



Enabling zero emissions pathways to green iron & steel with Calix's unique H₂-DRI technology

Chris Ormston
General Manager – Sustainable Processing

Innovations to Decarbonise the Steel Industry
WEBINAR INDUSTRY INSIGHTS

22nd January 2025



**NET-ZERO
INDUSTRIES**
MISSION

Important Disclaimer



This presentation has been prepared by Calix Limited (ABN 36 117 372 540) ("Company").

SUMMARY INFORMATION

This presentation contains summary information about the Company and its subsidiaries ("Calix") and their activities current as at 22 January 2025. The information in this presentation is a general background and does not purport to be complete.

NOT FINANCIAL PRODUCT ADVICE

This presentation is for information purposes only and is not a prospectus, product disclosure statement or other offer document under Australian law or the law of any other jurisdiction. This presentation is not financial product or investment advice, a recommendation to acquire Calix securities or accounting, legal or tax advice. It has been prepared without taking into account the objectives, financial or tax situation or needs of individuals. Before making an investment decision, prospective investors should consider the appropriateness of the information having regard to their own objectives, financial and tax situation and needs and seek legal and taxation advice appropriate to their jurisdiction. Calix is not licensed to provide financial product advice in respect of Calix securities. Cooling off rights do not apply to the acquisition of Calix securities.

FINANCIAL DATA

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.

PAST PERFORMANCE

Past performance information given in this presentation is given for illustrative purposes only and should not be relied upon as (and is not) an indication of the Company's views on its future financial performance or condition. Investors should note that past performance, including past share price performance, of Calix cannot be relied upon as an indicator of (and provides no guidance as to) future Calix performance including future share price performance.

FUTURE PERFORMANCE

This presentation contains certain "forward-looking statements". The words "expect", "future", "anticipate", "estimate", "intend", "believe", "guidance", "should", "could", "may", "will", "predict", "plan" and other similar expressions are intended to identify forward-looking statements. Indications of, and guidance on, future earnings and financial position and performance are also forward-looking statements. Forward-looking statements, opinions and estimates provided in this presentation are based on assumptions and contingencies which are subject to change without notice, as are statements about market and industry trends, which are based on interpretations of current market conditions. Forward-looking statements, including projections, guidance on future earnings and estimates are provided as a general guide only and should not be relied upon as an indication or guarantee of future performance. Such forward-looking statements are by their nature subject to significant uncertainties and contingencies and are based on a number of estimates and assumptions that are subject to change (and in many cases are outside the control of Calix and its directors) which may cause the actual results or performance of Calix to be materially different from any future results or performance expressed or implied by such forward-looking statements. The forward-looking statements should not be relied on as an indication of future value or for any other purpose.. No representation, warranty or assurance (express or implied) is given or made in relation to any forward-looking statement by any person (including the Company). In particular, no representation, warranty or assurance (express or implied) is given that the occurrence of the events expressed or implied in any forward-looking statements in this presentation will actually occur. Actual results, performance or achievement may vary materially from any projections and forward-looking statements and the assumptions on which those statements are based. The forward-looking statements in this presentation speak only as of the date of this presentation. Subject to any continuing obligations under applicable law, the Company disclaims any obligation or undertaking to provide any updates or revisions to any forward-looking statements in this presentation to reflect any change in expectations in relation to any forward-looking statements or any change in events, conditions or circumstances on which any such statement is based. Nothing in this presentation will under any circumstances create an implication that there has been no change in the affairs of Calix since the date of this presentation.

INVESTMENT RISK

An investment in Calix securities is subject to investment and other known and unknown risks, some of which are beyond the control of Calix, including possible delays in repayment and loss of income and principal invested. Calix does not guarantee any particular rate of return or the performance of Calix, nor does it guarantee the repayment of capital from Calix or any particular tax treatment. Persons should have regard to the risks outlined in this presentation and appendices.

NOT AN OFFER

This presentation is not and should not be considered an offer or an invitation to acquire Calix securities or any other financial products and does not and will not form any part of any contract for the acquisition of Calix securities.

This presentation does not constitute an offer to sell, or the solicitation of an offer to buy, any securities in the United States or to, or for the account or benefit of, any 'U.S. person' (as defined in Regulation S under the U.S. Securities Act ("U.S. Person")). The new shares to be offered and sold in the placement ("Offer") have not been, and none of them will be, registered under the U.S. Securities Act or the securities laws of any state or other jurisdiction of the United States. In addition, Calix has not been, and will not be, registered under the U.S. Investment Company Act of 1940, as amended (the "U.S. Investment Company Act") in reliance on the exception from the definition of "investment company" provided by Section 3(c)(7) thereof. The New Shares to be offered and sold in the Offer may not be offered and sold to, directly or indirectly, any person in the United States or any person that is, or is acting for the account or benefit of, a U.S. Person except pursuant to an exemption from, or in a transaction not subject to, the registration requirements of the U.S. Securities Act and applicable U.S. state securities laws and pursuant to an exception from the registration requirements of the U.S. Investment Company Act provided by Section 3(c)(7) thereof. This presentation may not be distributed or released in the United States or to any U.S. Person. The distribution of this presentation in other jurisdictions outside Australia may also be restricted by law and any such restrictions should be observed. Any failure to comply with such restrictions may constitute a violation of applicable securities laws. Offers in Australia of the shares are only being made to persons who are "sophisticated investors" or "professional investors" (within the meaning of section 708(8) and section 708(11) of the Australian Corporations Act (Act) respectively) or otherwise pursuant to one or more exemptions under Section 708 of the Act so that it is lawful to offer the shares in Australia without disclosure to investors under Part 6D.2 of the Act.

NO ADVICE

None of Calix's respective advisers or any of their respective affiliates, related bodies corporate, directors, officers, partners, employees and agents, have authorised, permitted or caused the issue, submission, dispatch or provision of this presentation and none of them makes or purports to make any statement in this presentation and there is no statement in this presentation which is based on any statement by any of them. For the avoidance of doubt, the advisers and their respective affiliates, related bodies corporate, directors, officers, partners, employees and agents have not made or purported to make any statement in this presentation and there is no statement in this presentation which is based on any statement by any of them. To the maximum extent permitted by law, Calix and its advisers and their respective affiliates, related bodies corporate, directors, officers, partners, employees and agents exclude and disclaim all liability, for any expenses, losses, damages or costs incurred by you as a result of your participation in the Offer and the information in this presentation being inaccurate or incomplete in any way for any reason, whether by negligence or otherwise. To the maximum extent permitted by law, Calix and its advisers and their respective affiliates, related bodies corporate, directors, officers, partners, employees and agents make no representation or warranty, express or implied, as to the currency, accuracy, reliability or completeness of information in this presentation and Calix's advisers and its affiliates, related bodies corporate, directors, officers, partners, employees and agents, take no responsibility for any part of this presentation or the Offer. Calix and Calix's advisers and their affiliates, related bodies corporate, directors, officers, partners, employees and agents make no recommendations as to whether you or your related parties should participate in the Offer nor do they make any representations or warranties to you concerning the Offer, and you represent, warrant and agree that you have not relied on any statements made by any of them in relation to the Offer and you further expressly disclaim that you are in a fiduciary relationship with any of them. Statements made in this presentation are made only as of the date of this presentation. The information in this presentation remains subject to change without notice. Calix reserves the right to withdraw the Offer or vary the timetable for the Offer without notice.



About Calix

Solving global challenges

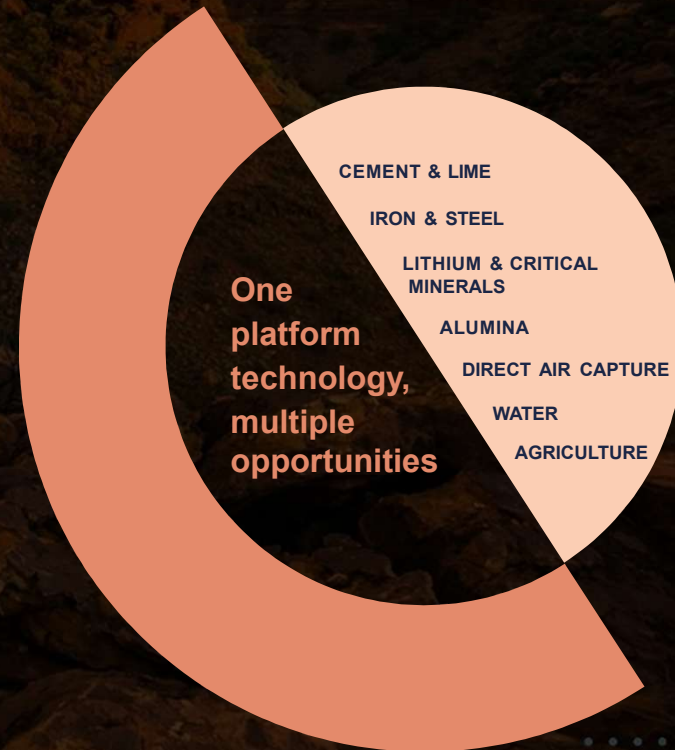
Electrification of industrial processing | Capture of unavoidable emissions | Sustainable environmental solutions

Calix Limited is an environmental technology company solving urgent global challenges in industrial decarbonisation and sustainability.

Calix's unique patented core platform technology delivers indirect heating of raw materials to enable efficient, precise, flexible and renewably powered mineral processing and capture of unavoidable industrial emissions.

With strong and increasing demand driven by global decarbonisation commitments, Calix is applying its platform technology to the cement, steel, alumina, and critical minerals industries, as well as the direct air capture of atmospheric carbon dioxide, and the production of sustainable environmental products.

Leveraging its core platform technology and a global network of partners, Calix is urgently developing multiple businesses that deliver positive global impact. Because there's only one Earth.



MARS IS FOR QUITTERS

Green mineral processing solutions for multiple industries

Multiple applications built & under development

1 Magnesia



Bacchus Marsh
Commissioned 2013
(50,000 tonnes per annum¹)

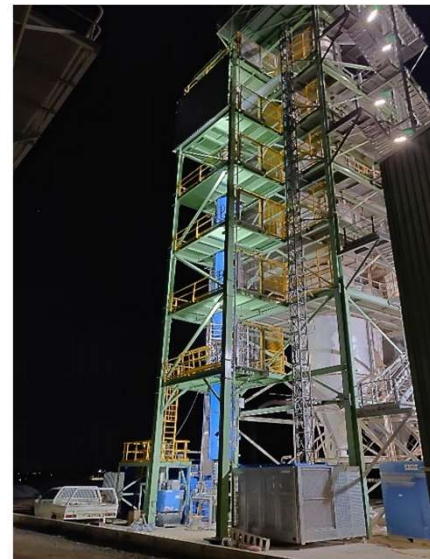
2 Cement & Lime



Belgium – “LEILAC-1”
Commissioned 2019
(50,000 tonnes per annum¹)



3 Alumina, lithium & critical minerals



Victoria, Australia
Commissioned 2019
(2,000 tonnes per annum¹,
fully electric and renewably powered)

4 ZESTY – Green Iron and Steel

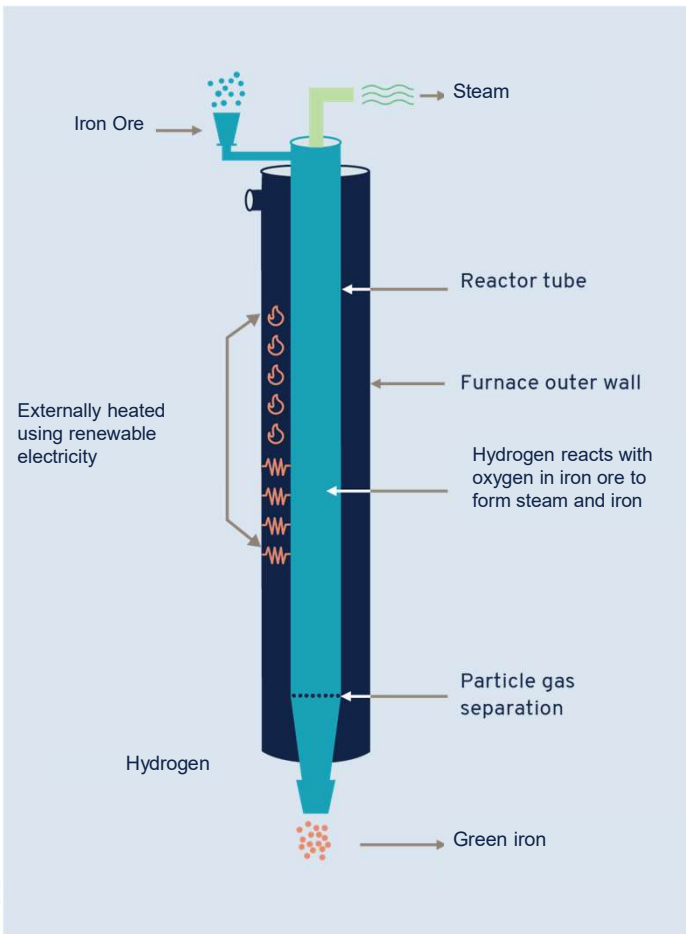


Location TBD
FEED Study complete
(30,000 tonnes per annum¹ fully electric)

1. Annualised name plate capacity feed rate

Calix's core platform technology

ZESTY uses hydrogen in a renewably-powered reactor to produce green iron, and ultimately green steel.



Carbon Capture

Unavoidable process CO₂ emissions from cement & lime production & CO₂ from the atmosphere are captured for use or storage.



Sustainable Processing

Compatible with electricity & alternative fuels to provide viable, flexible and economical pathways to sustainable processing.



Magnesia

Produces high purity / active materials with enhanced chemical and / or bioactivity.



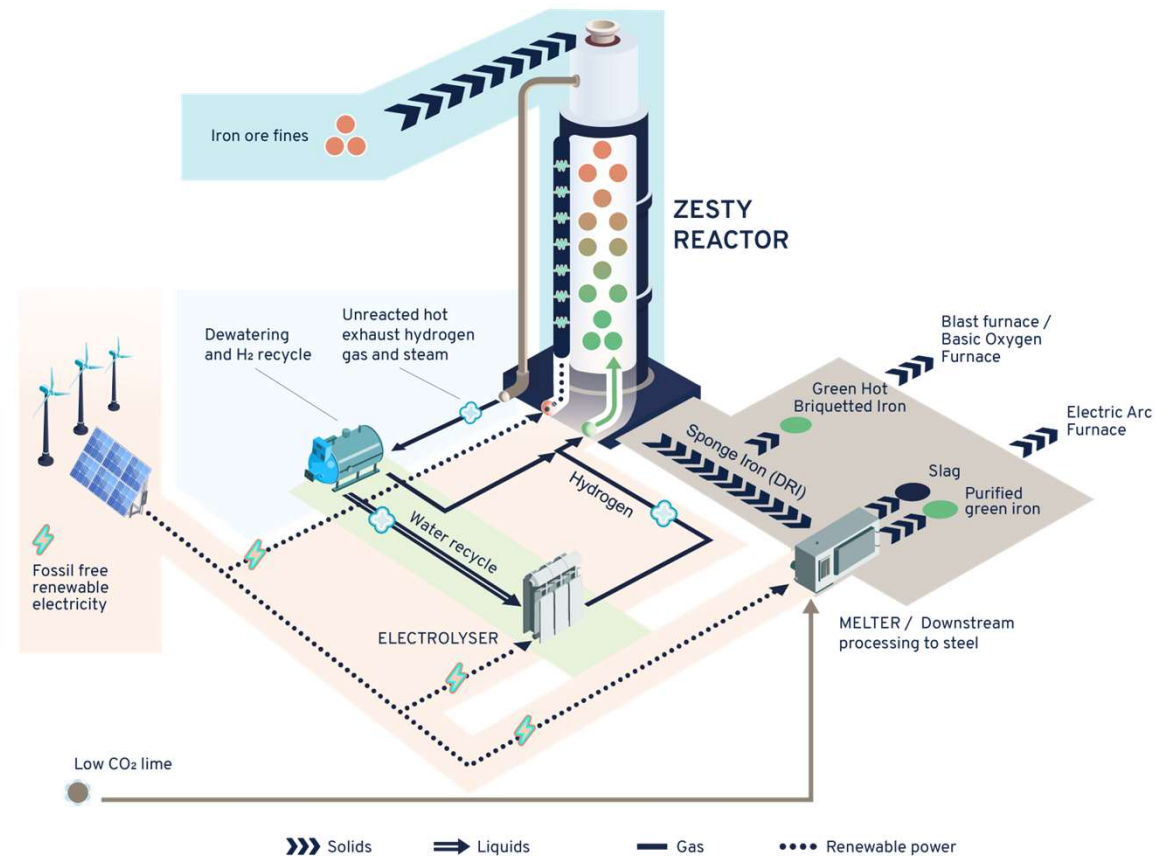
29

patent families covering core technology & applications.

Zero Emissions Steel Technology (ZESTY)

An innovative process with the potential to significantly influence steel decarbonization objectives and goals

- Renewably-Powered**
The whole system, including the reactor, can be powered by renewable electricity
- Lower grade ores**
Proven ability to process lower grade ores, including Australian hematite / goethite
- No Fluidized Beds**
Powder-based process suitable for processing of iron ore ultra-fines and fines (up to 0.5mm)¹, without fluidized beds: a highly simplified process
- No Pelletisation**
No requirement for iron ore fines pelletisation, avoiding significant capital and energy costs
- Minimum Hydrogen Consumption**
Targets theoretical minimum hydrogen use, through no use of hydrogen for combustion and through recycling of unreacted hydrogen
- Scalable & Flexible**
Ability to scale production relatively easily, using electric-powered reactor modules



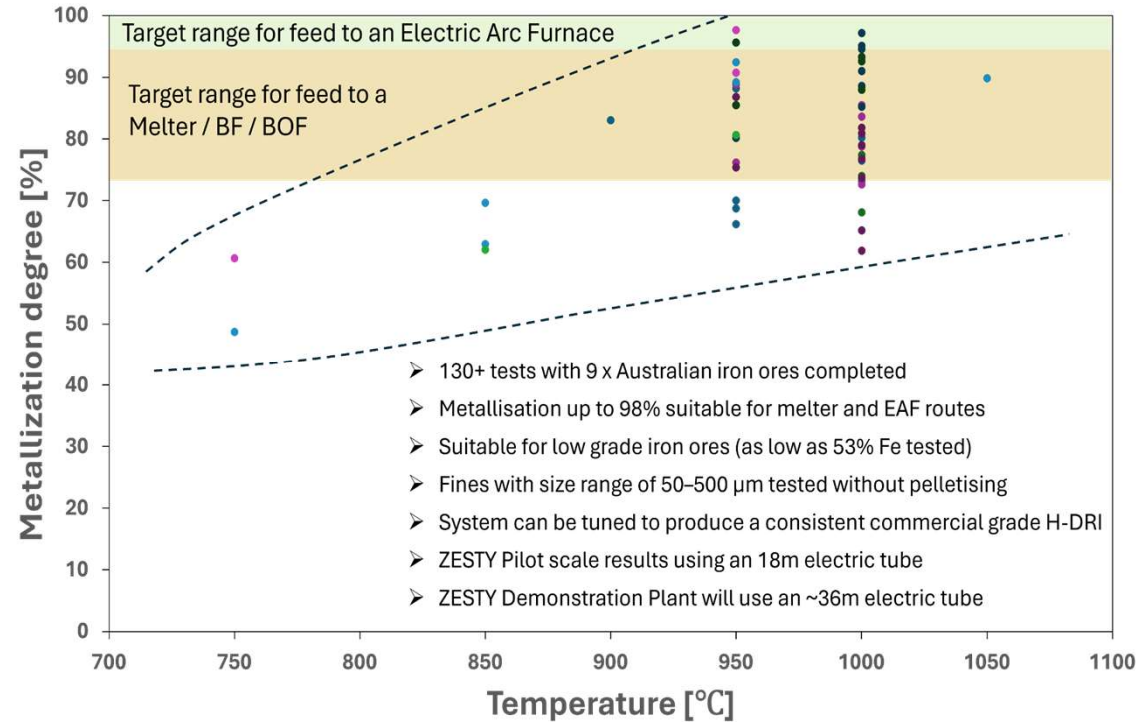
ZESTY pilot testing results

Excellent results achieved in multi-purpose pilot testing facility

- ✓ ZESTY proven at pilot scale, with metallisation rates up to 98%
- ✓ H₂-DRI produced from Australian hematite/goethite ores
~ 50% of global iron ore supply and not compatible with electric arc steel-making without upgrading
- ✓ ZESTY H₂-DRI fines have been successfully briquetted into a green HBI product with highly encouraging properties



Side profile of HBI produced from ZESTY H₂-DRI
briquetted at 200 MPa, 800 °C (scale: each square is
0.5x0.5 cm)



Metallisation Degree = Fe Wt% = the percentage of iron by weight in the ore

Towards FID for a ZESTY Demonstration Plant

ZESTY FEED study completed for a 30,000 tpa green iron demonstration plant

 A\$947,035 ARENA grant covering ~50% of FEED costs

Why 30,000 tpa demonstration is the right next step ?

The FEED study finalised inputs to a final investment decision, subject to financing, including:

- Site layout, environmental and permitting considerations
- Process design including operating regimes, venting, emergency response
- Major equipment sizing and costings
- Construction methodologies

- ✓ Represents full-scale implementation of a single reactor tube – the basis for further scale-up
- ✓ Capable of processing sufficient H₂- DRI / HBI for further downstream testing (steelmaking) at full scale to validate the product



The ZESTY commercial demonstrator is targeting BF-BOF suitable HBI produced from low grade iron ore

The demonstrator aims to charge a tolling fee to iron ore producers to test HBI trial products with their customers

ZESTY Demo Plant FEED study results

Pilot testing and FEED study completed



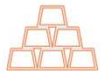
130+

Tests completed



9

Australian ores variants tested



75-98%

Metallisation degree



0.9 – 1.3 MWh

per tonne of HBI – highly efficient



US\$410-520

per tonne of HBI production cost



Near **ZERO**

emissions



Scalable

Multiple tubes for modular scale-up



ARENA Grant

Broader Australian government support

Techno-economics findings

- ✓ ZESTY could produce green HBI at costs close to the range of conventional (carbon intensive) HBI production¹
- ✓ ZESTY could reduce the emissions intensity of reducing iron ore to metal iron from 1.89 tonnes of CO₂ / tonne of iron to near zero
- ✓ No pelletisation and sintering = considerable capital and operating expenditure savings
- ✓ Low consumption of green hydrogen = approaching theoretical minimum for reduction
- ✓ Efficient electrical indirect heating methodology
- ✓ Economics expected to improve further with scale
- ✓ Including the cost of carbon would further enhance economics



The opportunity for ZESTY is both green iron & steel



The ZESTY value proposition is relevant to both iron ore producers and steel makers

	Strategy	ZESTY Technology	Outputs	Outcomes
	To deliver a zero-emission reduced iron technology for iron ore producers and/or their customers.	Iron ore + Hydrogen + Renewable energy	Green iron products	Elimination of CO ₂ emissions in ironmaking Reduced operating temperatures Product use in both BF-BOF and EAF downstream processing systems Strong collaboration with global iron ore producers
	Further integration of ZESTY technology to make product additives for the steelmaking process.	As above + Steelmaking	Green steel products	Production of green steel from ZESTY H ₂ -DRI in conjunction with: <ul style="list-style-type: none"> • bio-derived carburants; and • zero-emissions lime¹

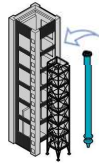
Scaling up the technology



A modular scale up approach duplicating a core reactor tube unit

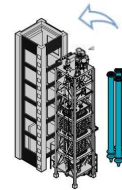
Leilac-1 Pilot plant

Lixhe, Belgium, commissioned in 2019
 25k tonnes / year CO₂
 ~5 % throughput of host plant.
 No plant down-time.
 One of the largest CO₂ capture facilities on a cement plant today
 Option for hybrid electrification testing in 2025



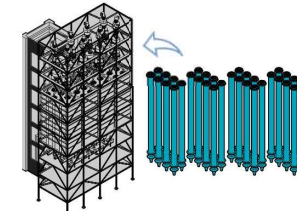
Leilac-2 Demonstration plant

Ennigerloh, Germany, 2025
 100k tonnes / year CO₂
 Multi-fuel module.
 ~ 20 % throughput.
 Demonstrate >95% alternative fuel use
 Retrofit planned to have no plant down-time



Leilac-3 Full scale

Several modules
 Full energy flexibility
 >500k tonnes / year CO₂
 (average ~ 1m tpa)
 Module simply duplicated to reach any scale.
 100% CO₂ throughput
 No expected plant down-time



Our partners



Heirloom



Enabling hybrid fuel use and grid-load balancing

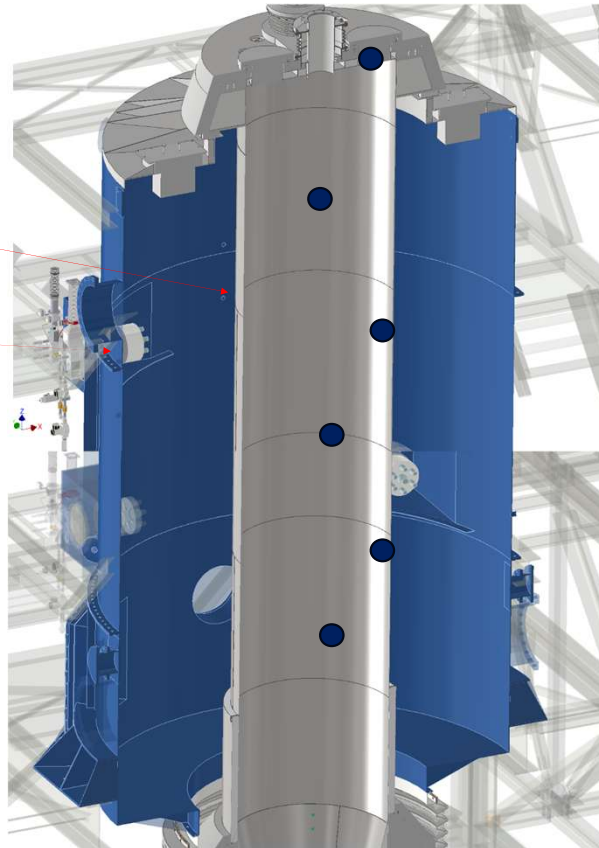
Potential to optimise energy operating costs and create new revenues by providing a stabilising service to the grid

Two responsive energy inputs:

1. Electrical heat from renewable power, or the grid, is controlled by the current in resistive heaters.
2. Combustion heat from burners using conventional or alternative fuels is controlled by the flow of a combustion gas and air.

This solution has the potential to allow rapid switching between electricity and combustion depending on:

- Fuel / electricity prices
- Grid load balancing requirements



Direct electrical heating has been proven at pilot scale at the Calix Technology Centre.

ZESTY wins global Net-Zero Industry Award at COP29



ZESTY wins COP29 global Net-Zero Industry Award for Outstanding Project

The award was presented by Ministers Chris Bowen (Australia) and Leonore Gewessler (Austria).

Organised by Mission Innovation's Net-Zero Industries Mission:

- The Mission is led by Austria and Australia, in collaboration with Canada, China, the European Commission, Finland, Germany, the Republic of Korea, the UK and the USA
- Member countries account for over 50% of global industrial emissions, and USD\$13 billion in annual investment in research, development and demonstration
- The Mission aims to deliver at least 50 large-scale demonstration projects around the world by 2030.



ZESTY recognised at HILT CRC 2024 Annual Conference

The Project “Testing of Australian iron ores in a hydrogen flash smelting process” was awarded the Best Contribution to Industry-Research Collaboration at the HILT CRC 2024 Annual Conference. The project was delivered through a collaboration between Calix, Swinburne, University of Adelaide, Fortescue, Roy Hill, Liberty and Grange Minerals.

“The innovative thinking behind the ZESTY project is a prime example of what industry needs to develop cost-competitive and scalable technology for low-emissions iron ore processing. It has been gratifying to work with Calix on accelerating the development of this technology, which can contribute to the decarbonisation of heavy industry. Congratulations to the Calix team for this well-deserved recognition.”

Jenny Selway, CEO, HILT CRC





Investor relations

Investorrelations@calix.global

calix.global

Media enquiries

media@calix.global



[Subscribe to our Newsletter](#)

Mars is for quitters