

Combined Heat and Power (CHP) Potential in Hotels and Casinos

There are nearly 54,000 hotels and 2,000 casinos across the US, forming a \$323 billion industry¹ that relies on continuous and reliable energy to serve their customers around the clock. Combined heat and power (CHP) generation systems are both efficient and resilient and provide hotels and casinos with the energy security they need to keep their customers safe and satisfied. Power outages have severe detrimental impacts upon these industries, completely shutting down their operations or forcing them to depend on expensive and often polluting back up power supplies.

Direct CHP Benefits for Hotels and Casinos:

- Increased energy reliability
- Microgrid capability
- Storm resilience
- Emergency preparedness
- Increased customer safety
- Reduced energy costs
- Increased energy efficiency
- Reduced emissions of air pollutants
- Insulation from volatile electricity prices
- Decreased dependency on backup power generation systems

A grid failure due to weather, malfunction, or an emergency puts a large financial strain on the hotel and casino as well as the businesses hosted within the facility, and the customers as they change plans or must house elsewhere. CHP systems allow hotels to operate as ‘microgrids’ meaning they can continue to run even during a grid-wide power outage, allowing immediate, continuous, and comfortable operation. Microgrids also eliminate the need for extensive and expensive backup systems that hotels currently use in the face of grid failure. In the US, nearly 150 hotels and casinos have installed CHP systems totaling 145.1 MW.² However, the US Department of Energy estimates that nearly 4,300 MW of CHP potential remain in the US in hotels and casinos alone.³

Fig. 1: CHP Installations in US Hotels and Casinos Compared to Technical Potential^{2,3}

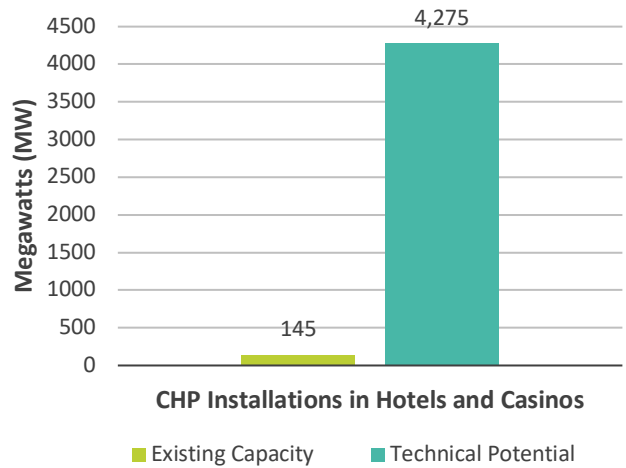
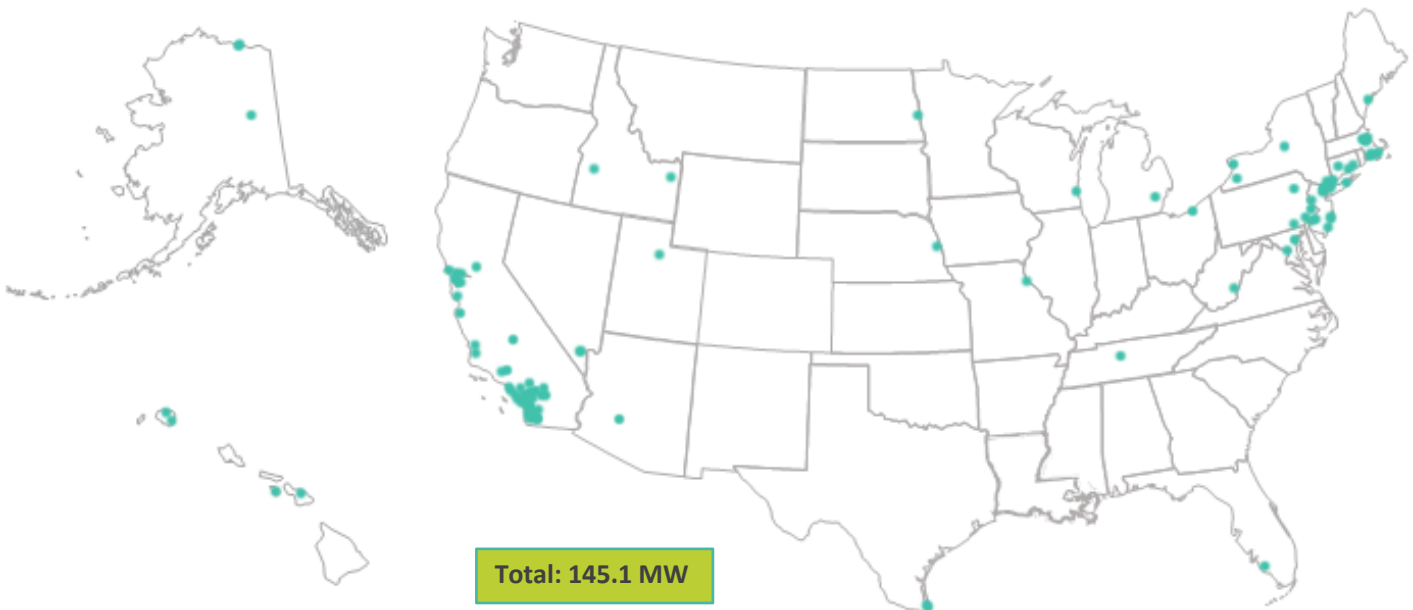


Fig. 2: CHP Hotel & Casino Installations in the US²



Case Study: Why hotels and casinos need dependable power

A gambler at the Paris Casino in Las Vegas, Nevada had just won \$1,000 on a slot machine and was cashing out when the screen went black. When the power was restored 13 hours later, the casino began the grueling process of sorting through each game and making sure the winnings were restored to that customer and over a thousand others who had been playing at the time of the outage as well. The Paris Casino and Hotel lost power on a 2016 morning, and when the backup system failed, they were forced to evacuate their 3,000 guests and relocate them to other hotels in the area. The casino experienced a significant loss in revenue as the hours stretched on—the casino was quiet, hotel refunds and vouchers were given, employees had to be devoted to sorting owed winnings, and food spoiled in hotel kitchens. Customers had to adjust travel, meal, and event plans, and lost time while evacuating and checking that the proper winnings were returned to them. The hotel declined to share their actual revenue loss because they stated they had too many customer cases to sort out to devote time to calculating losses.⁴



Connected to a separate power source, the Eiffel tower stays lit while the rest of the resort sits in the dark.

CHP Success Stories

Snowbird



Snowbird Ski and Summer Resort (Snowbird, UT): Snowbird is a year-round mountain resort covering over 2,500 acres and home to four large hotels. When the resort's operations grew too large for the utility's 25 kV power line, Snowbird turned towards onsite power generation, installing a 2 MW CHP system. This system saves the resort over \$815,000 a year on energy costs and had a seven year return on investment. It operates at 75% efficiency with the power generation's excess heat being used for building and pool heating and cooling and sidewalk melting in the winter. Being located in the mountains and subject to severe weather, the resort also benefits greatly from the increased reliability it gains from its microgrid potential.⁵

Foxwoods Resort & Casino (Ledyard, CT): Wanting to meet goals set in their clean energy initiative program, Foxwoods Resort and Casino installed a 15 MW CHP system in 2010. This new system—two 7.5 MW gas turbines—produces enough power to meet nearly 60% of the resort's electrical needs and 100% of both its heating and cooling needs. Because the hotel and casino never close, it is crucial to have a reliable and efficient system in place to meet energy demands. Overall, the plant has an 82.5% efficiency rating, which not only reduces emissions, but also saves the resort a lot of money—nearly \$36 million recouped over 3 years.⁶

Foxwoods



¹Statista. "Revenue of the United States hotel industry 2001-2017." 2018. <https://www.statista.com/statistics/245841/total-revenue-of-the-us-hotel-industry/>

²US DOE. "Combined Heat and Power (CHP) Installation Database." Installations as of December 31, 2017. <https://energy.gov/chp-installs>

³US DOE. "Combined Heat and Power (CHP) Technical Potential in the United States." March 2016. https://www.energy.gov/sites/prod/files/2016/04/f30/CHP_Technical_Potential_Study_3-31-2016_Final.pdf

⁴Moore, Thomas. "Despite power outage, gamblers unlikely to be left in dark on winnings." *Las Vegas Sun*. November 23, 2016. <https://lasvegassun.com/news/2016/nov/23/despite-a-casino-power-outage-or-other-emergency-g/>

⁵Gowrishankar, Vignesh, et al. "Combined Heat and Power Systems: Improving the Energy Efficiency of Our Manufacturing Plants, Buildings, and Other Facilities." *Natural Resources Defense Council*. April 2013. <https://www.nrdc.org/sites/default/files/combined-heat-power-IP.pdf>

⁶Syska Hennessy Group. "Foxwood Resort Casino Combined Heat and Power Plant." <https://syska.com/project/foxwoods-resort-casino-combined-heat-and-power-plant-mashantucket-connecticut/>

For more information, please
contact the Alliance for Industrial
Efficiency:
<https://alliance4industrialefficiency.org/join/>