



SkySpark

Find What Matters™

Case Study

**Crown Casino Melbourne:
Energy and Operational
Savings Across a Multi-Use
Entertainment Complex**

June 2015

SkyFoundry

www.skyfoundry.com

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Crowne Casino Melbourne: Analytics-Driven Energy and Operational Savings Across a Multi-Use Entertainment Complex Project

Overview

Crown Casino and Entertainment Complex is a large casino and entertainment precinct located on the south bank of the Yarra River, in Melbourne, Australia. Crown Casino is a unit of Crown Limited.

Originally built in 1997 the operations team identified that the complex had a huge potential for energy use reduction. An energy efficiency program was started in 2010 to achieve savings.



SkySpark® was implemented as part of a Building Optimization System (BOS) program across the facility. This Case Study provides an overview of the project and results.

Our thanks to Crown Limited, the end user, and BUENO Systems, the SkySpark® partner that implemented the system.



Case Study: Crowne Casino Melbourne

Location



- 536,000 square meters (5,769,000 square feet of space)
- 3 hotels, 1604 rooms
- 58 restaurants and bars
- 65 commercial tenants
- Conference & event spaces
- 17 million visitors a year
- 6,500 staff
- 1,500 contractors
- 24-7 operation
- 88 million kWh Electricity (equivalent of 11,000 homes)
- 500,000 GJ Gas (equivalent of 23,000 homes)
- 120,000t Carbon Emissions (173rd largest consumer on the NGERS list - National Greenhouse and Energy Reporting Scheme)

Case Study: Crowne Casino Melbourne

Plant & Equipment

It was clear that the size of the system was too large to monitor, identify and address faults manually. Automated analytics would be essential to achieve optimization goals.

Equipment systems included:

- 600 air handling units
- 2300 fan coil units
- 8 Cogeneration gas engines
- 27 Chillers (approx. 58MWt total capacity)
- 31 Boilers (approx. 38 MWt total capacity)
- 130 lifts and escalators
- 900 electrical boards
- 76,000 BMS points



The Crown team began a market review of available analytic solutions with the following objectives:

- Address faults before they create:
 - Issues for the customer (comfort)
 - Increased energy consumption
 - Equipment failure
- Reduce management costs
- Reduce maintenance costs
- Provide integrated reporting
- Avoid metering infrastructure



The results of their market review found:

- ~8 software packages currently available
- Most have limitations
 - Still in their infancy from a development and deployment standpoint
 - Utilize metering to identify faults
 - Cannot pinpoint fault cause
 - Limited reporting capability
 - Customization of analytic rules was not available
- Costly to implement and maintain

After review they chose to move forward with BUENO, a SkyFoundry partner that provides a complete managed services approach to monitoring and analytics employing SkySpark.

The Results – Identifying and Tracking System Faults

The BUENO Solution – Phase 1

- Commenced September 2014
- Promenade Hotel (465 rooms, 517,000 sq. ft./48,000 sq. m)
- Integrated into Honeywell EBI
- (11,500 BAS points)
- SkySpark® analytics platform
- BUENO provided setup and ongoing managed services working closely with the Crown operations team

The system was implemented with rules to detect common system faults including:

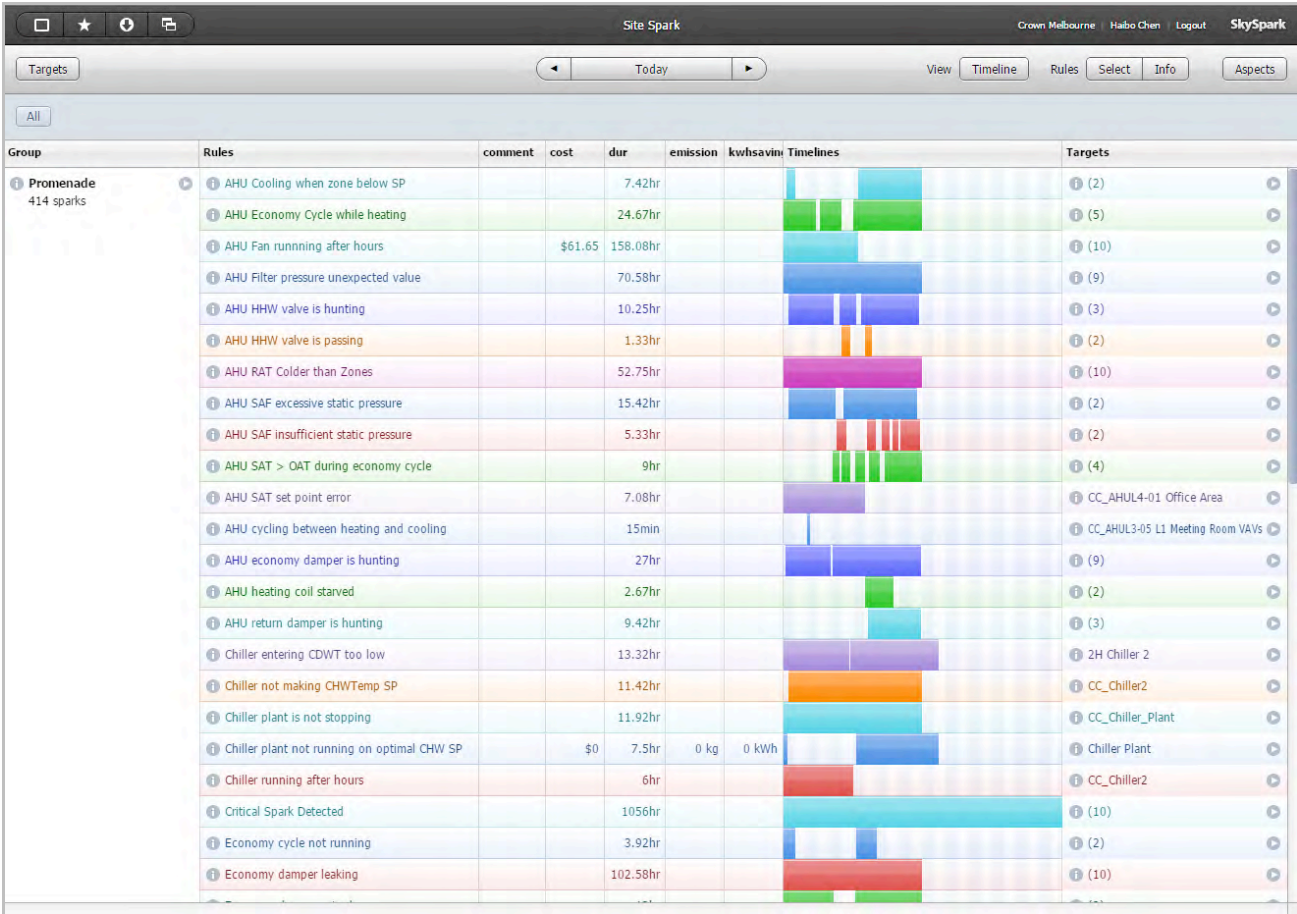
- Heating and chilled water valves not closing or failed
- Valves hunting
- Failed dampers
- VAV box failures/ issues
- Central plant short cycling
- Pumps/ fans hunting
- Temperature set points not being achieved
- Equipment left in manual override mode
- Invalid Occupancy readings from room control sensors



Case Study: Crowne Casino Melbourne

The Results - All the faults expected and more!

- Currently >150 SkySpark® rule algorithms are active across the facility
- Approximately 250 Sparks active at any one time



Analytic Results - Some Detail

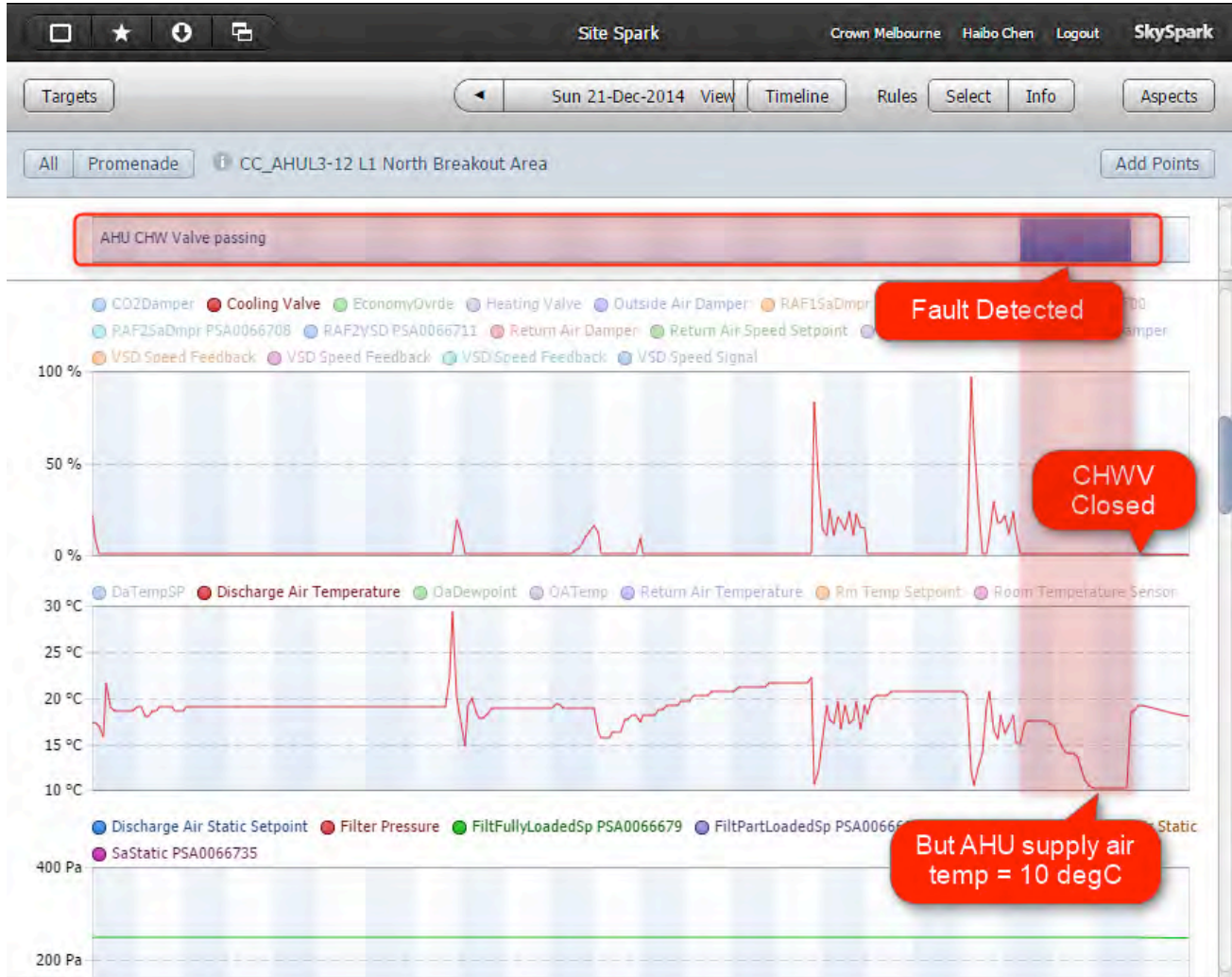
Examples of Sparks

Hunting Chilled Water Valves (Indicates that the control loop is not properly tuned affecting both comfort and energy use.)



Case Study: Crowne Casino Melbourne

“Passing” Chilled Water Valves. (Passing is the term used in Australia for the condition when the valve does not fully close off to stop the flow of water, thereby wasting energy)



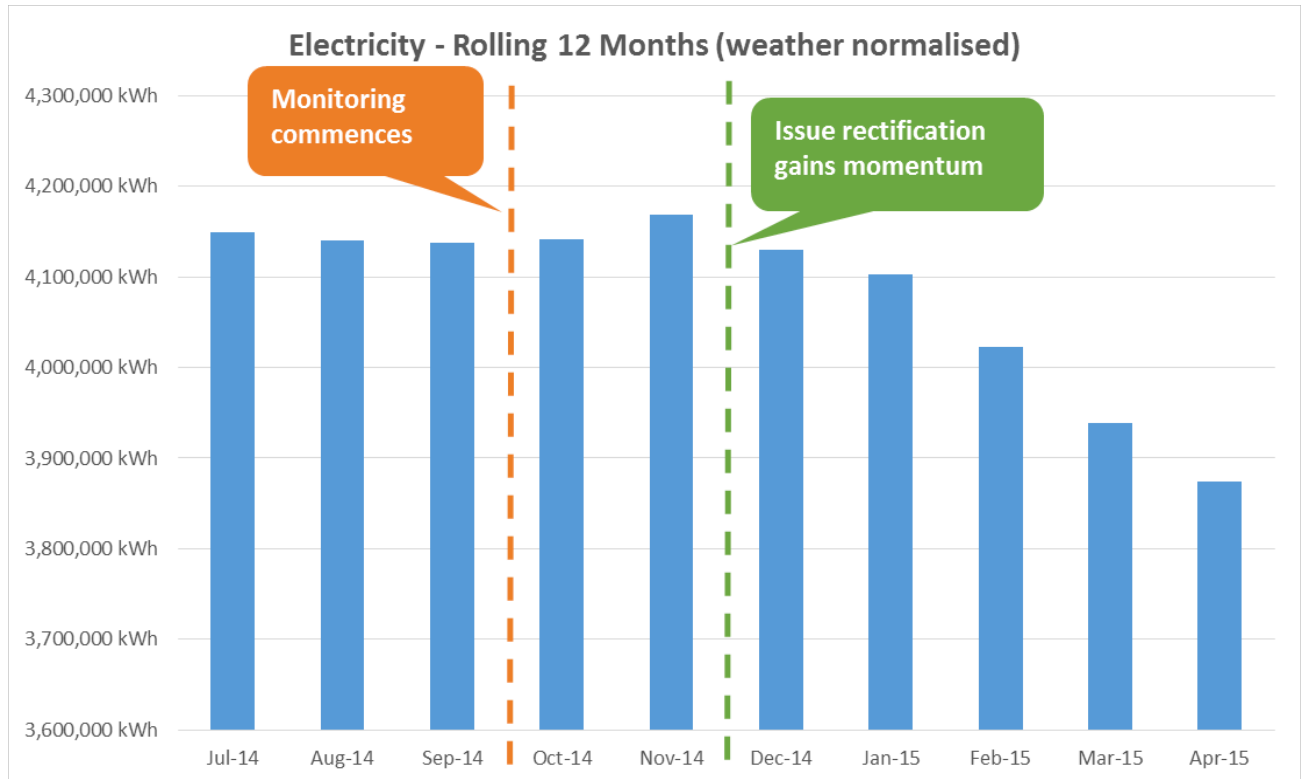
Implementation of additional rule algorithms is planned based on results to date and the input of the Crown Casino operations team and BUENO, SkyFoundry’s implementation partner.

Analytics is a journey!

The Financial Results

Electricity Savings

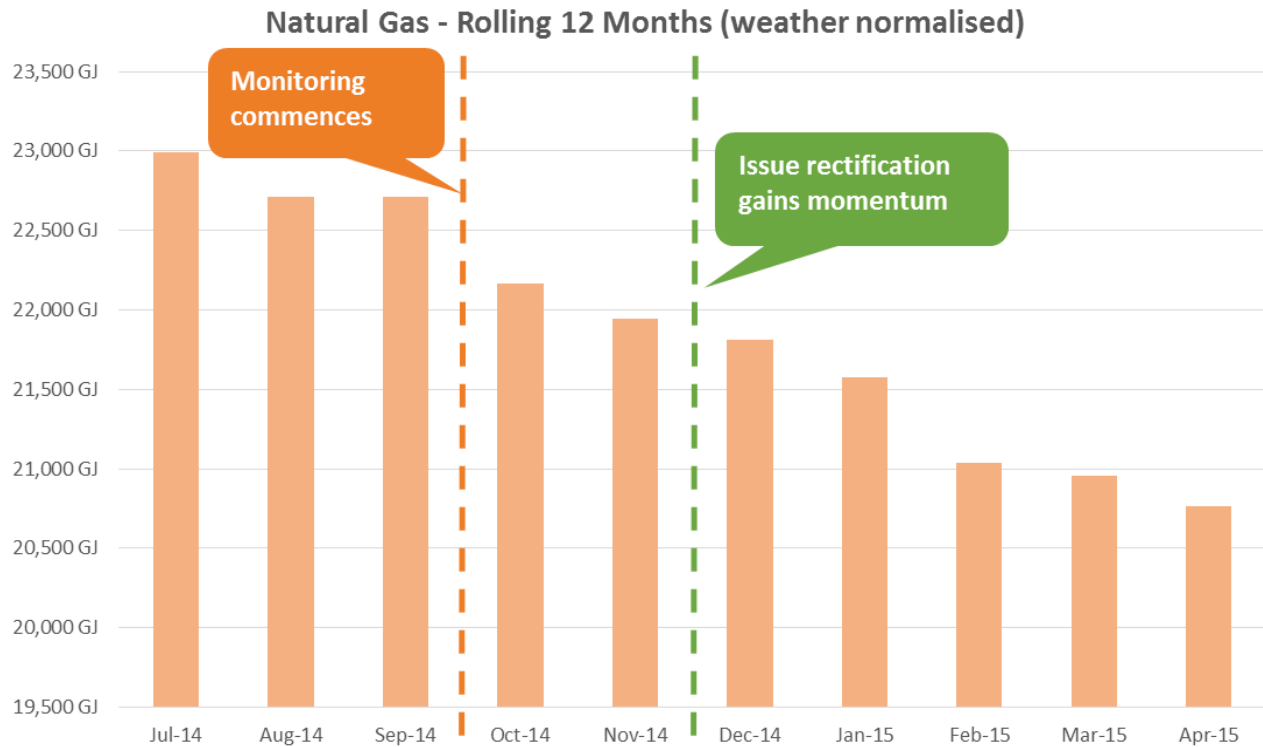
6% reduction in HVAC electrical consumption to date (10-15% by year end).
Savings accomplished by systems tuning and OPEX work only!



Case Study: Crowne Casino Melbourne

Natural Gas Savings

9% reduction in HVAC gas consumption (15-20% by end of year)
Savings accomplished with systems tuning and OPEX work only!



The Way Forward

- Continue to add new rule algorithms
- Roll-out analytics to the remainder of Melbourne and Perth facilities adding >5 Million additional sq. ft. (>450,000 sq. m) and >65,000 additional points!
- Integrated Warranty Period Corrections and Building Tuning
- Expand analytics to other services – water, lighting, lifts & escalators
- Automation of fault-rectification – maintenance system integration
- Continuously improve, innovate and stay ahead
- All buildings will have the BOS!

Additional Information

SkyFoundry would like to thank Crown Limited and BUENO Systems for this case study.

Case Study: Crowne Casino Melbourne

SkySpark® Analytics Software - For the World of Smart Devices



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, it is now possible to get the data produced by the wide range of devices found in today's smart devices 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 operational costs 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® Analytics Software directly addresses this challenge.

The new frontier is to efficiently manage and analyze data to *Find What Matters™*.



About SkyFoundry

SkyFoundry's mission is to provide software solutions for the age of 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 products help customers derive value from their investments in smart systems.

Learn more at: www.skyfoundry.com

Contact us at: info@skyfoundry.com

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