Intelligent Control of Energy Use

Driving Energy Savings at Multiple Sites of a Leading Printing Press in South Asia

Background

One of the largest circulated daily newspapers in India had a requirement for monitoring the energy consumption at the operational level across their regionally distributed printing locations in the country.

Business Situation

The daily's corporate management sought to understand the usage, peak loading, and the frequency at which the consumption crossed the maximum allocated demand across their portfolio of sites. In addition, the company wanted to benchmark their presses' daily business activities – printing, Computer to Print (CTP), packing, and Air Handling Units (AHUs) - with the operating cycles (running hours) of the machines.

The eC4 system was implemented at three printing press sites with 24x7 energy monitoring and control capabilities, at the granularity of individual subsystems, from a single location at the daily's headquarters.

Solution

The eC4 application was installed in the daily's head office and was connected to the three sites via intranet using the eC4 hub (hardware). The hub was in turn connected to existing energy meters in the distribution panels at each location using standard MODBUS compatibility.

An illustration of the overall implementation architecture can be found in Figure 1 below.
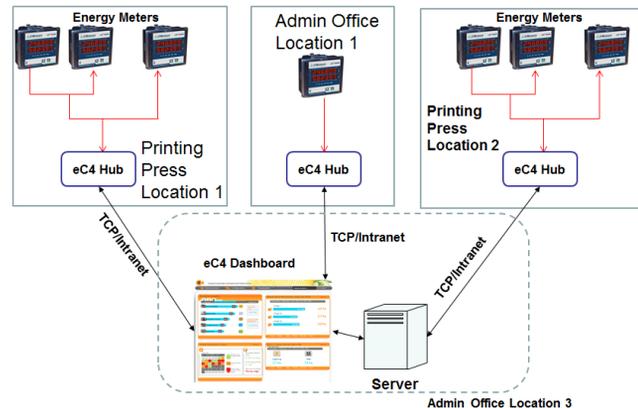

Fig. 1: eC4 architecture at the printing press

In addition to the monitoring the usage of the printing presses, eC4 also monitored consumption data from the sites' Air Handling Units (AHUs).

Analysis

At the three sites, eC4 abstracted the following equipment-level data from the energy meters:
- Hourly and Daily Printing Press consumption with Minimum, Maximum and Average consumption.
- Hourly and Daily consumption of the AHUs with Minimum, Maximum and Average consumption.
- AHU Running Hours Vs Printing Press Running Hours.
- Weekday-based consumption of AHUs & Printing Presses.
- Comparison of Operational Business As Usual (BAU) energy consumption with current week energy consumption for the AHUs. This allowed the users to quantify the wastages in a more realistic way in their own environment.

Findings

By analyzing the AHUs' daily consumption with their BAU consumption, eC4 identified that, at multiple instances the normal usage during a reporting period was in excess of the BAU consumption. It was therefore recommended to the organization that the 'Load Cycling' energy-saving strategy in eC4 be initiated to maintain a constant energy signature over the same period of usage to avoid excess consumption.

As a result, **15% of potential savings were identified**, and application of the 'Load Cycling' strategy to the AHUs allowed for the customer to **achieve actual savings of 10% from overall consumption**. A chart of the analysis is illustrated in Figure 2 below.
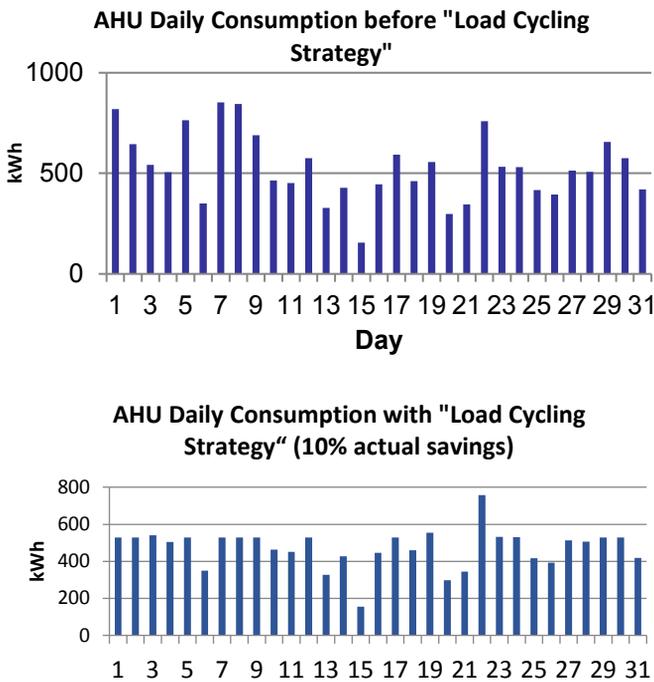
The hourly consumption analysis revealed that for certain days, the AHUs were left in operating mode for a certain duration which was outside the normal production hours and was causing unwanted usage of the equipment which went unnoticed by the plant operators.

Proactive visibility into the undesired usage was projected to management using eC4's software component with the collected historical information. The firm's Energy Manager tried out different strategies using eC4 to predict the potential saving and decided to apply the 'Load Shedding' strategy in eC4 during non-productive hours. The application resulted in **anticipated savings of 10%, with actual savings of 7% in the AHUs.** A chart of the strategy's effectiveness is shown in Figure 3 below.
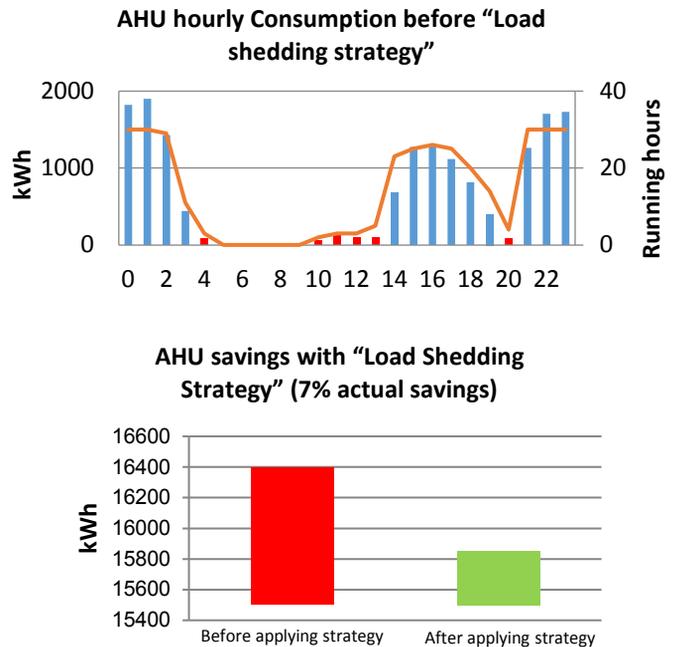
AHU Daily Consumption before "Load Cycling Strategy"

AHU hourly Consumption before "Load shedding strategy"

AHU Daily Consumption with "Load Cycling Strategy" (10% actual savings)

Figure 2: Driving energy savings in the AHUs using eC4's 'Load Cycling Strategy'

AHU savings with "Load Shedding Strategy" (7% actual savings)

Figure 3: Driving energy savings in the AHUs using eC4's 'Load Shedding Strategy'

About eC4

Energy costs constitute a high proportion of the overall operational costs of a facility. It is critical to understand the extent and the sources of energy "leaks" and take steps to minimize them. These leaks occur all the time due to operational inefficiencies, equipment inefficiencies and process inefficiencies. eC4 identifies such leaks in large facilities by connecting non-intrusively to different pieces of critical equipment or meters in a facility, eC4 "looks for" opportunistic reduction of energy leaks in real time.

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