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## **Archer Exploration Limited**

## Investor Presentation

April 2016



AXE has 3 projects rapidly moving to commercialisation

AXE is focused on capital efficiency and promotion of early cash flow projects

#### Magnesite business case

- World leading resource
- Agreements to fast track development
- Capital efficient toll processing opportunities
- Growing demand for magnesia
- Business case to add 0.5% of global supply
- Experienced sales marketing team
- Attractive project economics

# Agricultural Carbon business case

- Further studies due Q3 calendar 2016
- Surface resource with minimal capex
- Long life project
- Localised demand
- Minimal regulatory hurdles
- Creates cashflow and operational platform for graphene business.

#### Graphite/Graphene business case

- 100% owned project
- Access & availability of services including water
- Anticipated 16 year LOM
- Surface resource with minor capex
- Advanced product specification testing
- Looking to enter into similar capital efficient production agreement/toll processing

- Advanced near term production opportunity in Magnesite.
- Opportunity to be cash flow positive in next 12 – 18 months.
- Projects adjacent to existing infrastructure means low capital costs for mining.
- Potential to access third party infrastructure means low capital costs for manufacture.
- Management team has proven mine building, operating experience and product marketing.
- All tenements 100% owned and located in South Australia a safe mining jurisdiction.
- Supportive State Government.
- Multiple further growth opportunities remain in agricultural carbon and graphite on a 2-5 year timeline.

#### **Key information\***

ASX Code:	AXE				
Share price:	\$0.079 per share				
Shares on issue:	84.7 million				
Market cap:	\$6.7 million				
Shareholdings					
Management:	18%				
Тор 20:	35%				
Тор 50	47%				

\* Information as at COB 20 April 2016

### **Diversified business**

#### • Leigh Creek Magnesite

- World's largest magnesite deposit of its type & 20+ year resource.
- Discussions with magnesite mineral processors provides low cost and highly capital efficient path to production.
- Commercial calcining of magnesite expected to commence Q2 calendar 2017.
- Should provide long term cashflow.

#### Sugarloaf Agricultural Carbon

- Deposit outcrops & easily accessible
- Early test work shows potential use as soil conditioner for agricultural.
- Project economics expected Q4 calendar 2016
- Conceptually simple quarrying operation and long term cashflow
- Campoona graphite and graphene
  - Advanced ultrapure carbon project
  - Lithium battery grade graphite
  - Successful graphene manufacture



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### Leigh Creek Magnesite Deposits

- 6 magnesite deposits that extend for more than 120km NW of Leigh Creek Township
- Magnesite is a series of parallel dipping beds with dolomite interburden
- Closure of Alinta's operation's has created the opportunity and need to move ahead with this project





## World's largest cryptocrystalline resource

#### Leigh Creek Magnesite Project is 48% of world cryptocrystalline resources

- Cryptocrystalline magnesite is a unique and scarce mineral (7% of world's total magnesite resources) that has superior characteristics over macrocrystalline magnesite
- Cryptocrystalline producers tend to have quality characteristics and cost structures that allow them to produce across the complete spectrum of all high value and low value products



World cryptocrystalline magnesite resources by geography

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### Magnesite resources

- 453 million tonnes @ 41.4% MgO
- Mineral Resource calculated to 60m deep but is open at depth
- Located 20km northwest of the Leigh Creek township
- Detailed historic DFS drilling, metallurgical and other test work results owned by Archer.
- JORC 2012 resource 17.5 million tonnes @ 40.1% MgO for Mount Hutton Central

Deposit	Measured (Mt)	Indicated (Mt)	Inferred (Mt)	Total (Mt)	MgO (%)
JORC 2012 Mineral Resources					
Mount Hutton Central	12.0	5.5	0.0	17.5	40.1
JORC 2004 Mineral Resources					
Mount Hutton South		72.0	53.0	125	42.9
Mount Playfair	0.0	21.0	23.0	44.0	42.5
Pug Hill	0.0	10.0	10.0	20.0	42.7
Termination Hill	4.0	5.0	20.0	29.0	42.8
Witchelina	23.7	94.0	99.0	216.7	40.0
Total	27.7	202	205	434.7	41.4

## Demand for magnesia is expected to continue growing through 2017, at a rate of 3.6% pa (growth trend rate of the last 12 years = 4.7% pa)

**Global Magnesia Demand Expected Growth** 

	2017E	Growth (%)
	('000 t)	
High Value		
Deadburn (DBM)	2,197	3.5
Electrofused (EFM)	965	3.8
Caustic calcined (CCM)	866	7.6
	4,028	4.4
Low Value		
DBM	6,770	3.5
CCM	1,811	2.5
	8,581	3.3
Total	12,609	3.6

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## Magnesite Project highlights - Scope

- Low project capital cost of circa \$2m (including \$1.1m for pilot). No capital required for production process.
- Forecast annual production of 125,000tpa for 20+ years starting from Mount Hutton (17.5Mt @ 40.1% MgO).
- Archer targeting 50,000tpa of monolithic deadburn magnesia product (MDBM). Circa 0.5% of new global supply
- Advanced discussions with ABC and Arrium re: toll processing.
- Paul Rix (Archer NED) 12 years magnesia marketing experience (ex GM Marketing at QMag). Potential customers identified, marketing to commence next month.
- Potential for low cost near term expansion because;
  - Mining, logistics, toll processing, simple scale up



## Magnesite Project highlights - Economics

- 125,000 tn magnesite produces circa 50,000 tn magnesia
- Expected to be fully equity funded
- D&A expected minimal
- Resource capable of supporting 20+ yr project life
- Net margin is expected to be between A\$30/tn (low) and A\$100/tn (high)
- Production of 50,000 tpa is expected to provide positive cash flow of between A\$1.5M (low) and A\$5M (high) p.a.
- FX USD0.75:AUD1.00.







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Activity	Q3 16	Q4 16	Q1 17	Q2 17	Q3 17
Magnesite					
Pilot test					
Secure offtake					
Sign toll processing agreement					
Magnesite mining					
Magnesite toll processing					
Customer sales					
Graphite					
Pilot scale testing					
Grant of mining lease					
Secure offtake					

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#### Carbon and Graphite projects continue development ARCHER EXPLORATION LIMITED

#### **Sugarloaf Agricultural Carbon**

- Deposit outcrops
- Early test work shows potential use as soil conditioner.
- Potential to dig, crush and sell at mine gate.
- Potential for cashflow generation with minimal capex in 2017/2018
- Campoona graphite and graphene
  - Mining lease proposal prepared and ready for lodgment
  - Advanced ultrapure carbon project capable of producing Lithium battery grade graphite, and high grade graphene manufacture
  - Continuing to seek off-take partners with potential to move to production in 2018 with first sales in 2019.



#### **Eyre Peninsula Graphite Project**

**Advanced Graphite Projects** 

Campoona Sugarloaf



Emerging industrial minerals producer	>	Cryptocrystalline magnesite has superior physical and chemical characteristics enabling the production of high value magnesia products
	>	Management has extensive magnesite marketing expertise
Close proximity to		Magnesite close to existing towns (no-FIFO)
established industrial infrastructure	>	Access to existing power, water, rail and all weather bitumen road connections to the port of Adelaide
	$\checkmark$	Magnesite = low capital cost
Robust project concept	$\blacktriangleright$	Straight forward project concept and strategy
	>	Magnesite project with outstanding project economics with expansion opportunity
Rapid pathway to financing and production	~	Agreement with toll processors provides low cost and rapid pathway to production
	>	First product sales targeted for end of Q2 calendar 2017

## Additional Information



Leigh Creek Magnesite Project conceptual development layout

#### **Competent persons statement**

The exploration results and Exploration Target reported herein, insofar as they relate to mineralisation, are based on information compiled by Mr Wade Bollenhagen, Exploration Manager of Archer Exploration Limited. Mr Bollenhagen is a Member of the Australasian Institute of Mining and Metallurgy who has more than eighteen years experience in the field of activity being reported. Mr Bollenhagen has sufficient experience which is relevant to the styles of mineralisation and types of deposit under consideration and to the activity that he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' relating to the reporting of Exploration Results. Mr Bollenhagen consents to the inclusion in the report of matters based on his information in the form and context in which it appears.

The information in this report that relates to the Campoona Shaft and Central Campoona JORC 2012 Mineral Resource estimation has been prepared by Mr B. Knell who is a Member of the AusIMM and peer reviewed by Dr. C Gee who is also a Member of the AusIMM (CP). Mr Knell is a full time employee of Mining Plus Pty Ltd and Dr. Gee is a full time employee of Mining Plus Pty Ltd., both have more than five years' experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which they are undertaking to qualify as Competent Persons as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Mr Knell has consented in writing to the inclusion in this announcement of the Mineral Resource estimation information in the form and context in which it appears. This information was prepared and first disclosed under the JORC Code 2012.

#### **Forward looking statements**

The information in this presentation is published to inform you about Archer Exploration Limited and its activities. Some statements in this presentation regarding estimates or future events are forward looking statements.

Although Archer Exploration Limited believes that its expectations reflected in these forward-looking statements are reasonable, such statements involve risks and uncertainties and no assurance can be given that actual results and outcomes will be consistent with these forward-looking statements.

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## **Archer Exploration Limited**

AXE

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## Appendix Sugarloaf agricultural carbon project

#### A unique carbon material with soil conditioning properties

- Unique non-graphitic carbon with low crystallinity
- Macro- and micro-nutrients occur as both highly soluble and low solubility forms.
- Previous plant trials proved that Sugarloaf carbon enhanced plants growth (ASX 02 Sept 2015)



Wheat growth for Day 7: A: position of pots in incubator, B: wheat growth in pots, C- E: difference in shoot and root lengths of wheat for (left to right) zero (control sample), 7.5g, 15g and 30g Sugarloaf graphite samples

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## Appendix Sugarloaf agricultural carbon project

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#### Potential soil conditioner

- Further tests on run-of-mine Sugarloaf carbon are planned to further characterise the soil improvement properties.
- If these tests prove successful:
  - Possibility to develop a low cost mining operation.
  - Project located in farming district ready market at mine gate.
- Very large deposit with an Exploration Target\* of 40 – 70 million tonnes @ 10 – 12% TC that extends onto Archer's new southern tenement.



The potential quantities and grades presented in the Exploration Target are conceptual in nature, there has been insufficient exploration to define an overall Mineral Resource and it is uncertain if further exploration will result in the determination of a Mineral Resource.

## Appendix Sugarloaf agricultural carbon project

#### A simple operation with local demand

- Raw unprocessed Sugarloaf carbon improves soil wettability and aids moisture retention.
- Deposit outcrops at surface.
- Located on farm land owned by Archer. Surplus land to support future graphite project
- Demand in immediate farming area, anticipated 20+ year project.
- Concept; Simple open pit mining and screening operation.
- Project economics still being determined.



Looking west from top of Sugarloaf hill across Archer's farm land

#### High grade Campoona graphite concentrate enables production of pure graphene

- Research collaboration agreement with University of Adelaide. Test results showed:
  - Production of high grade graphene using one step process.
  - Manufacture of numerous products (inks, conductive films, electrodes).
  - Graphene electrodes performs well (resistivity of 0.5Ohm/sq).
- Graphene products have enormous potential.
- Further discussions and test work ongoing.



Selected graphene products : graphene conductive film, conductive flexible polymer, graphene composite and electrodes for batteries and supercapacitors

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## Appendix Campoona Shaft - battery grade graphite

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#### Campoona graphite targeting > 99% Cg natural graphite concentrate

- Aim to produce products grading to 99.5% carbon, matching the world's highest quality natural graphite.
- Production of up to 10,500 tpa high purity graphite
- Typical specifications:
  - Carbon 98.5 99.5% Cg
  - Sulphur <0.1%
  - Fe < 100ppm
  - Ni, Cu, V < 10ppm
  - Specific gravity 2.35 g/cc
- Application in lithium-ion batteries tested. Tests showed that Archer graphite performance equivalent to commercially available synthetic graphite.



SEM image of 99.5% Cg Campoona graphite

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