

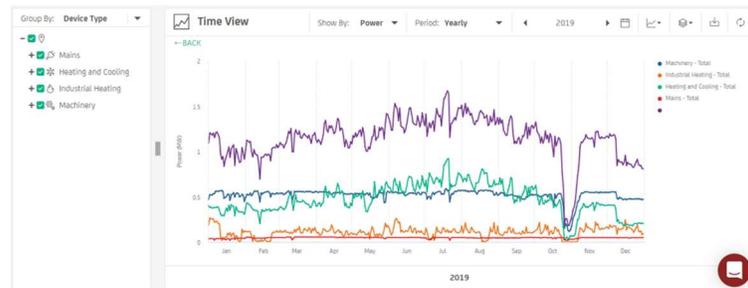
# SiteWatch Case Study

## Pharmaceutical Manufacturing

### Summary

ABC Pharmaceutical Company uses Panoramic Power<sup>1</sup> sensors on a range of equipment involved in manufacturing and conditioning, covering a range of equipment types. Sensor locations were chosen to provide insight to energy use, allowing the customer to track energy use as a key performance indicator. The following devices and device families are included in the monitoring scope:

- Mains
- Heating and Cooling
  - Air Handlers
  - Chillers
- Industrial Heating
- Machinery
  - Air compressors
  - Fans
  - Motors
  - Pumps
  - Other



The installation includes 50+ sensors and multiple bridges. Bridges onsite use a combination of Wi-Fi and cellular connections, with Wi-Fi bridges using the guest network, to access Power Radar servers for data uploads. The customer is using the monitoring solution achieve several goals:

**Identifying Wasted Energy** – Reviewing equipment operation through Power Radar, the customer can understand when equipment is operating outside its typical schedule or load profile. As a result of monitoring, this customer has the ability to update equipment schedules and can encourage operators to turn monitored equipment off after operating hours.

**Capital Planning** – Analyzing usage data for key equipment expected to be replaced allows the customer to understand the capacity of existing equipment versus the system being served. The collected data informs decision makers on ROI for energy efficiency improvements and helps verify baseline and post-installation usage for utility-administered incentive programs.

**Improve Process Efficiencies** - By understanding site energy used in each process/shift and generating production efficiency rates that can be used as a baseline for improving processes, the

<sup>1</sup> Panoramic Power and PowerRadar are registered trademarks of Panoramic Power Ltd in the United Kingdom and United States of America.

customer may improve heater furnace operations while confirming prescribed production sequences are being followed.

## SiteWatch Observations

**Weekly Reporting Captured Non-Typical Loading of a Partially Failed Compressor –** Site Watch-supported energy monitoring using Panoramic Power<sup>2</sup> hardware is capturing current on three air compressors, two serving general purposes and one oil-less compressor serving critical loads. A weekly automated report is reviewed by operations personnel to identify discrepancies in energy use for this system. The reporting module indicated a large drop in energy use for a constantly loaded compressor, indicating a change in operation not known to personnel. The compressor was found to have a control issue which caused the unit to cycle continuously on and off despite there being ongoing loads. The continuous cycling of the compressor was causing significant wear on the device, which would have led to total failure if not found.



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**Site Watch Application –** The customer used weekly reporting to identify non-typical loading of compressors, indicating a partial failure of a critical device. The equipment vendor was contacted, and a fix was deployed. The customer avoided a complete machine failure, which would have led to replacement cost, installation cost, and temporary rental cost totaling in excess of \$50,000.

**Secondary Chilled Water Pumps Not Properly Sequenced –** Site Watch reviewed chilled water pump operation to understand how pumps interacted to meet building load. The pumps are not similarly sized, and all are constant speed. The systems served by each pump vary to meet conditions, with secondary pumping running to supplement primary pumping in the event of pump failure (seen below

<sup>2</sup> Panoramic Power and PowerRadar are registered trademarks of Panoramic Power Ltd in the United Kingdom and United States of America.

<sup>3</sup> Views from Power Radar. Panoramic Power and PowerRadar are registered trademarks of Panoramic Power Ltd in the United Kingdom and United States of America.

from February through April 2019). Data from this site also shows that pumps are not rotated into duty, so a single pump on the secondary side is used to meet system load instead of spreading run hours across several other available pumps



**Site Watch Application –** Site Watch reviewed pump data through time view to identify usage patterns and relationships between how pumps operate. The recommendations based on this data review would be to alarm low amps on primary chilled water pumps to ensure a backup pump is enabled quickly.

**Air Handling Unit Operations Tracked, Opportunities for Alarming and Energy Savings –**

The customer currently monitors three air handling units, two serving process areas and one serving an office area. The site operates continuously, though with reduced overnight occupancy. During period of reduced occupancy, the office air handling unit fan energy should decrease, especially in AHUs with variable speed-driven fans. The site can use alarms to indicate fan motor over or under amp conditions, which indicate motor deterioration prior to complete motor failure. For fan motors serving process areas, a failure in the fan motor can cause space conditioning issues, leading to spoiled product.

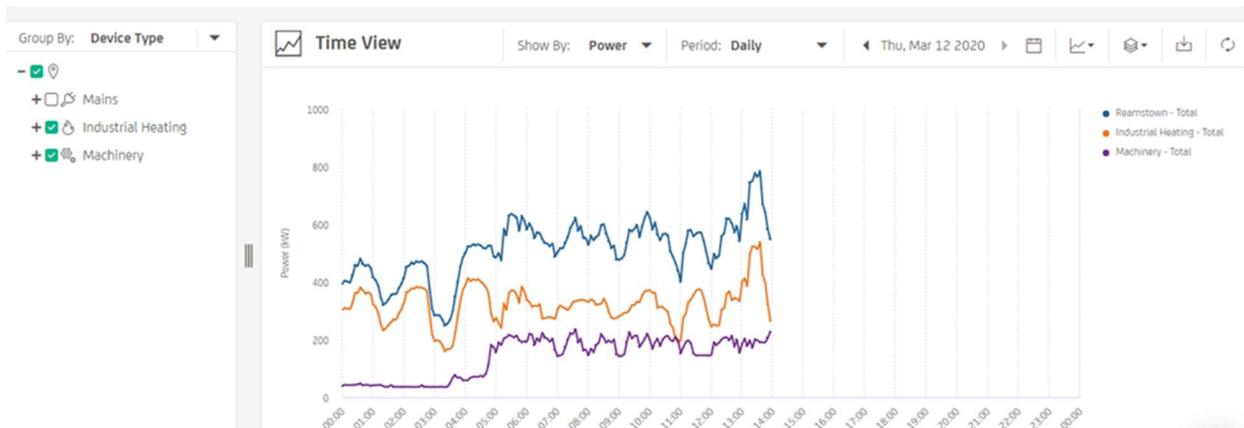


**Site Watch Application** – Site personnel can interact with SiteWatch to calculate ROI on proposed upgrades to existing constant volume air handling units while also enabling alarms on process area fans for over and under amp conditions.

## What is the Customer Using from Power Radar?

In addition to regularly viewing real-time and historical data in a readily understandable format, the customer uses daily and weekly reporting.

**Time View** - This view allows energy consumption to be viewed over a specific time period down, from annual to 5-minute intervals. Users can select specific equipment, equipment types, production lines, entire sites, or any other combination of sensors to view. Different periods can be overlaid, allowing for quick visual comparison of energy use. Data may be downloaded to .csv or .png format from 1-minute to monthly intervals.



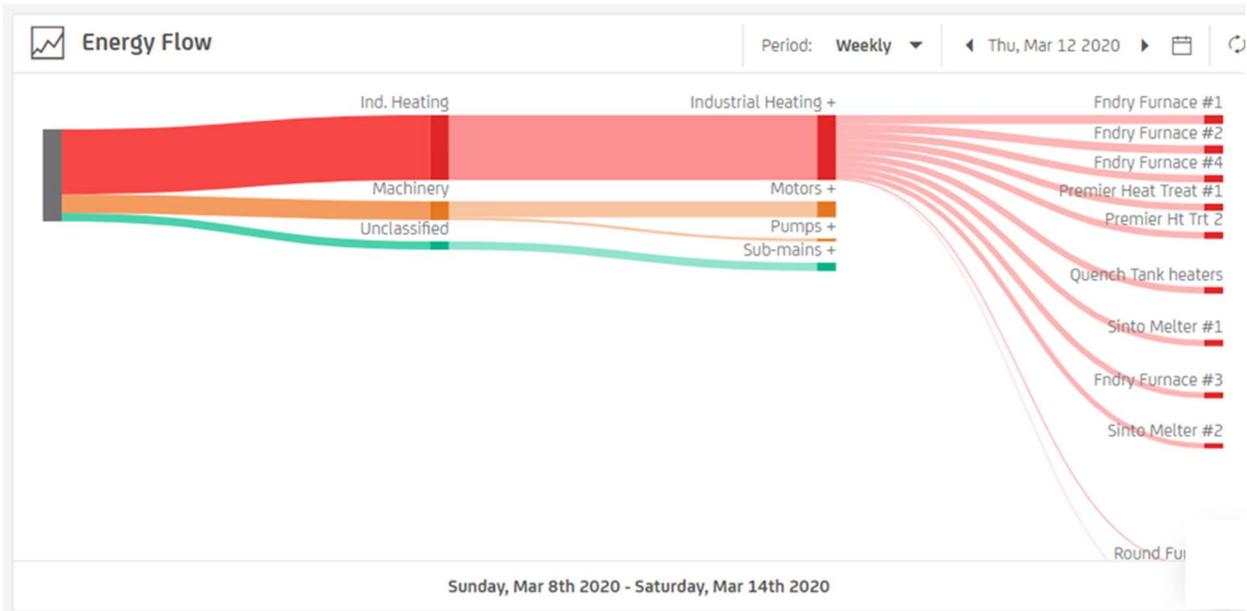
**Heat Map** – A heat map allows for easily understanding how the selected equipment, zone, panel, or site energy use varies through a 24-hour day, and across multiple days. The visualization allows for easy identification of equipment operating outside normal runtimes and can inform personnel of the cost of energy wasted during non-production or unoccupied periods.



**Benchmarking** – The benchmarking tool generates a value expressing the relationship between energy use and independent variables available in Power Radar, including cooling/heating degree days, operating hours, building footprint, or another normalization factor (e.g. production).



**Energy Flow** - This view allows energy use to be visually assigned by equipment type through a detailed graphic representation of how energy is distributed between monitored devices



## Daily Energy Reports

**Energy Consumption by Category** – Shows the daily consumption from the previous day, by end use, and compares it to the previous day through values and visual graphics. More detailed equipment classifications configured in Power Radar improve the efficacy of this report.

**Energy Consumption by Day** – Reviewed daily by the plant manager to understand fluctuations in total energy consumption from previous days. Managers will understand how plant utilization impacts changes in daily plant usage, ensuring usage data aligns with variations in production. If changes in energy use do not align with production, can indicate an issue requiring further investigation.

**Day-to-Day Energy Consumption** – Shows two weeks' worth of total daily consumption, with each day of the week presented side-by-side to easily show differences between the same day of the week. Site personnel use this to identify non-routine energy use outside of typical production days.

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