

PEER

MONTGOMERY COUNTY PUBLIC SAFETY HEADQUARTERS

CASE STUDY

OCTOBER 2018



Montgomery County PSHQ is the first of its kind to achieve PEER Platinum certification.

“The PEER certification for our advanced microgrid at the Public Safety Headquarters in Montgomery County, Maryland is a strong validation of Schneider Electric’s dedication to helping communities achieve sustainable power performance. With our trusted partner Duke Energy Renewables, our Microgrids-as-a-Service offering is helping companies and communities develop a roadmap for more sustainable energy usage and to have further autonomy of their energy usage.” - Mark Feasel, Vice President, Utility Segment, Smart Grid & Microgrid, Schneider Electric.

To ensure more reliable, resilient and efficient power to the state, Montgomery County, the most populous county in the state of Maryland, desired to come up with an advanced microgrid deployment at their Public Safety Headquarters (PSHQ) as a strategy to strengthen resiliency, reduce emissions and enhance sustainability in their state. Funded by **Schneider Electric’s innovative Microgrid-as-a-Service (MaaS)** business model, PSHQ generates clean, **on-site power through solar energy system & natural gas generators** to enable uninterrupted power supply during emergencies. **Duke Energy Renewables provides the key maintenance services for the microgrid.** PSHQ’s strong commitment towards sustainability and to evaluate their electrical infrastructure using a global standard - **Montgomery County PSHQ pursued PEER certification and achieved Platinum rating** after undergoing a rigorous certification and review process.

KEY HIGHLIGHTS OF MONTGOMERY COUNTY PSHQ

The project has achieved significant benefits through energy efficiency measures. The cumulative savings achieved per annum are:

-  Saved 12 million units of energy
-  Mitigated 11 kilotons of CO₂ emission
-  Cost savings of \$486,000

EXCELLENT MICROGRID PERFORMANCE

The Public Safety Headquarters is the county’s largest at nearly 400,000 sq. ft. and its surrounding campus is a long-term investment for Montgomery County. PSHQ houses police and fire dispatch and

administration, holding cells, evidence lockers, forensic laboratories, data and call centers and training facilities. This facility houses critical operations to the county and is operational during natural and manmade crises. For efficient operations and management of their services, power is critical to their facility.

The PSHQ building receives power from **Potomac Electric Power Company's (PEPCO) two 13.2kV feeders** (one acting as an alternate supply) provided with medium and low voltage switchgears. This acts as a **protection equipment as well as a switch between the main feeders and the facility's own microgrid supply**. All the breakers are electrically operated and are controlled by the microgrid controller discussed in the next section, except the generator feeder breakers which are manually operated.

As alternate to the main grid supply, PSHQ has the **Combined Heat & Power (CHP)** system installed within its project boundaries which has a **natural gas reciprocating engine**, coupled with heat recovery to the building's boiler system and an absorption chiller with chilled water recovery to the building's chilled water system. This CHP system can operate in **grid-parallel mode and in island mode** during times of grid outage and it is operated 24/7 at a constant output of **760kW**. CHP system is installed on a **raised pad with bollard protection** and is also equipped with **SensAlert gas monitoring system and conventional fire detector system**. Transformers and solar panels are also protected by fence to prevent unauthorized access.

All critical loads are identified and are powered from a separate diesel generator. Project control system and server are equipped with individual UPS (Uninterruptible Power Supply) units to provide backup power until generator system is online. **Standby natural gas generators (2 x 1MW) and CHP (0.8MW) are sized to provide power to the entire building** (max building load is 1.9MW). The 2.8MW generators are powered via **natural gas and can run the full building load for over a week**. During island mode (loss of utility service), the PV system will be connected onto the grid. There is **1.9MW of solar generation capacity available** on this site,



Figure 1. Aerial view of Public Health Safety Headquarters

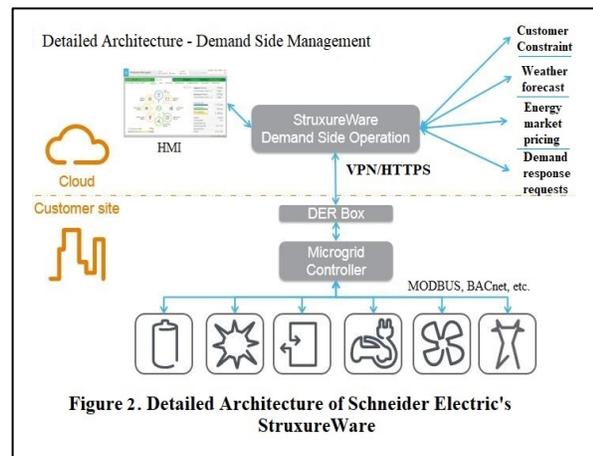
but this will be reduced in island mode for stability purposes. The microgrid's **electric cables are 100% underground** that includes both electrical feeders and solar PV system. With a strong electrical infrastructure and microgrid system in place, PSQH serves as a highly reliable campus with a **SAIDI (System Average Interruption Duration Index) minutes of 21.0** and **SAIFI (System Average Interruption Frequency Index) number of 0.06** showcasing their reliability performance.

ADVANCED METERING AND COMMUNICATION INFRASTRUCTURE

Advanced metering covers 100% of the building's loads. **Schneider Electric's PowerLogic™ ION7650 meters** offer advanced power quality analysis coupled with multiple communications options, web compatibility and control capabilities. These meters can be easily integrated with their respective software or with SCADA (Supervisory Control and Data Acquisition) systems via multiple communication and protocols.

Another excellent improvement to the PSHQ microgrid is **Schneider Electric's StruxureWare™ Power Monitoring Expert** which is a complete, interoperable, and scalable power management software solution that enables the facility to optimize their power distribution infrastructure, maximize operational efficiency, and improve their bottom-line performance and it also provides the facility with **automated power quality reports and waveform analysis tools**.

This implementation helps PSHQ to maximize facility uptime and reliability, examine and mitigate power quality related issues and track energy consumption to uncover savings opportunities. Schneider Electric has partnered with **Soundmind Network Solutions** to provide managed **next generation firewalls and ethernet switches for the microgrid ethernet infrastructure** at Montgomery County. This includes design, installation, centrally monitored and managed Palo Alto Network's next generation firewalls, with current support contracts and threat prevention subscriptions.



CONTINUOUS IMPROVEMENT THROUGH SUSTAINABILITY INITIATIVES

PEER emphasizes implementing comprehensive energy efficiency programs under the **Distributed Energy Resources (DER) credit**. District energy system (DES) enables the use of large, energy-efficient equipment,

concentrating the production of heating or cooling in one location can be more efficient than having smaller units distributed across buildings.

PSHQ has the capability to meet 100 % of its power consumption from the onsite solar, natural gas generator and the CHP system. On the other hand, **100% of PSQH's heating & cooling loads is met through the district energy system (DES)**. By demonstrating the above infrastructure capabilities, PSHQ realized an overall annual **energy savings of 12 million units as well as a cost savings of \$ 486,000**. Installation of CHP & solar has helped Montgomery County PSHQ to reduce **carbon emission of 11000 tons per annum**.

PEER CERTIFICATION:

PEER, or Performance Excellence in Electricity Renewal, is the first certification dedicated to measuring and improving power system performance. Applicable to any power system or electricity infrastructure, PEER-certified systems gain a competitive advantage by differentiating their performance, documenting the value produced and demonstrating meaningful outcomes. The PEER Rating System includes four credit categories:

- ▶ Reliability and Resiliency (RR)
- ▶ Energy Efficiency and Environment (EE)
- ▶ Operations, Management and Safety (OP)
- ▶ Grid Services (GS)

PEER Certification for Campus Projects	
Certified 24 October 2018	
Total Points Achieved	82
Reliability and Resiliency	26
Energy Efficiency & Environment	23
Operations, Management & Safety	28
Grid Services	14
Innovations & Regional Priority	01
Total Possible Points	110

Out of a possible 110 points, Montgomery County PSHQ **earned 82 points achieving PEER Platinum certification under version 2** of the rating system as a Campus project. Additionally, PSHQ met all the prerequisites including reliability performance monitoring, environmental performance disclosure, system energy efficiency coefficient disclosure, triple-bottom-line analysis, and load survey. PEER Platinum certification demonstrates that Montgomery County PSHQ microgrid has set a global benchmark around

the world by providing a resilient and reliable power infrastructure for its safety operations to its county.

About PEER

Performance Excellence in Electricity Renewal (PEER) is a rating system and certification for defining, assessing and verifying the overall sustainable performance of electricity delivery system design & operations. PEER is designed to deliver sustainable, resilient and reliable energy around the globe. Learn more: peer.gbci.org