

Latrobe Magnesium

AGM Presentation

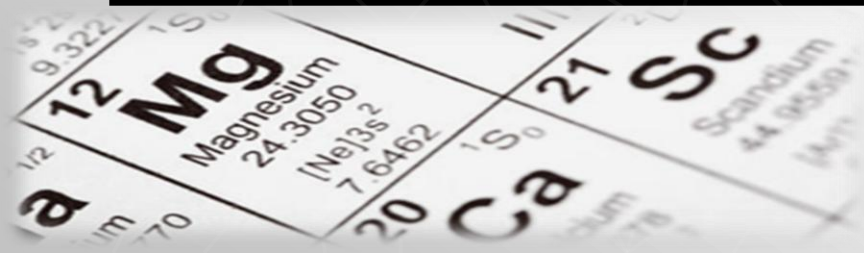
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1. Year 2015 highlights

- Extended the options on the Latrobe Valley site
- Processed the large bulk fly ash sample through a full scale commercial Chinese plant and received above average magnesium recoveries
- Strong results achieved from the cementitious material from the China sample and validated with later test work
- Granting of United States of America and China hydromet patent
- Maintained an operating loss \$691,251 (2015) - \$661,915 (2014).



2. Project summary

- Magnesium is a growth metal, with aluminium & magnesium sheet in cars lowering CO₂ emissions
- March 2016 complete feasibility study, financing arrangements & begin ordering the plant
- Third quarter 2017 – become Australia's only magnesium producer – “the green metal”
- Recycles 90% of fly ash into useable materials
- Low CO₂ emitter – 10tptMg versus 32tptMg



3. Magnesium production

Primary magnesium metal production

- 2000 210,300 tonnes
- 2013 770,000 tonnes
- 2014 869,000 tonnes
- 2024 projected production 1,700,000 tonnes

Annual growth 6-7%

Above estimates assumes average Mg in cars grow from 3.1kg to 6.0kg. If Mg grows to 20kg then demand is 3 million tonnes compared to 600,000 as in above

China – 84% of world production



3. Magnesium uses

	%
• Aluminium alloy	34
• Die casting for automobiles	26
• Steel desulphurization	18
• Titanium sponge	17
• Other die casting	5

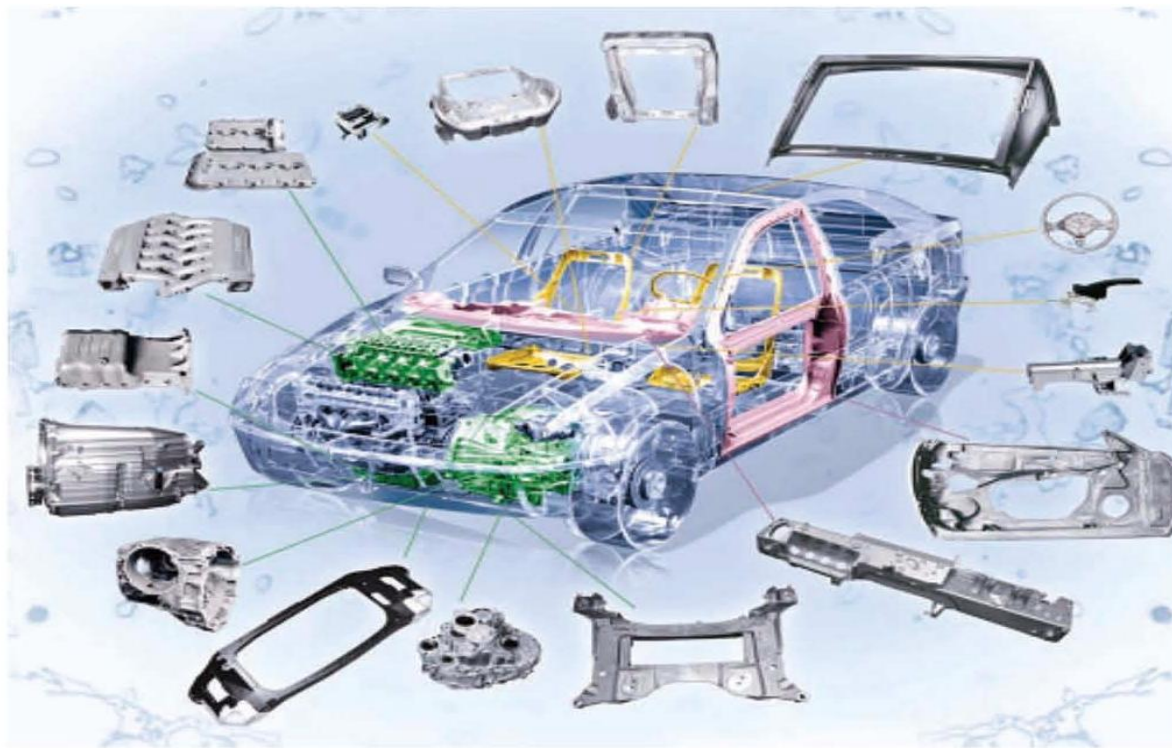
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New uses – planes (FAA approved 3/2015), trains, magnesium sheet & consumer products (laptops, mobile phones etc)



3. Magnesium & cars

Magnesium alloy applications replacing aluminium and steel is a focus for all automotive manufacturers



Industry drivers

12	Mg	21	Sc
	Magnesium		Scandium
	24.3050		44.9559
	[Ne]3s ²		[Ar]
	7.6462		
20	Ca		
	Calcium		
	40.078		
	[Ar]4s ²		

3. Magnesium & emissions

USA EPA Targets	2012 mpg	2015 mpg	2025 mpg	2012 to 2025 Increase %
Compact car (Honda Fit)	30	35	46	53
Midsize car (Ford Fusion)	25	25	42	68
Full Size car (Chrysler 300)	21	23	35	66
Pick up truck (Ford F150)	17	21	25	47

Penalty currently only US\$55 per vehicle for every 1mpg short.

CAFE standard for 2016 – 35.5 mpg, 2025 – 54.5 mpg. EPA some 25% less than CAFE

EU Emissions Targets	2007	2014	2021	Reduction
Average Fleet Emissions (in g CO ₂ per km)	159	123	95	28 or 23%

Penalty after 2020 at €95 per g CO₂ per km exceeding 2020 target
100kg weight generates ~10g CO₂ per km



3. Magnesium developments



2015 FORD F150
All Aluminium Body (1-6% Mg)



3. Magnesium developments

1. New Aluminium Sheet application

Ford F150

- 750,000 sales - Mg usage increase to 15kg - weight reduction 320kg (17%) with 13% emission saving

Ford Fusion

- 250,000 sales – Mg usage increase to 16 kg from 2.3kg – weight reduction 353kg (32%) emissions down 17%

2. New Alloys – GM

New alloy AX53 (Mg-Al-Ca) replaces AE44 used in the Corvette

Mg intensive front end design for a car saves 45% mass & reduced number of parts by 56% – 100 to 44



3. Magnesium developments

3. New Processes – Germany

- TeMaKplus project – developed processing technologies for industrial scale production of magnesium sheet & strip materials to produce parts at competitive cost to aluminium & steel
- 11 major industrial companies (Thyssen Krupp), two research institutes & German Government – looking to commercialise the processes

4. Magnesium Sheet – Korea

- First to install in back seat panel for the Hyundai Sonata & now developing uses for outside panels



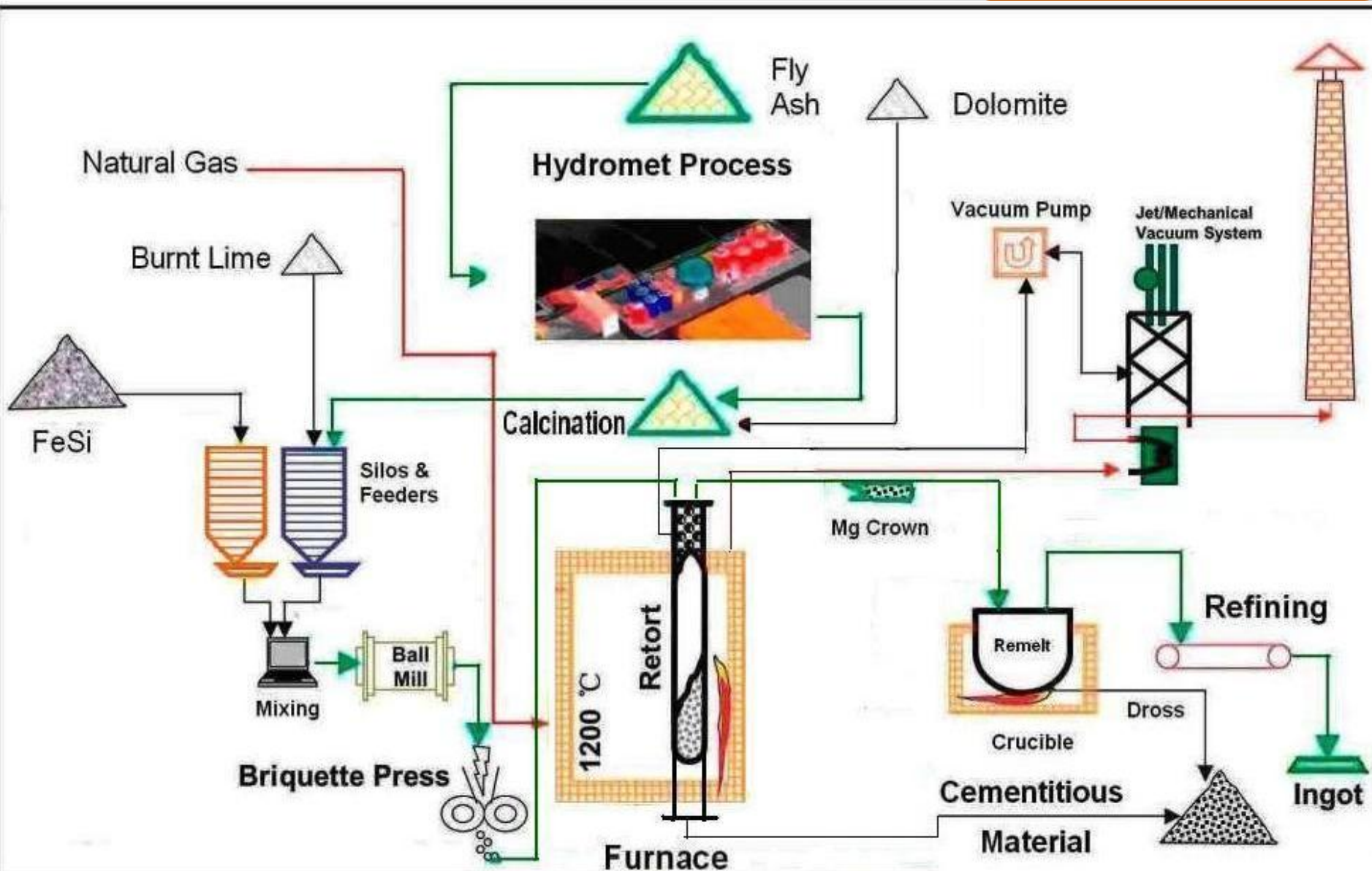
4. LMG process

Unique & proprietary process

- Combination of its unique patented hydromet process with the proven thermal reduction process in operation since 1941
- Hydromet process uses standard industrial reagents & equipment to remove impurities from the brown coal fly ash – sulfur, iron, silicon. Patent granted in Australia USA and China
- Beneficiated material used as feedstock to the established thermal reduction process to produce magnesium
- Owing to high Mg recoveries & the fly ash elements, the resultant cementitious product resembles a portland cement



4. LMG process



4. LMG Process: China Sample



Supplementary
cementitious material



Magnesium crown

5. LMG Site



Swop Line
from
Yallourn

Swop Line
from
Hazelwood

Natural
Gas
Pipeline

Proposed
Slurry
Pipeline

320
Tramway
Site

5. LMG Site



320 Tramway Site Building

6. Timelines/Milestones

Key Dates

- Feb 2016 complete vertical retort test work
- Mar 2016 conclude MOU with major customers & suppliers
- Mar 2016 complete feasibility study, financing arrangements & start ordering equipment
- Jul 2016 commence installing equipment
- Jul 2017 start production of 5,000 tonnes pa plant
- Dec 2018 expand the plant to 40,000 tonnes pa



7. Financial overview

Operating Parameters	40,000 tonnes A\$/tonne
Magnesium revenue	4,608
Net Cash operating costs	(2,851)
Operating surplus	1,757
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Exchange Rate	US\$71:A\$1.00
Capex for 5,000tpa	A\$40M
Capex for 40,000tpa	A\$250M
NPV pre equity at 12% discount factor	A\$137M
China operating costs range	US\$2,000 to US\$2,500/t

8. Corporate Overview

Directors and Staff

- Jock Murray Non exec chairman
- David Paterson Director & CEO
- Kevin Torpey Director & mining consultant
- John Lee Non exec director
- Philip Bruce Non exec director
- Jim Siemon Project director
- David Wandmaker Plant operations manager

Consultants

- CSIRO – Melbourne – Magnesium and smelter processors
- Clark & Marron – Magnesium industry experts
- GHD – Engineers for PFS
- Beijing Tieforce Engineering – Magnesium smelter construction company
- Curtin & Monash Universities – Mineralogy analyses
- Ecoengineers & Bureau Veritas Perth Laboratories – Hydromet advisor & laboratory
- BG&E Material Technologies – Cement advisor



Disclaimer

- This presentation may contain forward looking statements that are subject to risk factors associated with the magnesium business.
- It is believed that the expectations reflected in these statements are reasonable but they may be affected by a variety of variables and changes in underlying assumptions which could cause actual results or trends to differ materially including but not limited to: price fluctuations, actual demand, currency fluctuations, production results, reserve estimates, loss of market, industry competition, environmental risks, physical risks, legislative, fiscal and regulatory developments, economic and financial market conditions in various countries and regions, political risks, project delay or advancement, approvals and cost estimates.
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- All reference to dollars, cents or \$ in this presentation are to Australian currency, unless otherwise stated.

