

## Industrial Internet in the Lime Industry: AERO™ optimize blowers' efficiency and minimize the electric consumption with MOSAICO™ Intelligent Platform

### EXECUTIVE SUMMARY

Parallel Flow Regenerative (PFR) technology is the best solution for the calcination process in vertical lime kilns. It assures lower production costs and simplified maintenance and operation. PFR kiln has been substantially unchanged since its invention in '60s, but Industrial Internet changed the game.

MOSAICO Intelligent Platform, the Industrial Internet platform for the Lime Industry intelligently transforms operational data into actionable information, accessible anywhere and anytime. It delivers context and drive action based on equipment, location and people.

MOSAICO brings together connected machines, advanced sensors and controllers, and software for optimized performance. It provides robust analysis, visualization and reporting capabilities.

Harnessing the triple potential of sensors and connectivity, smart-machines and Industrial big-data and analytics

Customers can now:

- Optimize assets
- Optimize operations
- Realize the power of 1%, as intended by Qualical as small outcomes that can drive big changes in performance and operative margins.



*"Energy saved today is asset for future."* Carlo Cella, Qualical, CEO

## THE CHALLENGE

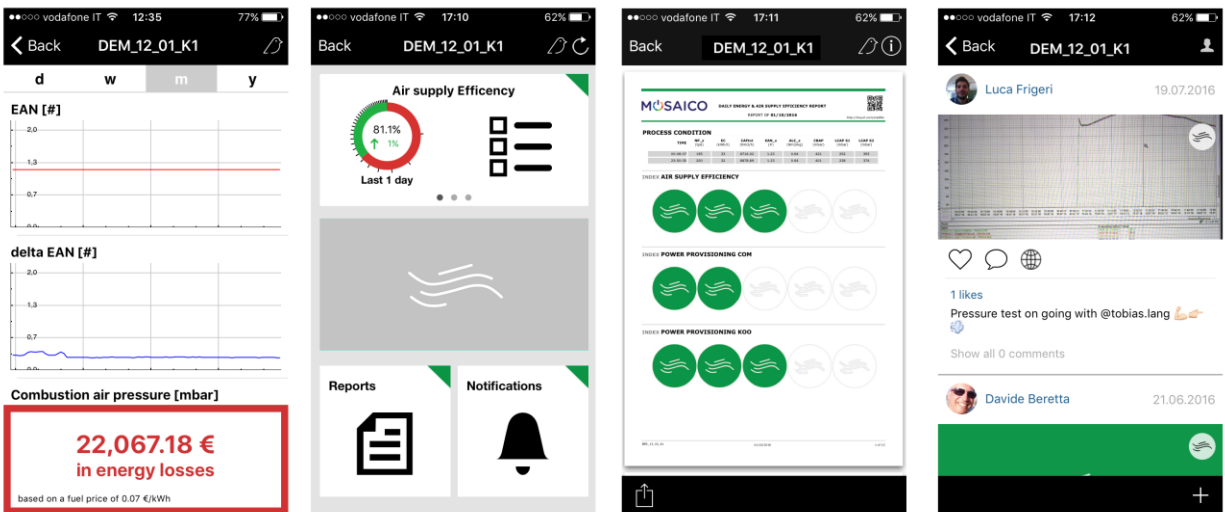
1% improvement in blowers' reliability and electrical consumption from QualiCal's PFR kiln operating in Calcis Group, Germany, by:

- Optimize blowers' operating conditions, increasing their lifespan;
- Recognize in advance sign of failures of the blowers;
- Suggest predictive fine – tuning to minimize electric consumption

At the highest production, the customer noted a decrease of quicklime quality and an unexpected increase of the energy consumption. MOSAICO has notified a discrepancy between the theoretical and real amount of air supplied by tri – lobe positive displacement blower and consequently the oxygen available for the combustion was lower than the necessary.

To balance the gap, the blowers increased their speed, increasing also the electrical consumption.

The customer needed a tool, in the hands of the plant manager, that helps him to prevent or quickly identify this phenomenon, to minimize product quality losses and take corrective actions in the shortest possible time.



## THE SOLUTION

QualiCal developed AERO™ App dedicated to optimize process air supply, minimizing blowers' electrical consumption, noise and maximizing their efficiency. AERO™, collecting these information, helps the customer to increase availability, reliability and efficiency of the major “energy – demanding” equipment of the kiln.

AERO™ manages in real-time the process air supplied with positive displacement blowers, taking automatic decisions on blower selection and speed settings, looking to the process requirement, plant conditions, environmental limits and historical data series on performance and maintenance.

Monitoring the power usage of electric motors, AERO reduces a plant’s overall operational cost by providing performance outcomes and allows qualified technicians to perform safe and effectively any electric maintenance activity.

Based on the analytics, it suggests also the optimal set of process parameters, calculated with advanced algorithms based on large volume of data collected in the QualiLog, a dedicated database.

- AERO™ Workflow

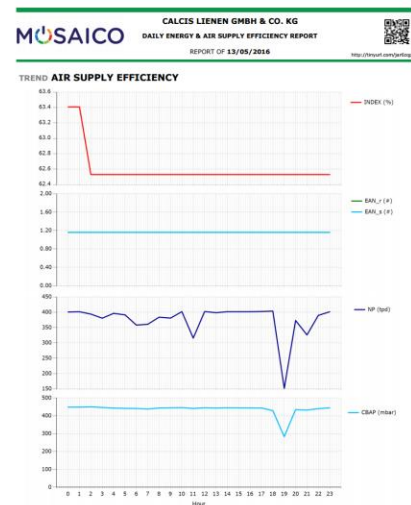
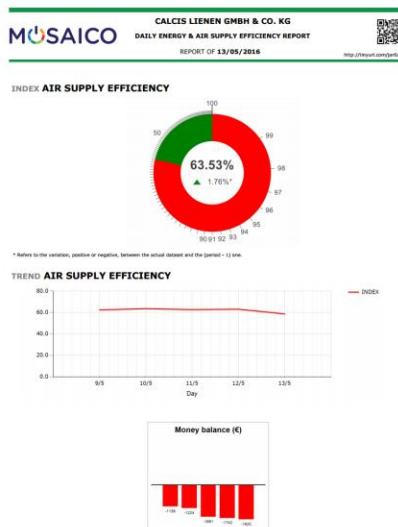
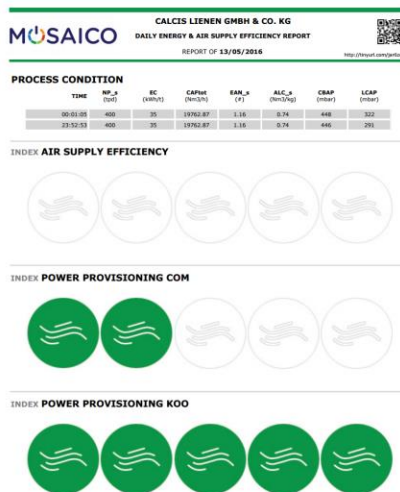
AERO™ interconnect into the cloud plant’s blowers, which supply the process air to the kiln, and in general the whole electric consumption information transmitted from equipment installed in the plant.



Thanks to tailor made algorithms or intelligent sensors, the customer receives a notification which is the spark to set off deeper studies to translate a brief notification in the practical problem in the plant.

In this way, the customer is directed straight to the point and able to act in advance preventing failures, increase blowers’ lifetime or simply improve asset efficiency.

AERO™ collects and analyzes information, distributing them to the customer with MOSAICO App and with an advanced reporting system on daily, weekly, monthly or on demand basis.



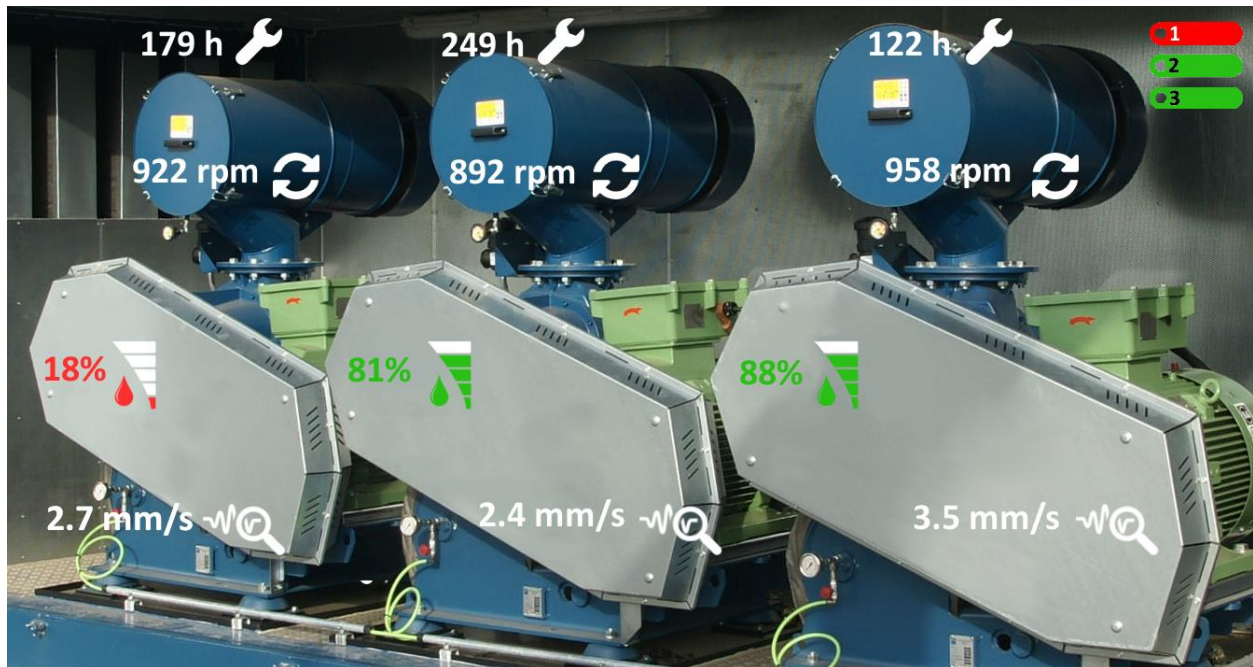
\* GREEN Histogram refers to gain of the specified amount and RED area refers to loss of the specified amount.

## RESULTS

Confirming the very good relationship with Calcis Group, QualiCal has performed several tests, cross – matching the information collected by AERO™ and from the plant, in order to maximize the efficiency of the process air supply and its impact on the electric consumption.

Together has been detected that the main reason is the high counter pressure of the kiln at the highest production, because of the fine raw material supplied into the kiln. Consequently, part of the air was discharged by the safety valve installed at blower output.

After a more careful screening of raw material supplied, removing the fine material, and increasing the release pressure of the safety valve the air supply efficiency, in one week, is improved from 63% to 92%, saving up to 450€ every day reducing the waste of electrical consumption.



One of the most important achievement is the maintenance evolution, replacing scheduled maintenance with just-in-time, predictive maintenance to prevent unplanned outages, assisted by an automated system, which capture data from the machines.

Moreover analyzing how such critical equipment interact with each other and with the whole industrial assets, we could build a digital twin for each blower and use it as base to design the most efficient blower settings and then keep optimizing the whole thing.

## ABOUT QUALICAL

1996-2016 – 20th anniversary

Since 20 years QualiCal is working in the LIME MARKET:

QualiCal identified the PFR, Parallel Flow Regenerative technology, as the best for the CALCINATION in vertical lime kilns and for this reason we implemented this technology in the very original design of the Synthesis® TWIN SHAFT LIME KILN.

At the same time QualiCal developed an unique and original design, providing plug & play QualiCUBE MODULAR solutions for quicklime hydration, hydrated lime classification and grinding and lime sizing.



*Ing. GianMario Cella – QualiCal Founder & President*

All the results we obtained has been achieved in the direction of the #neverstopINNOVATING R&D Corporate vision, allowing QualiCal to secure 43 active LIME KILN PROJECTs in Europe, Asia, Africa, North America

Actually 28 Synthesis® Kiln worldwide in operation from the smallest Synthesis®\_40 with a capacity from 100tpd to the biggest Synthesis®\_145 with a capacity till 800tpd.

Leader must drive the change! So QualiCal disrupts itself to leverage the promise of the industrial internet, and lead the #neverstopINNOVATING vision in the lime domain

We believe in the competitive advantages of being – the other side of the lime promoting and sharing the culture of the digital lime experience, rewarding the value of people and the value of the analytics,

We believe in the culture of innovation, driving innovation, encouraging innovation, rewarding innovation and expecting innovation

This is QualiCal: a fantastic industrial company that also a digital company!

## ABOUT THE INDUSTRIAL INTERNET CONSORTIUM

**QUALICAL** has been a member of the Industrial Internet Consortium (IIC) since **November 2014**. The Industrial Internet Consortium is a global public-private organization of over 200 members, formed to accelerate the development, adoption and wide-spread use of interconnected machines and devices, intelligent analytics, and people at work. Founded by AT&T, Cisco, General Electric, IBM and Intel in March 2014, the Industrial Internet Consortium catalyzes and coordinates the priorities and enabling technologies of the Industrial Internet. Visit [www.iiconsortium.org](http://www.iiconsortium.org).