

**11 October 2023**

## **Calix Investor Presentation – October 2023**

**Sydney, Australia | 11 October 2023** – Australian environmental technology company, Calix Limited (ASX: CXL) (“Calix” or “the Company”) is pleased to provide a copy of its presentation to Bell Potter Securities Limited.

The following presentation is to be delivered by Managing Director and CEO, Phil Hodgson at 11:00am (Eastern Daylight Time) on Wednesday 11<sup>th</sup> October 2023.

**-ENDS-**

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

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## 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, CO<sub>2</sub> 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/>

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**A platform technology  
to decarbonise heavy  
industry**

October 2023

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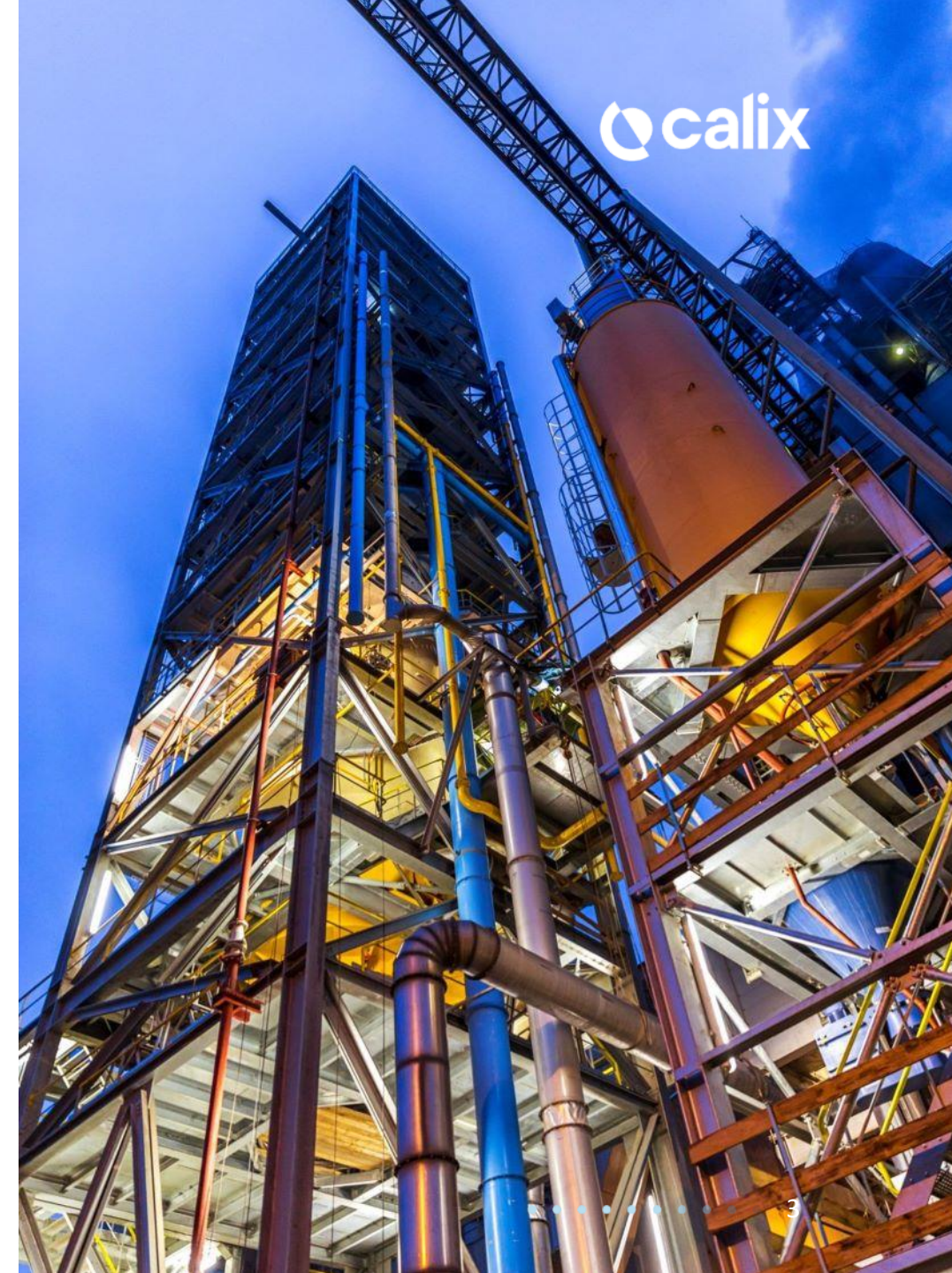
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# Executive Summary

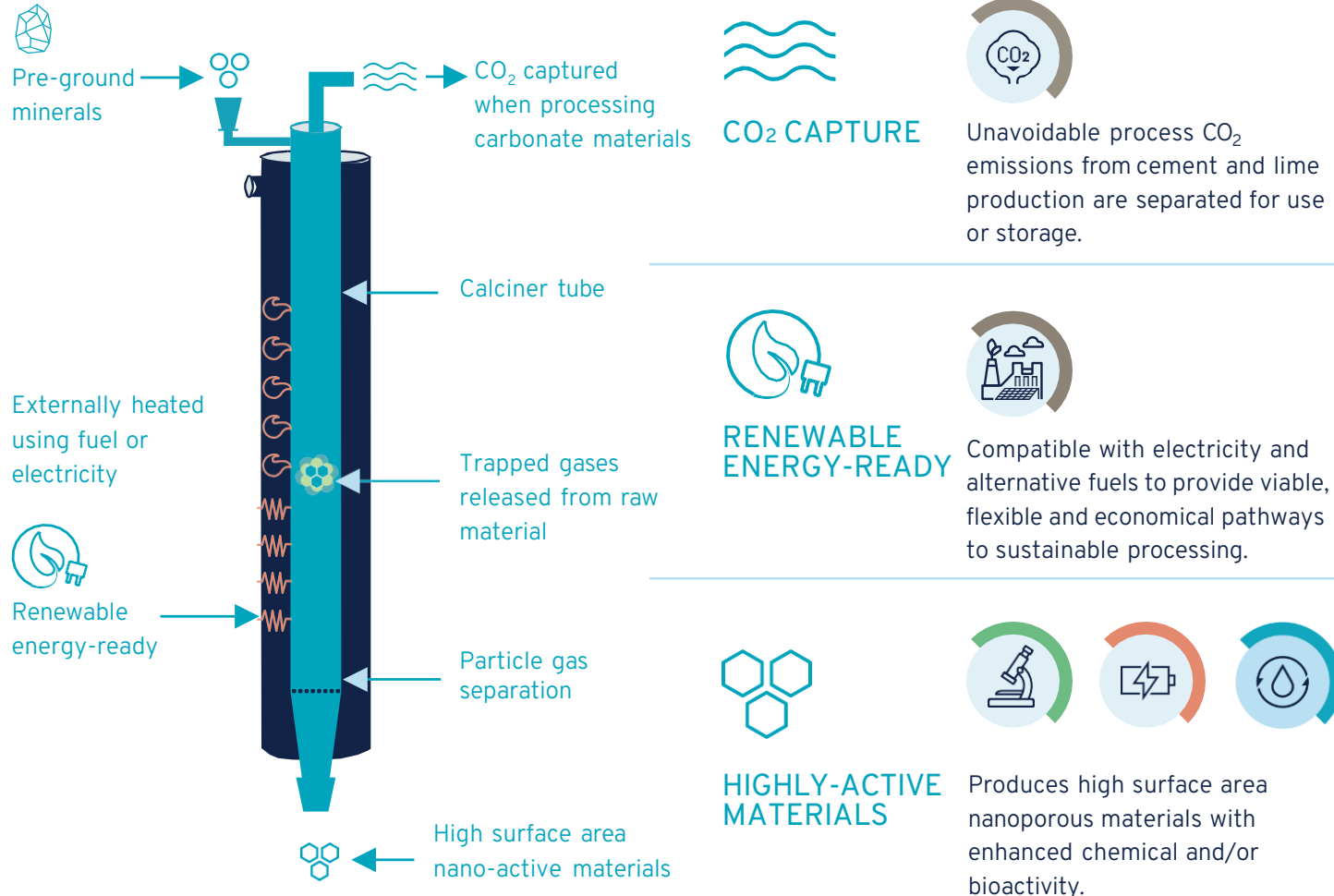
## FY24 Q1 update

- **Strong financial position:**
  - Balance sheet strength and flexible capital strategy to pursue commercialisation opportunities
  - Revenue and margin growth supporting investment in people
- Focused on **delivering key decarbonisation projects:**
  - **Cement and lime:** Scaling and retrofitting the Leilac technology with the Leilac-2 Project
  - **Green iron and steel:** Designing a demonstration plant for Calix's Zero Emissions Steel Technology (ZESTY)
  - **Critical Minerals:** Building a sustainable lithium processing demonstration plant with Pilbara Minerals (ASX: PLS)
  - **Direct Air Capture:** Applying the Leilac technology to the removal of atmospheric carbon dioxide with Heirloom
- At the end of Q1, **all FY24 KPIs on track**



# Calix's core platform technology

A new way to “heat stuff up”



28 patent families covering core technology & applications.

>A\$120m invested to develop core technology to date.

# Policies driving decarbonisation



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

## EUROPE

### Emissions Trading Scheme

- €80 – 2022 average EU ETS price, up from €50 in 2021
- 2.2% year-on-year reduction in free CO<sub>2</sub> permits to 2030

### Carbon Border Adjustment Mechanism

- A new carbon tariff, commencing in 2023
- Paves the way for phase out of exemptions for heavy industry

### Innovation Fund

- Energy, CCU/S, Energy Storage
- €10b funding from 2020 to 2030
- Up to 60% project cost contribution

### Net-Zero Industry Act

- CCS identified as a strategic priority
- 50 million tonnes of annual CO<sub>2</sub> storage capacity to be developed by 2030

## US

### Inflation Reduction Act

- US\$85 / tonne of CO<sub>2</sub> permanently stored
- US\$180 / tonne for DAC + permanent CO<sub>2</sub> storage
- US\$130 / tonne for DAC + used CO<sub>2</sub>

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

- Fast-track critical mineral supply chains
- Access to US capital and IRA benefits for Australian companies
- Australia to be a 'domestic source' under DPA, enabling financing and purchasing of Australian minerals

### DAC hubs

- US\$3.5 billion to establish Regional Direct Air Capture hubs
- Develop networks to facilitate sequestration or carbon utilization

## AUSTRALIA

### Safeguard Mechanism

- A price on carbon, capped at AU\$75
- AU\$15b National Reconstruction Fund**
- Up to AU\$3b for renewables and low-emission technologies & AU\$1b for value-adding in resources.

### AU\$1.9b Powering the Regions Fund

- AU\$600m Safeguard Transformation Stream
- AU\$400m Industrial Transformation Stream
- AU\$200m for Critical Inputs to Clean Energy Industries – Cement, Lime, Alumina and Aluminium Sector

### Critical Minerals Strategy

- Value-add, downstream processing & decarbonisation

### Carbon Border Adjustment Mechanism

- Review of an Australian CBAM underway

# Sustainable lithium demonstration plant

## Financial Investment Decision approved

- Calix and Pilbara Minerals (ASX: PLS) have approved the FID on a mid-stream lithium-phosphate demonstration plant being developed in a joint venture
- The Demonstration Plant will use Calix's electric calciner and be located at Pilbara Minerals' Pilgangoora Project
- Project objectives:
  - Reduce carbon intensity, waste and transport costs
  - Demonstrate lower CAPEX and OPEX with electric calcination
  - Create a higher value lithium product at the mine site
- Construction expected to commence in Apr-Jun Qtr 2024.
- Targeting production of first lithium salt in Apr-Jun Qtr 2025.
- Demonstration Plant CAPEX is ~ AU\$105m
  - Supported by \$20m in Australian Government funding
  - Calix will receive ~24% free carried equity in the facility, targeting \$17.5m CAPEX contribution for 45% equity



### Carbon emissions savings

A Life Cycle Assessment study<sup>1</sup> found that renewably powered electric calcination of spodumene would reduce emissions by:

- ↓ 90% vs a coal-fired rotary kiln
- ↓ 80% vs a natural gas-fired rotary kiln

1. Minviro Lifecycle Assessment study on the climate change impact of lithium, commissioned by Pilbara Minerals



# Leilac - Scaling up the Leilac technology

A modular design for delivery through a blueprint model



## Leilac-1

Pilot plant

Lixhe, Belgium 2019  
CO<sub>2</sub> capacity: 25 ktpa  
Clinker: 160 tpd  
~5% throughput

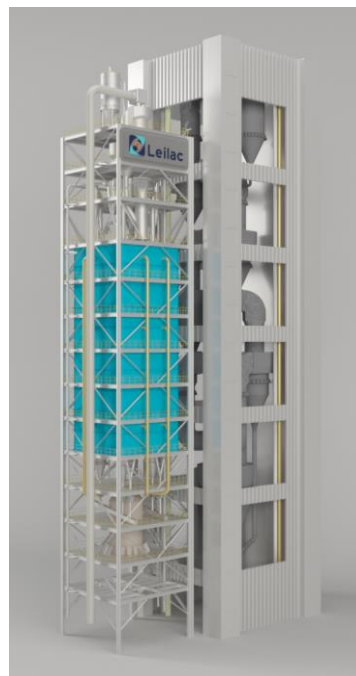


TUBE  
QTY  
1

## Leilac-2

Demonstration plant

Hannover, Germany  
CO<sub>2</sub> capacity: 100 ktpa  
Clinker: 640 tpd  
~20% throughput

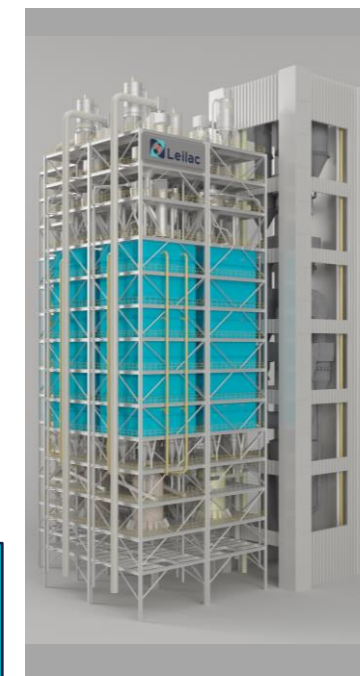


TUBE  
QTY  
4

## Leilac-3

Full scale

The future  
CO<sub>2</sub> capacity: 500+ ktpa  
Clinker: 3000+ tpd  
100% throughput






TUBE  
QTY  
20+





# Leilac – a growing pipeline of projects



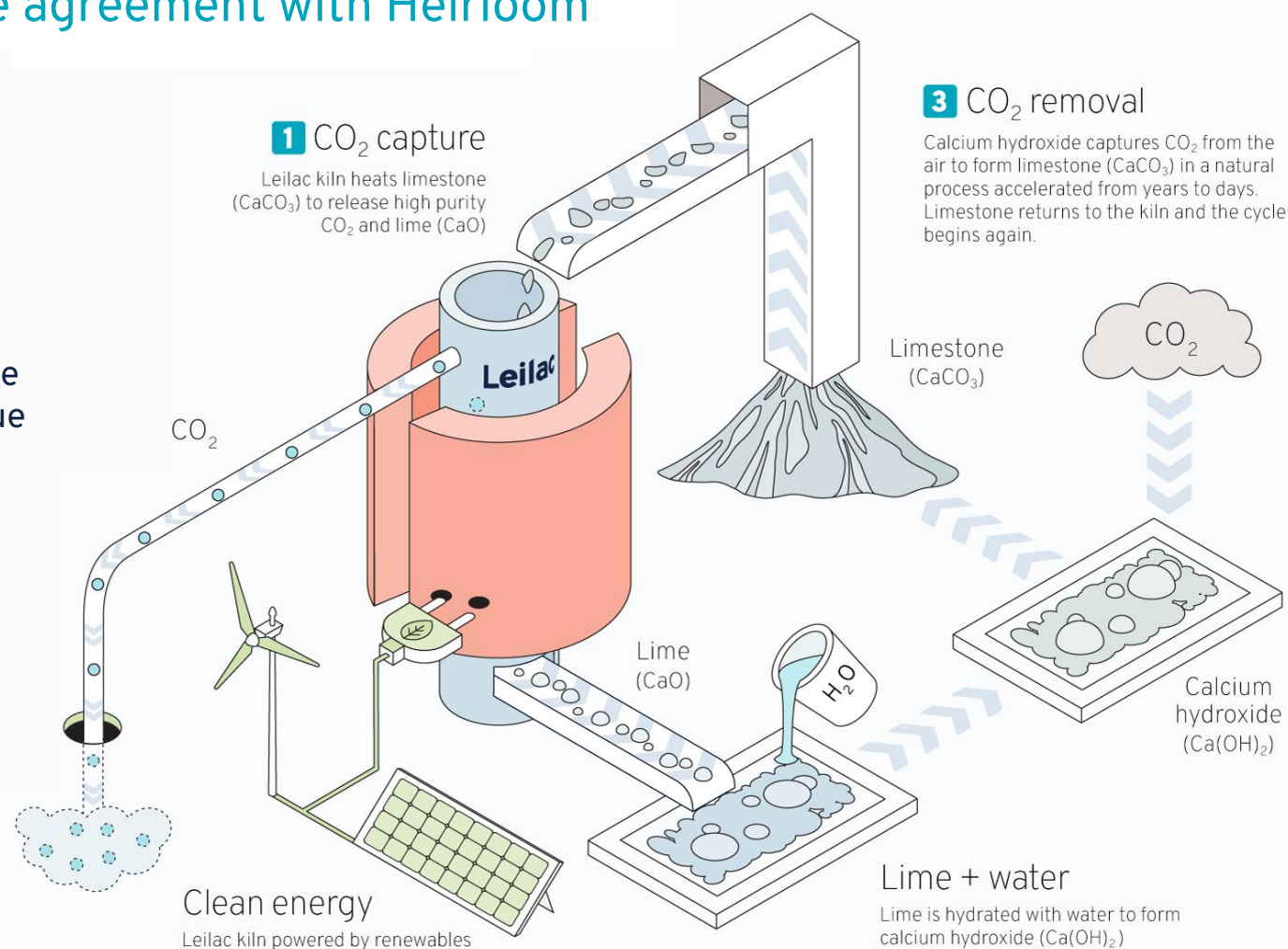
	Project discussions	Initial scoping	Detailed scoping / MOU	Pre-FEED / BOD	FEED	FID + construction	Operational	Total
Aug 2021	21	7	4	1			1	34
Aug 2022	25	13	9	5		1	1	54
Aug 2023	34	25	8	 4 	2 	1 Leilac-2	1 Leilac-1	76

- Pipeline growth: as at August 2023 there were **76 projects** in the pipeline.
  - Projects are ~ 2/3 cement and 1/3 lime, at average capacity of 500kTpa CO<sub>2</sub> for cement and 80 kTpa CO<sub>2</sub> for lime.
  - Leilac pipeline represents potential for over **20 Mtpa of CO<sub>2</sub> abatement projects**.
- **TARMAC** project passes UK Govt due diligence: 30kTpa lime facility with partial H<sub>2</sub> firing and CO<sub>2</sub> 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 CO<sub>2</sub> capture.
- **Leilac-2** – site works (demolition) have started after some permitting delays – likely to push completion / commissioning into 2025.



## Non-binding MOU for DAC global licence agreement with Heirloom

- Heirloom is a Direct Air Capture (DAC) company with an objective of capturing 1 billion tonnes of CO<sub>2</sub> by 2035.
- Heirloom part of **Project Cypress**, one of 2 projects selected for the US Department of Energy's US\$1.2b DAC Hubs program.<sup>1</sup>
- **Microsoft** has purchased 315,000 tonnes of carbon dioxide removal (CDR) credits from **Heirloom** at an estimated value of US\$200million.<sup>2</sup>
- Leilac and Heirloom have signed a MoU covering the key terms for a global and perpetual licence agreement that, once executed, will apply to any Heirloom facility.
- The technology licence fee comprises:
  - i. A royalty floor of US\$3 / tonne of CO<sub>2</sub> captured; and
  - ii. A variable royalty rate based on the prevailing CO<sub>2</sub> price for lime decarbonisation, less the amortised cost of capital of the Leilac kiln / tonne of CO<sub>2</sub> separated.
- A collaboration agreement includes US\$3m in R&D contribution from Heirloom.



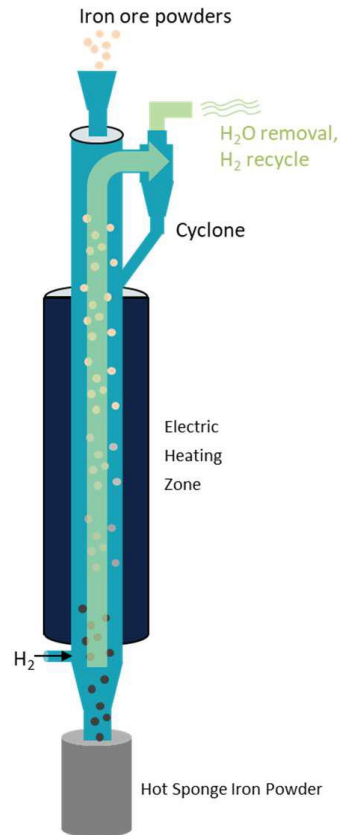
# Zero Emissions Steel Technology



Potential lowest cost green iron & steel

## About ZESTY

- Hydrogen reduction of iron ore (H-DRI)
- Can be easily and efficiently renewably powered
- Targeting theoretical minimum hydrogen use – simple gas recycle
- Processes fines <~0.3mm, no pelletisation
- Compatible with multiple ore types, including Hematite
- Targeting zero emissions iron and steel\*



## Development – 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. 90%+ H-DRI metallisation rates achieved.

## Phase 3: Pre-FEED / FEED study

- Design of 30,000 tpa, zero CO<sub>2</sub> emissions ZESTY-iron demonstration plant, supported by funding from ARENA.
- Study towards final investment decision: including:
  - Testing / confirmation / design input from pilot test runs
  - Beneficiation / passivation / briquetting / smelting trials
  - Multiple ore testing – due to demand = expanded program, Jul - Nov 2023
  - Site determination

# Global commercialisation strategy

- Licensing, joint ventures and spin-out strategies are designed to commercialise each application of the core platform technology
- Equity investment directly into subsidiary businesses to accelerate commercialisation
  - Investment in single-focused specialist team
  - Application specific technology development
- Licence agreement with subsidiary delivers royalty income regardless of Calix's future shareholding

**One core platform  
technology**

**Multiple environmental  
business opportunities**

**Flexible capital /  
funding options**



## Strategy in action:

- Sept 2021: Carbon Direct Capital Management invests in Leilac
  - €15m for a 6.98% stake, valuing Leilac at €215m in Sept 2021
  - Leilac spun-off as a standalone entity
  - Calix receives 30% of Leilac's royalty income regardless of Calix's shareholding in Leilac

## Catalysing growth – Leilac Since Sept 2021:

- From 8 to > 40 employees across 12 countries
- From 21 to > 70 projects around the world
- Licence agreements
  - Signed with Heidelberg Materials
  - MoU with Heirloom
  - Under negotiation with Cemex and others



# Valuing the opportunity

## Selected benchmarks – October 2023

### Green iron & steel – similar Technology Readiness Level

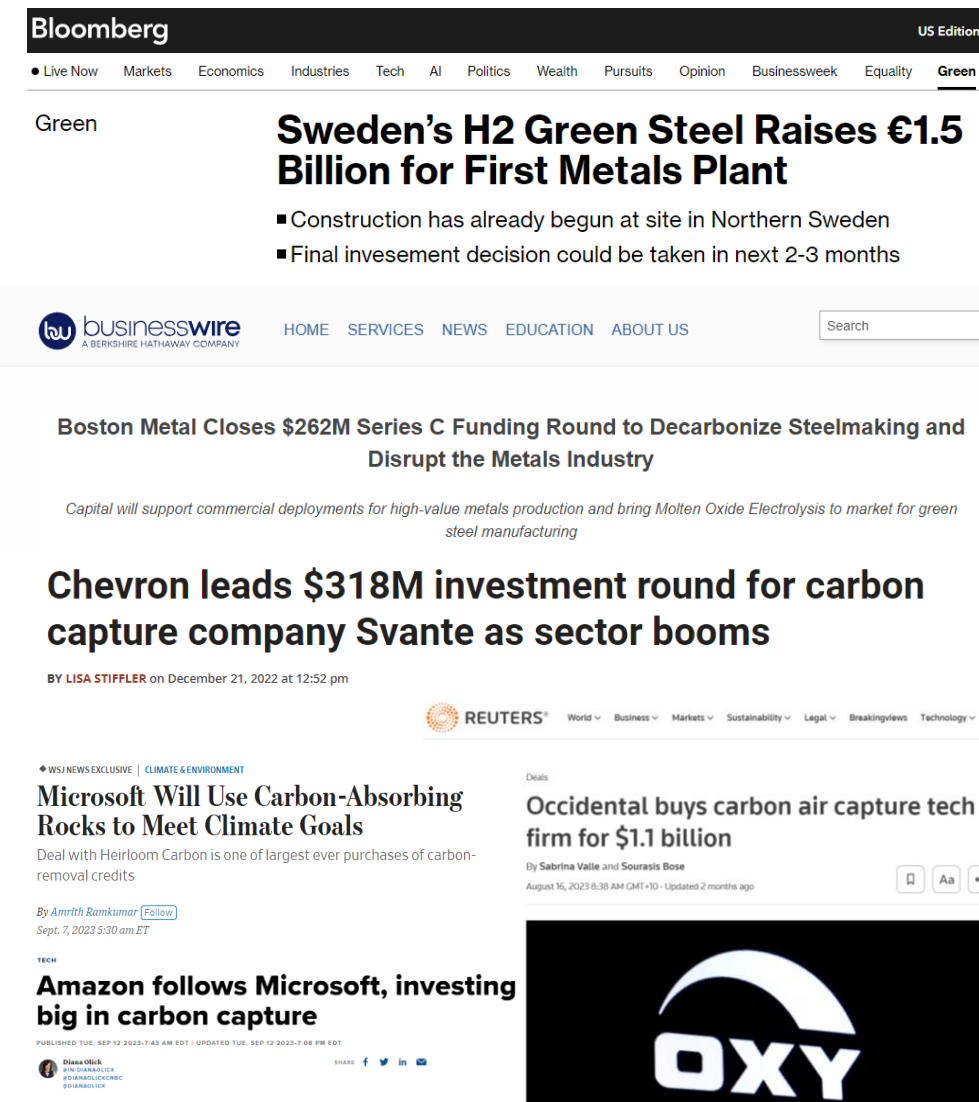
- **H2 Green Steel**
  - Multi-billion dollar valuation following US\$1.5b impact investment in Sept. 2023
- **Boston Metals**
  - Impact investment of US\$262m in green steel technology in Sept. 2023

### Carbon capture – similar Technology Readiness Level

- **Svante Inc.**
  - Latest cap raise of US\$318m, Dec 2022: Valuation ~US\$1 billion

### Direct Air Capture

- **Carbon Engineering** acquired by Occidental for US\$1.1 billion
- **Microsoft** purchases 315,000 tonnes of carbon dioxide removal (CDR) credits from **Heirloom**. Estimated value of US\$200million – > US\$600 / tonne of CO<sub>2</sub>
- **Amazon** purchases 250,000 CDR credits from **1PointFive**, an Oxy subsidiary



## In summary



**One core platform technology**  
already at demonstration scale...

**..targeting decarbonisation of**  
**multiple global industries...**

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

### CEMENT & LIME



### IRON & STEEL



### LITHIUM





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## KPI Dashboard for FY24

- Successfully completed
- On track
- Watch point

**GATEWAY 1**  
All High  
Level SHESQ  
action items  
completed  
on time



**Leilac**

### CO<sub>2</sub> Capture

- Leilac-2 all permitting and civil works complete
- Continue to move projects down the pipeline
- Basis Of Design for green methanol consortia project



### Sustainable Processing

#### Spodumene

- Spodumene Project Construction commenced

#### Iron and Steel - "ZESTY"

- Successful expanded ore program
- Completed FEED study leading to FID

#### Alumina

- First successful Pre-FEED study



### Advanced Batteries

- First battery module in consumer product format
- Demonstration facility for cathode production – FEED completed
- Successful commercial format cell with a new Calix electrode chemistry



### Magnesia

#### Water

- Continued growth US, Asia

#### Mg Metal

- Basis Of Design for Mg Metal plant

#### Specialties

- Continued commercialisation of Agriculture, Marine and AMR applications

# Glossary



Term	Meaning
Aluminium (Al)	Chemical element with the symbol Al
Anode	The negative electrode of a battery
Antimicrobial	Antimicrobial products kill or slow the spread of microorganisms, including bacteria, viruses and fungi.
AMR	Antimicrobial resistance – the development of resistance in bacteria, viruses, fungi and parasites to antimicrobials.
ARENA	The Australian Renewable Energy A
ASX	The Australian Securities Exchange
APVMA	Australian Pesticides and Veterinary Medicines Authority
BATMn	Calix's core kiln technology – electrified – for battery and catalyst materials production
BOD	Basis of Design
Calcium (Ca)	Chemical element with the symbol Ca
Carbonation	The capture of carbon dioxide by contacting with lime (calcium oxide), to form limestone (calcium carbonate)
Cathode	The positive electrode of a battery
CCS	Carbon Capture and Storage
CCUS	Carbon Capture, Utilisation and Storage
CO <sub>2</sub>	Carbon Dioxide
Copper (Cu)	Chemical element with the symbol Cu
CRC	Cooperative Research Centre – Australian Government supported industry-led collaborative research centres
CRC SAAFE	Cooperative Research Centre Solving Antimicrobial Resistance in Agribusiness, Food, and Environments
DAC	Direct Air Capture – the extraction of carbon dioxide directly from the atmosphere
EAF	Electric arc furnace – a furnace that heats material by means of an electric arc between two electrodes

Term	Meaning
EAP	Employee Assistance Program
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortisation
Electrode	The material that stores the lithium ions in a charged (anode) or discharged (cathode) state in a lithium-ion battery
Electrolyte	The medium that allows ions to move between the battery electrodes, via the separator
ESG	Environment, Social and Governance considerations
FEED	Front-End Engineering Design
FID	Final Investment Decision
Fines	Small particles, which are usually very difficult to handle in kilns etc as they simply get blown out
Green Hydrogen	Hydrogen that is produced from an electrolyser using renewable energy
Goethite	A mineral that is an ore of iron
HBI	Hot Briquetted Iron – “bricks” of relatively high purity iron ready for steel-making
H-DRI	The process of reducing iron ore to metallic iron with hydrogen as the reductant
Hematite	A mineral that is an ore of iron
HILT CRC	Heavy Industry Low-carbon Transition Cooperative Research Centre
HPO	“Hierarchical Porous Onion” - a crystal structure of lithium manganese oxide resembling tiny onion layers – allowing both strength and easier passage of lithium ions
Hydrometallurgy	A metal recovery method used to obtain metals from ores and waste materials
Iron (Fe)	The chemical element, represented by “Fe” on the periodic table
Iron Ore	Iron oxide mixed with various other minerals, as mined and “pre-processed” (purified) as best as possible
Leilac	Calix’s core kiln technology for Low Emissions Intensity Lime and Cement production with CO <sub>2</sub> capture
LFP	Lithium Iron Phosphate – a battery cathode material

Term	Meaning
LHM	Lithium Hydroxide Monohydrate – used in the production of cathode active materials for lithium-ion batteries
Lithium (Li)	Chemical element with the symbol Li
Lithium-phosphate / Lithium Salt / “Mid-Stream” Lithium	A form of lithium that is high in lithium content, to be shipped and utilised by battery producers
Lithium ion	The ionic form of lithium (Li+) – a positively charged atom of lithium
LMO	Lithium Manganese Oxide – a battery cathode material
LNMO	Lithium Nickel Manganese Oxide – a battery cathode material
LTO	Lithium Titanium Oxide – a battery anode material
Manganese Carbonate (MnCO <sub>3</sub> )	Form of manganese used mainly in agriculture as a fertiliser supplement
Magnesium (Mg)	Chemical element with the symbol Mg
Manganese (Mn)	Chemical element with the symbol Mn
Magnetite	A mineral that is an ore of iron
Metallurgical Coal	Very high carbon coal
MgO	Magnesium Oxide
MHL	Magnesium Hydroxide Liquid
MOU	Memorandum of Understanding
Nanoporous	A material with a regular, porous structure, with a pore size generally less than 100 nanometres.
Nickel (Ni)	Chemical element with the symbol Ni
NCA	A battery cathode material made from nickel, aluminium and cobalt
NCM, or NMC	A battery cathode material made from nickel, manganese and cobalt
Pelletisation	The formation of pellets from finer materials to aid in handling

# Glossary



Term	Meaning
Potassium (K)	Chemical element with the symbol K
Process emissions	Process emissions are inherent to the chemical reaction and are released directly and unavoidably from the chemical processing of raw material. They are distinct from energy related emissions that may result from the consumption of fuel to heat the reaction.
SDGs	The UN's Sustainable Development Goals or Global Goals are a collection of seventeen interlinked objectives designed to serve as a "shared blueprint for peace and prosperity for people and the planet, now and into the future."
Separator	The barrier between the anode and the cathode that prevents them touching, inside the battery
Siderite	A mineral that is an ore of iron
SLP	Single layer pouch cells – a soft battery design where most of the cell components are enclosed in a aluminium-coated plastic film.
Sodium (Na)	Chemical element with the symbol Na
Spodumene	A high lithium-containing ore, and the source of the majority of the world's lithium supply
$\alpha$ -Spodumene	A tight Li-crystal formation, from which extraction of Li is difficult
$\beta$ -Spodumene	A loose Li-crystal formation, from which extraction of Li is much easier than the alpha-form
Reduce / Reduction	The process by which oxygen is removed
Reductant	A material that, through its chemical properties, carries out reduction
RDF	Refuse-derived fuel – a fuel produced from various types of waste
Sponge Iron	Iron Ore that has been reduced (had the oxygen removed)
Steel	Mainly iron, with some carbon and other trace metals such as nickel, manganese etc depending upon the grade of steel being made
Sulphur (S)	Chemical element with the symbol S
Tpa	Tonnes per annum
UNGC	The United Nations Global Compact, the world's largest corporate sustainability initiative
Wh / kWh	Watt-hours / kilowatt-hours - a measure of energy
ZESTY	Calix's Zero Emissions Steel TechnologY