

Energy Management for Small Businesses

Overview

Facilities such as ATM kiosks, convenience stores, supermarkets, restaurants and small, industrial plants have saved up to 20% on energy costs through the installation of a T-BOX LT RTU.

Not only does a T-BOX LT automate equipment operation for energy savings, it keeps management informed, anytime, anywhere, via an alarm management system with multimedia messaging.

Using T-BOX LT, end-user businesses have also gained access to valuable, real-time and historical information regarding their operations and put it to use in continuous improvement programs.

T-BOX RTU products have been especially effective for chains, which are realizing savings across all their satellite operations through the installation of identical systems at all locations.

Key product features for energy management applications include the following:

- On-board Web server provides complete access to information with a standard browser and eliminates the need for expensive SCADA software licensing and configuration of HMI displays.
- The RTU uses push technology to immediately notify multiple recipients of alarm conditions, significant events, etc.; networking is greatly simplified because no polling is necessary.
- Use of inexpensive, public networks provides significant savings in communications costs.
- Software tools simplify configuration of control logic for equipment operation.
- Compact RTU installs and starts-up very quickly with minimum commissioning time.

Operations

Rising energy costs have made management of electricity and fuel consumption an urgent matter. T-BOX LT systems, which have recently been installed at ATM kiosks, convenience stores, supermarkets, restaurants, and industrial plants, have provided rapid pay-back as well as energy savings upwards of 20%.

Typically, a single, T-BOX LT supervises all equipment for baking, cooking, lighting, heating, and refrigeration. Following are best practices for monitoring and automation:

Opening and Closing Time Management

Annual electricity costs can be decreased by 15% to 20% through the management of start-up and shut-down times of equipment around business opening and closing hours. Much of the equipment, such as coolers for nonperishables, can be completely shut down before closing time and started soon before opening time. Lighting, even if on motion control, can be disabled during closing hours.

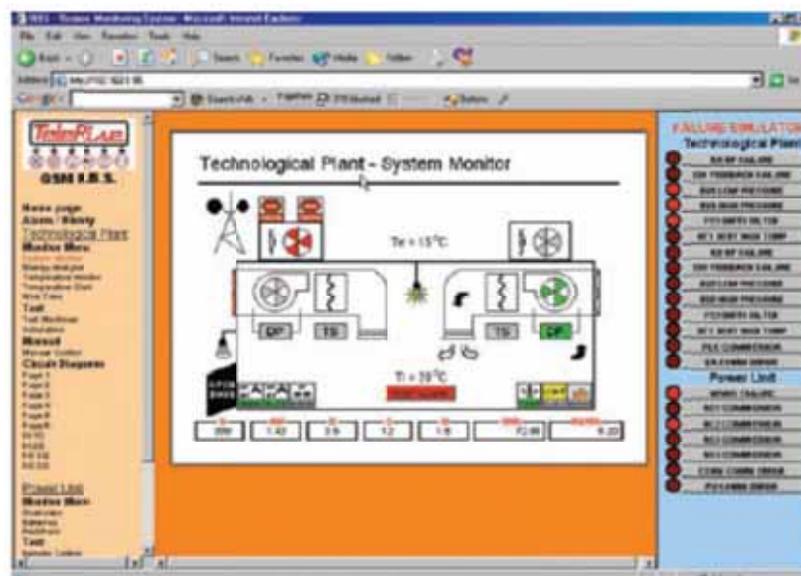
For equipment, which cannot be shut down during closing hours (e.g. refrigeration for perishable items), some businesses have found, given some labor, they could consolidate these items and allow the RTU to shut down unused equipment.

If the HVAC system is not controlled by a programmable thermostat, the T-BOX LT can pick-up that responsibility over all business hours and closing hours, including holidays. Using Semaphore's TWinSoft programming environment, the engineer can implement temperature controls, which are much more elaborate than those provided by a programmable thermostat.

Business Hour and Peak Time Management

During business hours, users can conserve energy through the intelligent capabilities of T-BOX LT. For example, with feedback on the lighting level in lumens as an input, the T-BOX LT can turn off selected banks of lights. Given the outdoor temperature as an input, the program can elect to operate ventilation louvers instead of running an air conditioner or furnace.

The dynamic trending and historical data logging capabilities of T-BOX have also allowed users to profile the energy use in equipment such as refrigerator cases and adjust controls to maximize efficiency. Users have further found that quality control has improved through trend monitoring and corresponding changes to operations. For example, refrigerators often require earlier starts or thermostat adjustments to prepare for peak activity.



For some users, simply monitoring their operations, without automation, has provided many benefits. Within the small space of an ATM kiosk, the ambient temperature is important to the comfort of visitors. A T-BOX LT can monitor the temperature, record historical trends, and initiate an alarm message if the temperature is beyond high or low limits. Using push technology, T-BOX can send messages to multiple recipients via e-mail, TCP/IP, or SMS text. Unacknowledged alarms will be escalated. Messages sent via e-mail and TCP/IP can include attached files, which provide live information, tabular data, or trend graphs.

For further monitoring at such locations, T-BOX LT has also interfaced with access controllers, door switches, hazardous gas detectors, motion detectors, smoke alarms, and video cameras. Transitions on signals from any of these devices could generate an alarm or event message. For those cases in which no message is necessary, T-BOX LT will record the occurrence in the historical log for future reference.

Monitoring and controls are also used for equipment efficiency and maintenance purposes. Operating time for equipment that provides an “on” or “running” contact can be accumulated in the historical log and used for runtime maintenance programs. T-BOX LT is often called upon to monitor the health of equipment, most often by using temperature inputs. The T-BOX LT will stop equipment that is running too hot, report that as an alarm and start alternate equipment, if available. For run-time maintenance, T-BOX LT also alternates operation of any equipment that is redundant.

Some sophisticated techniques from larger plants have been finding their way to smaller operations, even nonindustrials. Increased numbers of temperature inputs and technologies such as infrared sensing are being employed on some equipment in order to detect “hot spots” that a single measurement point would miss. Some applications are also using acoustic sensors or vibration sensors to detect malfunctions that temperature measurements would not reveal. Ultimately, the goal is to detect problems, sooner, to avoid expensive repairs, later. Again, the trending capabilities in T-BOX LT readily reveal operating deviations. Plus, there is still an energy savings component, too, as equipment that is operating in a deteriorated state will be less efficient.

Conclusion

Whether engineered by the end-user’s team or a third-party, systems integrator, energy management applications take full advantage of the features offered by Semaphore’s T-BOX LT:

- Integral Webserver – This feature provides significant savings vs. SCADA / HMI software, which could require multiple licenses. PC-based Web pages also provide all, local HMI operations when maintenance personnel visit the sites, thus saving the cost of a local display.
- Alarm management – The T-BOX alarm system detects and reports all alarm conditions using Push Technology. Alarm management ensures that un-acknowledged alarms will be escalated.

- Data logging – T-BOX data logging capability retains historical information, such as temperature profiles, in both tabular and trend graph formats and allows users to adapt operations for the highest efficiency. The trends can also reveal equipment maintenance issues.
- Push technology – End user operations personnel are immediately notified of alarms and important events without the need for polling the RTU.
- TWinSoft programming environment – A choice of programming via IEC 61131-3 LD (Ladder Diagram), Basic, or Microsoft Automation simplifies software development for the engineering team. TWinSoft makes it easy to download identical programs into multiple RTU's and also eases programming changes in order to allow for continuous improvement.
- I/O Complement – Providing a mix of I/O to 32 points in a single module makes for a very cost-effective system. To best match individual requirements such as discrete inputs, only, and multiple temperature zones, T-BOX LT is available in four configurations.

