

# Cement Production Optimization

Advanced Process Control to improve cement production economics

In today's economic environment, capital budgets and overhead are constantly being cut. Cement companies are faced with rising manufacturing costs, global competition, and increasing pressure to produce more with less energy and fewer emissions. To meet these challenges, manufacturers are forced to optimize operations and make performance improvements that will positively affect their bottom line and sustainability footprint.

A new solution from Schneider Electric™ to optimize kiln, cooler, and mill operation significantly improves production processes and is engineered for enhanced usability.



# Cement Production Optimization

## Features



### Maximize Your Profits

The kiln and mill optimization solution from Schneider Electric, which is based on Model Predictive Control, is comprehensive, advanced process control software that improves cement and minerals process profitability by enhancing quality, increasing throughput, and reducing energy usage. It uses modern, state-of-the-art technology to provide automatic control systems that are capable of releasing its full process potential.

Predictive control moves the process closer to its active constraints — resulting in reduced process variability and increased profits.

Schneider Electric provides unique strategic solutions based on improving economics, process operation, and energy use. Schneider Electric teams with its clients to reduce costs, streamline operations, increase sustainability and, ultimately, shareholder value.



### Process Control and Optimization

The kiln and mill optimization solution from Schneider Electric connects directly to a wide variety of automation systems and uses both real-time and historical data to analyze, identify, and model the significant cause-and-effect relationships in a cement process. Identification and verification of these relationships provide powerful analytical tools that give production engineers valuable insight into process behavior and an understanding of process characteristics.

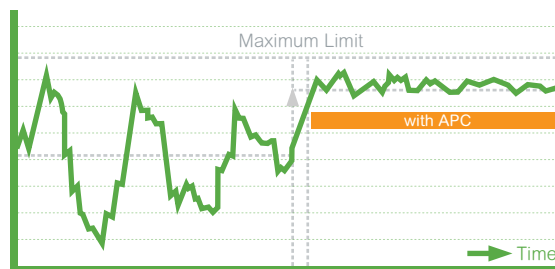
### Maximizing Economic Performance

The kiln and mill optimization solution:

- moves the process closer to multiple operating constraints and maximum profitability
- leads to improvements in process efficiency, reduced energy use, and increased output
- reduces the standard deviation of key product qualities and parameters, resulting in a more stable process
- delivers faster, more stable grade changes with virtually no overshoot

### Reducing Variability for Quality Control

The kiln and mill optimization solution simultaneously controls a number of process parameters, such as fan speed, kiln feed, cooler grade speed, etc., to maintain the product within specifications. Taking multiple process dynamics, interactions, constraints, and economics into account, the solution predicts future process behavior and makes adjustments before product measurements fall out of specification.



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## Features (continued)

### Immediate Quality Improvements Lead to Economic Benefits

Implementing the kiln and mill optimization solution from Schneider Electric will result in immediate quality improvements. This is confirmed by a significant reduction in the standard deviation from the target specifications of key product parameters, which leads to increases in throughput and significant reductions in material and/or energy consumption. The end result is measurable economic performance improvement.

### Increase Your Throughput

The optimization solution also allows the process to be driven closer to active constraints and provides a more stable overall process with fewer disruptions and less downtime, which will contribute to higher process yields. Typical increases range from 1 – 5%, however, some applications have increased yields of even more.

### Integrated Design Environment

- Identifies and quantifies integral cause-and-effect relationships, offering insight into process characteristics
- Incorporates a dynamic process model to provide tighter quality control
- Enables real-time, adaptive control to manage changing process conditions online
- Operates within physical constraints
- Maximizes process economic performance

### Improve Your Economic Performance

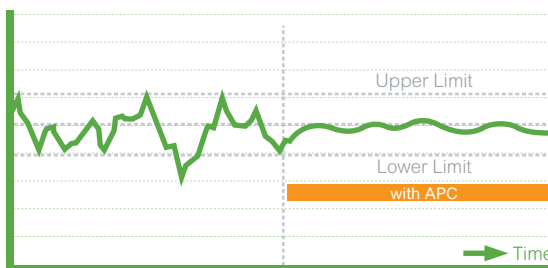
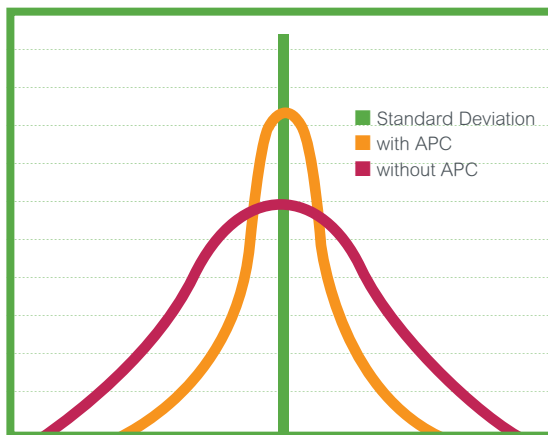
The kiln and mill optimization solution from Schneider Electric also delivers significant savings through optimized energy use. For example, by reducing the standard deviation and moving the process closer to constraints, pyro processes will experience a significant reduction in energy usage per unit of feed and facilitate the use of alternative fuels.

The solution anticipates the consequences of disturbances and control actions to maintain a superior quality product.

### A More Stable Process for Fast ROI

With fewer disruptions and increased process utilization, every installation of the kiln and mill optimization solution delivers a fast and quantifiable ROI.

- Reduce standard deviation by up to 30%
- Increase throughput by up to 5%
- Increase process yields 2 – 10%
- Reduce specific energy consumption up to 10%
- Reduce waste and energy related emissions



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## Features (continued)

### Optimize Your Process

The kiln and mill optimization solution from Schneider Electric manages process constraints, such as absolute limits on valve motion and rate-of-change limits on process variables, through state-of-the-art features, such as quadratic programming.

A linear programming technique, together with a steady-state model and an economic performance objective function, enables the identification of the optimum operating point based on maximum throughput, minimum energy consumption, or a balance between these and other performance objectives.

It easily integrates with DCS- and PLC-based control systems and plant information system databases from all major suppliers. The system is also compliant with the latest industry standards for data connectivity, such as OPC, allowing direct and efficient access to process data.

### Industry Expertise

Significant cost and profit improvements from using the kiln and optimization solution from Schneider Electric have been proven in the cement and minerals industries. Our global team of highly experienced engineers can work with your team to quickly realize significant improvements in your bottom line.

### Performance Teaming

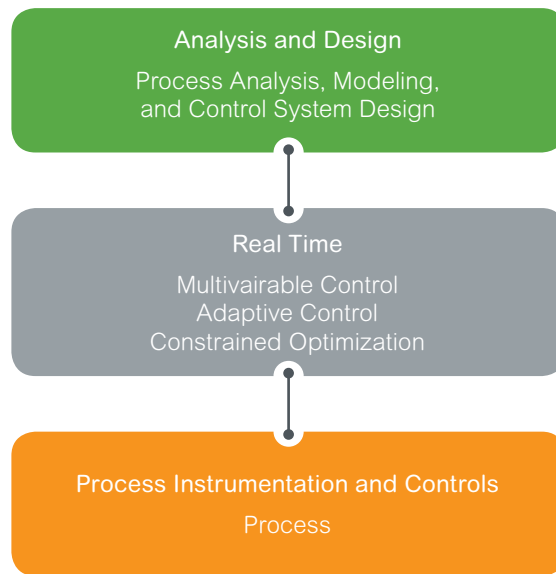
To be certain that a solution is running at peak performance, Schneider Electric works with its clients to improve control schemes as process needs evolve. Through advanced modeling and simulation, continuous process and equipment performance improvements are realized time and again.

### Training and Support

Schneider Electric provides an unbeatable combination of high-level technical and cement manufacturing expertise for optimizing cement plant performance. A complete training, support, and teaming system is available on the beneficial use and application of automation and optimization solutions.

### Performance Monitoring and Support

Besides providing personalized on-site assistance to operators/engineers, Schneider Electric can establish automatic remote monitoring of a process, accompanied by individual telephone, online, and/or email support.



As the global specialist in energy management with operations in more than 100 countries, Schneider Electric offers integrated solutions in energy and infrastructure, industrial processes, building automation, and data centers/networks, as well as a broad presence in residential applications. Schneider Electric is dedicated to making individuals' and organizations' energy safe, reliable, efficient, productive, and green from Power Plant to Plug™.