News

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Calix

HIGHLIGHTS

SPECIAL FEATURE: KEY SUSTAINABILITY TRENDS SET TO DOMINATE IN THE NEXT DECADE

CALIX IS ESTABLISHING ITS PRESENCE IN THE U.S MARKET

ANOTHER SUCCESSFUL BIOGAS CUSTOMER STORY FOR ACTI-MAG

AQUA-CAL+ NOW BEING USED BY SHRIMP FARMS IN NORTHERN CHINA

OUR COLLABORATIVE R&D PROGRAMS CONTINUE TO EXPAND IN 2019

Work continues on the LEILAC Project: above the LEILAC tower at HeidelbergCement's Lixhe plant in Europe.

EDITORIAL

Welcome to Issue Number 29 of the Calix Newsletter

Phil Hodgson
CEO

As we draw to the end of the 2018 Calendar year, it is very satisfying to look back on the significant progress the company has made over the last 12 months.

In January 2018, we kicked off our two advanced battery projects – one in Europe (SOCRATCES https://socratces.eu/) and one in Australia ("BATMn"). Both progressed well during the year, with BATMn due for commissioning in August, 2019. In further progress in developing our battery technology, in August 2018, Calix was part of the successful ARC Training Centre for Future Energy Storage Materials awarded $4.4m by the Australian Government to advance Australia's capabilities in advanced energy materials.

In February 2018, construction commenced on our LEILAC CO_2 capture Project for cement and lime (https://www.project-leilac.eu/) which as at December 2018 remains on time and budget for commissioning in April, 2019. The project was mentioned in numerous global publications over the course of the year in the cement and wider climate sustainability press, and presented at major global cement and sustainability conferences.

Over the course of 2018:

- Our BOOSTER-Mag crop protection product continued returning positive field trails results, and attracted 3 major crop protection companies to commence their own independent trials under license.
- Our ACTI-Mag alkali dosing product grew sales in Australia, as well as commencing sales in Asia into biogas production facilities. This newsletter features one of our oldest customers in Australia for biogas production, and the sustained increased performance they have experienced.
- Our AQUA-Cal+ aquaculture additive expanded trials into China, Thailand, Vietnam and Indonesia – the largest farmed shrimp markets in the world, as well as expanding application into freshwater lake remediation via a successful trial to date in Malaysia. This newsletter features our push into China and our Asian team conference.
- Our PROTECTA-Mag sewer asset protection coating continued its market entry. This newsletter features our US market entry and two new partners we have signed on in California to progress our expansion there.

Our R&D team continued to develop the technology, with a new Australian Academy of Technological Science grant award funding collaboration with CERTH in Greece to help develop our high surface area magnesium oxide into medical / pharmaceutical applications. A patent application was filed covering this exciting new opportunity.

Calix also completed a successful IPO of the company in July 2018, was awarded the NSW Premier's Export Award for Environmental Solutions and was a National Export Awards Finalist.

The Calix team look forward to continuing the company's development in 2019, and thank all shareholders and supporters of the company, and wish you all a safe and happy Christmas and New Year.

KEY MILESTONES

FORGING AHEAD IN THE US MARKET

After making initial inroads into the US through the Water Conference in Honolulu, Hawaii, Calix is forging ahead with this new market. The interest shown and speed of decision to trial our products has been a great initial step for Calix into the huge US market.

Calix is pleased to announce the set up of two new partners in Hawaii and Southern California with Performance Pipeline Technologies, which has been providing the cleaning and inspection services to most of the trenchless lining companies in Southern California since 2002, and Badgley & Associates, which specialises in trenchless pipeline and manhole rehabilitation. We are also in advanced stages of discussions with a new strategic partner for the State of Nevada.

Calix's first project will be in Southern California and will go live in January. Calix's Charleston units will dose ACTI-Mag into the city's sewers to mitigate odours. The customer has trialled various product and technologies to mitigate odour, but has not been successful thus far. ACTI-Mag will now be dosed progressively into each catchment and then also in the treatment plant. This project will provide a great case study to help build Calix's reputation in the US market.

Partner profile: Dave Badgley of Badgley & Associates

Dave has more than 35 years' experience in business development for the construction of pipelines, inspection, maintenance, locating equipment, pipe and construction services. The company specialises in trenchless technologies, including grouting, continuous and segmented sliplining, CIPP (Cured-in-Place), spiral wound, folded and reformed liners, internal joint seals, and maintenance hole rehabilitation. Dave has worked on more than 1,000,000 feet of rehabilitation projects totalling more than US$30 million in contracts.

Partner profile: Gene Glassburner – Performance Pipeline Technologies

As the owner of Performance Pipeline Technologies, Gene provides quality pipeline condition assessment services, cleaning, and pipeline cleaning for agencies and trenchless pipeline rehabilitation contractors.

He has worked on more than 1,000,000 feet of trenchless pipeliner installations and many manhole and pump station coating installations; and has done installations in many Southern California agencies including LA City, LA Co DPW, LA Co San Dist., OCSD, San Bernardino Co, or San Diego.

ACTI-Mag™ USE AT RENDERING PLANT

HELPS TO INCREASE BIOGAS PRODUCTION AND CUT ENERGY BILL BY $1.5 MILLION

ACTI-Mag™

A rendering plant that processes four million kilograms of animal waste each week and uses a substantial amount of water and energy for its operations needed to reduce its energy usage.

The exceptionally strong wastewater produced by the business is treated initially in covered anaerobic lagoons (CAL) before being aerobically treated in a sequenced batch reactor (SBR), then flowing to an irrigation dam via a maturation pond. The final effluent is used to irrigate the plant's own woodlot and pasture land used for cattle grazing.

Removing phosphorous from the effluent was important to ensure pasture uptake capacity is not exceeded. However, only limited phosphorous uptake is achievable within the SBR, resulting in the final effluent exceeding the allowable limit by double. And, the excess phosphorous created a nuisance deposit of struvite resulting in frequent pipe blockages.

In late 2014, the company engaged Calix to dose its anaerobic ponds with ACTI-Mag to allow the pond loadings to be increased from 70 per cent to 100 per cent of the plant's effluent.
ACTI-Mag allowed those loadings to be increased without producing excess acids, which would have caused a detrimental fall in the process pH. This would have compromised the treatment of the wastewater and the business's ability to generate biogas.

After the dosing, the loading was quickly increased to 100 per cent with an approximate doubling of methane yield for biogas.

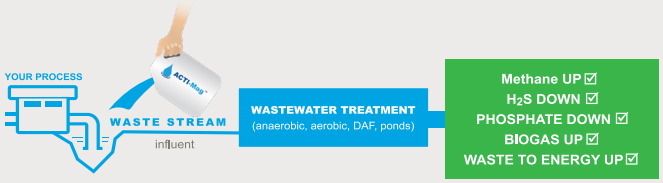
Calix was engaged to dose the plant's anaerobic ponds with ACTI-Mag to help with the treatment of wastewater and the production of biogas

How ACTI-Mag helped

Following the start of the ACTI-mag dosing, the final effluent phosphorous fell steadily to between 40 and 80 mg/L over six to 12 months. During this period, the reported incidence of struvite pipe blockages also decreased, indicating that nuisance struvite was being reduced.

These positive results encouraged the company to continue using ACTI-Mag to stabilise its process pH, increase biogas production, and lower final effluent phosphorous. Dosing with ACTI-Mag is now an intrinsic part of the wastewater treatment strategy for the business.

As a result of more efficient biogas production, the company has saved approximately $1.5 million on energy costs.



AQUA-Cal+™ IS NOW BEING USED

IN FACTORY SHRIMP FARMS IN NORTHERN CHINA.

AQUA-Cal+™

China, with one-fifth of the world's population, accounts for two-thirds of the world's reported aquaculture production.

China is one of the biggest markets in the world for shrimp with about one million metric tons grown per year. With a temperate climate and rather cold winters, Northern China cannot grow shrimp all year round as is the case in Southeast Asia.

Calix is partnering with Honlex Jones to develop a new method for control of nitrite using AQUA-Cal+ in Northern China. Early results show great promise.

Rising domestic demand for shrimp means factory farms must focus on increasing its yields and overall productivity. With intensive aquaculture shrimp farming comes large amounts of toxic sludge and chemical complexes like nitrite, that can be harmful to both shrimp and human health.

Calix's partners met in October at our first Calix Asian Partners Conference, to map out activities for the coming 12 months.

Targeting aquaculture, water conditioning and enhanced biogas markets with our innovative high surface area AQUA-Cal+ and ACTI-Mag products.

R&D UPDATE

OUR COLLABORATIVE R&D PROGRAMS CONTINUE TO EXPAND IN 2019

During 2018, Calix extended its linkages to universities and research institutes in Australia and Europe through participation in research programs, in which the focus is our unique production of nano-active materials in Australia.

Dr Matt Boot-Handford has recently joined the R&D team at Bacchus Marsh to lead these collaborations, and will coordinate European projects with Dr Tom Hills in London. Tom and Matt come to Calix through a long term collaboration with Professor Paul Fennell at Imperial College, UK.

The collaborative model enables science and engineering researchers to spend time at Bacchus Marsh making novel nano-active materials in an industrial environment, testing materials for specific applications in their laboratories using leading edge research capabilities, and working with industrial end users on the most promising applications.

To deliver this vision, Calix has upgraded its CFC 850 Calciner and is constructing the BATMn reactor, with Australian Government AMGF funding, to make new battery and catalyst materials under novel processing conditions. Calix has sponsored research at CERTH, in Greece, which has revealed important insights into the origin of the bioactivity of its nano-active MgO.

In 2018, Calix is a partner with Deakin and Monash Universities in its Australian Government funded industrial training centre for Future Energy Storage Technologies, and with Imperial College in its UK funded program Next Generation Synthesis & Reaction Technology.

These programs will lead to a number of collaborative projects in batteries, catalysts, 3-d printing and pharmaceuticals. These are examples of “lean innovation” in which early stage, prospective R&D can be progressed and rapidly assessed, and from which Calix has generated great success to date. We look forward to working with our collaborative R&D networks in 2019.

Calix is a partner of the ARC Industrial Transformation Training Centre leaded by Institute for Frontier Materials.

Chief Scientist Mark Sceats presented our advanced battery materials technology for which we are recruiting 3 students from Deakin and Monash Universities to work on this exciting project. As the world transitions to renewable energy, increasing demand is required of efficient, cheap and high capacity electricity storage.

STOP PRESS

Calix’s Technology was mentioned in an article published by TechCrunch, an American online publisher of technology industry news, as one of the very few carbon capture and storage technologies that could help mitigate the effects of climate change particularly for the cement sector.

Read the full article: https://techcrunch.com/2018/10/23/y-combinator-issues-a-request-for-geo-engineering-startups-because-climate-change-is-real-and-were-all-going-to-die/

Calix was mentioned in an article published by Local Government FOCUS, Australia’s National Local Government Newspaper Online, in an article on Manhole rehabilitation manhole maintenance costs.

Read the full article: http://www.lgfocus.com.au/editions/2018-10/manhole-trial-reduces-manhole-maintenance.php

Calix was also featured in Water Matters, a quarterly newsletter published by VicWater – the peak industry association for water corporations in Victoria.

Read the full article: https://vicwater.org.au/newsletters/winter-2018-2#Calix-Robust-strategies-in-a-volatile-world

INTRODUCING

ADAM CAPELJA - MAINTENANCE SUPERVISOR

Adam started working in civil construction in 2007, as a labourer working closely with heavy earthmoving machinery. After witnessing some of the machinery undergo repairs he soon found himself beginning an apprenticeship as Metal Fabricator/ welder.

Adam joined Calix in 2015, bringing a depth of expertise in general fabrication and extensive experience of onsite maintenance from a number of rock and sand quarries, concrete, asphalt and cement bagging batch plants.

Today as Calix Bacchus Marsh’s Maintenance Supervisor Adam plans and executes onsite maintenance, supervises and coordinates contractors during large scale maintenance projects.

In his free time, he likes to play competitive online video games, and trains as a powerlifter.

To learn more about Calix technology, products, applications and services,
Visit www.calix.com.au
Or call 02 8199 7400

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