



# Applying SkySpark Analytics to a Chiller Plant Retrofit and MBCx Project

Case Study  
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## Summary

A comprehensive central plant controls retrofit project at a large hospitality complex in Las Vegas demonstrated the power of analytics-driven project scoping, commissioning, and ongoing Measurement & Verification (M&V).

SkySpark® analytics were in place at the facility prior to the retrofit, greatly enhancing the quality and effectiveness of the project design and bid documents. The SkySpark® analytics platform was also used during construction and subsequent operations to demonstrate performance against both the historical and commissioned baselines.

Since the project's completion in 2016, the owner has saved a total of 18 million kWh, valued at \$1.375 million. The total project implementation cost was \$800,000, resulting in a verified simple payback of less than 4 years.

## Project Overview

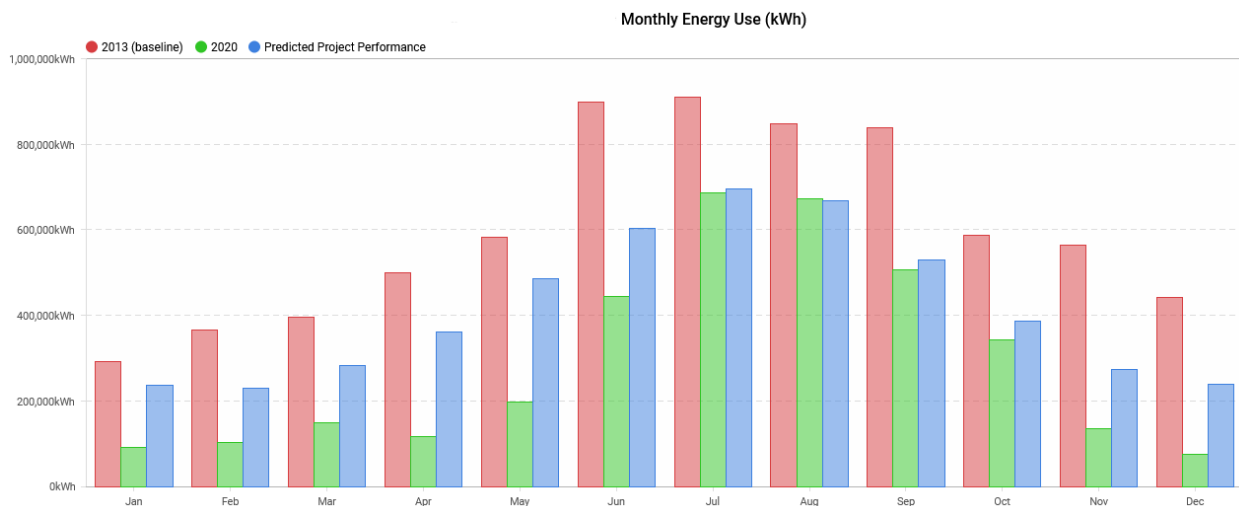
Altura, a SkyFoundry partner since 2013, provided project specification, bid assistance, SkySpark-based commissioning and M&V services on the project. The project scope included replacing all existing central plant controls with NiagaraAX™ field panels and implementing optimized sequences of operation. SkySpark was used to monitor all of the control and sensor points during the project to commission the sequences and validate contractor acceptance testing.

Since the project's completion in 2016, the SkySpark® platform has been used for ongoing Monitoring-Based Commissioning (MBCx) to identify operational issues, failed equipment, and subtle controls issues that impacted performance. Issues identified to date include: failed and overridden valve actuators, leaky valves, failed temperature sensors, clogged differential pressure sensors, VFDs in manual override, improper pump rotation, and incorrect waterside economizer control logic. Automated analysis of performance drift led to identification of issues with leaking isolation valves that were causing secondary pumping energy to be much higher than expected.

A custom Measurement & Verification view was created using SkySpark's flexible View Builder feature to track the energy savings vs. baseline year to monitor the performance, energy, and cost savings of the project on a monthly basis. View Builder enabled creation of this custom operator view with minimal effort.

## The Energy Reduction Results

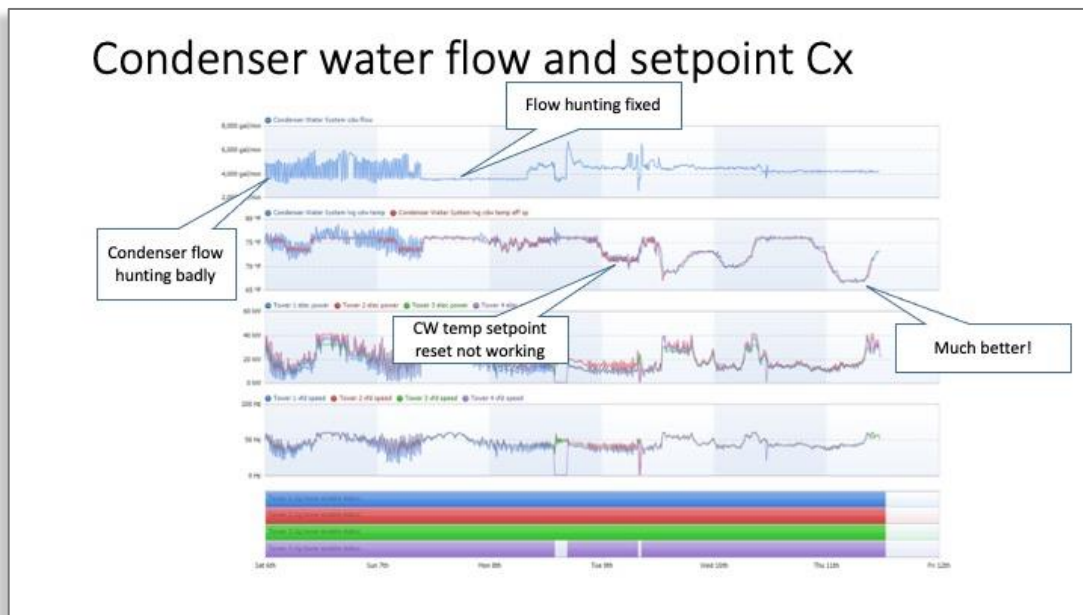
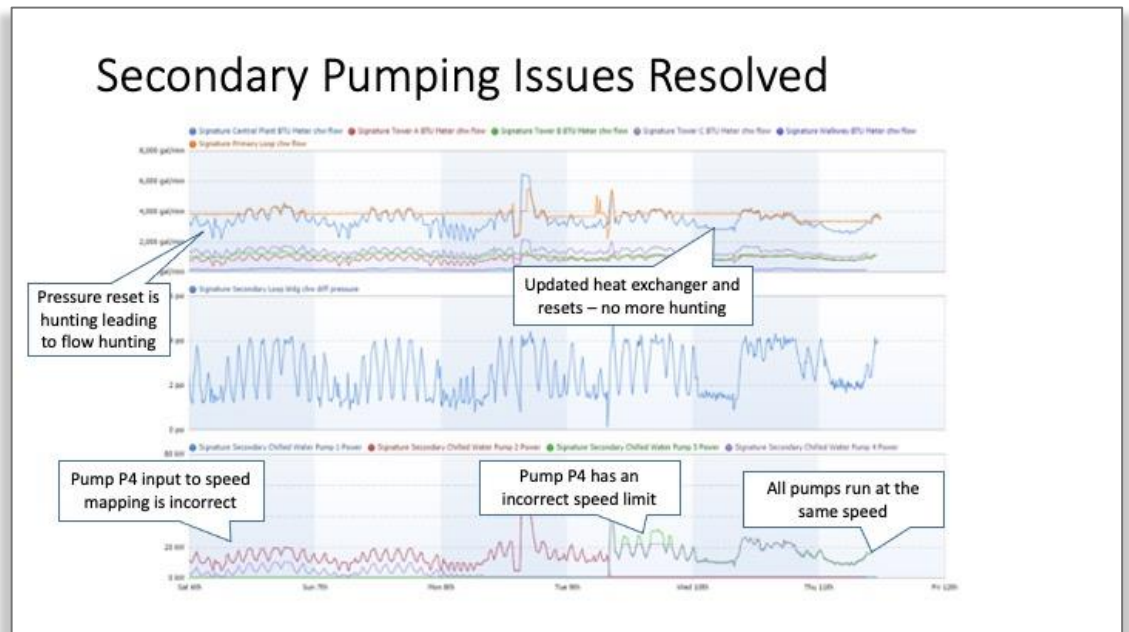
The following examples from actual SkySpark views show the results achieved with the project.



The view above shows the pre-project baseline calculated performance (red), the predicted performance (blue) and actual performance (green).

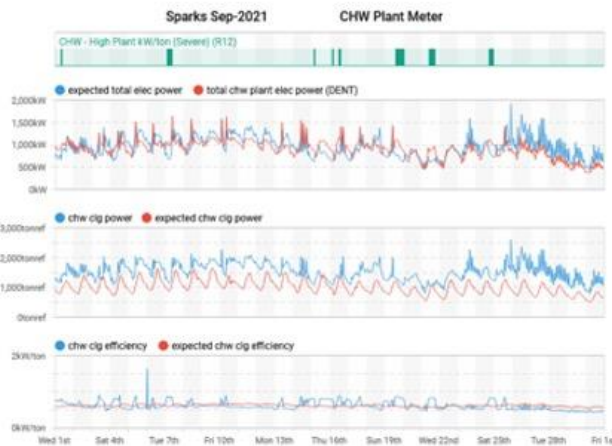
## A Detailed Look at Key Analytic Findings

SkySpark enabled visual inspection of numerous operational issues that were causing inefficient operation of equipment systems in the chiller plant. The views below show the issues detected and performance achieved after correction.



## A Detailed Look at Analytic Findings (con't)

### Spark notification for error and off-normal performance

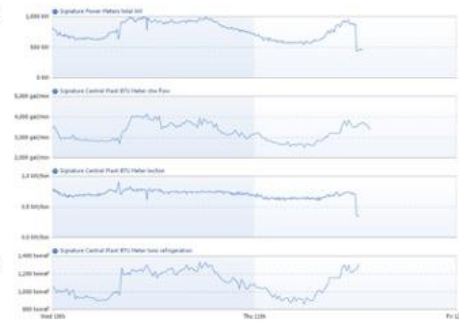


### Power meters vs. sum of plant powers

#### Troubleshooting Efficiency Monitoring

- Constant Speed chiller powers were calculated incorrectly
- Voltage and current references from before and after drive on VFD chillers
- Chiller drive kW significantly incorrect (~100kW)
- All based on plant feed kW vs. sum of equipment

#### High Degree of Confidence in kW/ton



SkyFoundry would like to thank **Altura** for sharing these examples of SkySpark in action for M&V and MBCx.

Contact them at: <https://alturaassociates.com/>



## 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's 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
- M&V and Greenhouse Gas Performance Tracking and Reporting

SkyFoundry's software helps customers derive value from their investments in smart systems. Learn more and request a demonstration at [www.skyfoundry.com](http://www.skyfoundry.com)



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

# SkyFoundry

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