



CHP
TECHNICAL ASSISTANCE
PARTNERSHIPS

Gaylord National Resort & Convention Center

6-MW CHP System

Site Description

The Gaylord National Harbor contains 2,000 guest rooms, 95 event rooms, 537,430 square feet of meeting space, seven restaurants, and a 20,000-square-foot spa. It employs 2,000 people. It features a 19-story glass atrium with views of the Potomac River.

Ryman Hospitality Properties is a real estate investment trust (REIT) specializing in group-oriented, destination hotel assets in urban and resort markets. Ryman's owned assets include a network of five upscale, meetings-focused resorts that are managed by lodging operator Marriott International, Inc. under the Gaylord Hotels brand.

Reasons for CHP

The new CHP system covers 64 percent of the venue's peak electrical demand and 90 percent of its annual electrical consumption, which is expected to reduce greenhouse gas emissions by 59 percent. The system was designed with protective relays and the existing programmable logic controllers were modified and re-programmed to allow the gear to seamlessly transition into island mode during single, double and triple utility outages. Investment in this CHP plant was made to:

- Reduce energy costs
- Increase reliability
- Reduce the Gaylord's carbon footprint
- Reduce local electric grid stress

Quick Facts

LOCATION: National Harbor, Maryland

MARKET SECTOR: Hospitality

FACILITY SIZE: 2,000 guest rooms

FACILITY PEAK LOAD: 10 megawatts (MW)

EQUIPMENT: 3 x 2 MW Recip Engines

FUEL: Natural Gas

USE OF THERMAL ENERGY: Heating, DHW and Reheat

CHP ANNUAL TOTAL EFFICIENCY: 67%

CHP MAXIMUM EFFICIENCY: 82%

ENVIRONMENTAL BENEFITS: reduces greenhouse gas emissions by 59%

YEARLY ENERGY SAVINGS:

Energy Service Agreement (ESA) with 15% reduction in energy cost to the Gaylord

CHP IN OPERATION SINCE: 2018

RESILIENCE: The CHP plant can be islanded if the electric grid fails



Gaylord National Resort & Convention Center, National Harbor, Maryland

CHP Equipment & Configuration



Three 2G Energy - 2 MW Feb 11 Packaged CHP Systems
SOURCE: UNISON ENERGY

In an area between the side of the convention center and the parking garage, Unison Energy installed three 2G CHP modules each with a 2 MW Caterpillar (MWM) natural gas engine driving a synchronous generator and producing 480-volt electric power and hot water. Each engine powers one of three independent electric circuits at the site. Each circuit can be manually isolated from the electric grid and the respective CHP system can black start and operate in island mode.

Hot water produced from the jacket water cooling system and exhaust gas heat recovery heat exchangers is used to provide heating, domestic hot water and reheat during the cooling season. The CHP plant displaces three of the four boilers during heating season with the fourth boiler trimming the load.

CHP Design

“This CHP Plant economically provides comfort and reliability to our guests and at the same time significantly reduces our greenhouse gas emissions at National Harbor.”

***Patrick Chaffin – Chief Operating Officer
at Ryman Hospitality Properties***

The system was designed, installed and commissioned by Unison Energy on an aggressive 15-month timeline from contract signing to commercial operation. A particularly challenging part of the design was siting the equipment. The available space was a 56' x 52' mechanical yard, which was a tight fit for three large generators and three 2,500 kVA step-up transformers. The packaged CHP systems were successfully designed to fit the yard, sometimes with only a foot to spare between the CHP and existing equipment and a screen wall. The 3-story tall screen wall was modified with roll-up doors and louvers to provide access and ventilation. The existing

electrical cabinets were modified to interconnect the CHP. To minimize the impact to the hotel's guests and conventions all outage work had to be completed during times of low occupancy, typically Sunday nights. To meet the utility's requirements for telemetry and trip control, a wireless radio frequency system was installed to communicate with the utility. This avoided installing an expensive dedicated fiberoptic line back to the substation.

Energy Service Agreement

Unison Energy managed the project from design to installation, and now owns, operates, maintains, and monitors the CHP plant under an Energy Services Agreement with Ryman Hospitality Properties, providing energy optimization and savings, as well as added power resiliency for the facility. Unison Energy has a full team of technicians in Maryland that monitors the system and maintains system performance 24/7/365.

For More Information

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

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**UNISON ENERGY is a Recognized
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Date produced: 2019