

The Switch – Mixed Use Facility

Fishers, Indiana

135 kW CHP System



Site Overview



The Switch (A Mixed Use Facility)

Loftus Robinson, a real estate developer located in Indianapolis, Indiana specializes in refurbishing older historic office buildings and markets the space to high-tech companies. In 2015, Loftus Robinson undertook the development of The Switch, a building located in Fishers, Indiana, a suburb northeast of Indianapolis. The development project included 41,000 square feet of office and retail space as well as 102 residential apartments. Tied into the project through a partnership with the City of Fisher, is a 425 car garage which provides tenant parking, public parking, and electric charging stations for electric vehicles. The Switch, a mixed-use facility, draws on the historic railroad past of Fishers, attracting residents and technical based businesses into the heart of the rebuilt downtown core.

Project Overview

As part of the development project, the principals at Loftus Robinson identified the installation of a Combined Heat and Power (CHP) system as a potential energy efficiency improvement that could benefit the tenants, improve the environment, and positively impact their “bottom line”. Working with MacAllister Power Systems, a Caterpillar dealer and provider of turnkey CHP Systems, they designed and installed a 135 kW CHP system utilizing a CAT G3306B internal combustion natural gas fueled engine.

The system was designed to provide the baseload electric requirements for The Switch office building as well as the electric vehicle chargers located in the garage. Operating in the electric load following mode, the unit runs 24/7 during the winter and summer months and an average of 18 hours per day during the shoulder months (estimated 7,335 hrs. per year). The CHP system generates approximately 950,000 kWh per year that would otherwise be purchased from the local electric utility (Duke Power) at approximately \$0.10/kWh.

The available waste heat from the engine (560,000 Btu/hr) is being used to provide domestic hot water for the two restaurant tenants that occupy the first floor of the building, substantially reducing and/or eliminating their hot water heating demands of an estimated 5,000 gallons of hot water per day. Between the two restaurants, the hot water demand is required from 6:00am to 10:00pm daily, resulting in an annual CHP thermal utilization factor of approximately 50%.

“The CHP system installed at The Switch adds tremendous value to our property and reduces our overall energy expenses. It guards against electric rate volatility, reduces tenants’ water heating expenses, and provides for backup / standby power.”

Kyle Robinson: Principal, Loftus Robinson and The Switch Property Owner

Quick Facts

Location: Fishers, Indiana

Market Sector: Mixed Use (Commercial / Residential)

CHP Generation Capacity: 135 kW

Prime Mover: Caterpillar IC Engine

CHP Fuel Source: Natural Gas

CHP Heat Recovery Rate: 560,000 Btu/hr

Use of Thermal Energy: Domestic Hot Water

Project Cost: \$314,000 (after incentives)

Project Payback: Estimated 6 years

Began Operation: August, 2017

An automated system is installed that continually monitors key operating points in the CHP system. The information can be accessed on site at The Switch and/or remotely at the Loftus Robinson offices in Indianapolis. The system automatically issues an email if it detects any issues, warning the recipients of the issue so steps can be immediately taken.

Should the local electric grid go down, the CHP system is designed to automatically disconnect from the electric grid and function as an emergency generator, automatically providing back-up power for the parking garage, building elevators and emergency lighting areas. Once the local electric grid is restarted, the CHP system is reconnected to the grid and returns to its normal operation (providing electricity and recovered heat to the office/retail tenants and electric vehicle chargers).

Project Economics

Loftus Robinson based its investment decision on a projected 6 year simple payback on the total installed project cost. Experience to date shows the unit should log about 7,335 hours per year, generating an estimated 950,616 kWh per year. With a utility cost of \$0.10/kWh, the system can generate \$95,062 in annual electric savings. Even with only a 50% thermal utilization factor, the CHP system's recovered heat displaces up to 2,567 MMBtus of natural gas used annually that

Project Partnership

Loftus Robinson (the building and CHP owner) received a \$100,000 grant from the Indiana Office of Energy Development to offset the total installed cost of the project. The grant was issued under the State's Community Conservation Challenge Program. In addition, the City of Fishers, Indiana contributed funds to the project in an amount originally earmarked for an emergency generator to support the parking garage. The CHP system is designed to provide emergency services to both the garage and Switch office building, saving the City from ongoing management and maintenance expenses associated with an emergency generator.

otherwise would be used to fuel an 80% efficient water heater. At \$4.87/MMBtu, this would equate to an annual natural gas savings of \$12,503.

On the cost side of the ledger, the CHP system would consume \$45,931 in natural gas annually (9,432 MMBtu X \$4.87/MMBtu) and the system is experiencing \$7,605 in annual O&M costs (\$0.008/kWh).

The above project economics result in a net annual savings of \$54,029. With the total installed project cost of the system at \$314,000 (including the \$100,000 grant from the Indiana Office of Energy Development), the simple payback comes out to 5.8 years.

Lessons Learned

The following are a few of the comments, thoughts, and lessons learned expressed by the Loftus Robinson Team following 8 months of operation of the CHP system:

- Although the primary use for the recovered waste heat was to provide hot water to the restaurant tenants, the existing thermal load only permits a 50% thermal utilization factor by the CHP system. Loftus Robinson is now evaluating other areas of the building (such as the modification of the vestibule heating system) to allow for the expanded use of the available waste heat.
- Early discussions with the local electric and natural gas utilities on interconnecting with their systems are imperative. Understanding and integrating their requirements into the project design phase can minimize costs and avoid unexpected delays.
- The CHP system performance over the first 18 months has been very satisfactory once initial start-up issues (mostly adjustment of settings to optimize performance) were resolved, which can be typical to CHP start-ups.
- The CHP system also benefits the environment. Considering the reduction of greenhouse gases generated at the central station power plant resulting from the efficiencies inherent in CHP systems, this unit has a net reduction of an estimated 200 tons of CO₂ emissions annually.



135 kW Packaged CHP System

For More Information

U.S. DOE MIDWEST CHP Technical Assistance
Partnership

Phone: (312) 996-4490

www.MidwestCHPTAP.org