

9 August 2023

Calix Investor Presentation - August 2023

Sydney, Australia 9 August 2023 – Australian environmental technology company, Calix Limited (ASX: CXL) ("Calix" or "the Company") is pleased to provide a copy of its presentation to the Canaccord Genuity 43rd Annual Growth Conference being held at the InterContinental Hotel in Boston, MA, United States of America from 7th-10th August.

The following presentation is to be delivered by Managing Director and CEO, Phil Hodgson at 2:30pm (Eastern Daylight Time) on Wednesday 9th August 2023.

-ENDS-

This announcement has been authorised for release to the ASX by:

Phil Hodgson Managing Director and CEO **Calix Limited** 9-11 Bridge Street Pymble NSW 2073 Ph +61 2 8199 7400



About Calix

Calix is a team of dedicated people who are urgently developing great businesses, leveraging our patented technology, that deliver positive global impact.

The core technology is being used to develop more environmentally-friendly solutions for water treatment, CO₂ mitigation, biotechnology, advanced batteries, and more sustainable mineral and chemical processing.

Calix develops its technology via a global network of research and development collaborations, including governments, research institutes and universities, some of world's largest companies, and a growing customer base and distributor network for its commercialised products and processes.

Because there's only one Earth - Mars is for Quitters.

Website: https://www.calix.global/

Twitter: @CalixLimited
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Calix

Decarbonisation technology for multiple industries

August 2023

Important Disclaimer



This presentation has been prepared by Calix Limited (ABN 36117372540) ("Company").

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This presentation contains summary information about the Company and its subsidiaries ("Calix") and their activities current as at 6th August, 2023. The information in this presentation is a general background and does not purport to be complete.

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All dollar values are in Australian dollars (\$ or A\$) and financial data is presented as at or for the full financial year ended 30 June 2021, unless stated otherwise.

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NO ADVICE

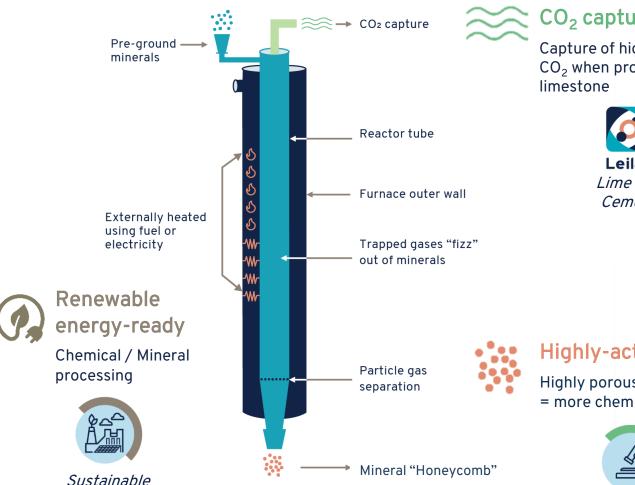
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Calix's core technology platform

A new way to heat stuff up...

Processing



CO₂ capture

Capture of high purity CO₂ when processing



Lime and Cement

An AUSTRALIAN invention...



28 patent families covering core technology and applications

Ocalix



>A\$120m has been invested to date in developing the technology

Highly-active materials

Highly porous "honeycomb" structure = more chemical- and/or bio-activity



Biotech



Materials



Water

Industrial decarbonisation tailwinds

Calix's mission is being propelled by net zero commitments

Government policy

Investor activity

Net zero spending

~90%

of global GDP now under net zero commitments.¹ US\$42tn

assets of signatories to the '2022 Global Investor Statement to Governments on the Climate Crisis'.² US\$275tn

Estimated spend required by 2050 to fund the global energy transition.³

- https://zerotracker.net/
- 2. 2022 Global Investor Statement to Governments on the Climate Crisis. The Investor Agenda
- 3. The net-zero transition: What it would cost, what it could bring. McKinsey Sustainability.



Policies driving decarbonisation



Review of an Australian CBAM imminent

Carbon penalties, value & support in Europe, US, & now Australia...

EUROPE	US	AUSTRALIA	
 Emissions Trading Scheme €80 - 2022 average EU ETS price, up from €50 in 2021 2.2% year-on-year reduction in free CO₂ permits to 2030 	 Inflation Reduction Act US\$85 / tonne of CO₂ permanently stored US\$180 / tonne for DAC + permanent CO₂ storage US\$130 / tonne for DAC + used CO 	 Safeguard Mechanism A price on carbon, capped at AU\$75 AU\$15b National Reconstruction Fund Up to AU\$3b for renewables and lowemission technologies & AU\$1b for value-adding in resources 	
 Carbon Border Adjustment Mechanism A new carbon tariff, commencing in 2023 Paves the way for phase out of exemptions for heavy industry 	 US\$130 / tonne for DAC + used CO₂ US-Australia Climate, Critical Minerals & Clean Energy Transformation Compact Fast-track critical mineral supply chains Access to US capital and IRA benefits 	 adding in resources. AU\$1.9b Powering the Regions Fund AU\$400m over 3 years for Critical Inputs to Clean Energy Industries, such as steel, cement & lime, & alumina 	
 Innovation Fund Energy, CCU/S, Energy Storage €10b funding from 2020 to 2030 Up to 60% project cost contribution 	for Australian companies • Australia to be a 'domestic source' under DPA, enabling financing and purchasing of Australian minerals	 Carbon Capture Technologies Program AU\$141m for hard-to-abate industries, such as cement Critical Minerals Strategy 	
 Net-Zero Industry Act CCS identified as a strategic priority 50 million tonnes of annual CO₂ storage capacity to be developed by 2030 	 DAC hubs US3.5 billion to establish Regional Direct Air Capture hubs Develop networks to facilitate 	 Value-add, downstream processing & decarbonisation Carbon Border Adjustment Mechanism 	

sequestration or carbon utilization



Ocalix

Decarbonising cement and lime

Largest single source of industrial emissions

- ~8% of global emissions¹
- Unavoidable process emissions released directly from limestone.

Net zero commitments

- GCCA member companies covering 40% of global cement production (80% outside of China) have set a net zero by 2050 target.²
- 1.4 billion tonnes of CO₂ from cement needs to be captured and stored annually by 2050 to reach net zero.²

"Carbon Capture and Storage (CCS) plays a major role in decarbonizing the industry sector in the context of 1.5°C and 2°C pathways, especially in industries with higher process emissions, such as cement." – IPCC³

Market drivers



Carbon pricing: 36 carbon taxes & 32 Emissions Trading Systems, covering 23% of global emissions & generating \$84bn in revenue⁴



>€80/tonne average EU carbon price for 2022



US\$85/tonne US tax credit for stored CO₂

SDG Impact







Trends in global CO2 emissions; 2016 Report, The Hague: PBL Netherlands Environmental Assessment Agency

^{2.} Global Cement & Concrete Association. Concrete Future Roadmap.

^{3.} SR1.5 Chapter 2. IPCC. 2018

^{4. &}lt;a href="https://zerotracker.net/">https://zerotracker.net/, <a href="https://zerotracker







Pilot plant 25,000 tpa CO₂

Lixhe, Belgium Built Operational 2019





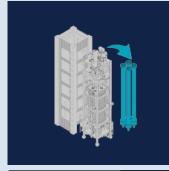




Leilac-2

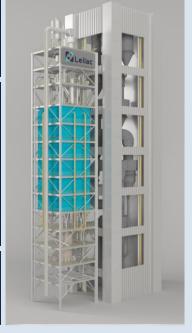
Demonstration plant 100,000 tpa CO₂

Hannover, Germany 4 tubes – 1 module Passed FID





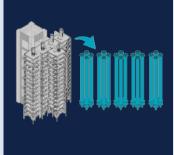




Leilac-3

Full commercial scale >500,000 tpa CO₂

Several multi-tube modules Multiple in planning





TUBE QTY 20



















Leilac's fullscale vision

BUT...we need to mitigate 1.4 billion tonnes per annum of process CO₂ emissions

- = up to 3,000 Leilac-3s
- ~2 built every week from now until 2050 !!









	Project discussions	Initial scoping	Detailed scoping / MOU	Pre-FEED / BOD	FEED	FID + construction	Operational	Total
Aug 2021	21	7	4	1			1	34
Aug 2022	25	13	9	5		1	1	54
Feb 2023	34	19	8	O ADBRI BORAL	Z TARMAC	1 Leilac-2	1 Leilac-1	71

- Pipeline growth: as at February 2023 there were 71 projects in the pipeline
 - Projects are ~ 2/3 cement and 1/3 lime, at average capacity of 500kTpa CO₂ for cement and 80 kTpa CO₂ for lime.
 - Leilac pipeline represents potential for over 20 Mtpa of CO₂ abatement projects.
- Heidelberg Materials global perpetual license executed 1H FY23
- TARMAC project passes UK Govt due diligence: 30kTpa lime facility with partial H₂ firing and CO₂ capture as part of HYNET project, UK.
- Three new projects with CEMEX announced in Germany, Poland and the US.
- Adbri work continues on pre-FEED for a 20kTpa electric facility with CO₂ capture with up to 15kTpa CO₂ now targeted for supply to the HyGATE Project¹, to produce green methanol a precursor for sustainable aviation and marine fuels



Decarbonising shipping & aviation

Tailwinds

- IMO targeting net zero by 2050 and 10% clean energy use by 2030.¹
- Maersk now has 25 methanol enabled vessels on order.²
- Industry, particularly cement, requires offtake for unavoidable CO₂ emissions.

Sustainable fuels from captured CO₂

- Captured CO₂ can be combined with hydrogen to produce methanol a
 possible alternative fuel for shipping and a precursor to sustainable
 aviation fuels.
- The Solar Methanol Project is developing a world-first methanol production plant using renewable energy, green hydrogen and captured industrial CO₂.
- Awarded ~\$40m funding as part of the German-Australian HyGATE initiative.³
- The project intends to use CO₂ captured by the Leilac technology during the production of low emissions lime, in partnership with Adbri (ASX: ABC).
- 1. https://www.imo.org/en/MediaCentre/HotTopics/Pages/Cutting-GHG-emissions.aspx
- 2. https://www.maersk.com/news/articles/2023/06/26/maersk-orders-six-methanol-powered-vessels
- 3. Calix part of Australian-German consortium awarded funding to manufacture sustainable fuels from captured CO2
- 4. https://www.iea.org/reports/transport



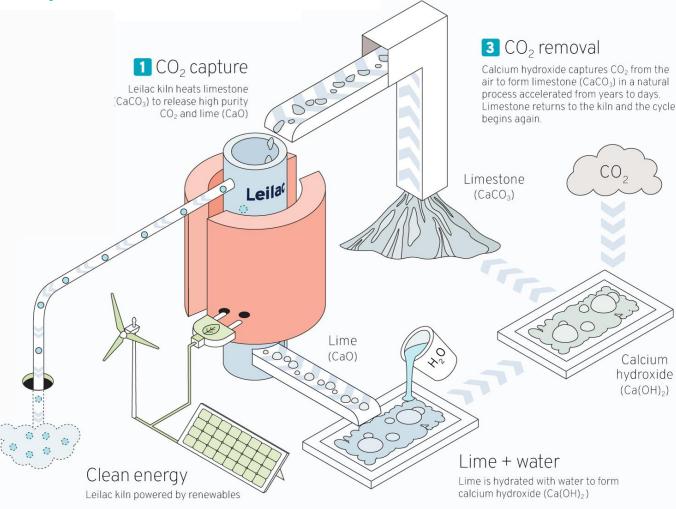






Non-binding MOU for DAC global licence agreement with Heirloom

- Heirloom¹ is a Direct Air Capture company with an objective of capturing 1 billion tonnes of CO₂ by 2035.
- Heirloom's backers include Gates-led Breakthrough Energy Ventures, Carbon Direct and Microsoft.
- The MOU outlines key collaboration terms, including US\$3m in R&D contribution from Heirloom to advance Leilac calcium looping.
- The MOU also covers key terms for a global licence agreement, which once executed, will apply to any Heirloom facility.
- The technology licence fee comprises:
 - i. A royalty floor of US\$3 per tonne of CO₂ captured; and
 - ii. A variable royalty rate based on the prevailing CO_2 price for lime decarbonisation, less the amortised cost of capital of the Leilac kiln per tonne of CO_2 separated.



1. https://www.heirloomcarbon.com/

Decarbonising iron and steel

Indispensable, carbon-intensive & hard-to-abate.



of global iron ore supplied by Australia²



Australian iron

- >A\$150b...44% of Australian export earnings in 2021⁴
- 96% of Australian iron ore is hematite⁵
- Value creation opportunity
 - 3-4x value add: iron ore \rightarrow iron
 - Green Iron...

<u>Decarbonisation solutions...ideally:</u>

- Resource efficient
 - Compatible with multiple ore types
 - Low waste
- Minimal supply chain disruption
- Fast route to impact
- Economical
 - Leverage existing assets
 - Efficient use of energy, reductant & raw material
- 1. Climate change and the production of iron and steel. World Steel Association. 2021
- 2. <u>www.statista.com</u>
- 3. Climate change and the production of iron and steel. World Steel Association. 2021
- https://www.minerals.org.au/news/record-high-resources-export-revenue Global Cement & Concrete Association. Concrete Future Roadmap.
- 5. Iron Ore Geoscience Australia
- 6. https://zerotracker.net/

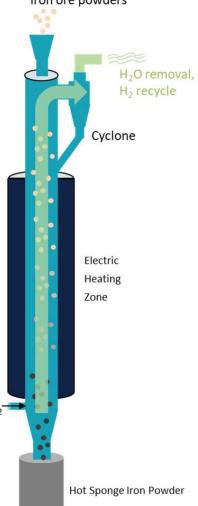


Zero Emissions Steel TechnologY



Potential lowest cost zero emissions iron & steel

Iron ore powders



About ZESTY

- Hydrogen reduction of iron ore
- Can be easily and efficiently renewably powered
- Targeting theoretical minimum hydrogen use simple gas recycle
- Processes fines <~0.3mm, no pelletisation
- Targeting zero emissions iron and steel*

	Simple process (low pressure / no fluid beds)	Compatible with fines & lower grade ores	No fossil fuel requirement	No CCS required	H₂ not combusted / easily recycled
BF / BOF + H ₂	✓	×	×	×	×
DRI-MIDREX	\checkmark	×	×	×	×
DRI- HISARNA	✓	✓	×	×	×
FINMET	×	\checkmark	×	×	×
HYBRIT	\checkmark	×	\checkmark	\checkmark	×
DRI_MIDREX H ₂	✓	×	×	×	×
Flash iron making	\checkmark	\checkmark	√	√	×
HYFOR	×	\checkmark	√	\checkmark	×
ZESTY	✓	√	✓	✓	✓

Zero Emissions Steel TechnologY

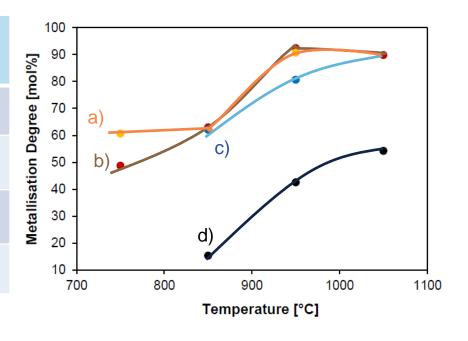


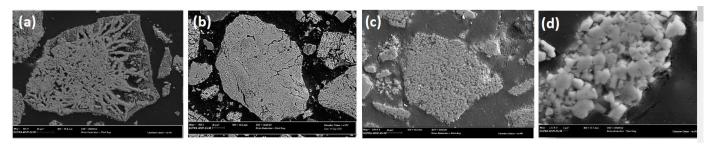
ZESTY development to date...

Phase 1 & 2: completed

- Theoretical kinetic studies
- Conversion of electric calciner to run hydrogen
- ✓ Confirmation of electric calciner + hydrogen reduction performance
- Successful pilot testing with multiple ores

		Fe Wt %)	D50 (um)	SSA (m²/g)	Pore Volume (cm3/g)
a)	Siderite	43	87	25	0.035
b)	Goethite / Hematite	57	130	15	0.034
c)	Goethite / Hematite	59	129	14	0.039
d)	Magnetite	67.5	38	0.8	0.003

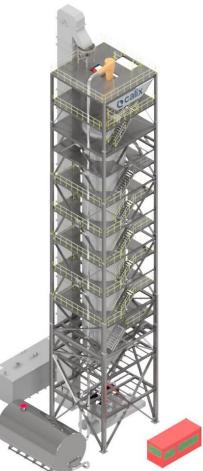




SEM Images of the different samples after processing @950C; H_2/O_{red} =2

Calix's ZESTY Technology: pre-FEED / FEED study

Towards Financial Investment Decision by end-2023



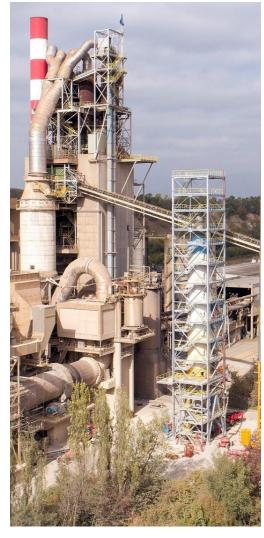
Pre-FEED / FEED study

- A\$947,035 ARENA grant.
- Proposed 30,000 tpa, zero CO₂ emissions ZESTY-iron demonstration plant.
- Study towards final investment decision, including:
 - Testing / confirmation / design input from pilot test runs
 - Beneficiation / passivation / briquetting / smelting trials
 - Multiple ore testing
 - Site determination
 - Knowledge sharing & partnership development

HILTCRC
Heavy Industry
Low-carbon Transition



Ocalix



The ZESTY reactor will be the same scale as Leilac-1 reactor for cement and lime

Sustainable & stable supply of critical minerals



Environmental & geopolitical tailwinds for sustainable mineral processing

US-Australia Climate, Critical Minerals & Clean Energy Transformation Compact

- Established to deliver "sustainable, resilient, & secure critical minerals & clean energy to the world & reduce emissions"
- New US-Australia taskforce will fast-track critical minerals supply chains & "ensure Australian resources companies can access US capital & benefit from the Inflation Reduction Act".
- Australia to receive "domestic source" status under the US Defence Production Act, giving Presidents the power to direct loans & purchase commitments to Australia.

Calix's Sustainable Processing technology

- Low carbon Electrification & renewable energy inputs
- Value add At-mine site processing for higher value products
- Low cost Enhanced recovery from ore body
- Low waste Leave waste at the mine site
- Secure supply Help simplify & diversify global supply chains



Sustainable lithium joint venture with Pilbara Minerals

Electrification and mid-stream mineral processing

Joint Venture

- 45% Calix / 55% Pilbara Minerals JV
- \$20m in Federal Government funding announced under the Modern Manufacturing Initiative¹
- Targeting an innovative mid-stream process for sustainable refining of lithium at the mine site:
 - Increase lithia concentration: ~6% → 35%
 - Reduce waste ~94% → 0
 - Reduce carbon intensity with electric calcination
 - Increase ore recovery
- Successful demonstration of the mid-stream process may lead to its commercialisation, with the JV licensing the technology to Pilbara Minerals and the global spodumene processing industry.





Sustainable lithium tailwinds

6x growth in lithium carbonate & equivalents market by 2030²

45% Electrification of industrial manufacturing target by 2035³



Increasing demand for sustainable & dependable supply of essential mineral products

SDG Impact









- Grant funding announced, contract executed with Federal Government in April 2023
- 2. Lithium mining: How new production technologies could fuel the global EV revolution McKinsey April 2022
- 3. Electrification in Industrials. Deloitte Insights. August 2020

Sustainable lithium demonstration plant



Financial Investment Decision approved

- Calix and Pilbara Minerals (ASX: PLS) have approved the FID on a demonstration plant to produce a mid-stream lithium-phosphate salt
- The Demo Plant will use Calix's electric calcination technology and be located at Pilbara Minerals' Pilgangoora Project
- The Demo Plant aims to develop a novel mid-stream lithium product that:
 - Reduces carbon intensity, waste and transport costs
 - Demonstrates lower CAPEX and OPEX with electric calcination
 - Creates a higher value sustainable lithium product at the mine site
- Construction expected to commence in Q4 FY24
- Targeting production of first lithium salt in Q4 FY24
- Demo Plant CAPEX is ~ AU\$105m
 - Supported by \$20m in Australian Government funding
 - Calix will receive ~24% free carried equity in the facility.

At current lithium prices, the demonstration scale plant running at full capacity could generate ~US\$85m revenue for the JV on an annual basis1



Carbon footprint study results²

- ↓ > 90% carbon emissions intensity of spodumene calcination by renewably powered electric calcination vs a coal-fired rotary kiln
- **↓** > 80% carbon emissions intensity of spodumene calcination by renewably powered electric calcination vs a natural gas-fired rotary kiln

Calix share is projected to be 45% of the JV. JV total revenue Assumes prevailing lithium prices Li-Carbonate-equivalent of US28.9k/tonne (43k A\$/tonne) and targeted lithium phosphate production of ~3,000tpa (source: Argus metals 17 April 2023)

Miviro Lifecycle Assessment study on the climate change impact of lithium, commissioned by Pilbara Minerals

In summary





ONE Core technology already at demonstration scale...

















IRON and **STEEL**















LITHIUM



..targeting decarbonisation of multiple global industries...

...already working with some of the world's largest industrial players...



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