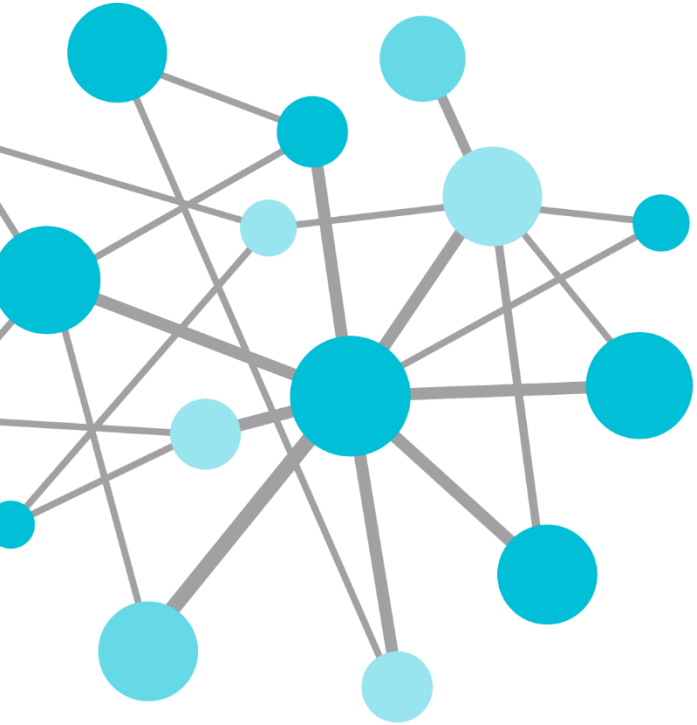
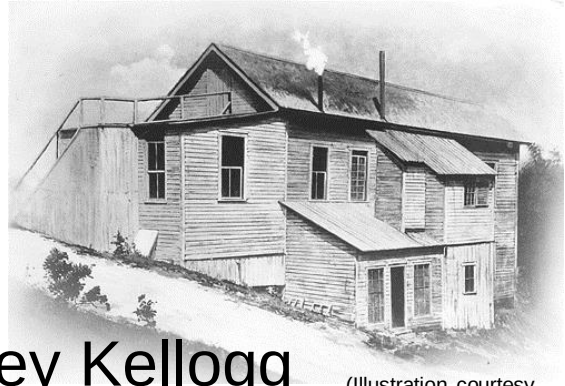


At Kellogg, Savings are in the Air!

Presented by

Michael Thomas
Controls Engineer
Kellogg Company, Lancaster PA

Kellogg Company



(Illustration courtesy of Kellogg Company Timeline)

- Kellogg Company History
  - 1894, W.K. Kellogg and Dr. John Harvey Kellogg discover flaked cereal
  - 1906, Kellogg Company started in Battle Creek, MI as the “Battle Creek Toasted Corn Flake Company”
  - 1907, Original Bartlett Street plant burns down
  - Today, Production facilities in 18 countries with product distributed to more that 180 countries
  - Other product include Kashi, Keebler and Pringles

Kellogg Company Lancaster, PA

- Kellogg Company, Lancaster History
  - 1976, Kellogg's builds state of the art manufacturing facility in Lancaster, PA
  - Products include:

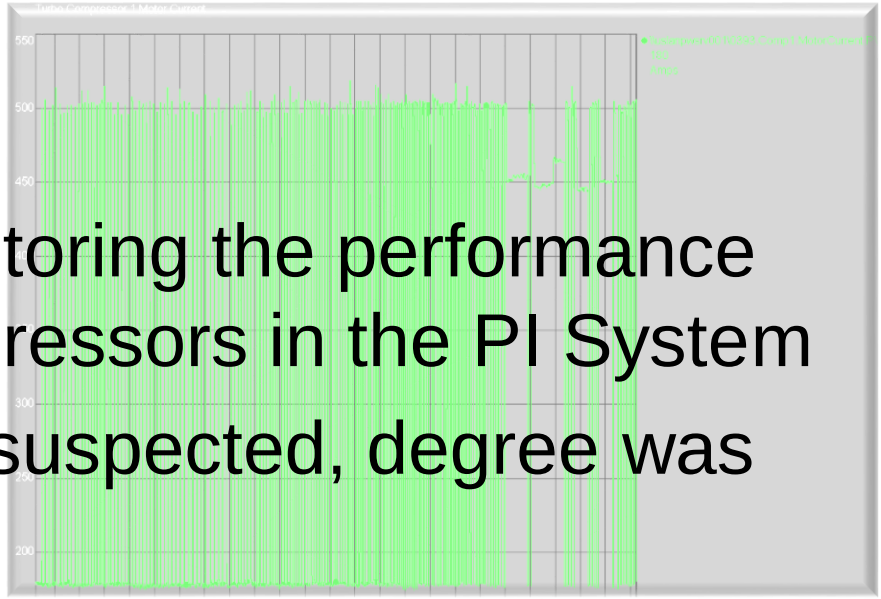
Kellogg Company Lancaster, PA

- Kellogg, Lancaster Plant PI System
  - Single PI Server
  - Single Interface Node
  - Current tag count: ~10,500 tags
  - PI System:
    - PI Server, PI ProcessBook, PI DataLink, PI Asset Framework, PI Interface for RSLinx, PI SQC

Michael Thomas, Controls Engineer

- Electrical Controls Engineer, 23 years
- 17 years at the Kellogg Company
- PI System administrator, 15 years
- vCampus member
- Aspiring
  self-proclaimed
  “Rock Star”

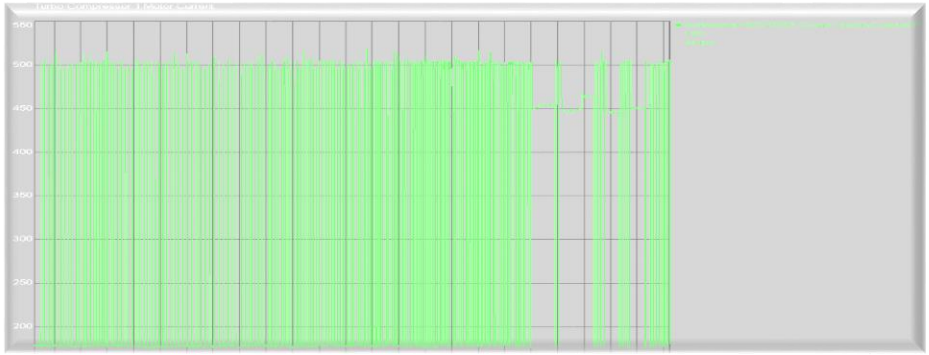
Project History



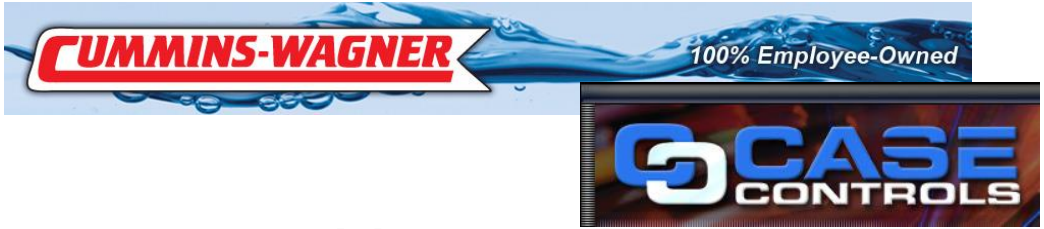
- In 2005, we began monitoring the performance of 4 centrifugal air compressors in the PI System
- Inefficient performance suspected, degree was unknown
- After reviewing historical data and performing some crude calculations, it appeared to be well over 1M kWh/year of waste

Project History

- We began implementing internal strategies to minimize wasteful compressed air consumption
- Although our conservation efforts proved valuable, it did not return the results that we knew were available

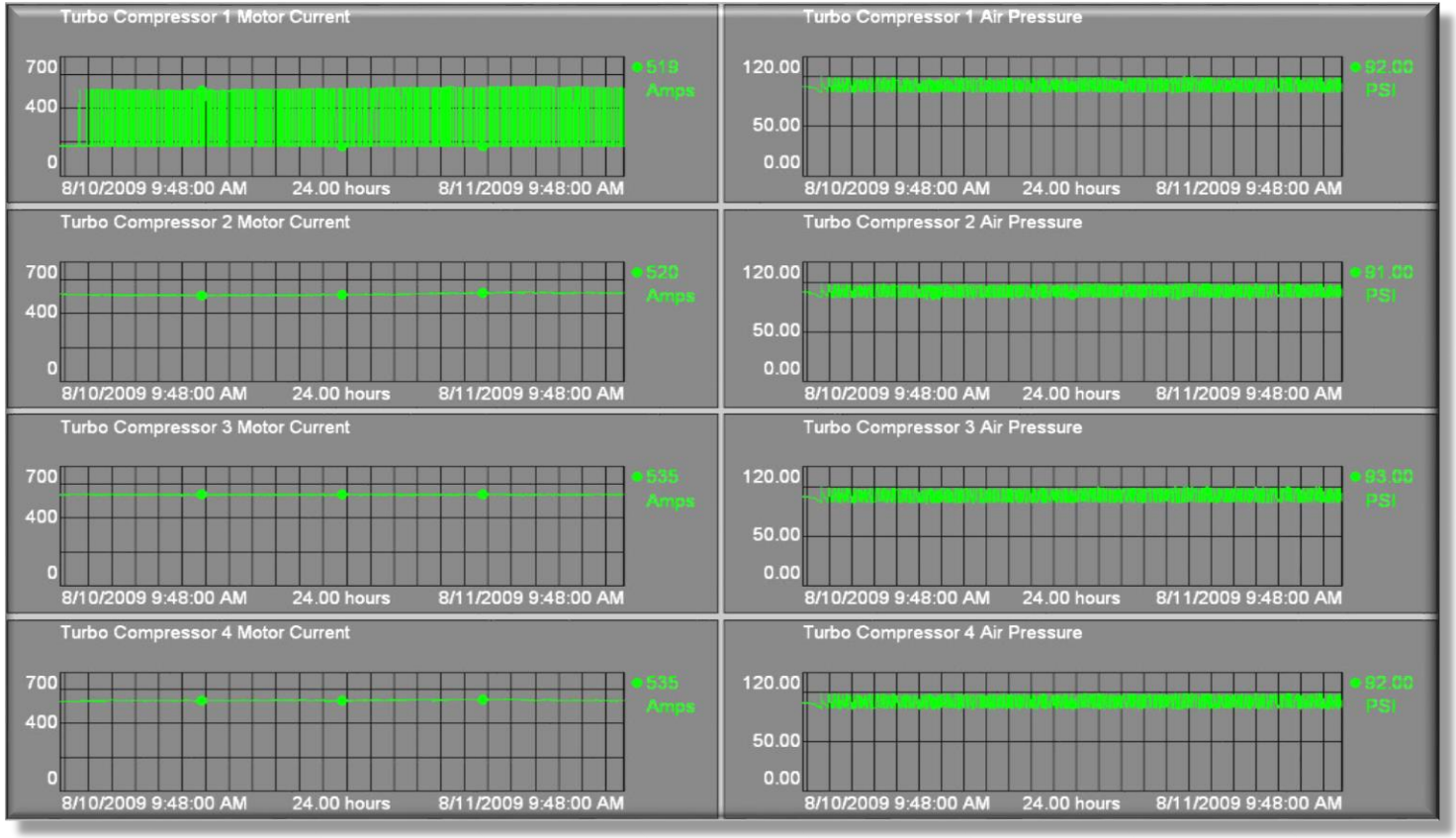


Project History

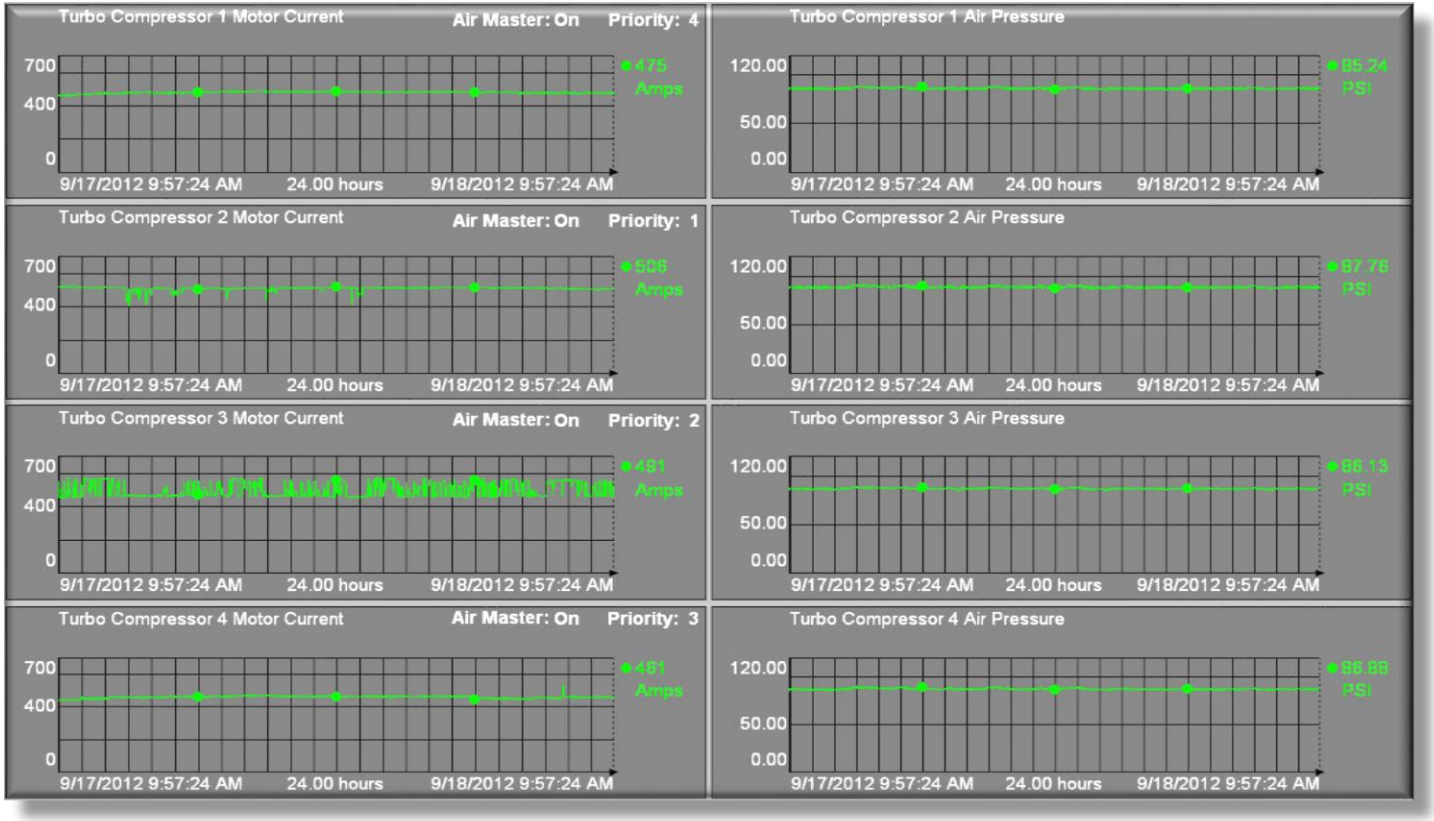


- The data drove us to start looking for better compressor control technologies
- In 2009 we were introduced to “Case Engineering, Inc.” through our local service company, Cummins-Wagner Co., Inc, specializing in air compressor controls
- A new control system was implemented in early 2010 and the savings was immediate

Compressor Performance Pre-Upgrade…

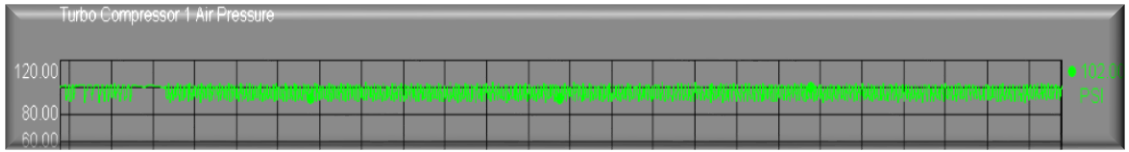


Following the control upgrade…

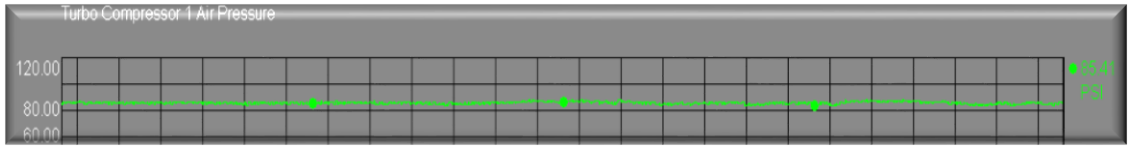


But Wait... THERE'S MORE!

BEFORE

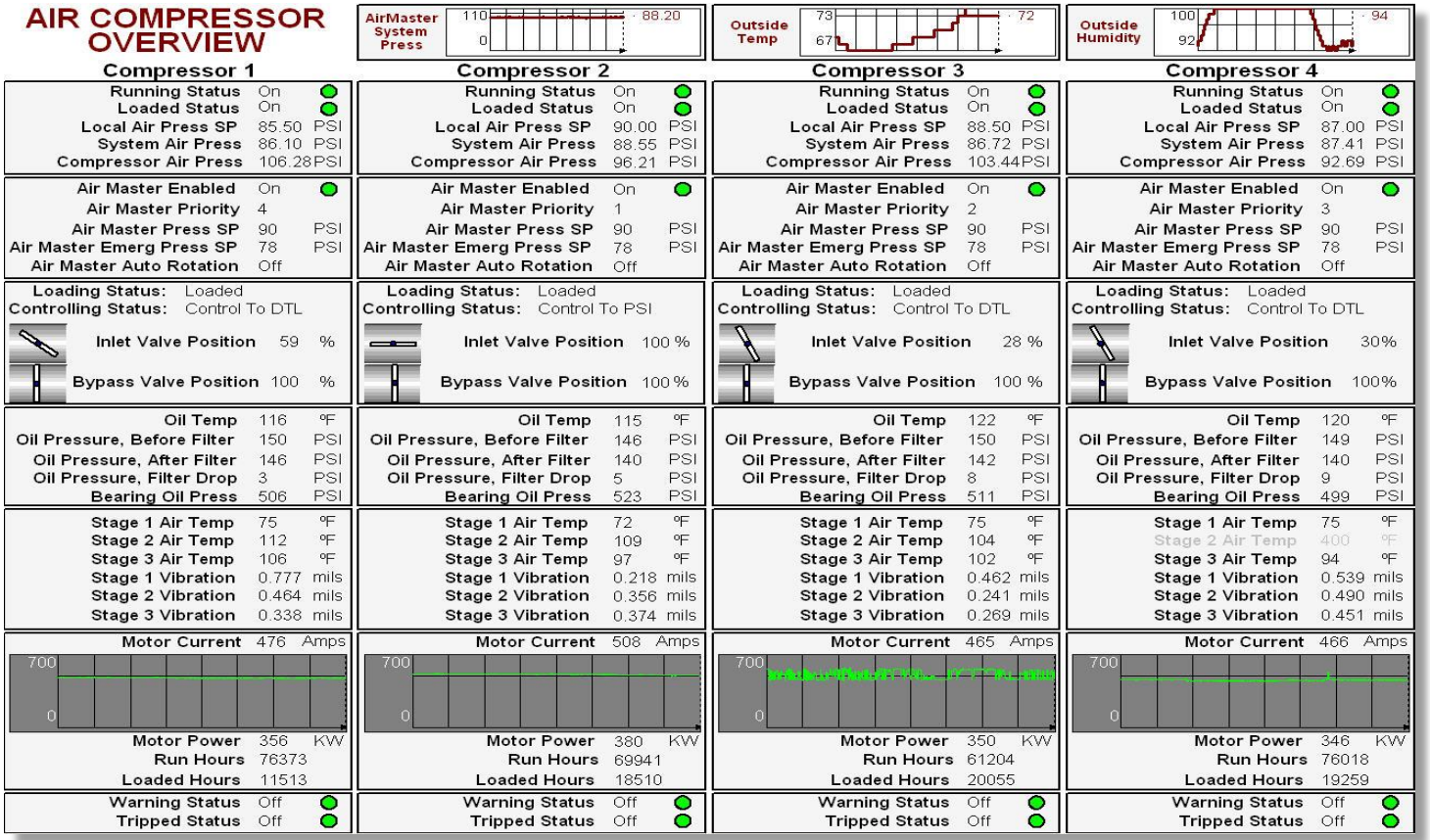


AFTER



"…the story gets even better"

Additional room for improvement…



Additional room for improvement…

- The project success to this point was great but a closer look at the data showed there was room for improvement
- Compressor performance efficiency increased significantly on cold days but flow was restricted due to lack of output from our 500 HP motors

More room for improvement…

- In conjunction with Cummins-Wagner Co., Inc performance benefits of implementing 600 HP premium efficiency motors was evaluated, the potential was solid and the project moved forward
- This phase of the project was completed in early 2011

PPL Customer incentive program...

- During the motor upgrade design, we were made aware of customer incentives being provided through our local electric provider.
- We met with representatives of PPL and a third party auditor hired to analyze the systems.

PPL Electric Utilities

PPL Customer incentive program…

- Auditors were shocked to say the least, they have never visited a company that had so much retrievable quality data.
- Based on amount of quality reliable data collected over the life of this project, PPL agreed to take into account all data including the Control System upgrade in 2010 resulting in a larger Customer Incentive Program payout of $265k.

PPL Customer incentive program...

Left to Right:

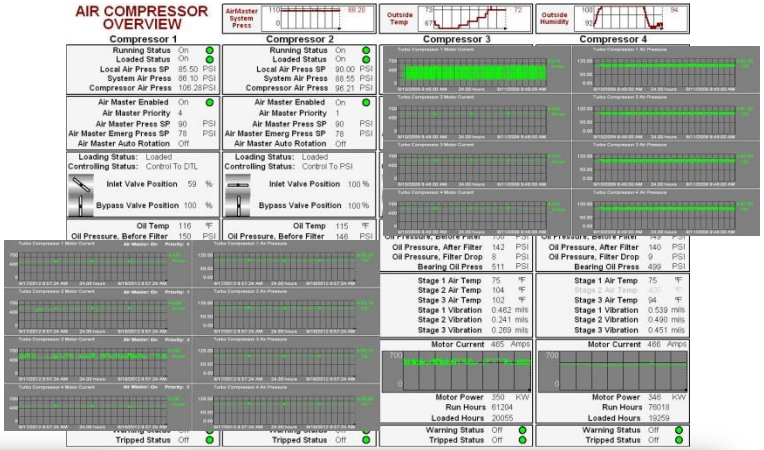
Michael Thomas
Kellogg Company
Controls Engineer

Scott Reilly
PPL Electric Utility
Key Accounts Manager

Timothy Fritz
Kellogg Company
Senior Manager, Engineering

At Kellogg, Savings are in the Air!

- “It was a great day to have the PI System”
- Michael Thomas – Controls Engineer – Lancaster, PA



Customer Business Challenge

- Corporate initiative to decrease carbon foot print.
- Site Goal: Conservation, optimization of resources, and cost control.

Solution

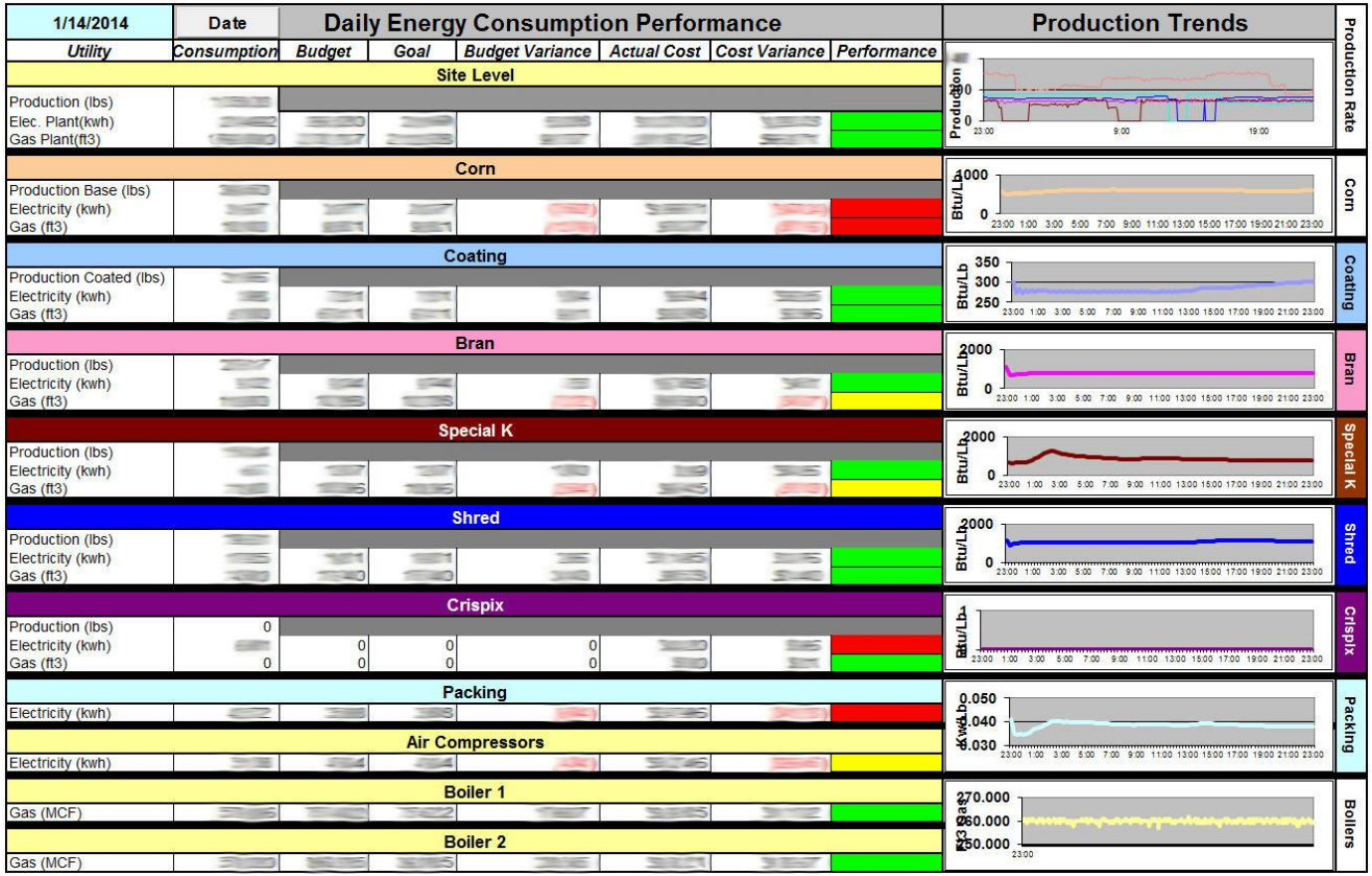
- Implemented Air Conservation program.
- Implemented Air compressor control technology upgrade.
- Leveraged the PPL customer incentive program.

Customer Results / Benefits

- **Final result was an energy reduction of over 2.5M kWh/year and a one time Customer Incentive payback of $265k.**

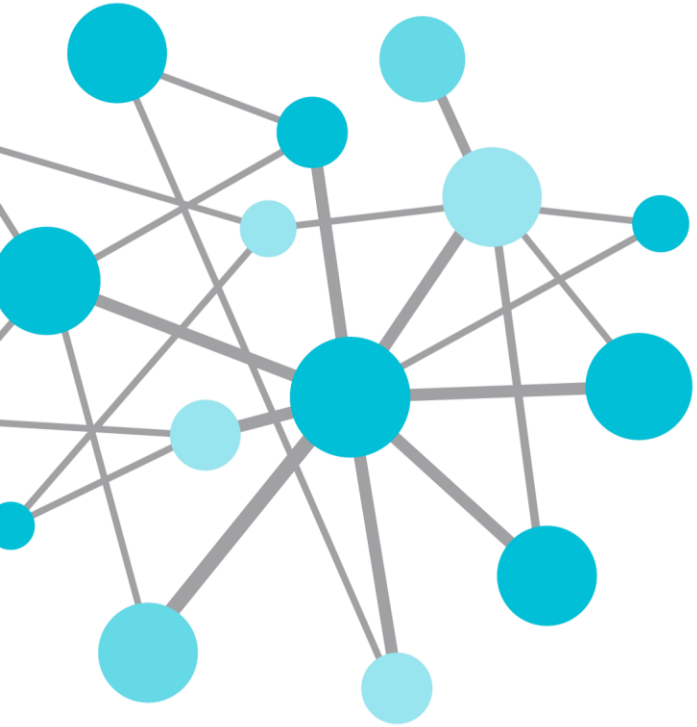
Energy Performance Management

- Daily Real-Time Visibility into Energy Conversion Performance
- Energy Consumption Based on Actual Production Performance
- Simple KPI's for Rapid Line Supervisor Response Time
- Converted Units to Actual Cost Provides Recognizable Impact on Plant Bottom Line Costs



Michael Thomas

- michael.thomas@kellogg.com
- Controls Engineer
- Kellogg Company



THANK YOU

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