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2024 QLD Winner

Green Tree Consulting

Ishaan, Kelly, Shreyas, and Siddesh.

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Green Gully Resources

Haul Truck Electrification - Operational Readiness Plan

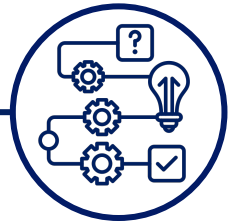
2024 Climate and Engineering Consulting Case Competition

Green Tree Consulting: Ishaan Patel, Siddesh Karekal, Shreyas Raman, Mingxuan (Kelly) Zhou

Deloitte.

Executive Summary

Challenge



Green Gully Resources is seeking a strategic operational readiness plan to support the implementation of 40 electric trucks in one of their WA sites with consideration for a smooth transition from its existing fleet.

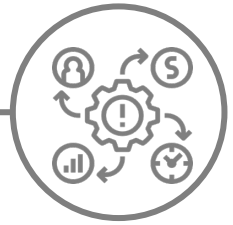
Question

Asset Management: How can GGR ensure that its existing fleet of non-electric haul trucks is effectively phased out and replaced with the new electric models in a cost-effective and efficient manner?

Solution

Effective Operational Readiness Plan		
1. Phased haul truck decommission plan that maximises value of existing assets	2. Deploying PPA and establishing an on-site solar farm to meet future energy needs.	3. Strategic investments in procedural optimisation to improve mine site efficiency

Impact



54.9% Reduction in life-cycle emissions by 2030	**-19.02%** Lower OPEX in the long-run	**$288 M** Saved by switching to EV's by 2040

Green Gully Resources' Company Position

GGR must overcome key challenges to meet its targets successfully.

Challenges Across the Value Chain

Green Gully Resources (GGR) is positioned to **capitalise** on the rise of electrified mine vehicles, but has important **metrics** to consider

Energy

- **211% increase** in electricity usage
- **30% reduction** in CO_2e emissions
- **Diversified renewable** energy grids

Assets

- Maintain **220t** payload capacity
- Reduce unnecessary costs
- Existing truck **waste management**

Training

- Restructuring of **operator** tasks
- **Optimise** for site **safety**
- Improve **utilisation** and **maintenance**

Positioned to learn from competitors in the WA resources industry

BHP igo RioTinto FMG AngloAmerican

Industry Trends

GGR must proactively adapt to the evolving landscape of the industry

- Electrification of haul trucks to reduce operating expenses
- Investment into renewable energy sources to reduce emissions
- Adoption of circular economy principles to minimise waste

Strategy 1: Decommission Plan Overview

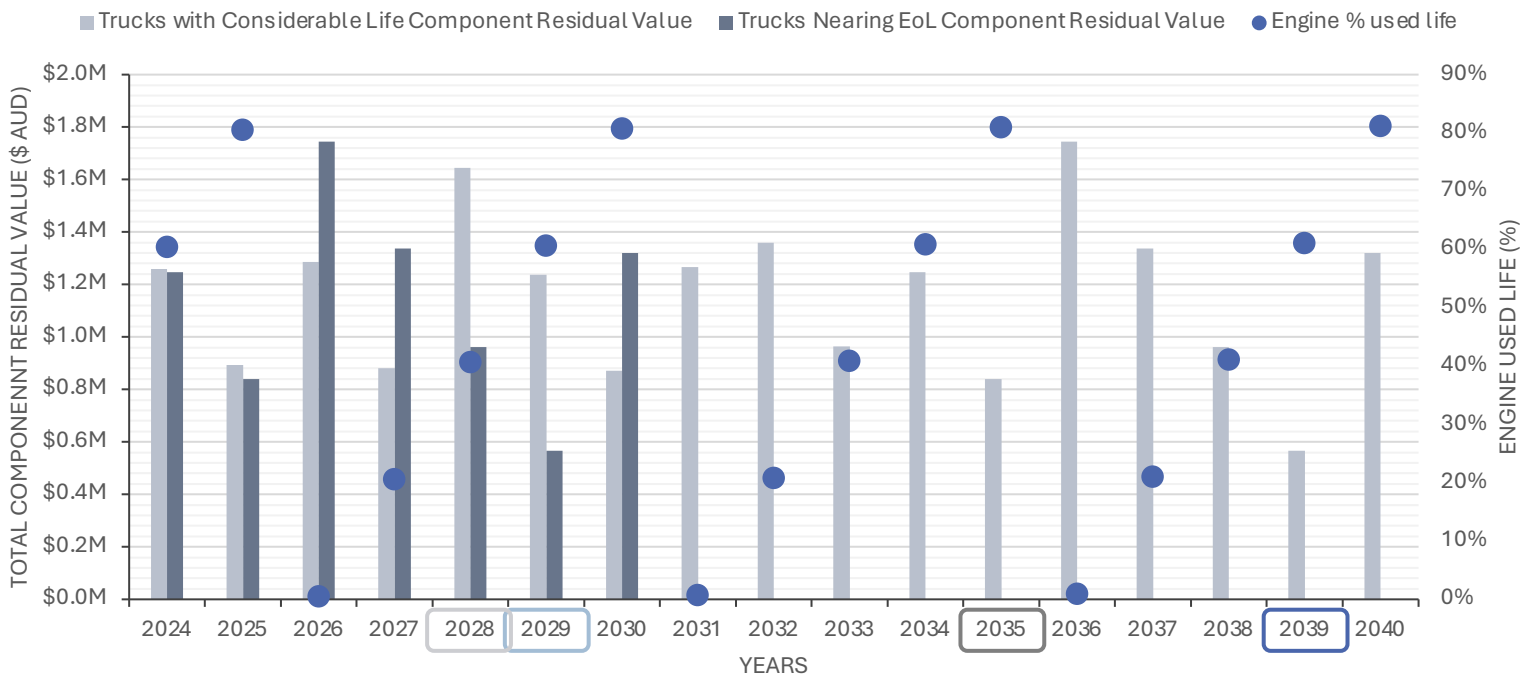
Decommission trucks nearing EoL by 2029, and trucks with considerable life by 2039.

Truck Lifecycle Planning

Existing truck components should be used until **low residual value** and **high % life used** to extract maximum value and avoid unnecessary cost.

2029 decommissioning of EoL trucks aligns well with 2028 delivery of EV trucks, allowing for a **phased transition**. Trucks with considerable life can be used to **supplement** EVs and maximise **mine efficiency**.

Truck Component Residual Value Forecast



Beginning 2028 – Repurpose engines from 6 trucks with considerable life

End 2028– Decommission 15 Trucks Nearing EoL

Beginning 2029– Decommission Remaining Trucks Nearing EoL

2035 – Decommission 7 Trucks with Considerable Life

2039 – Decommission Remaining Trucks with Considerable Life

[1] (Aurecon, 2023)

Strategy 1: Decommission Plan – Reusing Old Diesel Engines

GGR should adopt a circular economy model by repurposing 6 truck engines into electric generators

We Suggest…

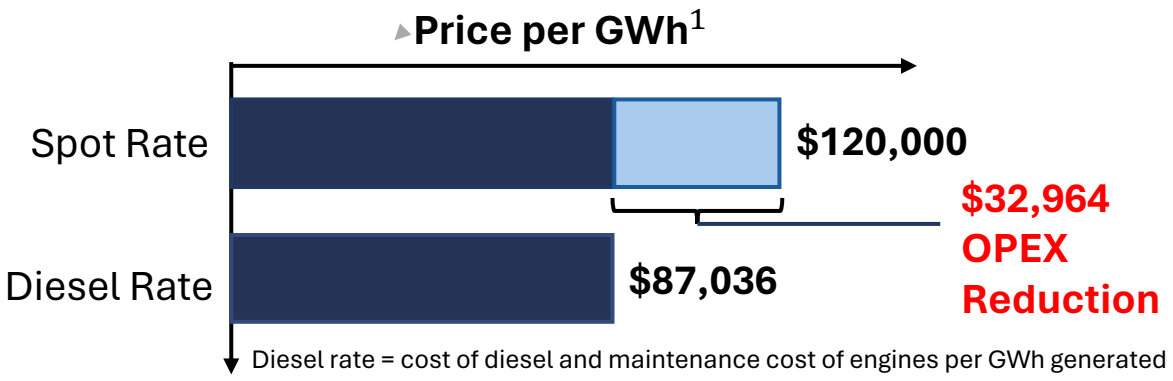
Establishing a **circular economy** by repurposing six aging engines

NOT buying expensive electricity from the spot market

6
Engines repurposed to electric generators

22%
Utilisation rate to provide peak power

14
Remaining diesel trucks operational



Key Benefits

Lower Costs

Significantly lower price per GWh compared to buying on the spot market. CAPEX remains low at **~$60,000** per engine for modification and installation.

Resilience and Flexibility

Each generator can produce up to **2MW**[2] of power, which will be utilised during peak consumption. This is available **24/7** and is not limited by access to sunlight or wind.

Time Savings

Diesel-electric generators are cheap to build and only take **~1 month** to construct, as all maintenance services and tools already exist on site.

Existing Supply Chain

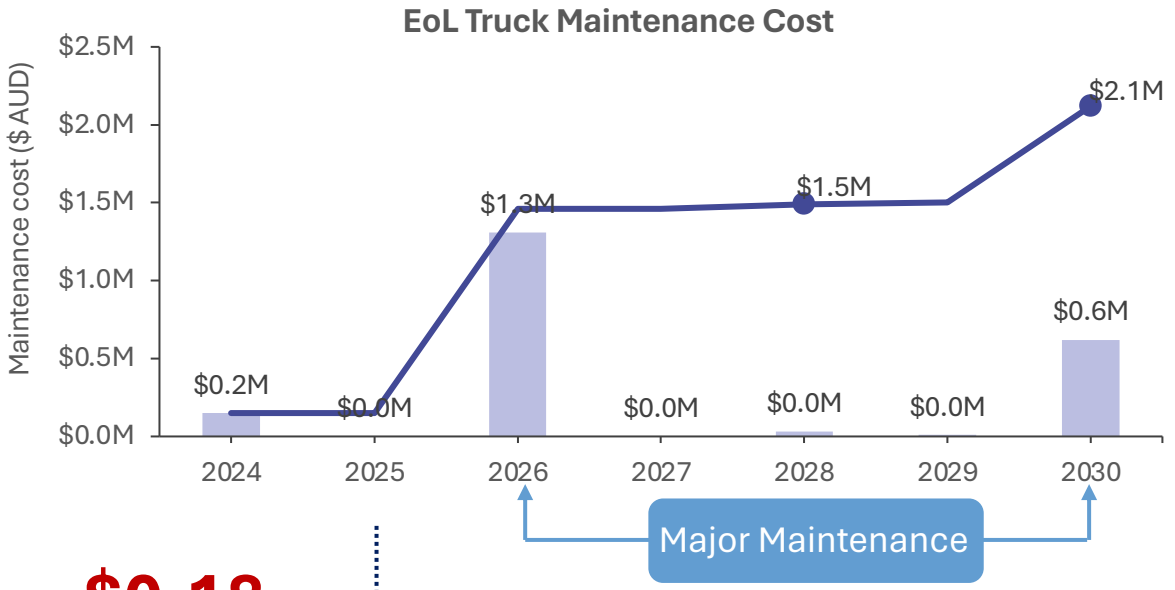
GGR already has supply chains in place for diesel supply and engine maintenance. Less demanding for grid infrastructure as some electricity is generated on site.

[1] (Rocky Mountain Institute, 2019), [2] (Cummins, 2021)

Strategy 1: Decommission Plan – End of Life Maintenance Analysis

GGR is recommended to decommission trucks before undertaking extensive component maintenance.

Trucks Close to End of Life

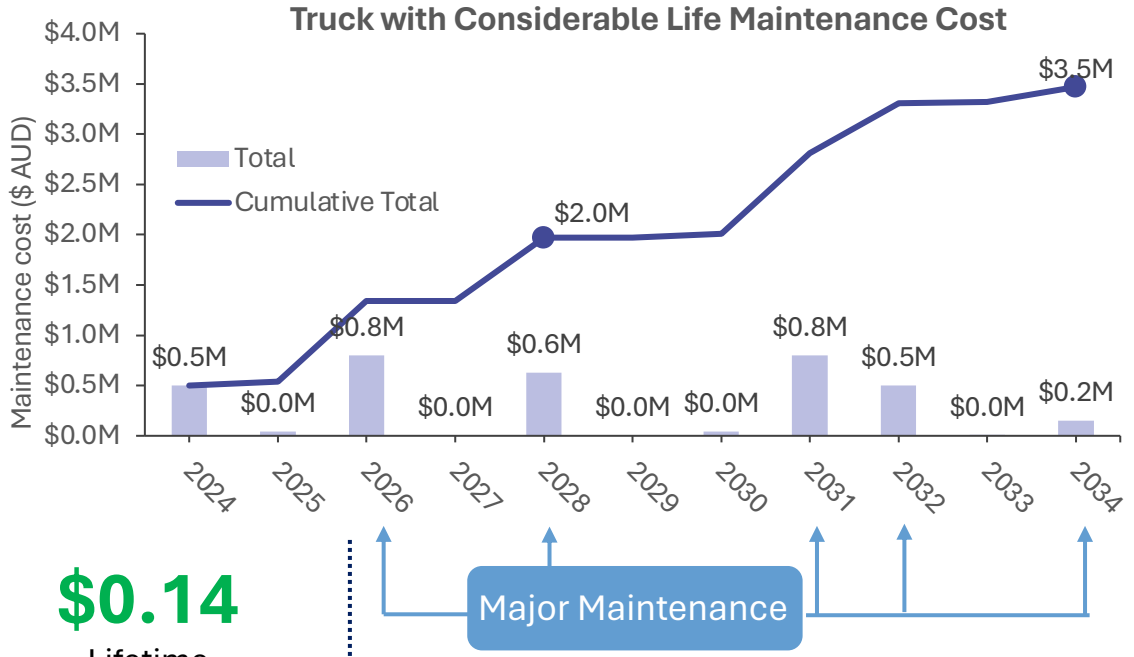


$0.18
Lifetime Maintenance cost per tonne

Decommission before 2030 major maintenance

Decommission EoL trucks as soon as possible given the higher maintenance cost per tonne.

Trucks with Considerable Life



$0.14
Lifetime Maintenance cost per tonne

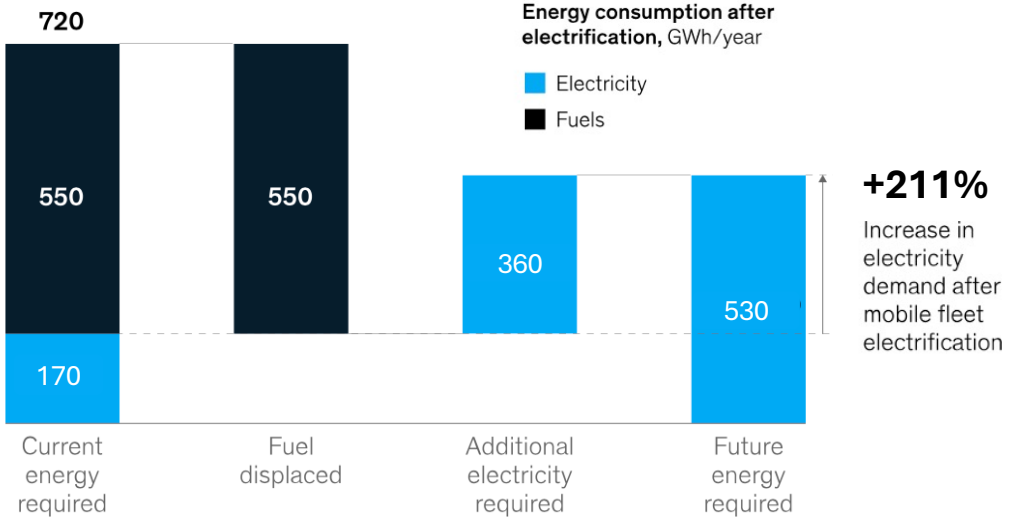
6 engines repurposed into electric generators right after 2028 maintenance, ensuring smooth operation during transition to EVs

Overall, by implementing a strategic and effective truck lifecycle plan, GGR will avoid **unnecessary maintenance costs** before decommissioning the haul trucks.

Strategy 2: Energy Management Plan - PPA

GGR should implement a PPA to prepare for significant future energy requirements

Energy Changes with Electrification



360 Extra GWh/year

30% Lower haul OPEX

3.12x Energy increase

125 Active WA mine sites

Strain On electricity grid

Our 3-pronged strategy proposes the swift movement required to gain a **competitive advantage** in the rapidly changing energy market.

Phase 1: Power Purchase Agreement (PPA)

Fully Firmed	Partially Firmed	Spot Exposed
Fixed price on electricity purchased from renewable farms for full contract	Hybrid Pricing - portion of electricity price is fixed, and remainder is subject to market prices	Prices entirely dependent on the wholesale electricity market prices
$0.10/kWh [1]	$0.087/kWh	~$0.12/kWh
	With a 3.4% inflation rate p.a.	

Value Proposition

Renewable Energy: Purchasing from renewable sources supports GGR's carbon reduction goals

Cost Savings: compared to fixed PPAs as there is some exposure to market prices, which is advantageous during periods of low prices.

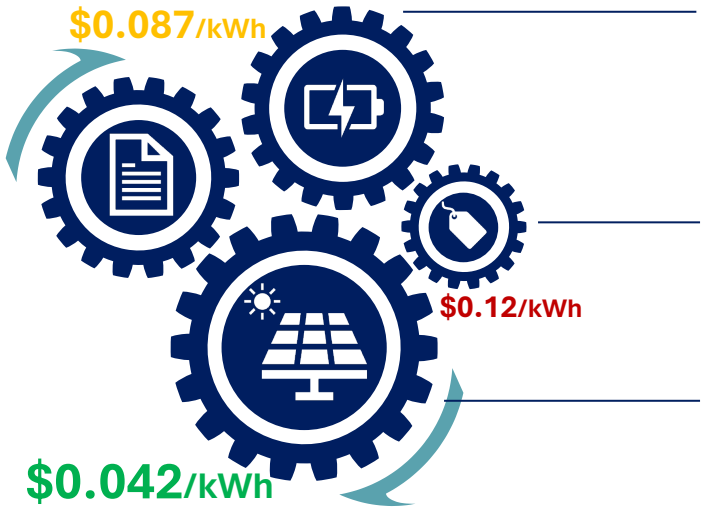
Integration with Strategy: Solar farms and diesel generators provide a great safety net for the non-fixed portion of electricity.

[1] (Target Solar, 2023), (McKinsey, 2023)

Strategy 2: Energy Management Plan – Solar Farm

GGR should construct a 10MW solar grid to lower costs and enhance sustainability.

Phase 2: Constructing a 10MW Solar Grid



Diesel Generators

As cheap as the PPA, but more flexibility as to when to run them to produce energy as GGR owns them.

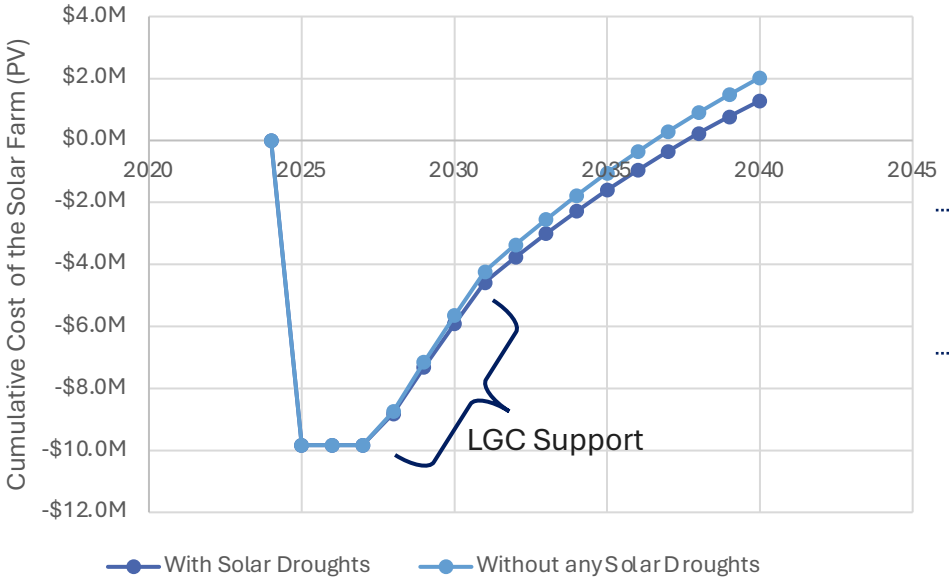
Spot Price

The most expensive and volatile source and should be used as a back-up

Solar Energy

The **cheapest source** of producing renewable energy **(-51.7% to PPA)** but high up-front investment costs

10MW Solar Farm NPV until 2040



0
Grid connection costs as instantly used in mines

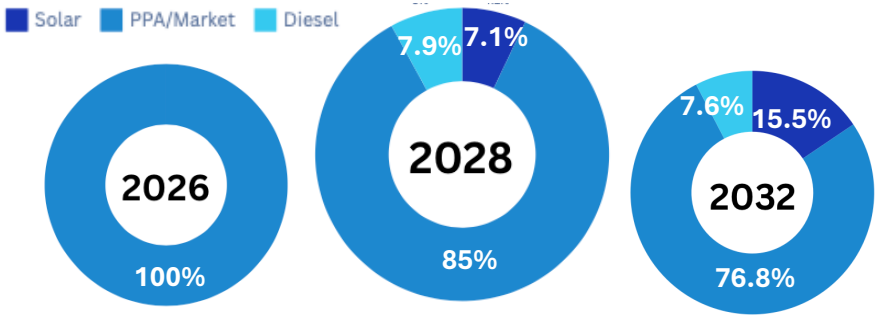
2037
Break-even Point

2030
Construct 2nd 10 MW Solar Grid if success seen

Solar provides the most value

- **$10 Million** Initial Investment
- **20.36 GWh** Annual Energy Production
- **$4 Million** LGC Revenue
- **$150k** Annual Operating Cost
- **$1.3 Million** NPV after 15 years

Site Electricity Requirements



Diesel generators are run at night to cover solar when electricity spot prices are high. Provides continual energy for mine site.

(Market Watch, 2024), (Sunny Renewables, 2023)

Strategy 3: Procedural Adaptation - Workforce Engagement

Employees directly interacting with EV haul trucks should receive priority training.

Key Considerations

By 2030, **half of the future workforce** will need high-level programming, coding and software skills[1]

Ensure **transparent communication** with site employees to facilitate transition to automated operations

Record skills and training on skill management platform

AG5 workday. connecteam

Conduct periodic assessments to refresh training

Evaluate Existing Skills in Workforce → **Facilitate EV Truck Training Programs** → **Review Workforce Adaptation**

Upskilling Priority

1. **Supervisors:** Coordinates the transition and monitors workforce progress.

2. **Operators**: Directly responsible for the day-to-day operation of the electric haul trucks.

3. **Maintainers**: Responsible for preventative maintenance. Their expertise can reduce downtime and optimise truck lifetime.

Value Proposition

Skills Gap	1	2	3
AI/ Software Skills	✓	✓	
EV truck operation	✓	✓	
EV truck safety	✓	✓	✓
EV truck electrical	✓		✓

- **Reliable Training:** Facilitate EV Truck Training from OEM e.g. Komatsu Training Academy
- **Increased Safety Awareness**: Refresh site safety knowledge with new assets
- **Operation Coordination**: Consistent operation of EV truck through standardised communications to improve site efficiency.

Strategy 3: Procedural Adaptation – Mine Facility Optimisation

GGR should position charging stations strategically to increase utilisation rate.

Dynamic charging - charging the EV while in motion, **reduces loaded time**, resulting in **improved tyre performance**

Increased speed through trolley assist – trucks charged via the grid during energy intensive periods

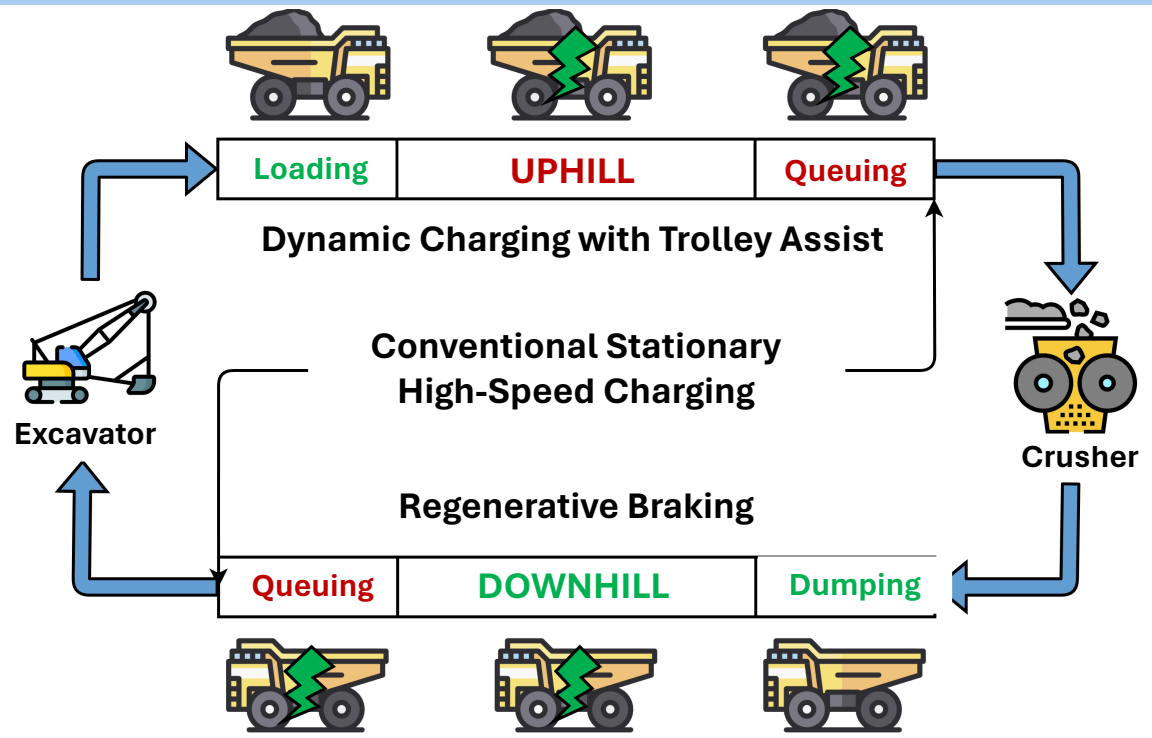
Optimised productivity through high-speed stationary charging

235 kt

Yearly increase in production from a Komatsu case study (2024)

$575,000

Estimated **annual cost saving** with a **$4.8m** initial investment



130kt

Yearly reduction in CO_2e emissions using a circuit-charging method

388 hours

Yearly reduction in total haul truck cycle times, increasing productivity

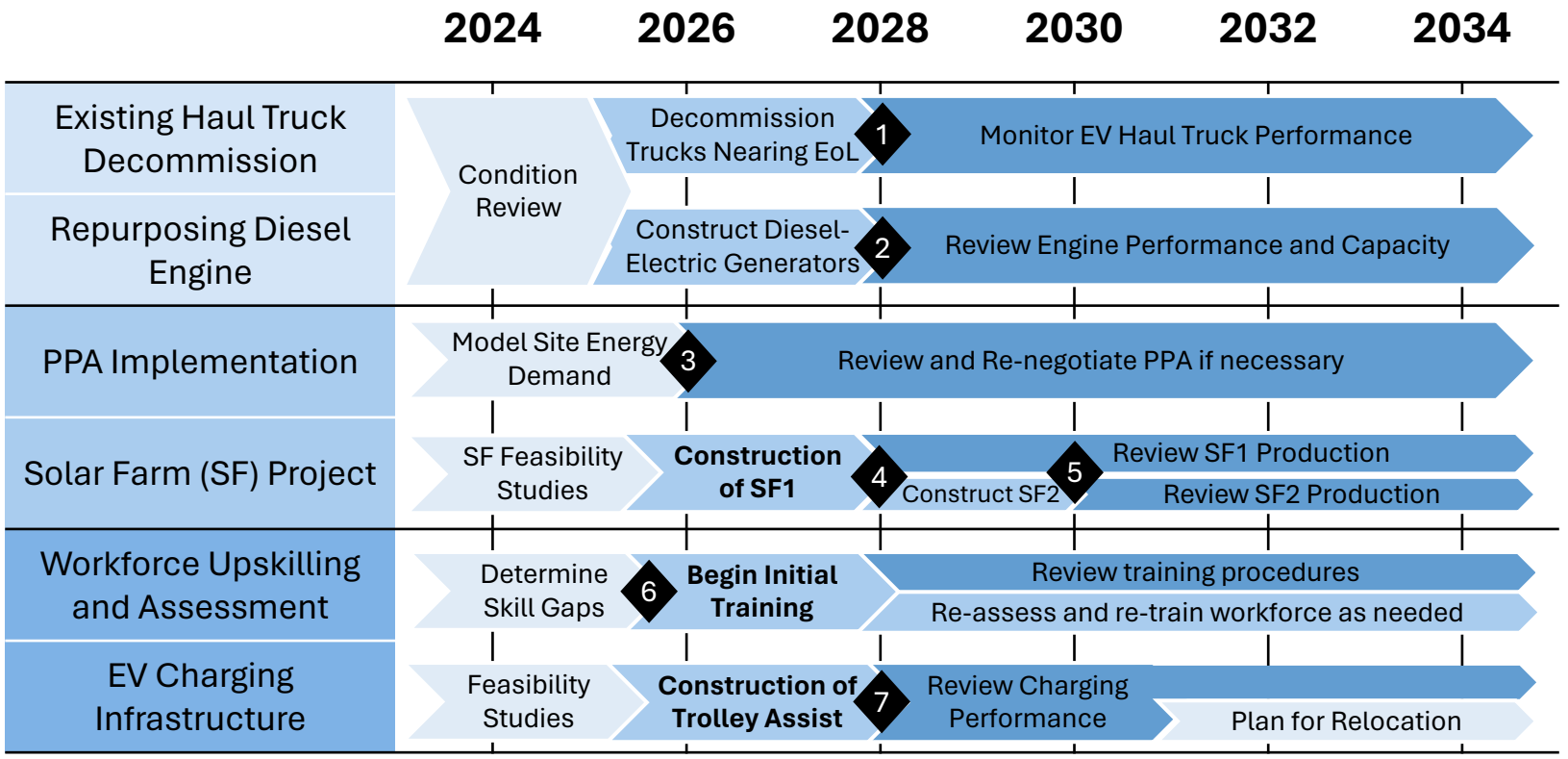
Repurposing unproductive **queuing time** for stationary charging

Up to **70% energy recovery** through regenerative braking

Increased speed by rolling downhill under empty weight

Timeline and Implementation

GGR's Operational Readiness Plan for Successful Implementation.



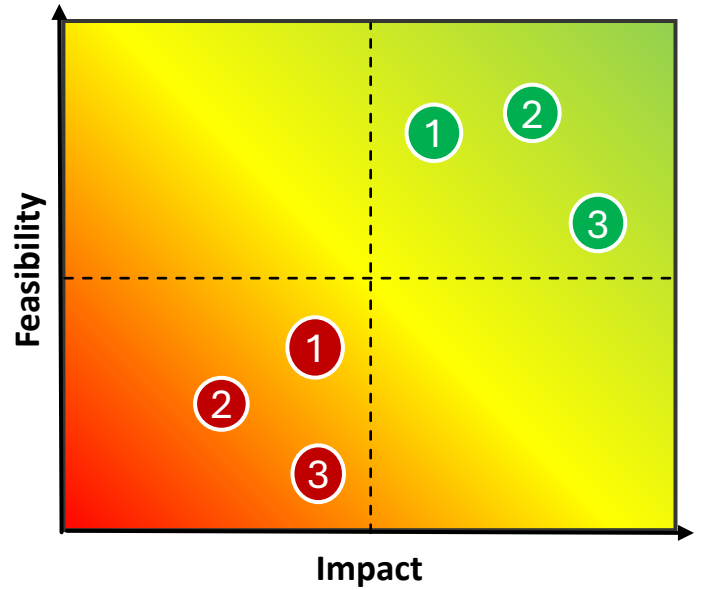
Key Milestones

1. **Electric Haul Trucks Arrive**
2. **Diesel Generators Operational**
3. **Partially-Firmed PPA Negotiated**
4. **SF1 Construction Finished**
5. **SF2 Construction Finished**
6. **Training Plan Developed**
7. **Trolley Assist Completed**

Pilot Testing

Pre-emptive training so no efficiency is lost when the electric fleet arrives

Hire & consult with electric implementation industry specialists

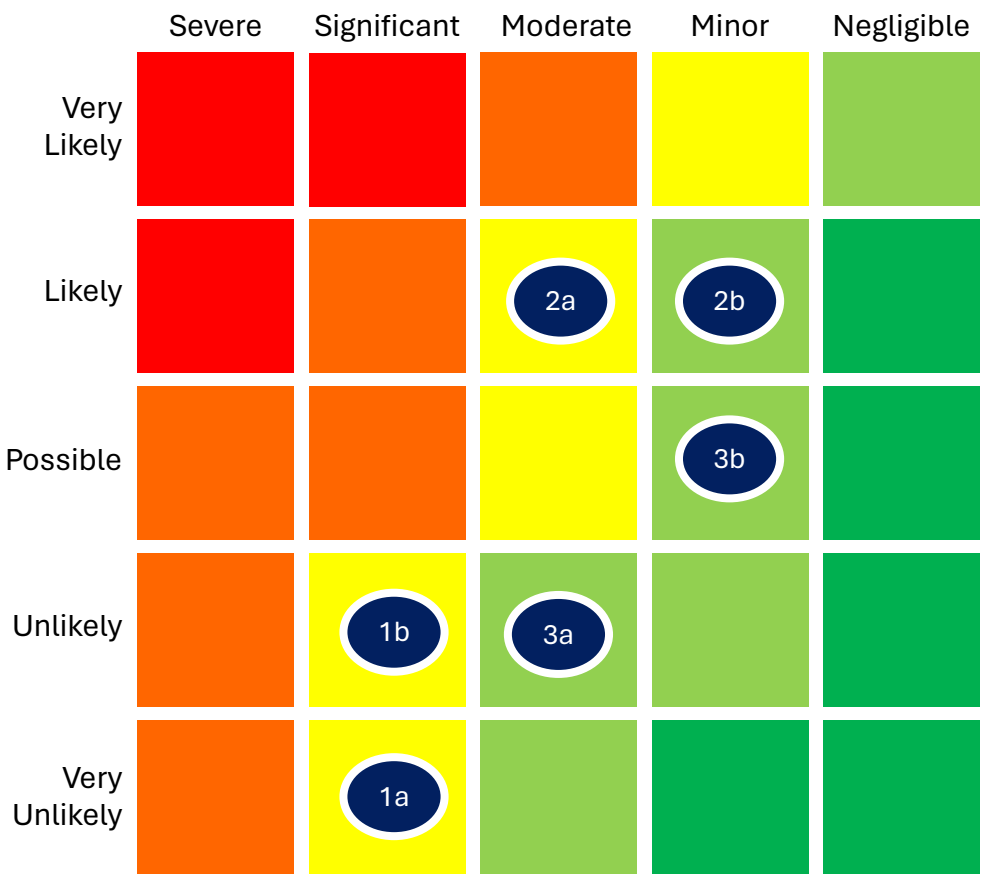


Using batteries	1	Decommission Plan	1
Use full solar power	2	Energy Plan	2
Keep using all trucks	3	Operations Plan	3

Risks and Mitigations

GGR must mitigate potential risks to ensure effective outcomes as planned.

Risk Matrix

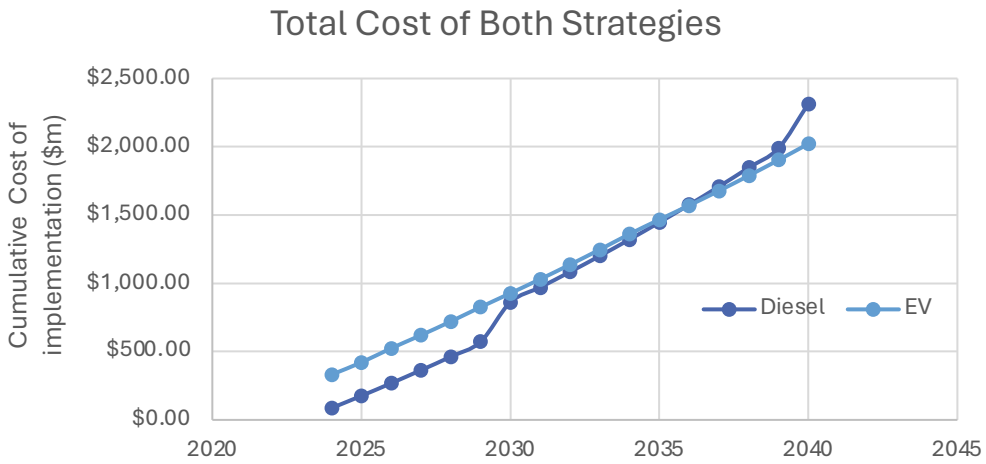


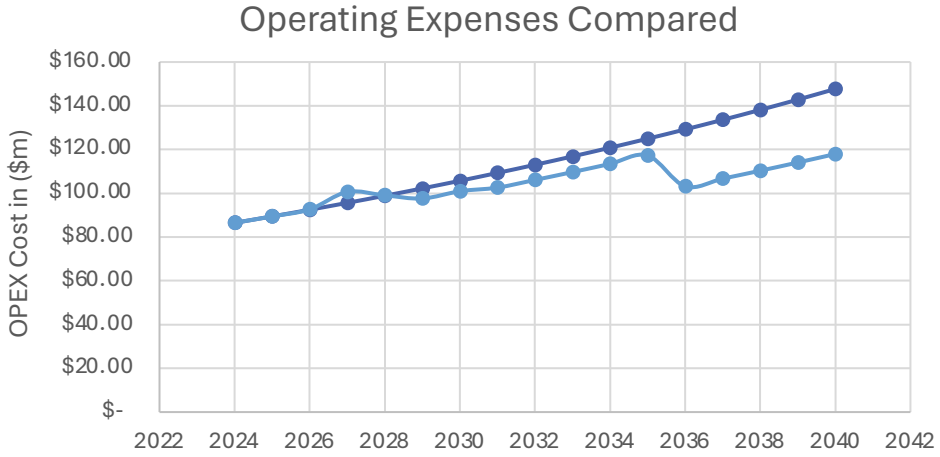
	Risk Description	Mitigations
1a	Infrastructure Availability	• Complete additional solar grids by early-2028 • Plan buffer regions into the electricity grid to account for the 211% electricity demand increase
1b	Compatibility for Alternate Use Case	• Review safety and legal regulations for strong governance • Consult the manufacturer for equipment recommendations
2a	Fluctuations in Solar Energy Production	• Target diesel generator capacity at ~22% of maximum • Build resilience into the solar grid through location diversification
2b	Volatility in Energy Prices	• Implement on-site redundancies (solar and diesel) • Negotiate longer-term PPAs that hedge against price fluctuations in the electricity spot-market
3a	Safety Issues from Training Lag	• Begin training before the arrival of the electric haul trucks • Conduct regular reviews of operator performance in the early stages of implementation
3b	Costs of Unscheduled Maintenance	• Use data modelling to predict the frequency of component failures • Implement regular reviews of maintenance schedules

Financial and Emissions Impact

Successful implementation of all 3 strategies will result in significantly lower costs and emissions

Cost of Implementation





2035

EV Total Cost is lower than Diesel

$288 M

Saved by switching to EV's by 2040

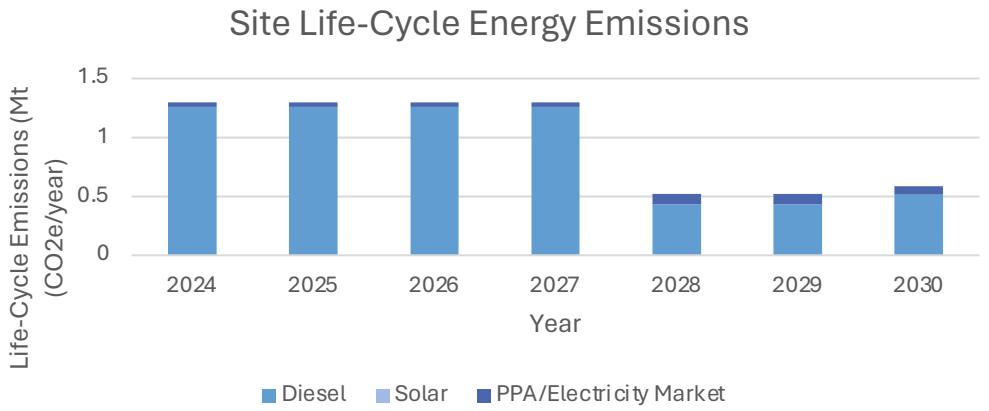
-5.0%

Lower OPEX in the short-run

-19.02%

Lower OPEX in the long-run

Emissions Impact



54.9%

Reduction in life-cycle emissions by 2030

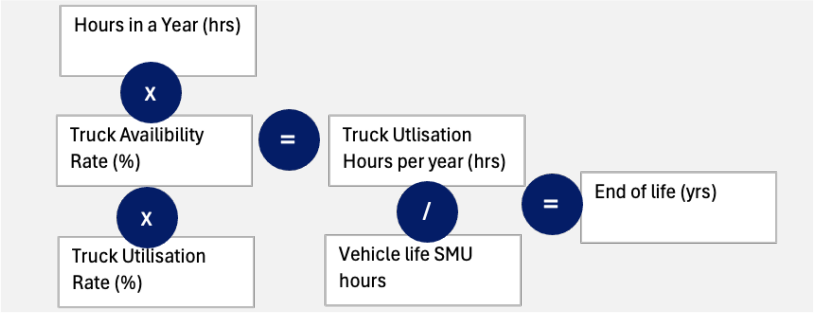
83%

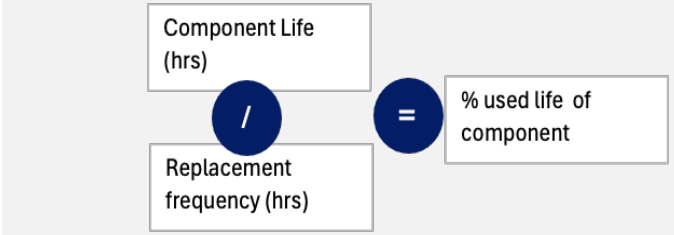
Improvement over the 30% reduction target

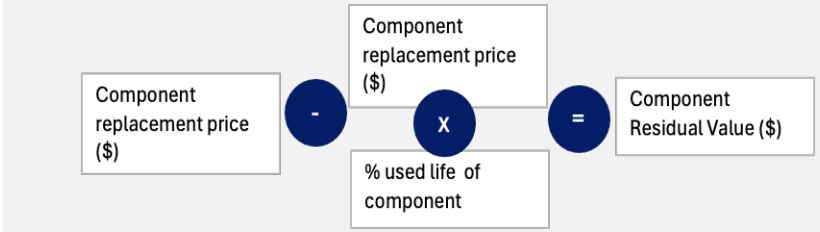
Our Effective Phased Truck Decommission strategy along with a **renewable energy** plan enables GGR to seamlessly integrate the **new EV truck** fleet into their WA mine site, ultimately achieving a more **sustainable mining** practice.

Appendix I

Truck	Purchase price	End of life (hrs)	Hours pa	Cycle time (hours)	Assumed loaded capacity (tonnes per round trip)	Cycles per year	Tonnes a year	Tonnes over remaining lifetime of truck	Remaning Lifetime maintenance cost	Cost per tonne (over lifetime)
Truck with significant life	$6,000,000.00	120,000	5,011	0.67	220	7,517	1,653,630	28,111,710	$3,970,000	$ 0.14
Truck nearing EoL	$6,000,000.00	120,000	5,011	0.67	220	7,517	1,653,630	11,575,410	$2,120,000	$ 0.18







Trucks with Considerable Life				SMU/year	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011
				Cumulative SMU	5,011	10,022	15033	20044	25055	30066	35077	40088	45099	50110	55121	60132	65143	70154	75165	80176	85187	90198
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
COMPONENT REPLACEMENT COST ANALYSIS					2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
2		Components	Replacement frequency	Price																		
cost of replacement	1	Power Module (Engine, Radiator, Alternato	25000	$800,000.00	$0.00	$0.00	$0.00	$0.00	$800,000.00	$0.00	$0.00	$0.00	$0.00	$800,000.00	$0.00	$0.00	$0.00	$0.00	$800,000.00	$0.00	$0.00	$0.00
	2	Final drive	22,000	$30,000.00	$0.00	$0.00	$0.00	$0.00	$30,000.00	$0.00	$0.00	$0.00	$30,000.00	$0.00	$0.00	$0.00	$0.00	$30,000.00	$0.00	$0.00	$0.00	$30,000.00
	3	Grid blower motor front	14,000	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00
	4	Grid blower motor rear	14,000	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00
	5	Electric wheel motor left	20,000	$250,000.00	$0.00	$0.00	$0.00	$250,000.00	$0.00	$0.00	$0.00	$250,000.00	$0.00	$0.00	$0.00	$250,000.00	$0.00	$0.00	$0.00	$250,000.00	$0.00	$0.00
	6	Electric wheel motor right	20,000	$250,000.00	$0.00	$0.00	$0.00	$250,000.00	$0.00	$0.00	$0.00	$250,000.00	$0.00	$0.00	$0.00	$250,000.00	$0.00	$0.00	$0.00	$250,000.00	$0.00	$0.00
	7	Hub; Brake & Spindle LH	30,000	$60,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$60,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$60,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$60,000.00
	8	Hub; Brake & Spindle RH	30,000	$60,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$60,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$60,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$60,000.00
				Total	$0	$0	$10,000	$500,000	$830,000	$130,000	$0	$500,000	$40,000	$800,000	$0	$630,000	$0	$40,000	$800,000	$500,000	$10,000	$150,000
				Cumulative Total	$0	$0	$10,000	$510,000	$1,340,000	$1,470,000	$1,470,000	$500,000	$540,000	$1,340,000	$1,340,000	$1,970,000	$1,970,000	$2,010,000	$2,810,000	$3,310,000	$3,320,000	$3,470,000

Trucks nearing EoL				SMU/year	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011	5,011
				Cumulative SMU	5,011	10022	15033	20044	25055	30066	35077	40088	45099	50110	55121	60132	65143	70154	75165	80176	85187	90198	95209	100220	105231	110242	115253	120264
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
COMPONENT REPLACEMENT COST ANALYSIS					2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
2		Components	Replacement frequency	Price																								
cost of replacement	1	Power Module (Engine, Radiator, Alternat	25000	$800,000.00	$0.00	$0.00	$0.00	$0.00	$800,000.00	$0.00	$0.00	$0.00	$0.00	$800,000.00	$0.00	$0.00	$0.00	$0.00	$800,000.00	$0.00	$0.00	$0.00	$0.00	$800,000.00	$0.00	$0.00	$0.00	$0.00
	2	Final drive	22,000	$30,000.00	$0.00	$0.00	$0.00	$0.00	$30,000.00	$0.00	$0.00	$0.00	$30,000.00	$0.00	$0.00	$0.00	$0.00	$30,000.00	$0.00	$0.00	$0.00	$0.00	$30,000.00	$0.00	$0.00	$0.00	$30,000.00	$0.00
	3	Grid blower motor front	14,000	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00
	4	Grid blower motor rear	14,000	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00	$0.00	$5,000.00	$0.00
	5	Electric wheel motor left	20,000	$250,000.00	$0.00	$0.00	$0.00	$250,000.00	$0.00	$0.00	$0.00	$250,000.00	$0.00	$0.00	$0.00	$250,000.00	$0.00	$0.00	$0.00	$250,000.00	$0.00	$0.00	$0.00	$250,000.00	$0.00	$0.00	$0.00	$250,000.00
	6	Electric wheel motor right	20,000	$250,000.00	$0.00	$0.00	$0.00	$250,000.00	$0.00	$0.00	$0.00	$250,000.00	$0.00	$0.00	$0.00	$250,000.00	$0.00	$0.00	$0.00	$250,000.00	$0.00	$0.00	$0.00	$250,000.00	$0.00	$0.00	$0.00	$250,000.00
	7	Hub; Brake & Spindle LH	30,000	$60,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$60,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$60,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$60,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$60,000.00
	8	Hub; Brake & Spindle RH	30,000	$60,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$60,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$60,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$60,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$60,000.00
				Total	$0	$0	$10,000	$500,000	$830,000	$130,000	$0	$500,000	$40,000	$800,000	$0	$630,000	$0	$40,000	$800,000	$500,000	$10,000	$150,000	$0	$1,310,000	$0	$30,000	$10,000	$620,000
				Cumulative Total	$0	$0	$10,000	$510,000	$1,340,000	$1,470,000	$1,470,000	$1,970,000	$2,010,000	$2,810,000	$2,810,000	$3,440,000	$3,440,000	$3,480,000	$4,280,000	$4,780,000	$4,790,000	$4,940,000	$4,940,000	$6,250,000	$6,250,000	$6,280,000	$6,290,000	$6,910,000

Appendix II

Description	Unit	Value	Source
Diesel Truck Energy Requirement	GWh/year	360	(McKinsey)
Diesel Truck Efficiency Rate	%	45%	
Electric Truck Efficiency Rate	%	90%	
Electric Truck Energy Requirement	GWh/year	180	
Energy Contribution from Trucks	%	70%	(DAS Australia)
Total Energy Requirement (pre-2028)	GWh/year	108	
Total Energy Requirement (post-2028)	GWh/year	288	
Solar Farm Theoretical Capacity	MWh/year/SF	21670	
Operating Efficiency Utilisation Rate	%	93.96%	
Solar Farm Expected Capacity	MWh/year/SF	20361.132	
Diesel Generators Expected Capacity (day)	MWh/year/SF	1308.868	
Diesel Generators Expected Capacity (night)	MWh/year/SF	21670	
Total Diesel Generators Capacity	MWh/year/SF	22978.868	
Diesel Trucks Still Running (post-2028)		14	
Generator Capacity	GWh/year/unit	17.52	
Generator Utilisation Aim		25%	
Number of Units Required		**5.246316895**	(Rounded up to 6)
True Utilisation		**21.86%**	
Diesel Generators Emissions	gCO2e/kWh	3500	(Australian Government, 2022)
Solar Farm Emissions	gCO2e/kWh	41	(Beyer et al., 2023)
Renewable PPA Emissions	gCO2e/kWh	353	(Clemons et al., 2021)
Diesel OPEX (6 engines)	$/year	800000	(Modular Mining, 2011)
Maintenance OPEX (1 engine)	$/year	200000	
Operating Cost	$/year	2000000	
Diesel Generator Electricity Production	kWh/year	22978868	
Price per kWh	$/kWh	$ 0.0870	
Price per GWh	$/GWh	**$ 87,036.49**	

Energy Production (GWh/year)							
Year	2024	2025	2024-2026	2027	2028	2029	2030 onwards
Number of Solar Units	0	0	0	0	1	1	2
Total Electricity Requirement	108	108	108	108	288	288	288
Diesel	0	0	0	0	22.97887	22.97887	45.957736
Solar	0	0	0	0	20.36113	20.36113	40.722264
PPA/Electricity Market	108	108	108	108	244.66	244.66	201.32

Carbon Emissions (Mt CO2e/year)							
Year	2024	2025	2026	2027	2028	2029	2030
Number of Solar Units	0	0	0	0	1	1	2
Total Diesel Energy Requirement	360	360	360	360	100.8	100.8	100.8
Total Electric Energy Requirement	108	108	108	108	288	288	288
Solar	0	0	0	0	0.000835	0.000835	0.001669613
PPA/Electricity Market	0.038124	0.038124	0.038124	0.038124	0.086365	0.086365	0.07106596
Diesel	1.26	1.26	1.26	1.26	0.433226	0.433226	0.513652076

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Operational Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Revenues																		
PPA Revenue	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
LGC Revenue	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,221,279.89	$ 1,270,131.09	$ 1,320,936.33	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Spot Price Savings	$ -	$ -	$ -	$ -	$ -	$ 2,229,479.18	$ 2,318,658.35	$ 2,411,404.69	$ 2,507,860.87	$ 2,608,175.31	$ 2,712,502.32	$ 2,821,002.41	$ 2,933,842.51	$3,051,196.21	$3,173,244.06	$3,300,173.82	$3,432,180.77	$3,569,468.00
Total Revenue	$ -	$ -	$ -	$ -	$ -	$ 2,229,479.18	$ 3,539,938.24	$ 3,681,535.77	$ 3,828,797.20	$ 2,608,175.31	$ 2,712,502.32	$ 2,821,002.41	$ 2,933,842.51	$3,051,196.21	$3,173,244.06	$3,300,173.82	$3,432,180.77	$3,569,468.00
Expenses																		
Expenses	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Operating Costs	$ -	$ -	$ 10,816,000.00	$ -	$ -	$ 182,497.94	$ 189,797.85	$ 197,389.77	$ 205,285.36	$ 213,496.77	$ 222,036.64	$ 230,918.11	$ 240,154.83	$ 249,761.03	$ 259,751.47	$ 270,141.53	$ 280,947.19	$ 292,185.07
Total Costs	$ -	$ -	$ 10,816,000.00	$ -	$ -	$ 182,497.94	$ 189,797.85	$ 197,389.77	$ 205,285.36	$ 213,496.77	$ 222,036.64	$ 230,918.11	$ 240,154.83	$ 249,761.03	$ 259,751.47	$ 270,141.53	$ 280,947.19	$ 292,185.07
Taxation																		
Depreciation	$ -	$ -	$ -	$ -	$ -	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00
Taxable Income	$ -	$ -	$ -	$ -	$ -	$ 1,846,981.25	$ 3,150,140.39	$ 3,284,146.01	$ 3,423,511.85	$ 2,194,678.54	$ 2,290,465.68	$ 2,390,084.30	$ 2,493,687.68	$2,601,435.18	$2,713,492.59	$2,830,032.29	$2,951,233.59	$3,077,282.93
Tax Paid	$ -	$ -	$ -	$ -	$ -	$ 554,094.37	$ 945,042.12	$ 985,243.80	$ 1,027,053.55	$ 658,403.56	$ 687,139.70	$ 717,025.29	$ 748,106.30	$ 780,430.55	$ 814,047.78	$ 849,009.69	$ 885,370.08	$ 923,184.88
Total																		
Net Profit After Tax		$ -	$(10,816,000.00)	$ -	$ -	$ 1,292,886.87	$ 2,205,098.27	$ 2,298,902.20	$ 2,396,458.29	$ 1,536,274.97	$ 1,603,325.97	$ 1,673,059.01	$ 1,745,581.37	$1,821,004.63	$1,899,444.81	$1,981,022.61	$2,065,863.51	$2,154,098.05
Net Cash Flow		$ -	$(10,816,000.00)	$ -	$ -	$ 1,492,886.87	$ 2,405,098.27	$ 2,498,902.20	$ 2,596,458.29	$ 1,736,274.97	$ 1,803,325.97	$ 1,873,059.01	$ 1,945,581.37	$2,021,004.63	$2,099,444.81	$2,181,022.61	$2,265,863.51	$2,354,098.05
Discount Rate	0.00	1.00	0.91	0.83	0.75	0.68	0.62	0.56	0.51	0.47	0.42	0.39	0.35	0.32	0.29	0.26	0.24	0.22
Present Value	$ -	$ -	$ (9,832,727.27)	$ -	$ -	$ 1,019,661.82	$ 1,493,376.80	$ 1,410,565.15	$ 1,332,393.65	$ 809,985.09	$ 764,786.25	$ 722,145.33	$ 681,914.40	$ 643,954.36	$ 608,134.38	$ 574,331.42	$ 542,429.71	$ 512,320.32
Cumulative Present Value	$ -	$ -	$ (9,832,727.27)	$ (9,832,727.27)	$ (9,832,727.27)	$ (8,813,065.45)	$ (7,319,688.65)	$ (5,909,123.50)	$ (4,576,729.85)	$ (3,766,744.76)	$ (3,001,958.51)	$ (2,279,813.18)	$ (1,597,898.77)	$ (953,944.42)	$ (345,810.04)	$ 228,521.38	$ 770,951.09	$ 1,283,271.42
Net Present Value	$ 1,283,271.42																	

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
	0	1	2	3	4	5	6	7	8	9	10
Diesel Trucks											
	$ 2,024.00	$ 2,025.00	$ 2,026.00	$ 2,027.00	$ 2,028.00	$ 2,029.00	$ 2,030.00	$ 2,031.00	$ 2,032.00	$ 2,033.00	$ 2,034.00
Maintenance Cost	$ 10,000,000.00	$ 10,340,000.00	$ 10,691,560.00	$ 11,055,073.04	$ 11,430,945.52	$ 11,819,597.67	$ 12,221,463.99	$ 12,636,993.77	$ 13,066,651.56	$ 13,510,917.71	$ 13,970,288.91
Diesel Cost	$ 76,500,000.00	$ 79,101,000.00	$ 81,790,434.00	$ 84,571,308.76	$ 87,446,733.25	$ 90,419,922.18	$ 93,494,199.54	$ 96,673,002.32	$ 99,959,884.40	$ 103,358,520.47	$ 106,872,710.17
Decommission Cost	$ -	$ -	$ -	$ -	$ -	$ 7,091,758.60		$ -	$ -	$ -	$ -
Truck Replacement	$ -	$ -	$ -	$ -	$ -	$ -	$ 183,321,959.88	$ -	$ -	$ -	$ -
Delivery	$ -	$ -	$ -	$ -	$ -	$ -	$ 6,110,732.00	$ -	$ -	$ -	$ -
Total	$ 86,502,024.00	$ 89,443,025.00	$ 92,484,020.00	$ 95,628,408.80	$ 98,879,706.78	$ 109,333,307.46	$ 289,039,653.41	$ 109,312,027.09	$ 113,028,567.96	$ 116,871,471.18	$ 120,845,033.08
Cumulative	$ 86,502,024.00	$ 175,945,049.00	$ 268,429,069.00	$ 364,057,477.80	$ 462,937,184.57	$ 572,270,492.03	$ 861,310,145.44	$ 970,622,172.53	$ 1,083,650,740.49	$ 1,200,522,211.67	$ 1,321,367,244.75
OPEX	$ 86,500,000.00	$ 89,441,000.00	$ 92,481,994.00	$ 95,626,381.80	$ 98,877,678.78	$ 102,239,519.86	$ 105,715,663.53	$ 109,309,996.09	$ 113,026,535.96	$ 116,869,438.18	$ 120,842,999.08
Total	***$ 2,315,345,217.81***										
Electric Trucks											
Maintenance Cost	$ -	$ -	$ -	$ -	$ -	$ 47,278,390.68	$ 48,885,855.97	$ 50,547,975.07	$ 52,266,606.22	$ 54,043,670.83	$ 55,881,155.64
Electricity Cost	$ -	$ -	$ -	$ -	$ -	$ 31,466,132.92	$ 32,535,981.44	$ 33,642,204.81	$ 34,786,039.77	$ 35,968,765.12	$ 37,191,703.14
Truck Cost	$ 240,000,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Delivery	$ 5,000,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Charging Grid Cost	$ -	$ -	$ -	$ -	$ 1,500,000.00	$ -	$ -	$ -	$ -	$ -	$ -
Solar Farm Cost	$ -	$ -	$ 10,816,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Solar Farm Maintenance	$ -	$ -	$ 182,497.00	$ 188,701.90	$ 195,117.76	$ 201,751.77	$ 208,611.33	$ 215,704.11	$ 223,038.05	$ 230,621.35	$ 238,462.47
Trolly Assist	$ -	$ -	$ -	$ 4,800,000.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Savings from Assist	$ -	$ -	$ -	$ -	$ 575,000.00	-$ 594,550.00	-$ 614,764.70	-$ 635,666.70	-$ 657,279.37	-$ 679,626.87	-$ 702,734.18
Diesel Cost (GENS)	$ -	$ -	$ -	$ -	$ -	$ 2,712,597.67	$ 2,804,825.99	$ 2,900,190.07	$ 2,998,796.53	$ 3,100,755.61	$ 3,206,181.31
Diesel Gen Conversion	$ -	$ -	$ -	$ -	$ -	$ 425,505.52	$ 100,000.00	$ 454,931.78	$ 470,399.46	$ 486,393.04	$ 502,930.40
Diesel Gen Maintance	$ -	$ -	$ -	$ -	$ -	$ 709,175.86	$ 733,287.84	$ 758,219.63	$ 783,999.09	$ 810,655.06	$ 838,217.33
Maintenance Cost (truck)	$ 10,000,000.00	$ 10,340,000.00	$ 10,691,560.00	$ 11,055,073.04	$ 11,430,945.52	$ 3,309,487.35	$ 3,422,009.92	$ 1,769,179.13	$ 1,829,331.22	$ 1,891,528.48	$ 1,955,840.45
Disel Cost (Trucks)	$ 76,500,000.00	$ 79,101,000.00	$ 81,790,434.00	$ 84,571,308.76	$ 87,446,733.25	$ 12,658,789.11	$ 13,089,187.94	$ 13,534,220.33	$ 13,994,383.82	$ 14,470,192.87	$ 14,962,179.42
Decomission Trucks	$ -	$ -	$ -	$ -	$ -	$ 7,091,758.60	$ -	$ -	$ -	$ -	$ -
Total	$ 331,500,000.00	$ 89,441,000.00	$ 103,480,491.00	$ 100,615,083.69	$ 99,997,796.54	$ 105,259,039.47	$ 101,164,995.71	$ 103,186,958.22	$ 106,695,314.79	$ 110,322,955.50	$ 114,073,935.98
Total Cumulative	$ 331,500,000.00	$ 420,941,000.00	$ 524,421,491.00	$ 625,036,574.69	$ 725,034,371.23	$ 830,293,410.70	$ 931,458,406.42	$ 1,034,645,364.63	$ 1,141,340,679.43	$ 1,251,663,634.92	$ 1,365,737,570.91
OPEX	$ 86,502,024.00	$ 89,443,025.00	$ 92,666,517.00	$ 100,617,110.69	$ 99,074,824.54	$ 98,763,859.87	$ 101,781,790.41	$ 103,824,655.91	$ 107,354,626.16	$ 111,004,615.36	$ 114,778,704.16
Total	***$ 2,027,668,927.57***										