Operational Readiness and Alignment with ISO 55001

Mine Maintenance, Asset management & Reliability Strategies

Brisbane, August 2024

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Mining in Australia

Overview of the Industry

Mining is the backbone of the Australian economy, representing its largest sector. Over the last decade, it has eclipsed other major industries, driving substantial economic growth.

Economic Contributions:

- The mining industry has generated over AUD 2.4 trillion in export revenue in the last ten years.
- It has contributed AUD 252 billion in wages and AUD 143 billion in company taxes.
- Additionally, it has paid AUD 112 billion in royalties, and its growth accounts for 21% of the economy's expansion.

Source: Minerals Council of Australia (Feb 2023) and Reserve Bank of Australia (Apr 2024).

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The Future of Mining

By 2030, to meet demand for electricity storage alone **the world will require 50 new lithium mines, 60 new nickel mines and 17 new cobalt mines**.

Global mining investment is expected to increase by US$100 billion annually from current levels to produce the mineral commodities required for the world to achieve net-zero emissions by 2050.

Source: Minerals Council of Australia (May 2024).

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The Future of Mining

Global **iron ore** production is expected to increase at a compound annual growth rate (CAGR) of 1.9%, from 2,084Mt in 2022 to reach 3,003Mt in 2030.

Source: ResearchAndMarkets (Jan 2024).

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The Future of Mining

Global **copper** production is expected to increase at a compound annual growth rate (CAGR) of 4% to 5% over the next 5 years to reach 38.5Mt in 2030.

Source: ANZ Research (Jun 2024).

Global Market size of **copper** is expected to grow from USD170B in 2022 to USD260B in 2030.

Source: Statista (Jun 2024).

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Growth in Mining

Two key aspects to sustain growth in mining:

Operational Readiness is a structured process of ensuring the operations team acquires the tools, skills and documentation to operate and maintain a newly completed project.

ISO 55001 is an international standard that states the requirements for a management system for Asset Management. The goal is to help organisations to manage assets through their full lifecycle to meet the needs of the organisation and its stakeholders.

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Operational Readiness

Phases (based on the **PMI**)

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┌──────────────┐   ┌──────────────┐   ┌──────────────┐   ┌──────────────┐   ┌──────────────┐   ┌──────────────┐
│   Project    │ → │   Business   │ → │    Design    │ → │   Build /    │ → │Implementation│ → │     Post     │
│  Initiation  │   │ Requirements │   │              │   │     Test     │   │              │   │Implementation│
│              │   │  / Analysis  │   │              │   │              │   │              │   │              │
└──────────────┘   └──────────────┘   └──────────────┘   └──────────────┘   └──────────────┘   └──────────────┘
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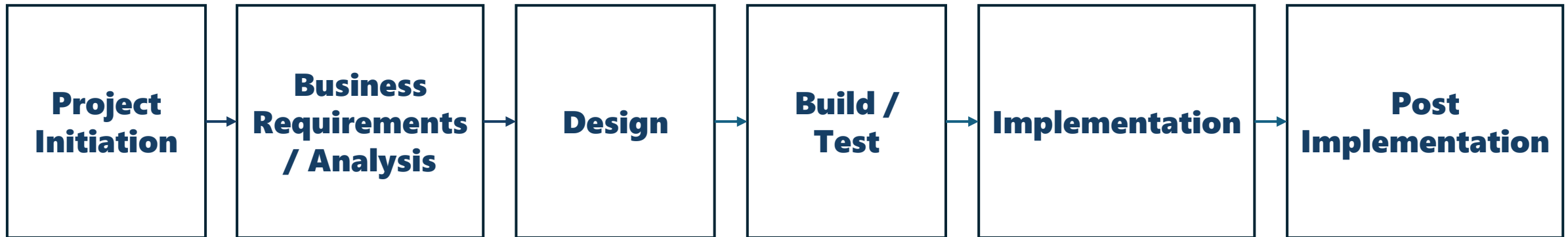
Ops Readiness and ISO 55001

Phases (based on the **PMI**)

Project Initiation	Business Requirements / Analysis	Design	Build / Test	Implementation	Post Implementation
Identify key areas of change and their **potential impact**.	**Assess current state** and **develop plan** to ensure readiness of all dimensions.	Define **operational needs**, assess readiness and prepare test plans.	Test for readiness in the **operating environment**, make adjustments where required and **prepare the end user** for implementation	Train staff and clients; approve and deploy **production environment**.	**Make adjustments to the production environment**; transfer.

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Growth in Mining

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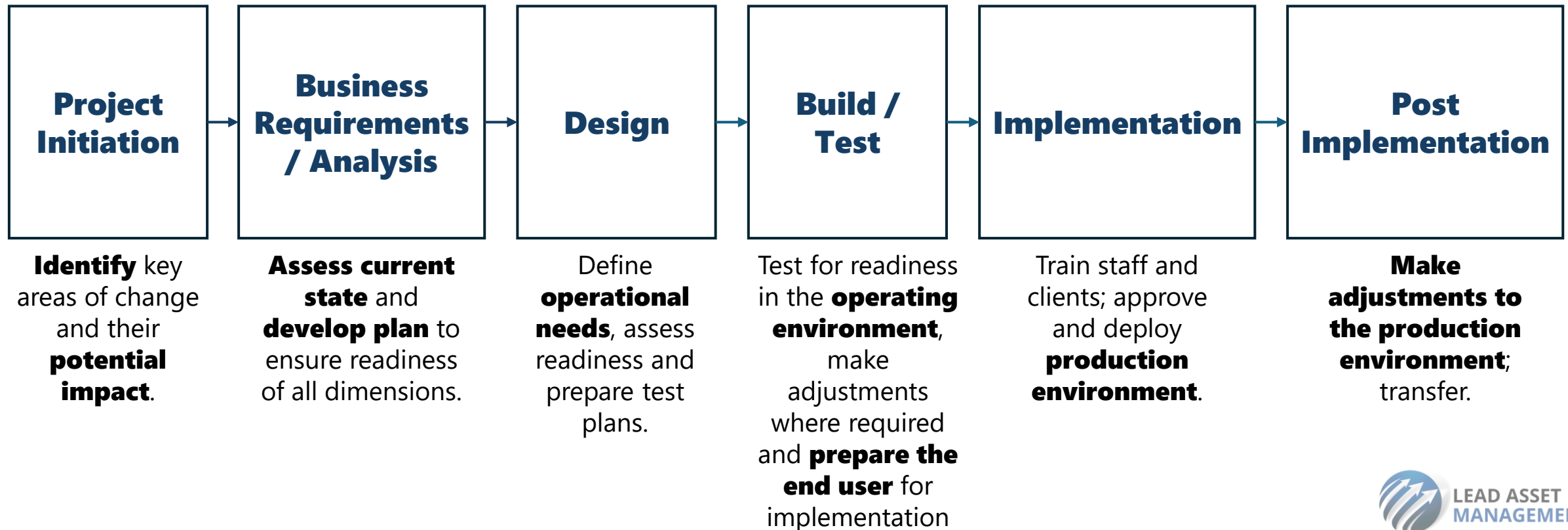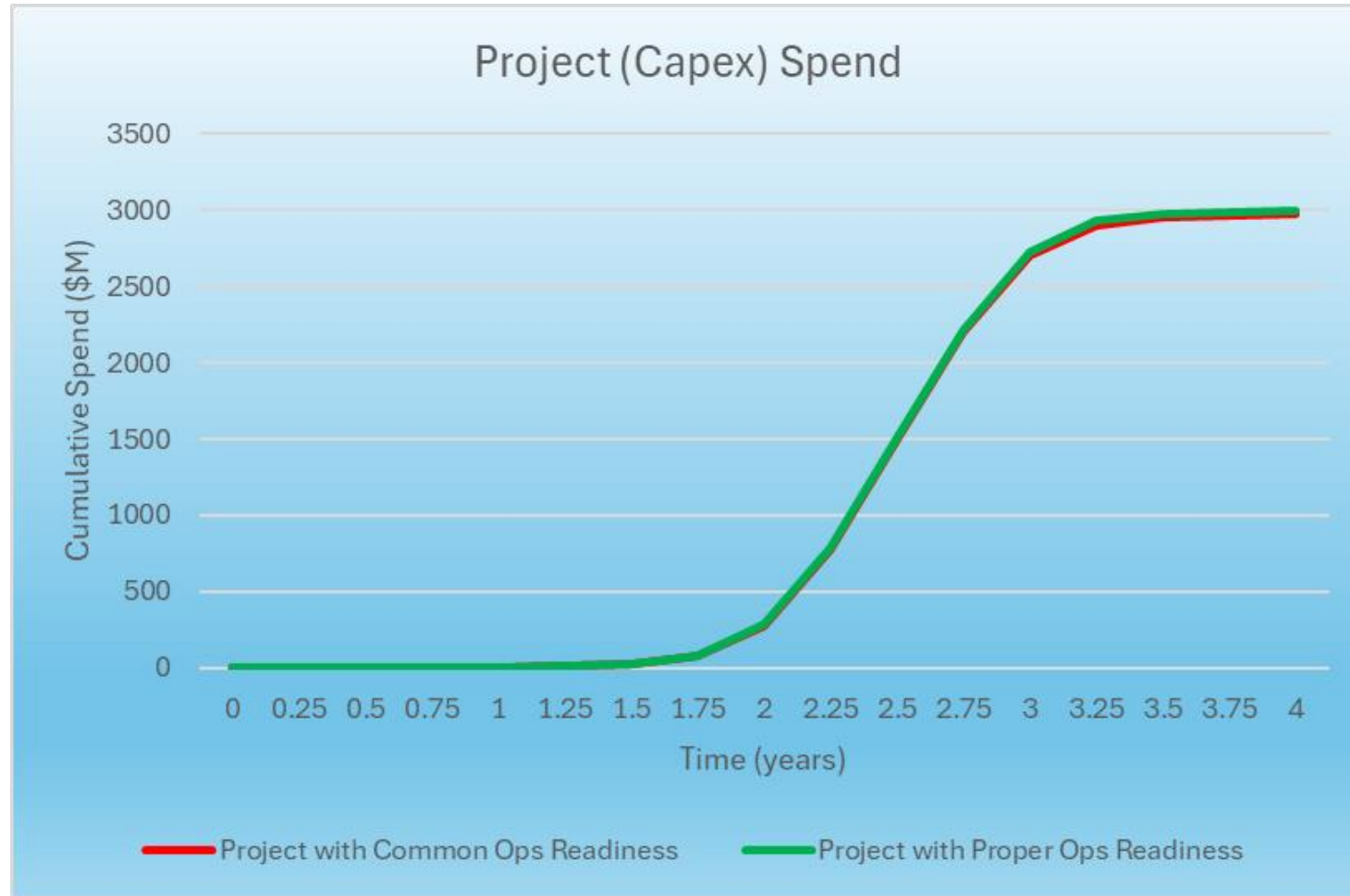
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Operational Readiness Deliverables

Asset Management item	Common OR	With focus on ISO 55001
OEM Manuals	√	√
Design Drawings	√	√
Strategic Asset Management Plan (SAMP)	X	√
Asset Management Plan (AMP)	X	√
Equipment Criticality	X	√
Materials Cataloguing	√	√
Spares Criticality	X	√
Spares Stocking Strategies	X	√
Spares Preservation Strategies	X	√

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Operational Readiness Deliverables

Asset Management item	Common OR	With focus on ISO 55001
Bill of Materials (BOM)	√ X	√
RCM/FMECA Based Maintenance Strategies / Tactics	X	√
Preventive Maintenance Strategies	√	√
Corrective Maintenance Strategies	X	√
Work Instructions	√ X	√
Equipment Recovery Plans (ERP)	X	√
Business Continuity Plans (BCP)	X	√
Review of the Maintenance Organisational Structure	X	√
5Y/2Y Maintenance Budget	X	√

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Ops Readiness Impact on Project

Ops Readiness Impact on Ramp Up

Ramp Up (% Capacity)

- Ramp Up with Common Ops Readiness
- Ramp Up with Proper Ops Readiness
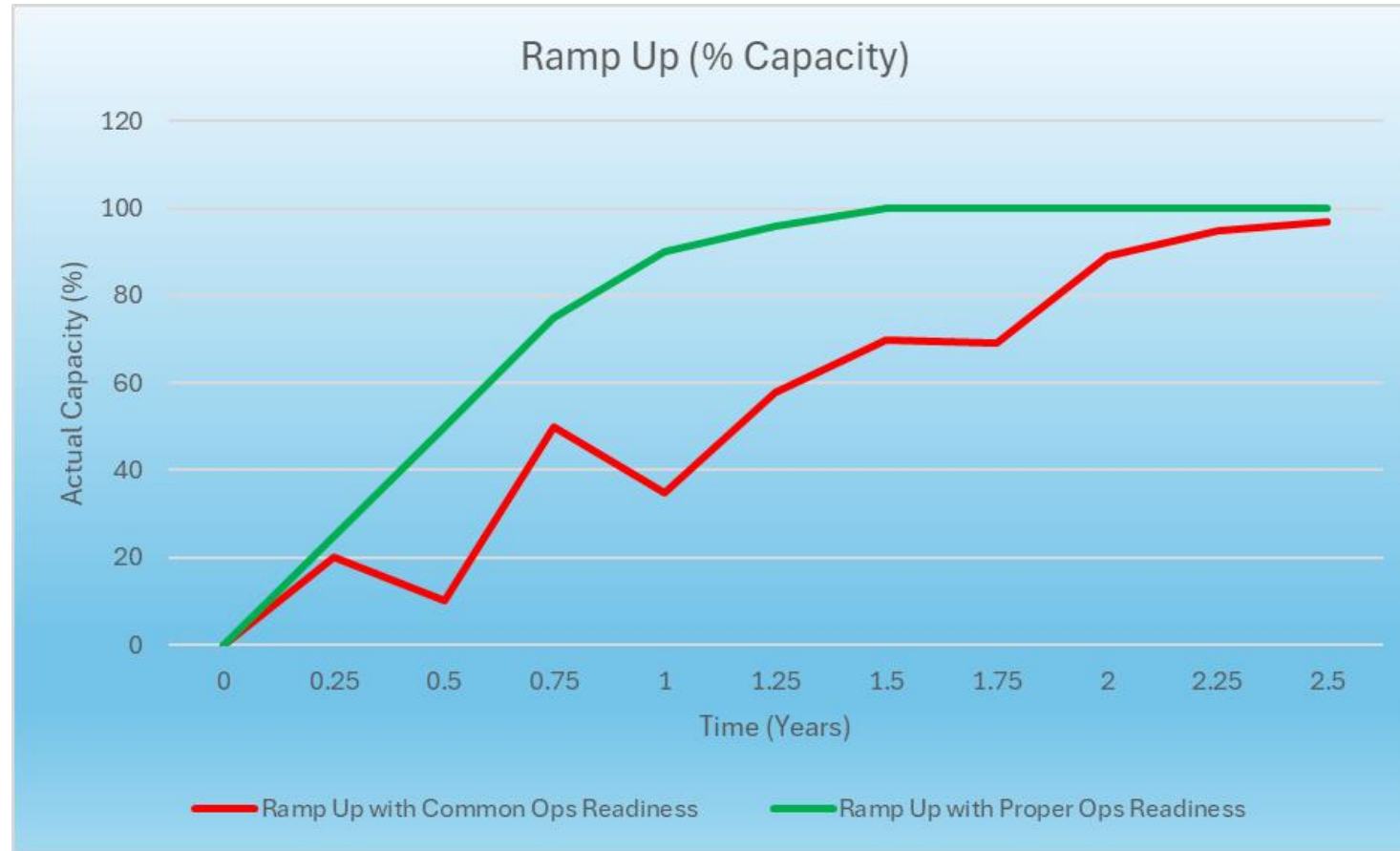
Ops Readiness Impact on Operations

Net Profit during Whole of Life ($M)

Net Profit ($M)

Time (Years)

— Net Profit with Common Ops Readiness   — Net Profit with Proper Ops Readiness
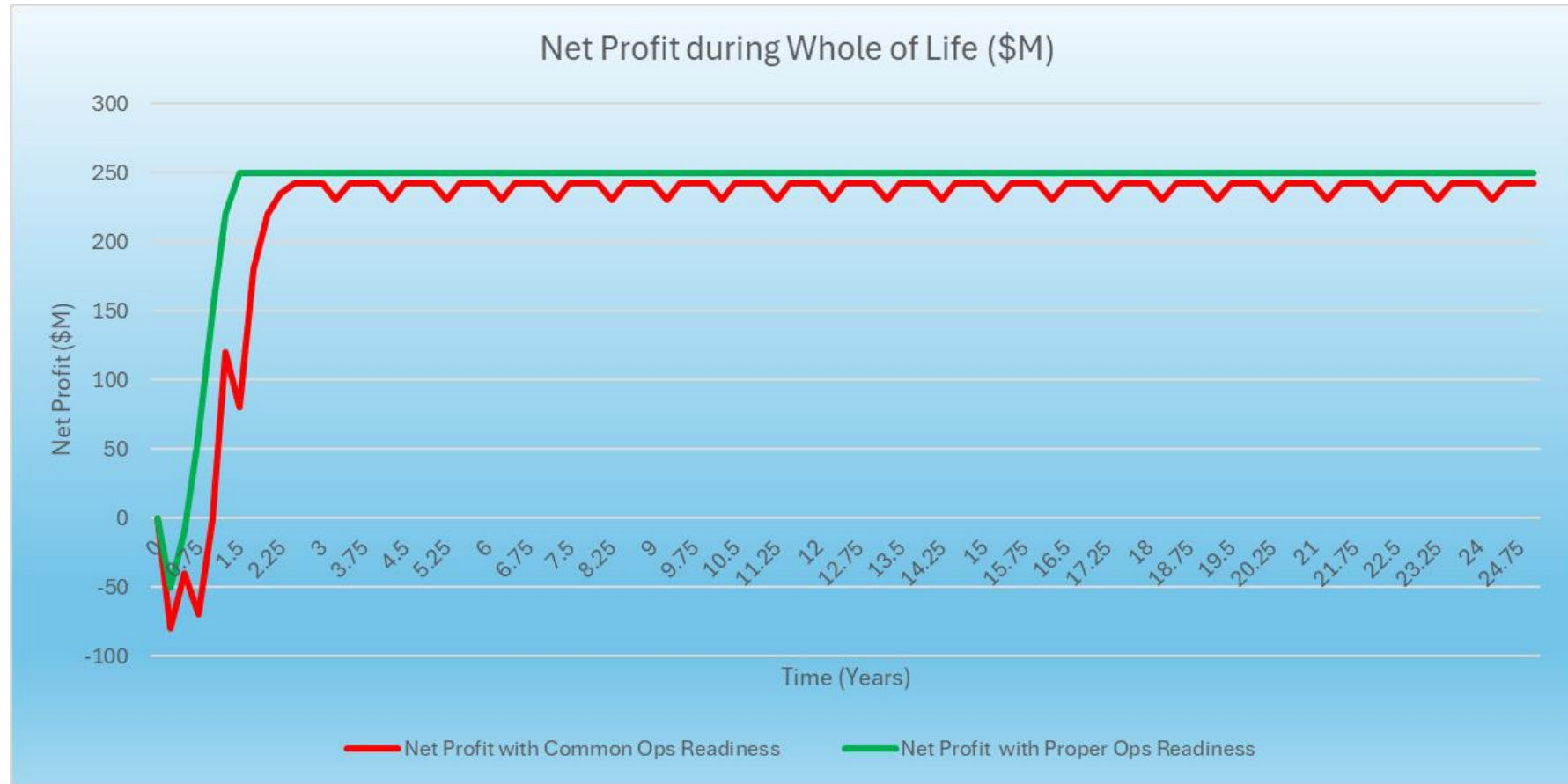
Ops Readiness Impact on Cash Flow

Cumulative Cash Flow for Whole of Life ($M)
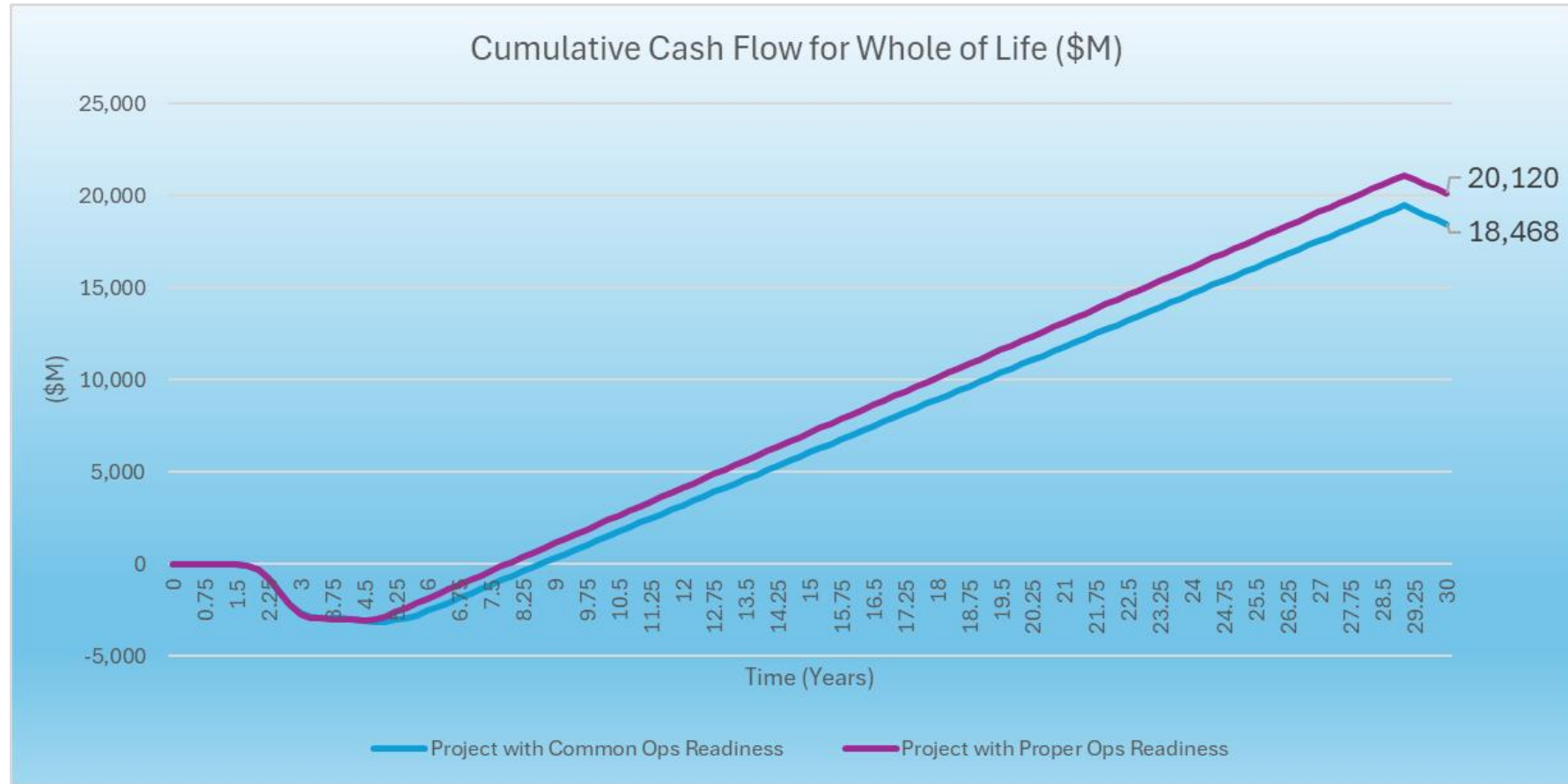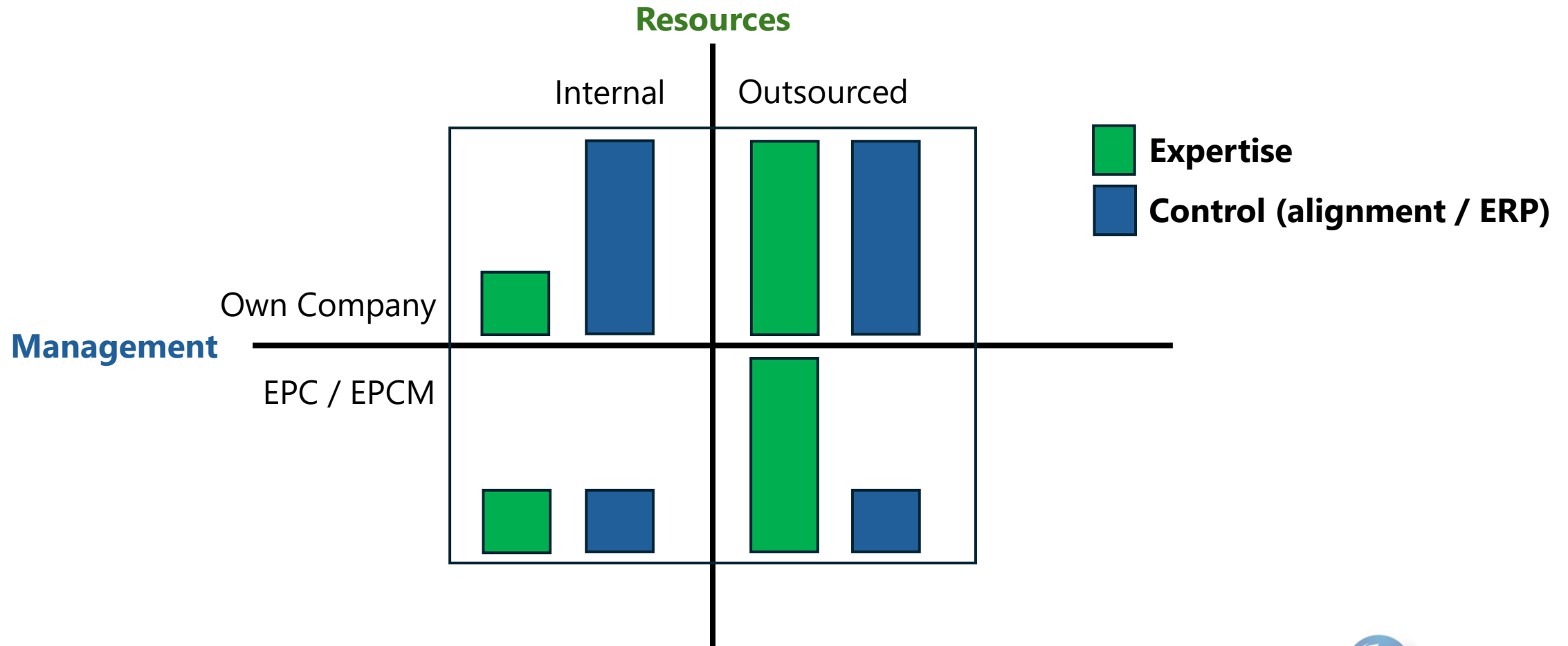
Operational Readiness Controls

Keys for success:

- Accountable OR Manager/Lead.
- Operations accountability for endorsement.
- Ops Readiness awareness across Projects, EPC/EPCM, Operations teams.
- Deliverables into final repositories (ERP, document repositories).
- Decisions & Assumptions Register.
- Locked support during Ramp-up period.

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Operational Readiness – Takeaways

Takeaways:

- Is your Ops Readiness aligned with ISO 55001? Asset full life cycle.

- Do you have an adequate Ops Readiness model? Resources & management.

- Do you have adequate Ops Readiness controls?

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Thank you

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