Realize faster time-to-value benefits, lower life-cycle costs and a higher lifetime return on investment

**Benefits:**
- Reduce blend variability
- Reduce blend costs
- Improve resource usage
- Improve contractual performance
- Improve downstream and end-user performance
- Improve process performance

**Rockwell Software Solutions**
Our solutions leverage Rockwell Automation’s 100+ years of CMM innovation, experience and global support. Industry best practices are incorporated into every application, which is built upon a composite application framework that leverages a Service Oriented Architecture (SOA). This scalable solution, when combined with library-based content, offers personalization options that promote faster user adoption and time-to-value.

**The Challenges**
Companies face increasingly competitive demands for quality products. At the same time, a challenge exists to reduce input costs and reconcile operational demands with environmental impact and sustainability objectives. The need for increased flexibility to market demands introduces even greater levels of operational complexity.

From an economic perspective, blending high mass flow and multiple raw materials to simultaneous quality targets is required to promote effective downstream processing. Late stage adjustments with expensive materials need to be avoided, even when high frequency online sampling is not available. Since mined materials are variable in nature, a robust solution that deals effectively with these incoming disturbances is required.

Rockwell Software recognizes these challenges and offers an application focused on delivering valuable material blending information to improve performance and economic value.
This Rockwell Software Model Predictive Control (MPC) Application for the cement industry provides control and optimization of the blending process through patented, industry-leading technology.

**Monitor and Control**
Real-time visibility of blending metrics improves downstream performance for the facility and end-user. Preventive or corrective measures are provided to reduce variability and inefficiencies.

Using library-based content, this application can be easily configured to meet individual and specific operational objectives. Multiple process parameters are predicted and controlled in real-time. When combined with an online analyzer, this application acts at very high frequency for efficient and accurate calculation of feeder setpoints. It also internally predicts a combination of blend quality parameters. Control actions are updated continuously based on actual feed rates and material analyses, while plant and material usage constraints are taken into account. Implementations without an online analyzer require the use of a sampling schedule for measurement feedback to the blend control.

This application includes a unique ability to run virtual blend designs for validation of raw mix recipes and plant constraints in both input and output prediction modes for improved accuracy and flexibility in blend design. It also streamlines the evaluation of additional raw materials streams, while the online solution improves the blend quality with multiple feed materials in real-time.

**Performance and Energy Usage**
Real-time performance management is included in this application. Consistent performance awareness, process evaluation and predictive decision support is provided, thereby reducing the time to corrective and predictive actions. The material blending process creates a consistent material stream that, when sent to downstream processing, promotes a more stable operational environment and reduced energy usage.

**Optimization**
This application provides control performance by minimizing the disturbance effects from material variations and feed interruptions. Real-time optimization is achieved for stockpile and process feedstock blending by including chemical analyses, cost information and plant constraints for the feed materials.

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**Material Blending – Cement Raw Mix Application**

Provides real-time control and optimization of the process to improve efficiencies and reduce costs.