PIMA MINING NL

Going Forward With The Dow Magnesium Technology

Presentation to IMM
30 January 2002

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Building a world class business in the magnesium industry

Strategy:

1. Use proven, deliverable technology – Dow
2. Expand to capture scale economies
3. Develop second and third projects to increase market share
4. Develop strong relationships with customers

COST of metal is the key

Project Overview

- **Scale:** Stage 1 65,000 tpa
  Stage 2 200,000 tpa
- **Location:** Port Pirie, South Australia
- **Feedstock:** Magnesite from northern Flinders Ranges - 579 million tonne resource
- **Process:** Proven, robust Dow Technology
- **Power:** Adjacent Combined Cycle Gas Turbine Power Station
- **Costs:** **Capital** - Approx. A$800 million
  Operating - Around 55 US¢/lb

Project Delivery

Board Additions

- Malcolm Richmond
- Andy Hogendijk
- 2 others tba

Management

- Rob Eaglesham - GM Project Delivery
- Phil Baily - GM Operations
- Darryl Smith - GM Commercial
- Various ex Dow Magnesium personnell

Likely EPC Contractor

- JV Thiess/Kvaerner

Banks Independent Engineer

- Behre Dolbear Australia

Why Dow Process?

SAMAG has undertaken studies to confirm the selection of the Dow Process

- Comparative Process Review Study
- Thiess/Krupp Uhde Engineering Study
- Thiess/Kvaerner Engineering Study
- Behr Dolbear Review for Banks
- International Project Analysis Technical Risk Study
- CRU/Clark & Marron Study

Our Findings

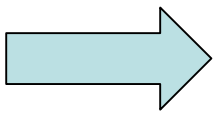
The Dow Process

1.	Technology	Proven, well developed
2.	Operability	Robust, flexible, tolerant
3.	Operating Costs	Equal best, if not lowest
4.	Capital Cost	Low capital requirement
5.	NVIRO	Complies with modern standards
6.	Deliverability	Demonstrated
7.	Risks	Comparatively Low
8.	Improvements	Considerable Potential

1.1 Technology

Electrolytic technology has best potential long term

- Continuous process
- Lower operating cost than Pidgeon technology
- Real potential for economies of scale
- Considerable potential for further process improvement



Lowest costs

1.2 Technology

The Dow Process is well proven

- Around 3.5 million tonnes produced since 1916
- Seven successful plants built, commissioned and operated
- Several successful expansions
- Last plant at Freeport closed in 1998

1.3 Technology

The Dow process has produced more metal than other technologies

Process	Est. Cum. Tonnage
Dow	3,500,000 t
I G Farben & Variants	2,500,000 t
MagneTherm	2,000,000 t
SilicoThermic	1,500,000 t
VAMI/UTI	1,200,000 t
Becancour Process	400,000 t
Magnola Process	20,000 t
Other Processes	1,000,000 t?

***All estimates approximations only**

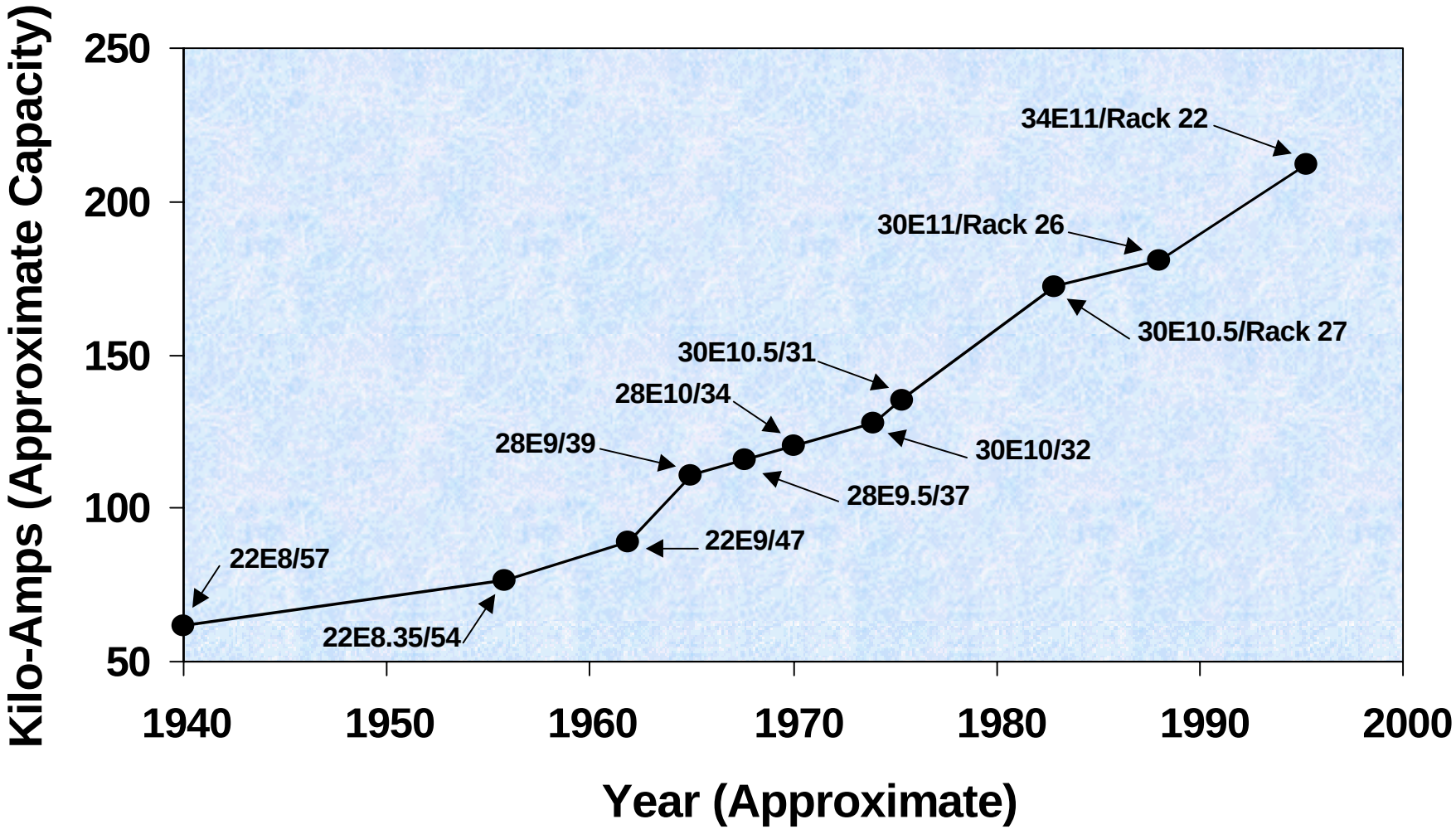
1.4 Technology

The Dow process is well developed

The Dow process has been developed over the past 80 years

- Cell development has been continuous
  - Increased amperage
  - Reduced resistance
  - Larger cells
- Improved energy efficiency since “oil shock” of 1971
  - Change from Shelf Dryer to Fluidised Bed Dryer
  - Development of heat recovery system in Acid Furnace
  - Improved cell efficiency

Historical Mag Cell Improvements



Designation: No. Anodes / Type / Anode Diameter / Cell Resistance

1.5 Technology

The Dow Process is less complex than others

Project	Process	Feed	Unit Processes*	Recycle Loops
Freeport	Dow	Seawater	7	1
Magnola	Magnola	Serpentine	10	2
Dead Sea	VAMI/UTI	Brine	8	2
Rowley	Magcorp	Brine	10	2
Becancour	Norsk	Magnesite	7	1
AMC	AMC	Magnesite	12	4
SAMAG	Dow	Magnesite	7	1

***Major Unit Processes. There are many ways to count unit processes. We have tried to be internally consistent for this exercise.**

2.1 Operability

The Dow Process is robust and forgiving – tolerant of impure feed

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Different philosophy than other electrolytic technologies

- Accepts that preparation of a pure, anhydrous feed is very difficult, costly, and entails significant risk.
- Cells are designed to accept impure "wet" feed – $MgCl_2.2H_2O$
  - Consumable anodes rather than fixed anodes
  - Cells designed so that slag can be removed

John Deere Tractor rather than a Ferrari*

***Characterisation applied by former Dow Magnesium executives to illustrate the point.**

2.2 Operability

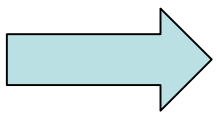
Unit operations are not tightly linked.

- Most unit operations are separated from each other by adequate storage
- This permits “departures” to be handled without serious disruptions or damage to the plant.
- Also greatly facilitates commissioning of the plant

3.1 Operating Cost

The Dow process is lowest on operating cost.

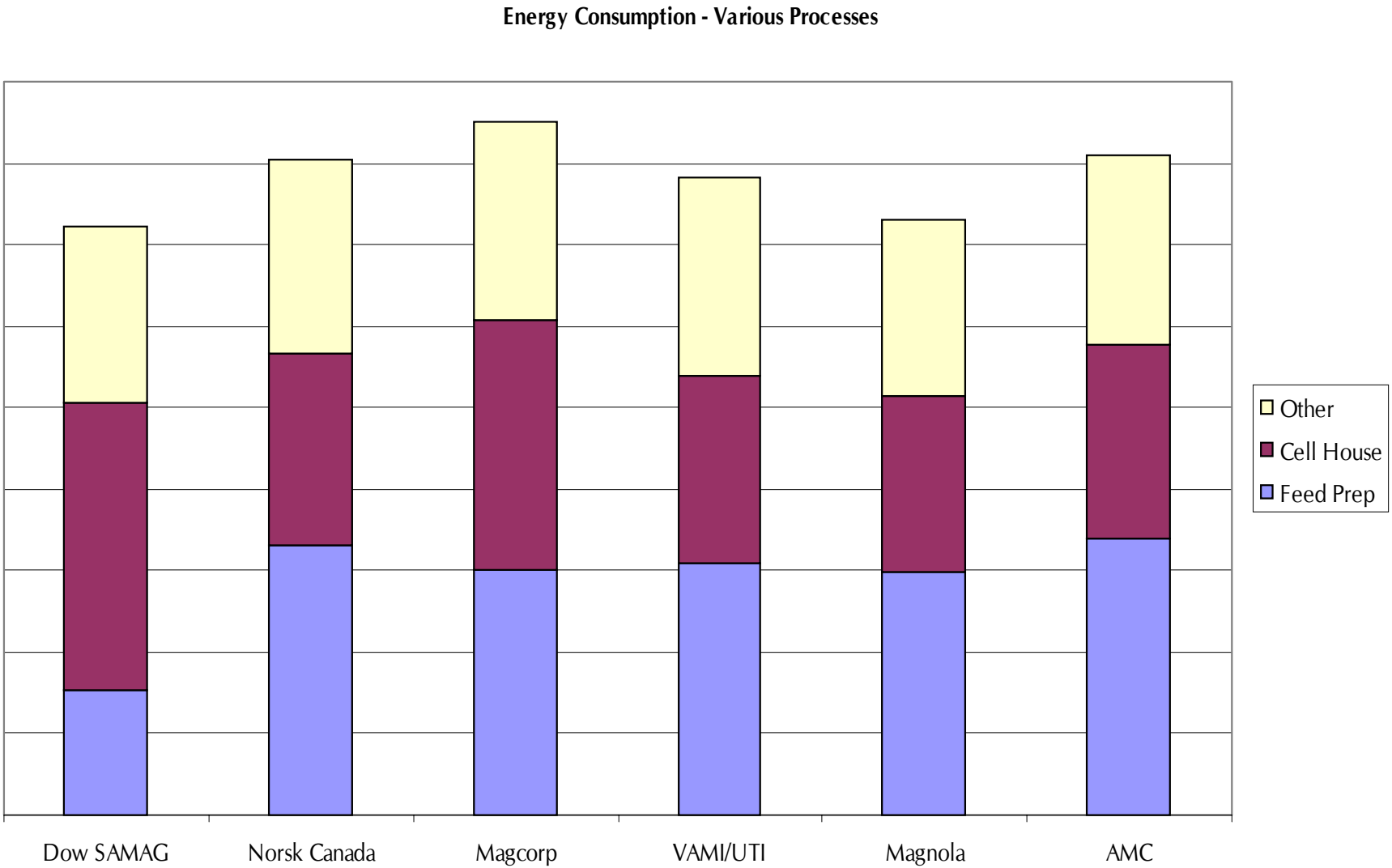
	Relative To Others
Energy	Equal best
Consumables	Higher
Feed Prep Labour	Lower
Cell-house Labour	Higher
Maintenance	Lower
Other Costs	Similar



Lowest Operating Cost

3.2 Operating Cost

Dow is competitive on energy consumption



Based on Study of a plant using the different processes at Port Pirie ie same inputs for each.

3.3 Operating Cost

The Dow process is instantaneously interruptible which reduces power costs

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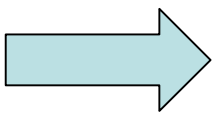
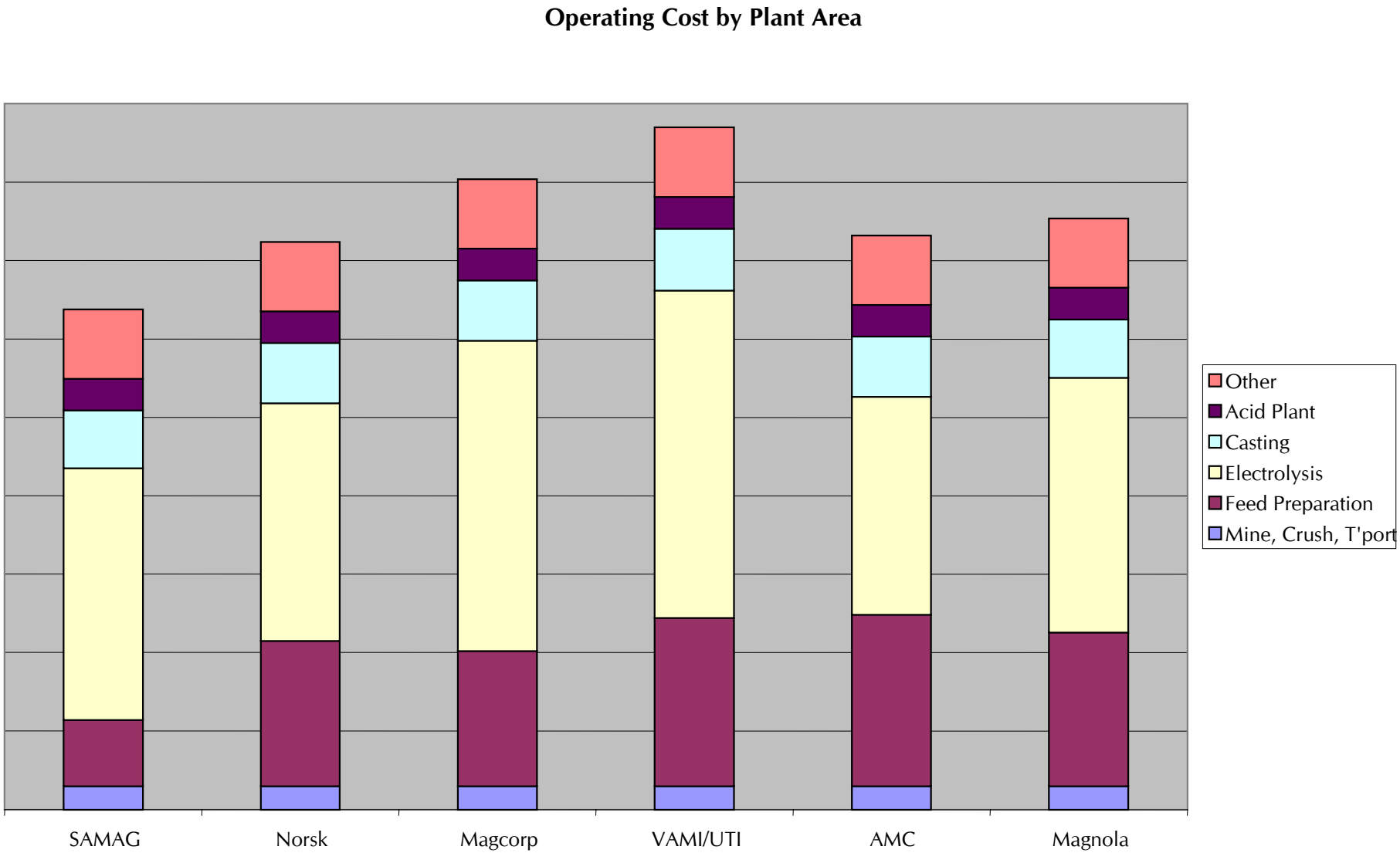
- The Dow cell is not refractory lined
- This facilitates heat management – both heating and cooling
- The DC load can be instantaneously interrupted
- Cells can be kept off-line for several days.
- In some power markets such as SA, interruptibility is valuable – up to A$9.00/MWh.



Competitive net energy costs

3.4 Operating Cost



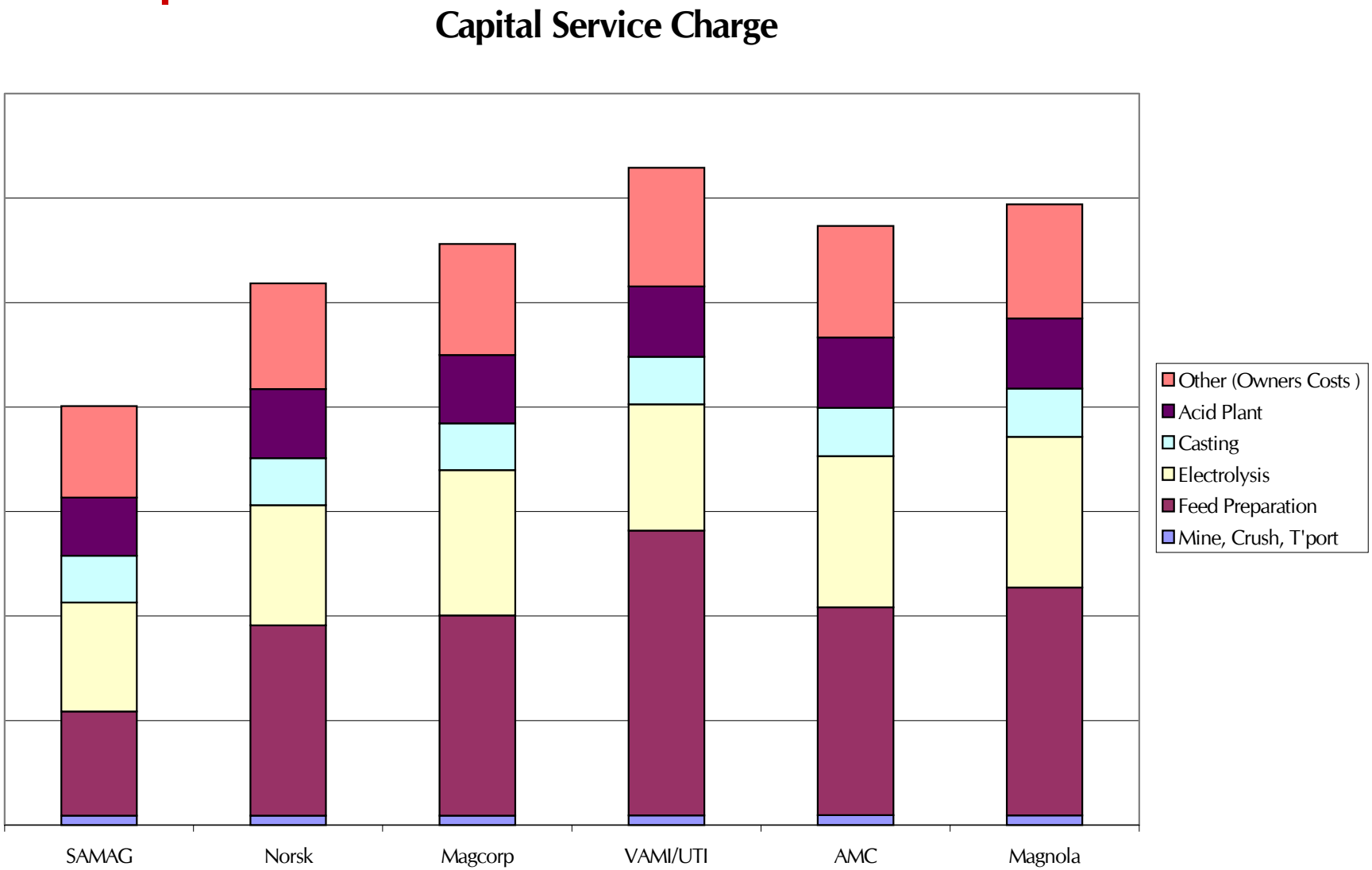
Different processes, same inputs for a Port Pirie plant. Based on A$1 = US 65c

4.1 Capital Cost

Dow Process is lowest on capital requirement

- Eliminates the difficult and costly di-hydrate to anhydrous feed preparation step - halves feed prep capex
- Other parts of the plant comparable to other processes
  - leach/purification
  - acid plant
  - casting
- Ease of commissioning reduces need for working capital and standby equity
- Proven nature of the process means that SAMAG can access insurance

4.2 Capital Cost



Based on using different processes, same inputs at Port Pirie. A$1 = US 65c. Calculatedusing Credit Foncier 15 year life, 10% cost of capital.

5.1 Environmental

Dow Process complies with stringent EPA requirements

- Any project today MUST comply with tight environmental regulations.
- Dow's Freeport plant complied with all relevant environmental regulations.
- Dow acid plant proven safe with respect to CHCs, dioxins and furan emissions
- SAMAG's Port Pirie plant will include engineered improvements and will achieve better environmental performance than Freeport.
- SAMAG has an approved Environmental Impact Statement.

6.1 Deliverability

Achieving design capacity on budget, on time, is crucial to expansion

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- Plants that experience capital cost over-runs and slow commissioning struggle to secure capital for expansion.
- Failure to expand locks-in adverse economics
- Achieving completion on time and budget will:
  - enable scale economies and experience curve effects to be realised
  - attract long-term off-take contracts.
  - allow subsequent expansion

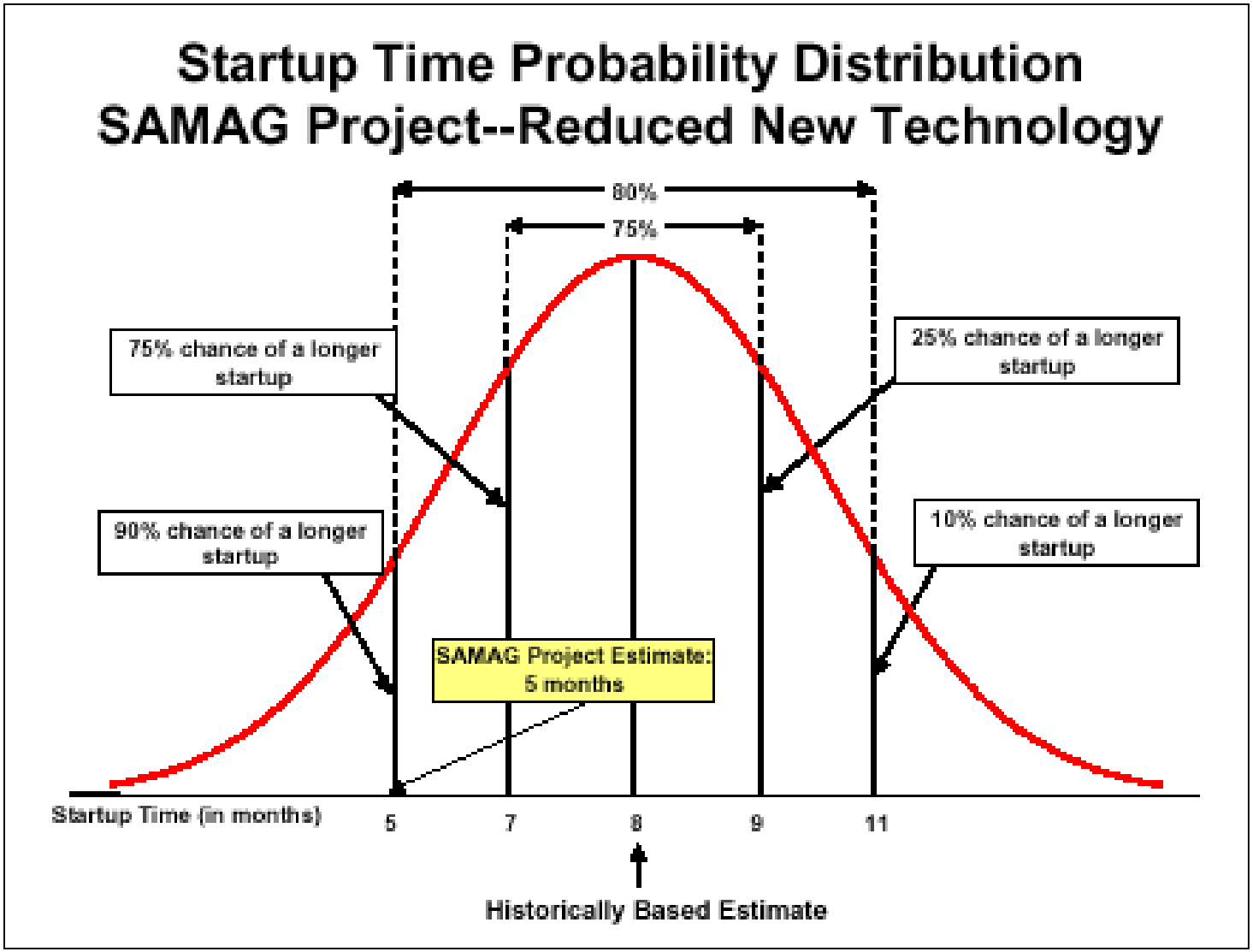
6.2 Deliverability

Dow Process plants are straightforward to commission

- Limited interdependency between unit operations facilitates commissioning.
- Track record of successful commissioning of seven successful precursor plants, and several expansions
- Dow plants have reached 100% production within 5 to 7 months from the start of operations.
- SAMAG has access to former Dow Magnesium executives with more than 300 man-years of relevant experience

6.4 Deliverability

IPA's Technical Risk Review Concurs



7.1 Risks

Risks appear manageable

Comprehensive risk reviews show modest or manageable risk

- IPA Technical Risk Assessment
- Normet/SAMAG Risk Assessment
- Hazop Study
- Environmental Impact Statement

IPA has not completed an assessment of Project Delivery Risk – as important as Technical Risk.

Summary of IPA Technical Assessment of the SAMAG Project

Area Evaluated	Risk to SAMAG Project
1. Process Complexity	Low
2. Percentage investment in new Technology	Low
3. Number of New Process Steps	Moderate
4. Status as First-of-a-Kind	None
5. Percentage of Heat and Materials Balance Data Based on Commercial Operating Experience	Low
6. Process Development Status	Low
7. Magnitude of Impurities Related Concerns	Moderate
8. Engineering Design Status [Not yet completed]	High
9. Process Feedstock [Different to Freeport]	Moderate/High

8.1 Improvements

Port Pirie incorporates a number of improvements compared with Freeport

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- New plant has optimal layout.
- Magnesite feed (23% Mg) instead of seawater (0.18%)
- Reduced manning and labour cost.
- Improved system for rapid change-out of cells for maintenance.
- GLAMA truck metal recovery system.
- Modern instrumentation and control systems.
- Cooling di-hydrate prills improves quality
- Better cell settings/gas burner system
- More modern cast-house.

8.2 Improvements

SAMAG expects to make further improvements in time

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1. New magnesite deposit nearby.
2. Eliminate SO4/BaCl2 system for removing calcium
3. Low cost source of make-up Cl ion
4. Further reduce the resistance of the cell/anode system
5. Automated slagging
6. Expansion will permit scale economies to be realised
7. Adopt cell design improvements not utilised by Dow

potential to reduce opex by US10c/lb or more

9.1 Availability

SAMAG has secured exclusive world rights to Dow process technology

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- Electrolytic process technology is difficult to access
  - Norsk, Magcorp, Magnola and AMC technologies not available for license
  - VAMI/UTI technology available, but expensive
- The acquisition cost for the entire world rights are modest compared to the costs of developing new process technology.
- The package includes exclusive world rights to Dow's comprehensive Magnesium Development files.

Dow process scores well on success factors...

Success Factors for Magnesium Projects	**Dow**
• Numerous pre-cursor plants	**Yes**
• Well developed technology	**Yes**
• Avoid last stage of feed prep	**Yes**
• Unit operations largely disconnected	**Yes**
• Experienced team available	**Yes**

… but not on failure factors

Failure Factors for Magnesium Projects	**Dow**
• Improperly characterised feedstock	**Manageable**
• New feed prep process	**No**
• New anhydration process	**No**
• New cell-house technology	**No**
• Technology transfer issues	**No**
• Insufficient piloting	**No**
• Ineffectual project delivery	**Manageable**

Our Findings

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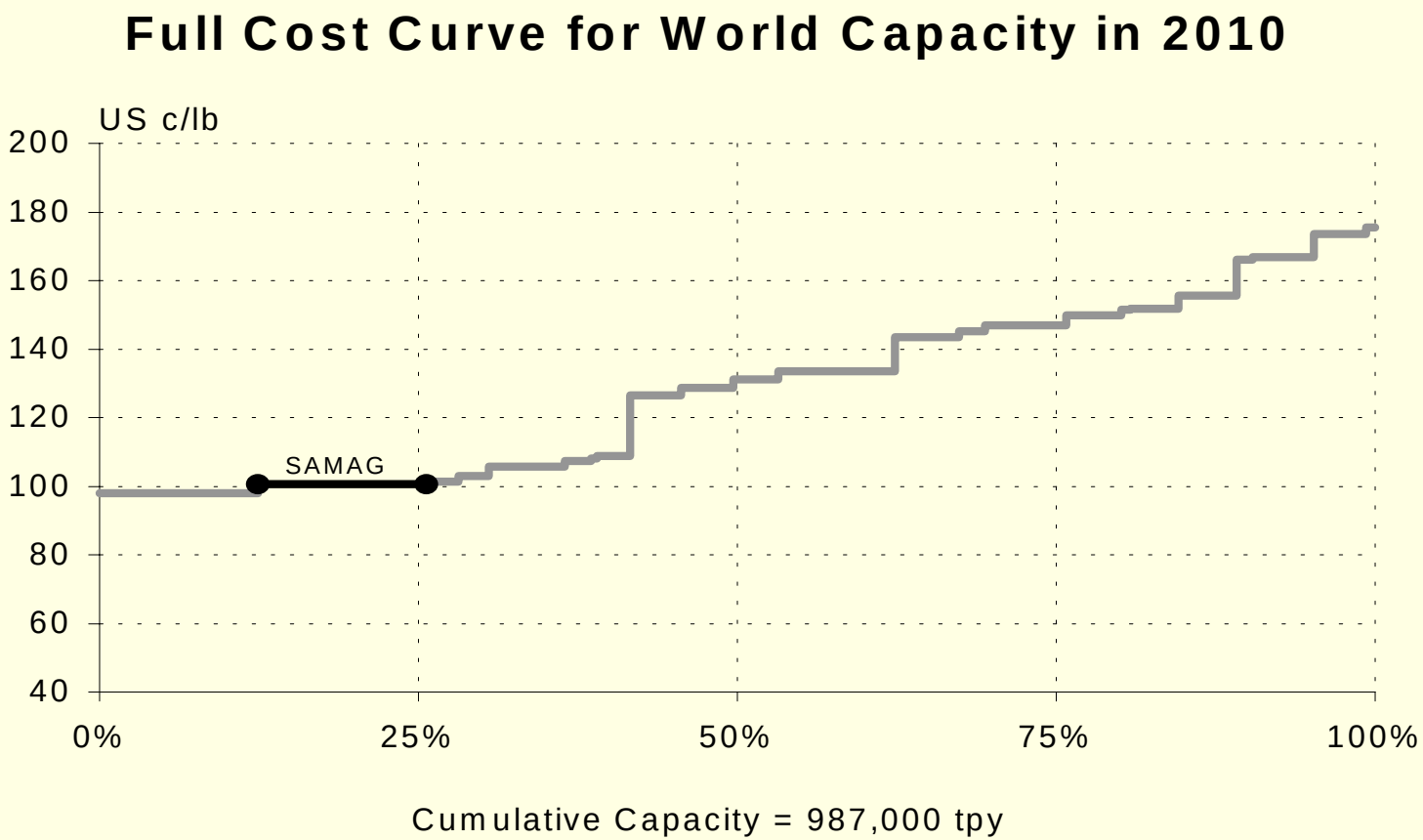
7.	Risks	Comparatively Low
8.	Improvements	Considerable Potential
9.	Availability	SAMAG Exclusive

SAMAG – At the right place on both the cash opex and full cost cost curves



Note: Primary Magnesium Full Cost - Delivered & Duty Paid Europe
Capital Charge based on WACC of 13% & 15 years
Source: Clark & Marron

SAMAG Limited

Building a World Class Magnesium Business