

## HIGHLIGHTS

**Our Low Emissions Intensity Lime and Cement (LEILAC) Project Completes Major Milestone**

**Global BOOSTER-Mag Licencing Process Begins**

**Not all Magnesium Hydroxide Liquids are Created Equal**

**R&D Update: New Automatic Cleaning & Coating Applicator Launched**

The LEILAC (Low Emissions Intensity Lime And Cement) Project has now entered the Detailed Engineering, Procurement and Construction phase. Processing 10 tonnes of cement meal an hour, and integrated into Heidelberg Cement's cement plant in Belgium, the pilot plant is anticipated to start operations late next year.

A unique consortium of partners have come together led by Calix, comprising HeidelbergCement, CEMEX, Tarmac, Lhoist, Amec Foster Wheeler, ECN, Imperial College, PSE, Quantis and the Carbon Trust. LEILAC is funded by the EU Horizons 2020 scheme and is supported by CEMBUREAU, ECRA, and EuLA. The project aims to apply and demonstrate Calix's breakthrough technology that will enable Europe's cement and lime industries to reduce their carbon footprint significantly.

## EDITORIAL

### Welcome to Issue Number 22 of the Calix Newsletter.



Phil Hodgson  
CEO

Since our last Newsletter, we have successfully passed a significant milestone in our European LEILAC Project, with the project consortium unanimously voting to proceed to the next stage of the project – Detailed Engineering, Procurement and Construction. The success of the project to date is a testament to both Calix's core technology, and the Calix-led LEILAC team. Our next key milestone is commissioning the pilot facility, targeted for late 2018, and the intervening period will be a busy time as the pieces of the pilot plant are put together on the HeidelbergCement site in Lixhe, Belgium.

I am also very pleased to announce the launch of a global search for a licensing partner, or partners, for our BOOSTER-Mag™ agricultural spray. Having spent over 3 years researching and developing the product, we are excited by its potential for safe, environmentally friendly crop protection and yield improvement, and are looking for an established agricultural business or businesses to help take it to market. If the interest generated by our recent presentation on BOOSTER-Mag™ efficacy at the European Bio-pesticide conference is anything to go by, our BOOSTER-Mag™ licensing strategy is off to a great start.

Our progress in application technology for our PROTECTA-Mag™ product is also featured in our R&D update. Having signed 3 applications partners across eastern Australia, and with 3 more potentially coming on-board covering southern and western Australia and New Zealand, the growth in our asset protection business over the last two quarters has been exceptional. Our relentless R&D focus on better ways to apply our novel products will keep us, and our new partners, well ahead of any competition.

Our full year financial results are being finalised and still subject to audit, however all indications are that we have had another record year in sales revenue and EBITDA, after our previous record the year before. The Calix team look forward to building substantially on our performance this next financial year, and continue to be very excited by the huge potential of our technology in many new products and applications.

## KEY MILESTONES

### INNOVATIVE PROJECT TO CAPTURE CO<sub>2</sub> EMISSIONS FROM CEMENT AND LIME PROGRESSES TO NEXT PHASE



At an important Project LEILAC meeting in Belgium in June, the consortium voted unanimously to progress to Detailed Engineering Procurement and Construction of the LEILAC pilot plant. Processing 10 tonnes of cement meal an hour, and integrated into HeidelbergCement's cement plant at Lixhe, Belgium, it is anticipated that this pilot plant will start operations late next year.

The 5-year LEILAC project, supported by the European Union's Horizon 2020 research and innovation programme, aims to apply Calix's Direct Separation technology to cement and lime plants, and validate the resulting process demands and performance. Once proven, and scaled up to apply to a fully size production plant, this technology should enable both the cement and lime industries to capture their unavoidable process carbon dioxide (CO<sub>2</sub>) emissions for minimal energy penalty (just compression) and at comparable capital costs to conventional emitting equipment.

The technology has the potential to enable both Europe's cement and lime industries to reduce their emissions dramatically while retaining, or even increasing international competitiveness.

Since the project commenced in 2016, a number of research, development, design evaluation and performance studies have been successfully undertaken for the pilot plant, with the aim of reducing the major scale-up risks. In addition to developing a workable solution, which achieves the project's objectives, costs for the pilot's construction have been evaluated to within a ±15% level of accuracy.

Health and Safety considerations remain a core pillar of the LEILAC consortium and full Hazard and Environment studies, with outputs feeding into the design of the LEILAC plant, have been completed. Governance procedures and protocols have been put in place and are operating effectively, and engagement with the local community around the Lixhe plant is underway.

Phil Hodgson, Calix MD and CEO and Chairman of the LEILAC Executive Board said that a significant milestone had been achieved with the innovative project and demonstrates the momentum which is building around the LEILAC project.

*"Thanks to the dedication, professionalism and collaboration between all of the consortium partners, the LEILAC project is pleased to announce its decision to pass its FID and enter the final phase of design and construction of the pilot plant. This marks a significant stage in the technology's development, and it is with great anticipation and pleasure that we look forward to realising the successful construction and validation of the LEILAC technology."*

The LEILAC consortium is led by Calix and comprises Heidelberg Cement, CEMEX, Tarmac, Lhoist, Amec Foster Wheeler, ECN, Imperial College, PSE, Quantis and the Carbon Trust.

It is supported by CEMBUREAU, ECRA, and EuLA. The project aims to apply and demonstrate a breakthrough technology that will enable Europe's cement and lime industries to reduce their carbon footprint significantly.

For more information, visit: [www.project-leilac.eu](http://www.project-leilac.eu)



▲ LEILAC Consortium Meeting in Belgium, June 2017.

# BOOSTER-Mag™ NEWS

## LICENSING PROCESS BEGINS



After 3 years of laboratory, greenhouse and field testing, Calix's Bio-reactive agricultural product BOOSTER-Mag™ is ready for a global launch.

BOOSTER-Mag™ is a revolutionary agricultural solution for increased yield, more efficient fertiliser use, pest management and fungal control. With field results from Australia, France and the Philippines across a wide range of crops, we have built a strong dossier of positive results for BOOSTER-Mag™. We are also working towards APVMA (Australian Pesticides and Veterinary Medicines Authority) registration in Australia with the support of our AusIndustry Accelerating Commercialisation grant.

BOOSTER-Mag™ is manufactured in commercial quantities in our patented facility at Bacchus Marsh in Victoria.

Calix has begun a global search for sales and marketing partners for BOOSTER-Mag™ which has recently been supported by

a presentation at the European Bio-pesticide conference in Madrid in June 2017. ▼



A whitepaper on BOOSTER-Mag™ will also be presented at the 18th Australian Agronomy Conference in Melbourne from 24-28 September 2017. The paper, prepared under the auspices of the Australian Processing Tomato Research Council (APTRC) will cover the results from multi-replicated field evaluations of BOOSTER-Mag™ treatment in field grown processing tomato across three different farms in central Victoria.

# ACTI-Mag™ - INTERESTING FACTS

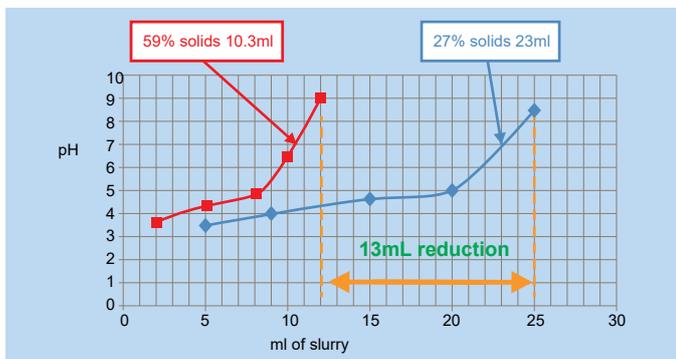
## NOT ALL MAGNESIUM HYDROXIDE LIQUIDS ARE CREATED EQUAL



Like most process chemicals, Magnesium Hydroxide (MHL) slurry is available in a number of formulations and product strengths. Whilst Calix's ACTI-Mag™ is a 60% solids concentration MHL slurry (~900 g/L active ingredients) - alternative MHL products are available with lower concentrations of active ingredients in Australia.

### MAKE SURE YOU UNDERSTAND WHAT YOU ARE BUYING

#### SOLIDS CONCENTRATION & PRODUCT CONSUMPTION

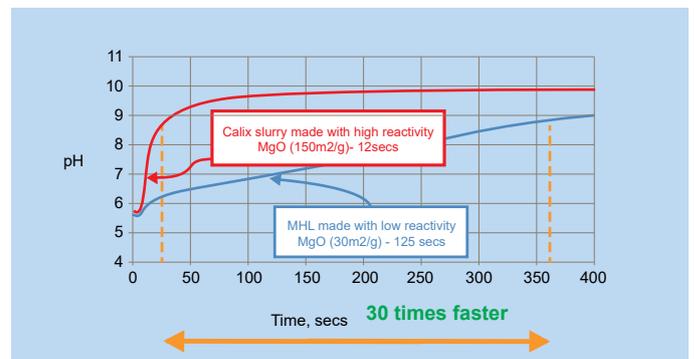


When an alkaline compound dissolves in water it produces hydroxide ions, OH<sup>-</sup>. These ions are responsible for the alkalinity of the solution.

Therefore, neutralisation rate depends on how readily the solids dissolve to form an alkaline solution.

ACTI-Mag™ is produced with Calix's own highly reactive Magnesium Oxide (MgO) produced using Calix Flash calcination process. This short contact heat treatment (less than 10 sec) rapidly converts the Magnesium carbonate ore (MgCO<sub>3</sub>) to MgO by driving off CO<sub>2</sub>. As the CO<sub>2</sub> is 'fizzled-off' from the fine ground mineral particles, it produces a highly porous mineral 'honeycomb' leaving a very high surface area. This allows for rapid hydration to MHL and the resultant high surface, reactive ACTI-Mag™ product is more readily released by dissolution to allow a significantly higher neutralisation rate than other low surface area, low reactivity MHL products.

#### MgO REACTIVITY & NEUTRALISATION TIME



Lower cost-per-litre does not necessarily mean cheaper, it may mean lower solids concentration. The concentration of active ingredients in MHL impacts on the neutralisation time.

more solids (higher level of MHL per volume) = lower required dose

At a 30% solids concentration, MHL can take more than twice the dose to achieve the same neutralisation capacity as ACTI-Mag™, which would result in significantly higher annual consumption costs.

Not all MHLs are created equal - Remember we are just a phone call away, so if you need help with understanding the role of concentration or neutralisation speed in MHL, always feel free to give us a call. We are happy to assist you with your choices for achieving optimum alkalinity adjustment at the lowest possible cost.

## R&D UPDATE

### CALIX LAUNCHES AUTOMATIC CLEANING AND COATING APPLICATOR TO PROTECT DEEPER MANHOLES



Calix's ongoing Research & Development program ensures it remains at the forefront of the industry, and in turn delivering the best asset protection equipment to its customers.

For the corrosion protection of manholes deeper than 3 metres, Calix has developed and launched an automatic cleaning and coating applicator - the Mk IV - featuring:

- LED lights to illuminate the asset during application
- Smart hydraulic connections for easy and quick changeover
- A lighter, stronger and water tight chassis

Another applicator for the coating of wet wells and pump stations is currently under development. The requirements for wet wells is different than manholes due to the asset size and the various pieces of equipment - tubes, pipes, supports etc. - mounted inside the asset.

The purpose-built wet well cleaner and applicator will have the capabilities:

- On-board real-time camera
- Special nozzles that can clean walls from a distance of over 2 metres
- Remotely adjustable spray position in X and Y direction
- Blue tooth control via smart phone or tablet

These units will be demonstrated during the WIOA 2017 Victorian Conferences at the Bendigo Exhibition Centre (6 & 7 September 2017). For a free delegate pass, please contact us.



## INTRODUCING

### DARREN CHARLES - CFO / COMPANY SECRETARY

Darren has spent all his professional career to date in leading edge technology companies, including the last 6 years with Calix. Prior to becoming our CFO, he was a CFO and Executive Director at ASX listed Altium where he worked for almost 13 years as the company grew from a team of 25 to over 350 staff with operations in 9 countries. In addition, to this he spent 2 years with a telco software startup company.



At Calix, Darren leads our finance team, is the company secretary and oversees the IT and admin functions. Darren graduated from University of Tasmania as a Bachelor of Commerce with an accounting major and is a Fellow of CPA Australia.

Darren works with our executive and board with the development of business strategy with specific focus on the strategies for the finance and funding needs of the company. His previous experience with international business development, tax management, budgeting and forecasting, financial reporting and an IPO will serve the company well as it continues its growth trajectory.

When not at work, Darren likes to spend time with his family with weekends taken up with kid's sport participation and assisting to run a local junior AFL team during winter months. He also likes to keep himself active and regularly plays soccer and goes to the gym.

To learn more about Calix technology, products, applications and services,  
Visit [www.calix.com.au](http://www.calix.com.au)  
Or call 02 8199 7400

Stay connected

