of an asset breakdown, that is the impact to Ausgrid's maintenance and/or capital delivery as a result of unplanned asset failure. To assess this impact and its consequent cost, a workshop was held with representatives from Field Operations and Network Delivery Services. This workshop concluded that it was rare for a job to be cancelled as a result of an crane borer breakdown, however there was instead a significant increase in the time spent to complete the impacted job – particularly when efforts to reschedule resources and outages were considered.

A summary of the increase in time spent per resource category when a breakdown occurs is summarised in **Figure 13** below.

Figure 13 – Crane borer breakdowns: time escalator per resource category

Resource category	Time escalator
Lineworker	25%
Technician	25%
Operator	75%
ESO / Plant Operator	25%
Other (Safety Trained)	25%
Works Preparer	10%

To calculate the cost impact of an crane borer breakdown, these time (and therefore cost) escalations were applied to the per job cost of common crane borer-related tasks from Ausgrid's Field Services Standard Jobs Manual. On this basis, the average breakdown cost was determined to be $1,872 with the per annum impact calculated based on the average number of breakdowns per annum as shown in **Figure 14** below.

Figure 14 – Average number of breakdowns per annum

Asset Class	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Borer Erector	1	1	1	1	1	1	3	3	3	3	3	3	3	3	3

5. OPTIONS

Four options have been developed, including the Base (Counterfactual) Case which assumes incremental capital expenditure for required major inspections only. These options have been informed by Ausgrid's experience in operating crane borers over the last three regulatory periods (2019-24, 2014-19, 2009-14), and includes consideration of operator feedback, technology advances, fleet utilisation, employee productivity, and employee and public safety.

The expenditure forecast for the Base (Counterfactual) Case, which assumes major inspections (as prescribed in relevant Australian Standards) are undertaken instead of asset replacement, is summarised in **Figure 15**. This approach is not considered acceptable due to the capital expenditure required and the immaterial benefit it would have on reliability and operating costs. Adopting such a strategy would forego the productivity benefits to be derived from new assets, while also exposing Ausgrid to increased employee and public safety risk.

For the purposes of NPV modelling and in recognition of the fact that Ausgrid possesses negligible operating cost data for crane borer assets older than 15 years, it has been assumed that maintenance, repair, fuel, safety and reliability costs would remain constant with neither a benefit nor disbenefit received.

Figure 15 – Expenditure Forecast: Option 1 - Base (Counterfactual) Case

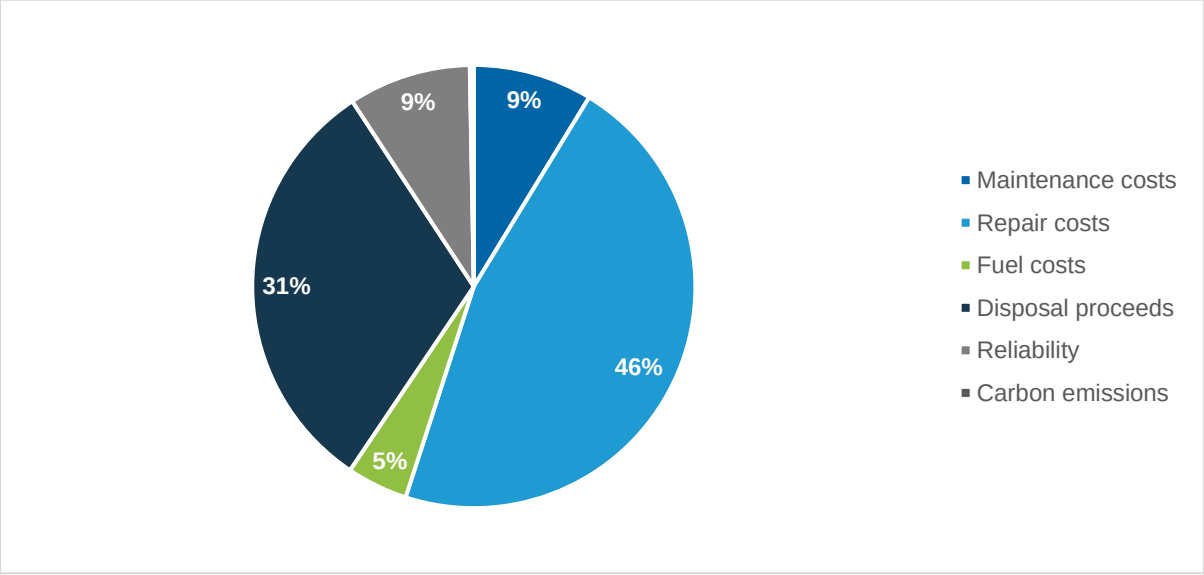
($M Real, FY24)	FY25	FY26	FY27	FY28	FY29	Total
CAPEX	2.0	2.0	1.3	0.3	-	**6.0**
OPEX benefits	-	-	-	-	-	**-**
CAPEX benefits	**-**	**-**	**-**	**-**	**-**	**-**

Option 2 assumes current asset volumes are maintained for crane borers. With the majority of crane borer assets having recently undergone major inspection / rebuild, this option also assumes that the determined useful life for crane borers is maintained at 15 years. The expenditure forecast and benefit breakdown for Option 2 is summarised in **Figure 16** and **Figure 17** below.

Figure 16 – Expenditure Forecast: Option 2 – BAU Replacement Case

($M Real, FY24)	FY25	FY26	FY27	FY28	FY29	Total
CAPEX	6.4	5.9	3.7	0.7	-	**16.7**
OPEX benefits	0.2	0.5	0.6	0.6	0.6	**2.6**
CAPEX benefits	0.4	0.4	0.3	0.1	-	**1.2**

Figure 17 – Benefit Breakdown: Option 2 – BAU Replacement Case

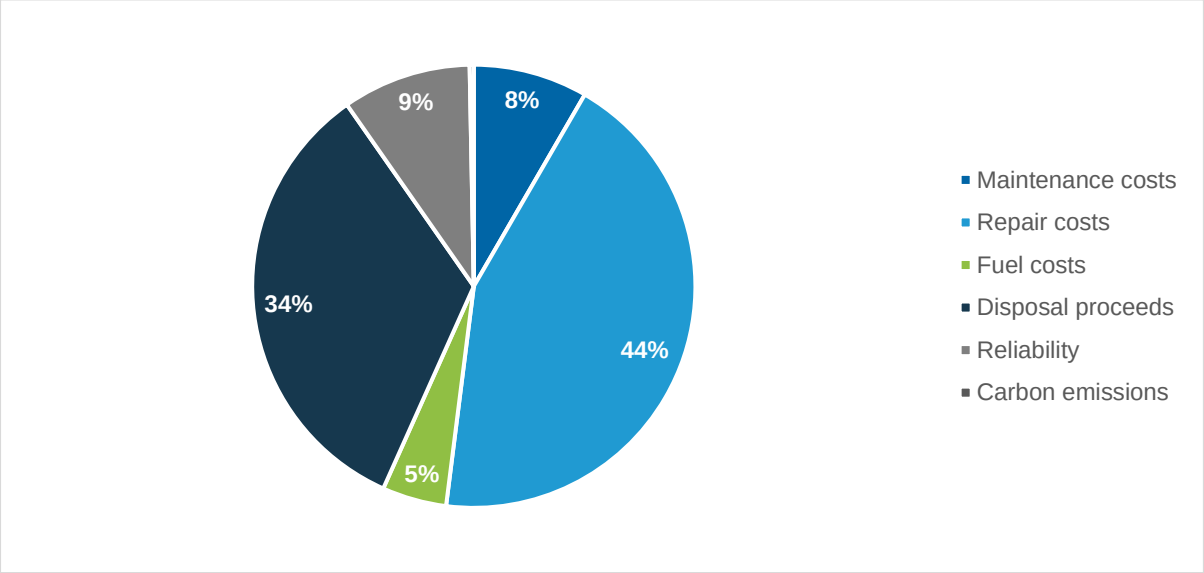


Option 3 assumes a 15% increase in crane borer volumes. This parallels a proposed increase of 14% in network capital expenditure between 2019-2024 and 2024-29. This option is further justified by the recent unavailability of crane borer assets, noting that much of this reduced availability has been due to Ausgrid's significant program of major inspections / rebuilds (as discussed in section 3.3) and the recent identification (and rectification) of a winch issues within Ozzy-manufacturered assets. The expenditure forecast and benefit breakdown for Option 3 is summarised in **Figure 18** below.

Figure 18 – Expenditure Forecast: Option 3 – Rapid Replacement Case

($M Real, FY24)	FY25	FY26	FY27	FY28	FY29	Total
CAPEX	6.4	7.4	5.9	0.7	-	**20.4**
OPEX benefits	0.2	0.5	0.7	0.7	0.7	**2.9**
CAPEX benefits	0.4	0.5	0.4	0.1	-	**1.5**

Figure 18 – Benefit Breakdown: Option 3 – Rapid Replacement Case

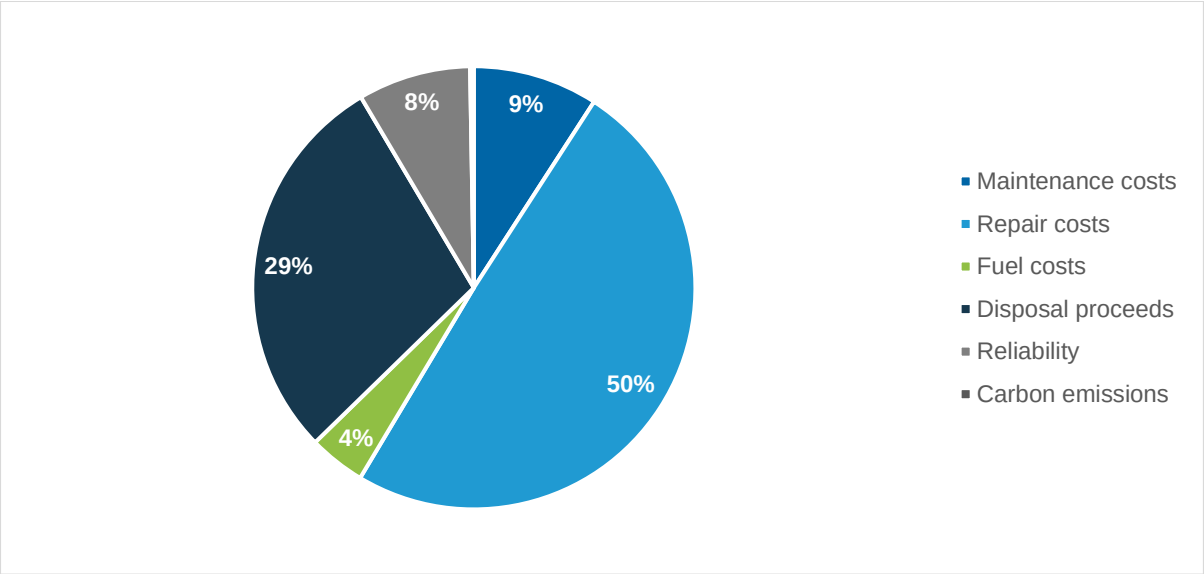


Option 4 assumes a 15% reduction in crane borer replacement volumes, implying that further fleet optimisation is possible and should continue. Recent experience with the reduced availability of crane borer assets, coupled with the proposed increase in network capital expenditure for the 2024-29 period would suggest that this option would expose Ausgrid to significant risk of under-delivery. The expenditure forecast and benefit breakdown for Option 4 is summarised in **Figure 19** and **Figure 20** below.

Figure 19 – Expenditure Forecast: Option 4 – Further Optimisation Case

($M Real, FY24)	FY25	FY26	FY27	FY28	FY29	Total
CAPEX	0.6	2.9	2.9	0.7	-	**13.0**
OPEX benefits	0.2	0.4	0.5	0.6	0.6	**2.3**
CAPEX benefits	0.4	0.2	0.2	0.1	-	**0.9**

Figure 20 – Benefit Breakdown: Option 3 – Further Optimisation Case



6. RECOMMENDATION

Options for Ausgrid's crane borer replacement program that have been considered for this business case, including the Market NPV outcomes, are summarised in **Figure 21**.

Figure 21 – Crane Borer: NPV Modelling Options

Option	Description	Market NPV
Option 1: **BASE CASE (Counterfactual)**	Key initiatives include: • **Incremental investment for major inspections only**	**-$5.3 million**
Option 2: **BAU REPLACEMENT**	Key initiatives include: • **Current asset volumes maintained** • **No change to determined useful life of: 15 years**	**$0.2 million**
Option 3: **RAPID REPLACEMENT**	Key initiatives include: • **Asset replacement volumes increased by 15% per annum** • **No change to determined useful life of: 15 years**	**-$1.4 million**
Option 4: **FURTHER OPTIMISATION**	Key initiatives include: • **Asset replacement volumes reduced by 15% per annum** • **No change to determined useful life of: 15 years**	**$1.7 million**

The recommended option for the 2024-29 period is Option 2. For a capital cost of $16.7 million, it results in an NPV of $0.2 million. While quantitative analysis demonstrates that Option 4 will unlock the greater net economic benefits compared to this option, the risk that a shortage of crane borer assets would expose Ausgrid's network capital delivery to is not considered acceptable.

6.1.1. Alignment to strategy

In line with Ausgrid's ELT-endorsed Fleet Strategy, preparations for the 2024-29 Fleet Capital Expenditure Program has already commenced. Selection of new assets has been finalised, with new platforms delivering increased crane capacity and a significant reduction in maintenance and repair costs.

6.1.2. Program delivery risks and dependencies

The most significant risk to delivery of the 2024-29 Fleet Capital Expenditure Program for crane borers relates to the direct and indirect impacts of the COVID-19 pandemic on Ausgrid's contracted suppliers.

The Fleet Engineering & Strategy team and its current level of resourcing is a critical dependency to the successful delivery of this program. This includes the third-party support of an FMO (currently *sgfleet*) who will be relied upon to administer ordering processes. Successful delivery of the crane borer program is also dependent on robust, on-site pre-commissioning inspections and the development of risk assessments and safe operating procedures.

It is considered that these risks have been appropriately mitigated through robust planning, the establishment of key commercial arrangements, and the on-boarding of additional dedicated resourcing within the Fleet Engineering & Strategy team.

6.1.3. Business area impacts

#	Impacted Group	Description
01	**Field Operations**	Staff within this workgroup account for 100% of crane borer allocations,

6.1.4. Next steps

This business case has been developed to support Ausgrid's proposed fleet capital expenditure (capex) forecast and should be read in conjunction with Ausgrid's Fleet Strategy. Subject to endorsement by the Investment Governance Committee, it will be used for Ausgrid's FY25-29 Regulatory Proposal.