



Riverside Hotel

Boise, Idaho

400-kW CHP System



Quick Facts

LOCATION: Boise, Idaho
MARKET SECTOR: Hospitality
FACILITY SIZE: 300 guest rooms
FACILITY Electrical Energy Use: 3.5 million kWh/year
EQUIPMENT: 400 kW reciprocating engine
FUEL: Natural gas-fired
USE OF THERMAL ENERGY: Space, hot water, laundry, and pool heating
CHP TOTAL EFFICIENCY: About 82% at full-load. Meets 76% of on-site thermal loads and 88% of electrical loads
ENVIRONMENTAL BENEFITS: Offsets 2,194 metric tonnes of CO₂ annually
TOTAL PROJECT COST: Part of larger facilities improvement project.
YEARLY ENERGY SAVINGS: ~\$193,000
PAYBACK: 4.3 years
CHP IN OPERATION SINCE: April, 2017

Site Description

The 304,000 square foot full amenity Riverside Hotel features 300 spacious guest rooms, 15 large meeting rooms, two restaurants, two bars, a fitness center, as well as an outdoor heated pool, hot tub, and splash pad. The hotel sits on 14 acres of gardens as it winds along the scenic Boise River Greenbelt, a 25-mile paved trail that follows the Boise River. The hotel management became interested in CHP after talking with Northwest CHP TAP staff and reviewing our screening assessment.

Reasons for CHP

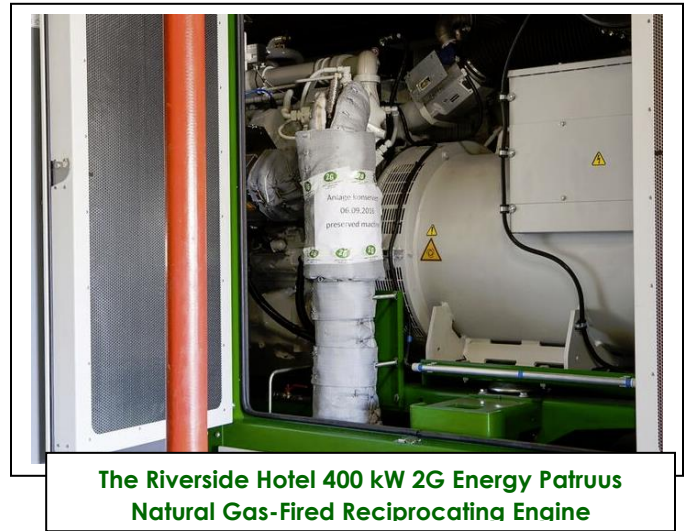
With an aging boiler system, the Riverside Hotel needed a new solution to keep up with its high electrical and hot water demands. The hotel Director of Engineering turned to the Northwest CHP TAP to conduct a CHP qualification screening analysis. It was found that the site would support economic CHP operation and qualified as a potential candidate for installation of a 300 kW to 450 kW natural gas-fired CHP project.

Additional management concerns that supported CHP project installation and operation included the potential for higher future energy costs to impact the business, along with power reliability and the effect that power outages have on guests and other activities that occur at the hotel. Advantages favoring CHP are that the hotel is in operation continuously with concurrent electrical and thermal loads and has an existing central heating system. CHP total installed costs were reduced due to avoided boiler/heat exchanger replacement costs as well as costs associated with purchasing new pool and laundry boilers.

CHP Equipment & Configuration

The CHP project resulted in substantial avoided equipment replacement costs including two-domestic hot water boilers plus separate laundry, and pool and spa boilers. Thermal needs of the facility are met by the 180°F water provided through engine water jacket heat recovery plus a backup boiler with a modulating burner.

The 8 MMBtuh backup boiler provides a hot water temperature boost during times of peak thermal loads and satisfies hotel domestic hot water, laundry, and space heating requirements when the reciprocating engine is down for maintenance. The CHP project operates at full output to meet summer peak electrical loads and follows electrical loads during the winter. No electrical energy is sold to the local utility due to low avoided costs and the need for additional expensive interconnection equipment.



The Riverside Hotel 400 kW 2G Energy Patruus Natural Gas-Fired Reciprocating Engine

CHP Design, Installation, and Operation

A CHP equipment distributor was retained to manage all aspects of the CHP project from design through CHP installation and service. Construction activities included demolition of the two existing 1962 vintage hot water boilers, while pre-installing and using the new backup hot water boiler to maintain hotel functions while the CHP project was being installed. The overall project included electrical infrastructure improvements plus climate control in the electrical room and improved pool water treatment. The CHP project is capable of independent (island mode) operation in the event of a utility power outage, however there is a time delay as the CHP project must go off-line and then undergo a manual re-start after re-setting hotel systems.

The Hotel “invested in education” when they sent their on-site maintenance person to a one week engine maintenance certification course. Current generation CHP equipment can be designed for remote monitoring by the equipment distributor and even for remote control and operation when desired.

Energy Efficiency Alternatives Analysis

Hotel management knew they had to make changes so examined several energy efficiency and operating cost saving alternatives including new boilers operating in conjunction with a solar system. Even with existing solar incentives, the CHP solution provided additional savings and a more attractive simple payback on investment than the solar options investigated. The alternatives comparison plus the large and constant hotel thermal loads pointed hotel management towards the CHP project.

“I learned about the financial value of CHP projects. An energy savings of \$200,000 annually exceeds \$2 million over the life of the project. The project should provide a cash return forever”.

-David Johnson, owner, Riverside Hotel

For More Information

U.S. DOE Northwest CHP TECHNICAL ASSISTANCE PARTNERSHIP (CHP TAP)

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