

Demand Management System Pays Back Investment in Six Months



High quality steel bar producer Republic Technologies International (RTI) recovered the installed cost of their new demand management system in under 6 months and projects ongoing cost savings upwards of \$70,000 monthly, plus additional productivity enhancements.

Problem Definition

RTI operates a facility in Canton, Ohio. Electric power costs of \$2.7 million per month make up a significant share of operating expenses. RTI's contract with



furnace loads to control power demand. The system totalizes electric meter pulses, and projects demand within the 30 minute fixed demand interval. Furnace operators select priorities to

determine the system's actions based on the demand forecast.

The new system replaced an unreliable, obsolete system with known Y2K issues and an overly conservative demand control algorithm that adversely impacted melt shop productivity.

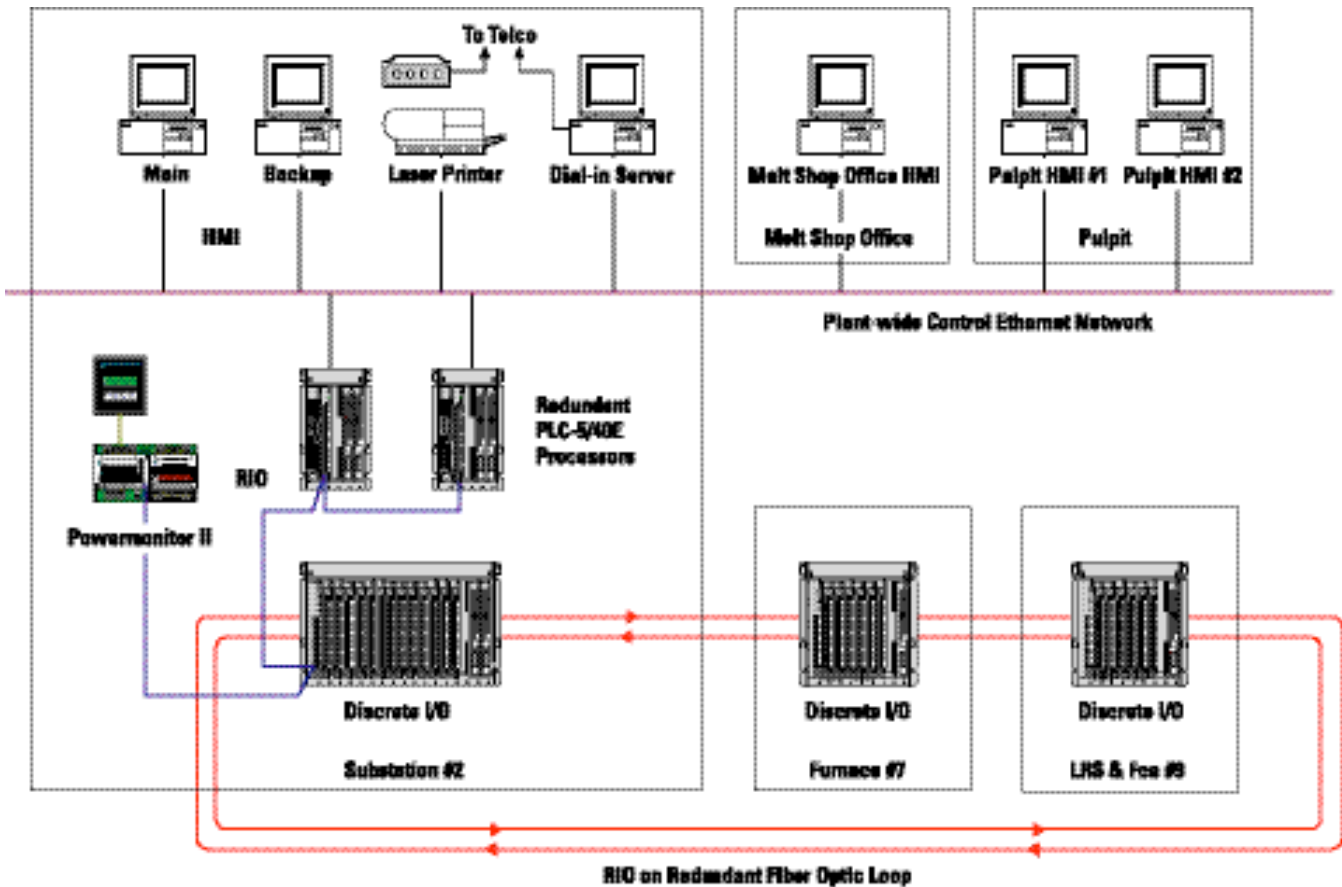
their electric power provider includes a demand limit, above which the price of power significantly rises. A curtailment clause gives the utility the option to mandate immediate reduction of load to base levels.

The solution provided by Rockwell Automation inhibits or sheds electric

Control Solution

The solution engineered by Rockwell Automation utilizes a redundant pair of PLC-5™ processors with backup communications modules, tied to the existing control Ethernet® network. Remote I/O panels at the three furnaces use a redundant fiber optic loop to communicate with the PLC-5/40E processors. A Powermonitor II on the plant mains provides additional power quality data.

The new demand management system was required to integrate with a new control system on Furnace #9. The new system was commissioned in parallel



with the existing system until Republic personnel were comfortable switching to the new system.

The new system provides four dedicated operator HMI stations, including one main and one backup workstation, and a dial-in server in the #2 substation. Another dedicated HMI terminal is installed in the Melter's office, and an integrated overview screen was added into the pulpit HMI workstations.

System Functionality

Demand Control – The system regulates plant energy consumption to preset limits, calculating energy projections every five seconds at the plant mains and the three furnaces.

The algorithm is highly accurate, permitting the system to delay shedding furnaces as long as possible. The system also predicts when the next furnace will be shed.

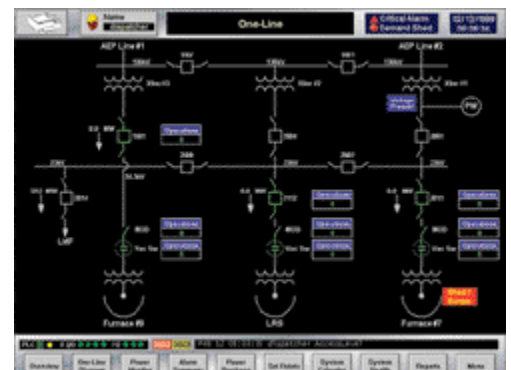
Automatic Setpoint Adjustment

Operators classify each quarter hour of the day as "Super Peak," "On Peak," "Intermediate Peak," or "Off Peak" for working & non-working days. The operator enters contract, shed & restore level setpoints, and the system automatically manages setpoints based on utility status, day of week and time of day.

Manage Power Purchases

The system handles curtailment dictated by the utility, and also includes features that

allow it to dynamically respond to real time spot power purchases. Operator screens are designed to assist operators in managing purchases of power at spot market prices on an hour by hour basis. The demand management system has been designed with "hooks" for direct future interface with the utility.



Voltage and Power Monitoring – A Powermonitor II is used to provide valuable real-time power quality data. Besides voltage and current, MW, MVAR, MVA and power factor, the PMII tracks and triggers alarms on transient voltage excursions that are hard to pinpoint with a chart recorder. The power monitor provides detailed power quality information, such as voltage harmonic distortion.

Alarm Paging – The system provides four levels of alarms. Certain critical alarms trigger an automatic page message.



Other critical, non-critical, and informational alarms are not paged, but all alarms appear in the alarm summary and are logged. A number of alarms are associated with the utility's meter and demand interval pulses.

Energy & Delay Reporting – The system produces a variety of tabular and graphical reports, including daily reports, and weekly and monthly summaries of demand, delays and energy usage.

Planned Enhancements

RTI plans to implement a direct communication interface with the serving utility. When this extension is in place, the utility will download their system status and market prices. The demand management system will use this information to automate the purchase



decision. The system will then upload purchase quantities to the utility.

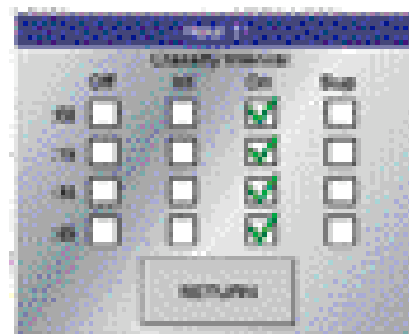
RTI also plans to add power monitors on other critical circuits, as well as automated reactive power (VAR) and load tap changer (LTC) control.

Measurable Benefits

RTI's new Power and Energy Management System dramatically reduces power and energy costs, providing fast payback and continued savings into the future.

The total installed cost of \$300k was recovered in less than 6 months. The system reduced substation personnel from five to one, saving nearly \$176,000 annually.

RTI's new system increased production by reducing furnace delay by 78% per heat, and improved voltage regulation and power factor. The system reduced voltage sags by better utilizing existing capacitor banks, and improved energy utilization through tighter control. RTI anticipates saving an additional \$70,000 per month by reducing their contracted demand level.



Rockwell Automation Solution Delivery Capabilities

For the RTI project, Rockwell Automation supplied a complete, turnkey system including the following services:

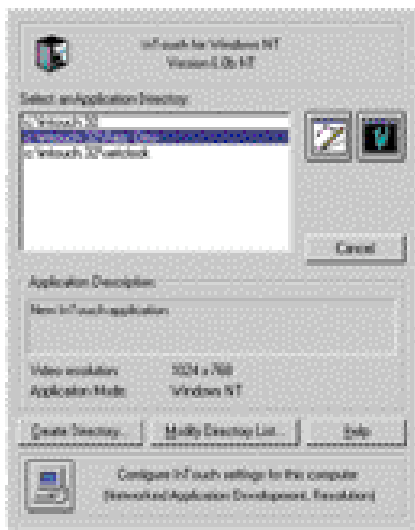
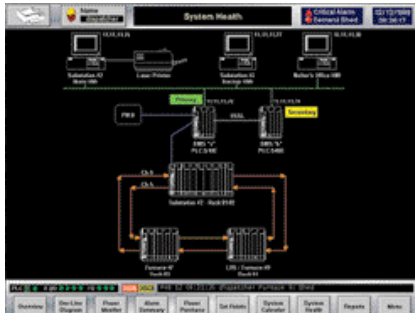
- Functional specification development
- Software and hardware engineering
- Design and drafting
- PLC® programming and HMI configuration
- Factory acceptance testing
- Preparation of final documentation set
- Consultation on energy saving enhancements

A Complete Portfolio

With Rockwell Automation Power & Energy Management Solutions (PEMS) you gain access to a complete portfolio of systems, products, communications and applications from your Complete Automation leader.

Systems

PEMS offers turnkey-engineered energy systems configured to your



company's specific needs. These systems leverage Rockwell Automation's 30 years of experience developing engineered systems, and provide you with a single point of contact, making your system easy to implement and maintain.

Products

We offer a full line of power monitoring hardware to fit your application, network, and budget needs. Combined with Allen-Bradley's controllers, I/O, MCCs, and drives, our powermonitors enable you to take the next step in energy management monitoring and control. Our specialty modules, designed exclusively for the power industry, provide unique and exclusive functionality to help you manage your energy.

Software

PEMS software is available for simple and complex systems. PEMS software helps you configure our power monitors and access energy data in real time. Our software also enables you to capture, analyze, store, and share energy data across your entire enterprise through standard web browsers. This makes it easy for you to acquire and distribute the

knowledge you need to optimize energy consumption and improve productivity while lowering energy costs.

Communications

Using data effectively means having it at your fingertips. We realize that moving the data to where it is needed across your plant is just as important as making the measurement. Fortunately, our power monitors offer a variety of communication options to PCs, PLCs, and other operator interface and control devices.

Applications

Putting all the pieces together is the strength of PEMS. Our applications focus on saving you money by enabling you to renegotiate your rates, prevent costly power quality problems, identify and correct power delivery issues, and control demand to avoid penalties.

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