

24 July 2025

Calix executes \$44.9m ARENA grant agreement for ZESTY Green Iron Demonstration Plant

Sydney, Australia | 24 July 2025 – Australian environmental technology company, Calix Limited (ASX: CXL) (“Calix”) is pleased to announce today that it has executed final agreements on the award of a AUD\$44.9 million grant from the Australian Renewable Energy Agency (“ARENA”) to build a Green Iron Demonstration Plant using its Zero Emissions Steel Technology (“ZESTY”).

Highlights:

- Calix has executed a \$44.9 million grant award from ARENA to build a ZESTY Green Iron Demonstration Plant (“Demonstration Plant”).
- The Demonstration Plant has a targeted capacity to produce 30,000 tonnes per annum of hydrogen direct reduced iron (“H₂-DRI”) or hot briquetted iron (“HBI”).
- The Demonstration Plant is designed to deliver toll processing of iron ores from a range of producers to support the ongoing viability of Australian iron ore in a low emissions steel value chain and support the development of a green iron industry in Australia.
- The Project will also complete an engineering study for a commercial scale ZESTY plant to facilitate future commercial deployment.
- The location of the Demonstration Plant remains commercial in confidence. A Final Investment Decision (“FID”) is targeted for FY26. The procurement of major capital items will remain subject to further financing and detailed design and engineering.
- Subject to matching funding being secured, procurement and construction is targeted to commence in 2026, followed by a staged commissioning and operations phase that is planned to commence in 2028.
- The ARENA grant provides up to 50% of the project budget and is subject to matched contribution and key project milestones being achieved. Calix has the resources and balance sheet to progress the project through to end-FY26, and intends to finance the remaining budget through equity funding from strategic and/or financial investors in a ZESTY subsidiary business, and/or project financing.
- The Demonstration Plant Project follows the ARENA funded pilot-scale trials that proved ZESTY’s potential to produce economic green iron from a range of iron ores, including lower grade ores from the Australian Pilbara region.
- Calix will host a deep-dive webinar on the ZESTY technology and Demonstration Plant at 11:00am AEST, Thursday 31 July. Registration is available at:
<https://events.teams.microsoft.com/event/aca45e2a-593a-4ace-ab66-90186abea17e@881ca852-0f27-471e-b2ca-9b468b57387a>

The ZESTY Green Iron Demonstration Plant Project

Calix's ZESTY uses a combination of electric heating and hydrogen reduction to produce green iron and ultimately, green steel. ZESTY aims to provide lowest cost pathways to green iron and steel by:

- Enabling flexible operations compatible with variable renewable energy sources;
- Enabling theoretical minimum hydrogen use of 54kg per tonne of iron;
- Removing the need for ore pelletisation; and
- Enabling the use of fines and lower-grade ores.

As reported by The Superpower Institute's *A Green Iron Plan for Australia*, ZESTY's targeted benefits have the potential to enable substantial cost savings for green iron projects compared with 'inflexible' hydrogen direct reduced iron technologies.¹

Following successful pilot-scale trials and the positive outcome of an ARENA funded Pre-Front End Engineering Design ("Pre-FEED") / Front-End Engineering Design ("FEED") study, Calix and ARENA have executed a \$44.9m grant award as part of ARENA's Advancing Renewables Program for a ZESTY Demonstration Plant Project ("The Project").

The Project aims to advance the technical and commercial readiness of ZESTY, facilitating its scale up to commercial operations. The Project's objectives are:

1. Construct, commission and operate a 30,000 tonne per annum H₂-DRI / HBI ZESTY Demonstration Plant.
2. Deliver a Pre-FEED / FEED study for a commercial scale ZESTY plant.

The Demonstration Plant is designed to enable toll processing of iron ores from a range of producers both within Australia and internationally. Targeted project outcomes aim to assist in progressing the viability of Australian iron ore in a low emissions steel value chain, support the development of a green iron industry in Australia, and support global deployment of the technology.

The Demonstration Plant's toll processing of multiple ore types and grades is also designed to facilitate testing of the H₂-DRI / HBI product by multiple steelmakers using different steelmaking routes. This aims to demonstrate ZESTY's potential to provide flexible decarbonisation pathways, including substituting a portion of the iron ore charge to a blast furnace in the near term, and longer-term low emissions steel production via an Electric Smelting Furnace ("ESF") / Electric Arc Furnace ("EAF") route.

The Project will now commence detailed design engineering. FID for the Demonstration Plant, the location of which remains commercial in confidence, is targeted for FY26. The procurement of major capital items will remain subject to further financing and detailed design and engineering. Subject to matched funding being secured, procurement and construction is targeted to commence in 2026, followed by a staged commissioning and operations phase that is planned to

¹ The Superpower Institute. [A Green Iron Plan for Australia](#). May 2025

commence in 2028. Following commissioning, the Demonstration Plant will be used to test a wide range of iron ores with different mineralogy, grade and composition.

Informed by the Demonstration Plant's results, a pre-FEED/FEED study for a commercial scale ZESTY plant will provide a detailed techno-economic assessment of ZESTY at scale. This study is designed to support the final scale up stage of the technology and facilitate commercial deployment into international supply chains.

Minister for Climate Change and Energy, Chris Bowen said:

"Australia is the world's largest exporter of iron ore — and with that comes a massive opportunity to help decarbonise global steelmaking.

"That's why green metals are a priority area for the Albanese Government's Future Made in Australia agenda and a clear example of how Australian innovation, backed by support from the Government, can drive down industrial emissions, create new jobs, and seize new clean export opportunities.

"We're backing technologies like ZESTY because cutting emissions from heavy industry is not only essential to reaching net zero — it's also good for Australian workers and good for our economy."

ARENA CEO, Darren Miller said:

"As the world's largest producer and exporter of iron ore, Australia has a critical role in reducing emissions across the steel value chain.

"ZESTY is a strong step toward building a low-emissions steel industry at home.

"What makes ZESTY so compelling is its potential to dramatically lower the amount of hydrogen required to convert iron ore into pure iron. ZESTY, in combination with use of renewable electricity from Australia's world-class solar and wind resources, has the potential to create a new green iron industry targeting both domestic and export markets as the world transitions away from fossil fuels."

Calix Chief Executive Officer and Managing Director, Phil Hodgson said:

"Calix is delighted to announce this important milestone in the commercialisation of ZESTY, and we thank ARENA and the Australian Government for its support.

"Our shared vision is that a green iron industry here in Australia can add value to, and help future-proof, Australia's iron ore industry. Iron ore is Australia's largest source of export income, and it is under existential threat in a decarbonising global economy.

"Following successful pilot-scale testing and global recognition for ZESTY from the Net-Zero Industries Award at COP29² and the Decarb Connect Next Gen Award³ over the past 12 months, this next milestone continues to mark our progress in realising ZESTY's potential. With the iron

² <https://calix.global/news/calix-zesty-wins-global-net-zero-industry-award-cop29/>

³ <https://calix.global/news/calix-wins-decarb-connect-north-americas-next-gen-awards/>

and steel industry responsible for approximately 7% to 8% of global CO₂ emissions,⁴ we look forward to working with ARENA to advance the project and help address this significant global challenge and opportunity.”

Calix GM, Sustainable Processing, Chris Ormston said:

“The ZESTY Demonstration Plant, if successful, would be a landmark facility to help accelerate the development of a green iron industry in Australia. ZESTY’s compatibility with multiple ore types and grades will make it an ideal, multi-user platform facility to test and develop green iron and steel pathways. Its potential to minimise hydrogen consumption, avoid pelletisation, and operate flexibly on low-cost electricity can enable it to do so in the most cost-effective way possible. We look forward to continuing to work with our partners across the iron and steel value chain in this exciting next phase.”

–ENDS–

Appendix 1: About ZESTY

Calix’s Zero Emissions Steel TechnologY is a renewably powered H₂-DRI technology for the production of green iron and ultimately, green steel.

ZESTY’s feature and benefits:

- Efficient electrification & hydrogen use

ZESTY is an application of Calix’s indirect heating platform technology, which enables fossil fuel combustion to be replaced by efficient, precise and renewably powered electric heating. Like other H₂-DRI technologies, ZESTY uses hydrogen to remove oxygen from the iron ore to produce metallic iron and water. Unlike other approaches, however, ZESTY separates the heat source from the reaction to ensure hydrogen is not combusted or used as a fuel and may be readily recycled.

- Flexible energy use

Compatible with intermittent and renewable sources of electricity, ZESTY’s electric heating provides a high degree of temperature control with fast start-up and shut down, and highly flexible production rates. As such, it may match production with the availability of low-cost electricity and hydrogen and may also provide a versatile load balancing service to the energy grid.

- Processes lower grade ores & fines

Australia is the world’s largest producer of iron ore,⁵ with 96% of its exports low or mid-grade hematite / goethite ores⁶ from the Pilbara region that are otherwise not suitable for use in electric arc furnaces. ZESTY’s compatibility with lower grade ores provides a

⁴ [IEA Emissions Measurement for NetZero Steel Apr 2023](#)

⁵ USGS. [Mineral Commodity Summaries 2025, Iron Ore](#)

⁶ [Iron ore –Geoscience Australia.](#)

pathway for them to be used in future low-carbon steelmaking routes. This aims to protect existing supply chains and assets, and future-proof Australia's largest source of export income. ZESTY is also well suited to process small particle sizes, or fine material, that may otherwise be discarded as waste.

- Simplified process

ZESTY removes the requirement for iron ore fines to be pelletised, eliminating process steps and avoiding significant capital and energy costs. ZESTY also delivers a simplified process for the processing of iron ore fines and ultra-fines without fluidised beds.

- Versatile & scalable

ZESTY could be integrated directly at the iron ore source for the export of green iron, or by a steelmaker to feed a blast furnace, basic oxygen furnace, electric smelter or electric arc furnace, providing flexible near- and long-term decarbonisation pathways for the industry. Calix's modular technology is designed to be simply scaled through duplication, de-risking technology scale up and enabling flexible production volumes.

- Proven at pilot scale

Extensive pilot-scale testing delivered excellent metallisation results from over 130 test runs using nine different Australian ores and covering a range of grades and particle sizes. Most test runs achieved the level of metallisation suitable for downstream use in either an electric smelter or blast furnace, while several tests reached sufficient metallisation levels for feed directly to an electric arc furnace.

Appendix 2: Enabling flexible and lowest-cost pathways to green iron and steel

The steel industry is energy and carbon intensive, accounting for ~2.8 billion tonnes per year, or 7–8% of global CO₂ emissions.⁷ Global steel production predominantly uses the high emissions blast furnace–basic oxygen furnace (BF–BOF) route, which relies on metallurgical coke as both a heat source and reductant. The reduction of iron ore to metal iron in a blast furnace accounts for over 80% of the emissions from steelmaking, leading to ~1.9 tonnes of CO₂ emitted for every tonne of steel produced via BF–BOF.⁸ Australia is the world's largest iron ore producer, with most of this being medium grade hematite/goethite ore exported from the Pilbara region and processed overseas via the BF–BOF route.⁹

The alternate direct reduced iron – electric arc furnace (DRI–EAF) route has significantly lower carbon emissions. Using natural gas to produce a 'syngas' of hydrogen and carbon monoxide to make direct reduced iron can reduce carbon emissions to ~0.7 tonnes of CO₂ for each tonne of steel produced.⁴ Replacing natural gas with renewable hydrogen and electricity (i.e. H₂–DRI) can further reduce ironmaking emissions to near zero. However, Australian hematite/goethite iron ore,

⁷ IEA. [Emissions Measurement and Data Collection for a Net Zero Steel Industry](#). April 2023

⁸ Midrex. [The Winding Road Toward Zero-Carbon Iron](#). Tech article. 2021

⁹ [Iron ore –Geoscience Australia](#).

due to its high level of impurities/gangue, is not directly suitable for conventional DRI-EAF processes without costly beneficiation.

A novel process to address the use of hematite/goethite ores in low emissions steelmaking is the DRI-ESF route, where impurities are removed after the direct reduction step in an ESF, which has greater flexibility to process lower grades of iron ore compared to an EAF. The Neosmelt project in Kwinana that is being developed by Rio Tinto, BHP and Bluescope with funding from ARENA is an example of this processing route.¹⁰ Hot metal produced from an ESF may be refined downstream in existing BOF infrastructure or an EAF to produce low emissions steel. It should be noted, however, that an ESF needs a DRI input, such as that provided by ZESTY.

Addressing the use of hematite/goethite ores in low emission steelmaking routes is critical to ensure the viability of Australian iron ore in a future green steel value chain. ZESTY initially targets incremental decarbonisation of the BF-BOF route via partial substitution of ZESTY H₂-DRI / HBI in the raw BF feed, offsetting a portion of iron ore and metallurgical coke. Ultimately, ZESTY aims to process hematite/goethite ore fines into H₂-DRI / HBI compatible with the ESF-BOF and EAF steelmaking routes.

Appendix 3: Project funding terms

The grant funding is made to the Company by the Australian Renewable Energy Agency (ARENA) as part of ARENA's Advancing Renewables Program and is subject to the terms of a funding agreement.

The grant funding is to assist the engineering, construction, commissioning and operation of the Demonstration Plant and other deliverables of the Project. As per a standard Australian Government grant agreement, the grant is payable to the Company as reimbursement of Project commitments and expenditure, paid in instalments distributed over the term of the Project expected to be completed by March 2031, and subject to the successful completion of Project milestones.

Failure to satisfy the milestone conditions, or a change in Australian Government policy with respect to ARENA's Advancing Renewables Program, or funding provided by ARENA, that relates to ARENA's obligations under this agreement, may result in ARENA or the Australian Government by notice terminating this agreement or changing the scope of the Project, effective from the time specified in the notice. Such provisions are typical in government funding agreements.

Further information about the ARENA Advancing Renewables Program is available at:

<https://arena.gov.au/funding/advancing-renewables-program/#step-1-read-the-program-guidelines>

¹⁰ [ARENA: Industry giants collaborating to seek to decarbonise steel](#)

Material Grant Agreement Milestones

Milestone	Targeted Milestone Completion Date
Engineering, Procurement & Construction Management commenced	Mid 2026
Detailed Engineering completed	Early 2027
Procurement completed	Mid / late 2027
Construction completed	Mid / late 2028

Table 1. Material project milestones linked to grant payments. Targeted timing includes the completion of all associated deliverables, including milestone reports and knowledge sharing.

This announcement has been authorised for release to the ASX by the Calix Board of Directors.

About Calix

Calix Limited (ASX: CXL) is an environmental technology company creating great businesses that solve 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 metals and minerals processing and capture of unavoidable industrial emissions.

With strong and increasing demand driven by global decarbonisation commitments, Calix is applying its core technology to the cement, steel, alumina and critical minerals industries, as well as 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.

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