



SkySpark® Analytics in Industrial Applications – Compressed Air System Optimization in a Medical Equipment Manufacturing Facility

Case Study
October 2017

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Overview

Using technology to aggregate and organize huge amounts of data into actionable information is not a new concept. The ETC Group helped to initiate and coach energy management improvements in their compressed air system. The goal was to implement a long-term energy efficiency campaign.

The foundation of the campaign was an ETC monitoring & analytics program based on SkyFoundry’s SkySpark® Analytics.



Project Approach – Technology, Consulting and Education

ETC Group provided a turn-key solution including all the necessary hardware, software, and programming to monitor energy performance and capture savings opportunities. Real-time data is collected and displayed for operator and engineer review. Custom analytic rules and algorithms compare system performance with efficiency criteria and flag problems for troubleshooting by local support staff.

Compressed Air System

The plant has a large compressed air system, including 8 compressors and a peak electric load of 2 MW. The project goals were to achieve Energy Savings by:

- Shifting load from centrifugal compressor with high kW/scfm (designed for 10 bar and operating at less than 9 bar) to better performing rotary screw machines
- Changing base load compressors
- Better allocation of compressors between high- and low-pressure system
- Identifying plugged filter
- Reducing operating pressure at the compressor to minimize losses identified

Capital Investments

- New variable speed trim compressor
- Replace standard compressed air purge dryer with heater blower purge dryers

Based on user feedback and plant inspection, ETC Group engineers developed an action plan starting by documenting a consumption baseline and identifying potential saving opportunities.

Load profiles, system schematics, key performance indicators, capital improvement plans, and a Systems Manual were all delivered as part of the project to help the facility manage and maintain the performance of the newly optimized system.

The work is ongoing. As more data points come into the monitoring & analytics software, additional opportunities are identified through the use of data visualization and additional analytics.

Examples of the Analytic Findings Produced by SkySpark



Figure 1: Power and Flow Correlation - Operational Insight
Note the large fluctuations in power, while flow and pressure remain relatively constant.
We worked with plant operators to evaluate compressor staging.



Figure 2: Baseline vs. Actual Energy Use
The difference in baseline power calculated (blue) compared to actual power (red) demonstrates savings over time due to implementation of efficiency measures.



Figure 3: This SkySpark screen shows that the 5 PSIG pressure drop (loss) between the plant and the end of line goes away when flow decreases to 400 SCFM.

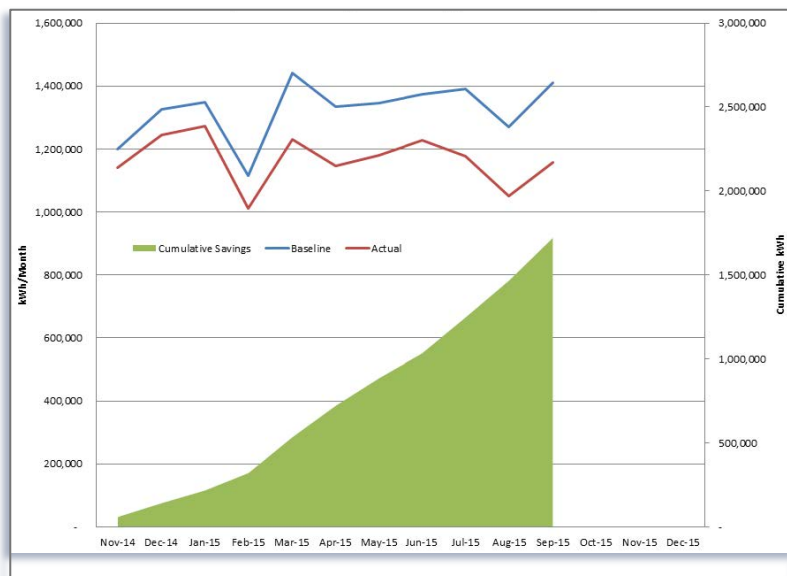


Figure 4: Summary of Compressed Air System Energy Use and Savings
This chart shows the clear reduction in energy usage by the Compressed Air System following the modifications made during this project (red line). It highlights the dramatic cumulative savings provided by Monitoring-based Commissioning

The Results

Annual Savings: Compressed Air

- Energy Saved: 2,000,000 kWh
- Cost Savings: \$284,000 USD
- Verified savings are 15% of total annual consumption

“Before, I was blind. Today, I can clearly see our operational challenges and act fast and efficiently.”

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Senior Technical Specialist, Customer

Keys to Success

In addition to the dedicated facility staff, keys to success included:

In-Depth System Understanding:

- Detailed system schematics
- Load characterization
- Planned iterative optimizations
- Capital improvements integrated into campaign

Energy Savings Longevity:

- Operator involvement in operations evaluation
- On-going data collection and analytics
- Key Performance Indicators (KPI)
- Project scoping and implementation by same contractor

Documentation and Education:

- Systems Manual
- Consistent system component taxonomy
- Capital improvement plan

Summary

Over the course of the twelve-month project there has been a significant improvement in performance and a 20% average reduction in monthly energy consumption. This demonstrates the value of monitoring-based commissioning due to the large energy and operational savings.

Using SkySpark to monitor the equipment system performance allowed engineers to quickly and easily identify operational issues and faults. These issues were then effectively communicated to facility managers and service personnel to undertake repairs or controls tuning. While these issues often had little to no measurable effect on the interior conditions and comfort of the building, such inefficiencies are detrimental to equipment lifetime and overall building energy performance. It is likely that without automated analytics these issues may otherwise have been lost in the sheer amount of data generated by a modern BAS.

Ongoing monitoring will continue to ensure these savings are maintained and any new issues can be quickly identified and corrected before they have a large impact on energy performance. The use of automated analytics allows building operators and facility managers to gain valuable insight from the raw BAS data. Reviewing the data in SkySpark allows multiple streams of data to be correlated in a single visualization. This integrated view saves the operator time and can serve to identify new faults that can only be seen by correlating data from multiple sensors and equipment. New rules can then be added to the SkySpark rule database to catch recurring instances.

For More Information

This Case Study document provides a summary of the project and results. For more information, contact the ETC Group at <http://www.etcgrp.com/monitoring-analytics>



This case study was compiled by the ETC Group with help from SkyFoundry.

SkySpark® – Analytics for a World of Smart Device Data

The past decade has seen dramatic advances in automation systems and smart devices. From IP connected systems using a variety of standard protocols, to support for web services and xml data schemas, it is now possible to get the data produced by the wide range of devices found in today's buildings and equipment systems.

Access to this data opens up new opportunities for the creation of value-added services to help businesses reduce energy consumption and cost and to identify opportunities to enhance operations through improved control, and replacement or repair of capital equipment. Access to the data is just the first step in that journey, however. The new challenge is how to manage and derive value from the exploding amount of data available from these smart and connected devices. SkyFoundry SkySpark directly addresses this challenge.

About SkyFoundry

SkyFoundry's mission is to provide software solutions for the "Internet of Things". Areas of focus include:

- Building automation and facility management
- Energy management, utility data analytics
- Remote device and equipment monitoring
- Asset management

SkyFoundry's software helps customers derive value from their investments in smart systems. Learn more and request a demonstration at www.skyfoundry.com.



The new frontier is to efficiently manage and analyze data to find what matters™.

SkyFoundry

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