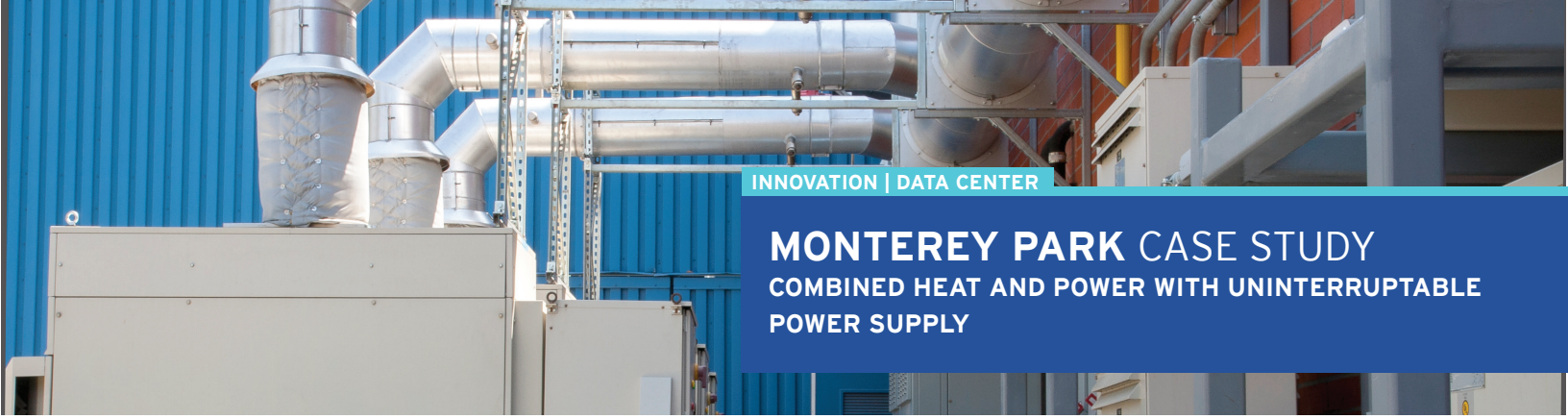


INNOVATION | DATA CENTER

MONTEREY PARK CASE STUDY

COMBINED HEAT AND POWER WITH UNINTERRUPTABLE POWER SUPPLY

BACKGROUND INFORMATION

SoCalGas® has implemented a Combined Heat and Power (CHP) demonstration at the our data center facility in the Monterey Park. The purpose of the project is to demonstrate an innovative CHP Hybrid with Capstone Turbine Corporation Uninterruptable Power Supply (UPS) technology, introduced by Capstone Turbine Corporation, and integrate it with a Thermax absorption chiller to produce electric power and chilled water to provide space cooling.

PROJECT GOALS:

- Increase energy efficiency - show an increase in energy efficiency of 59 to 66 percent (lower heating value basis for natural gas fuel).
- Generate on-site electricity – Produce 174 kW of net electric power.
- Deliver chilled water – Produce 77 tons of cooling capacity.
- Reduce NOx emissions – Reduce NOx emissions by 80 percent compared to grid electricity.
- Reduce energy costs – Show a reduction of 18 to 41 percent in energy costs depending on CHP operating schedule.

BENEFITS

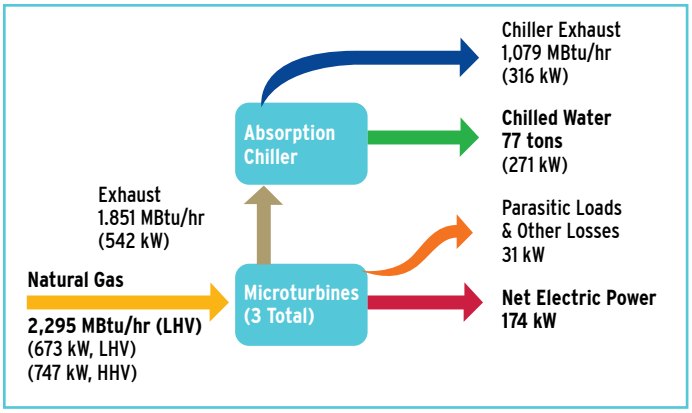
The CHP Hybrid UPS system showed slightly lower electric output, chilled water production and overall efficiency compared to the goals. The CHP Hybrid UPS system saved a significant amount of electricity for the Monterey Park data center, and the energy savings are reflected in the energy cost results. Energy costs were reduced by 20 to 44 percent, depending on the operating schedule for the CHP Hybrid UPS system. The energy cost results were positively impacted by changes in utility rates that occurred between project initiation in 2012 and project conclusion in 2015. During this time period, gas rates decreased and electricity rates increased, thereby improving the economics of the CHP Hybrid UPS system. While the technical performance did not reach all of the set goals the overall performance was positive.

TECHNOLOGY

The purpose of this project was to demonstrate the benefits of installing three Capstone microturbines to produce about 174 kW of electric power and provide Hybrid UPS technology to the data center. The exhaust gases from the microturbines provide the necessary energy to drive a Thermax absorption chiller to produce chilled water to supply 77 tons of space cooling to the center. Energy balance for the conceptual design of the CHP Hybrid UPS system is shown on next page:

SoCalGas

A Sempra Energy utility



Energy Balance for CHP Hybrid UPS System

MARKET POTENTIAL

There are approximately 1,200 data centers in California that collectively consume 5.2 billion kWh of electricity each year. A conservative market impact projection was developed based on the adoption of 50 CHP Hybrid UPS systems, each with a capacity of 500 kW (electric power plus cooling). The impact of installing 50 CHP Hybrid UPS systems is estimated to save California data centers nearly 98,000 MWh of electricity each year, and reduce electric demand by 25 MW. At 15.3 ¢/kWh, the CHP Hybrid UPS technology will help these data centers collectively save $15 million each year.

FIND OUT MORE

To find out more about this project or opportunities for your company, please contact:

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ADDITIONAL SOURCES

For more detail visit Technology Development Intranet Site:
https://sps.socalgas.com/so/td/Pages/Home-Page.aspx

RDD ANNUAL REPORT:

https://sps.socalgas.com/so/td/SiteAssets/Pages/Home-Page/2013%20RDD%20Annual%20Report%20Final.pdf

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