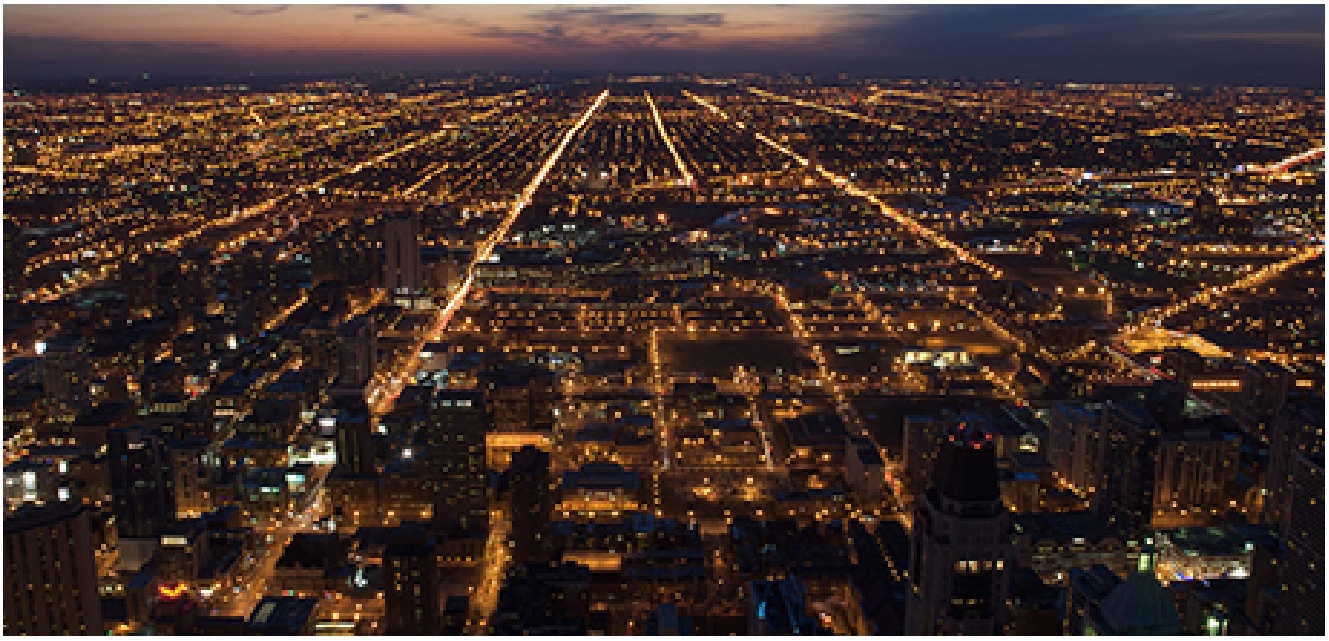

Potential benefits of microgrids for hospitals

January 5, 2018

For hospitals, a major power outage can pose a serious threat to the health of patients. In the wake of various hurricanes and severe storms in 2017, there has been a renewed focus on ways to increase reliability and resiliency for hospitals beyond traditional backup diesel generators. One option that has been discussed recently is microgrids.

This article discusses what constitutes a microgrid and summarizes some of the potential benefits microgrids can provide hospitals. In addition, this article discusses AEP-Ohio's proposed microgrid demonstration project. If AEP-Ohio's proposal is accepted by the Public Utilities Commission of Ohio (the Commission), a medical facility within AEP-Ohio's service territory may be eligible to be selected to host a microgrid.

What is a microgrid?

A microgrid is small-scale energy system that contains loads and distributed energy resources (DERs) (such as generation, storage or controllable loads) within a clearly defined boundary that acts as a single controllable entity. A microgrid can connect to and operate in parallel with the larger electric grid system. However, the key aspect of a microgrid is its ability to disconnect from the electric grid, which allows the microgrid to "island" itself and continue to operate while separated from the electric grid. Another important aspect of a microgrid is its ability to independently manage the DERs in a systematic and coordinated manner.[1]

How is a microgrid different from emergency backup generation?

The ability to seamlessly separate from the electric grid while efficiently and reliably maintaining power distinguishes microgrids

from traditional backup generators. Emergency backup generators are critical for hospitals when there is a power outage, but these generators are not typically designed to run for extended periods of time. In addition, backup generators typically need time to start up before supplying power, so hospitals can suffer interruptions during a blackout until the backup generators do so. Further, although hospitals are required to frequently test their backup generators, these generators can fail when an actual emergency occurs. For example, during a blackout in 2003, half of New York City's 58 hospitals suffered failures in their backup power generators.[2]

Diesel generators can serve an important role in microgrids and are often combined with other generation resources and storage in microgrids, which provides redundancy and additional reliability. However, unlike standalone backup generators, microgrids can proactively sense the quality of the power flowing through the larger electric grid and disconnect from the grid at a moment's notice if there is an outage. Further, when the electric grid is operating effectively, a microgrid that is generating electricity from renewable sources can deliver energy to the grid for revenue or potentially earn revenue for providing valuable services (such as demand response and frequency regulation) to the regional electric transmission market.

Recent weather emergencies have demonstrated the value of microgrids

Microgrids are not a new technology. A number of colleges and universities have been operating microgrids for decades. However, after Hurricane Sandy hit the northeastern portion of the U.S., many entities started taking a closer look at the potential benefits of microgrids. During the superstorm, microgrids in New York and New Jersey maintained power. In particular, South Oaks Hospital in New York transitioned its microgrid to "island" mode during Sandy with no interruption of power.[3]

During Hurricane Harvey, H-E-B grocery stores in the Houston area were able to remain open despite power outages and massive flooding. These stores became refuges from the flooding and storms because of their microgrids. In addition, the Texas Medical Center in downtown Houston was able to maintain power during the flooding due to its microgrid.

AEP-Ohio's proposed microgrid project

In a case currently pending before the Commission, AEP-Ohio committed to developing one or more pilot microgrid projects as part of its Smart City Columbus initiatives.[4] The costs of the microgrid project(s) are not to exceed $10.5 million, which will be recovered through AEP-Ohio's proposed "Smart City Rider". The pilot microgrids will be limited to nonprofit, public-serving entities in AEP-Ohio's territory, which includes medical facilities.

The pilot project will serve as a "demonstration" project, and AEP-Ohio will share information regarding the project with Commission staff and Smart City Columbus. AEP-Ohio has agreed not to own generation or battery resources involved in the pilot project. In addition, AEP-Ohio may implement rebates to help eligible customers pay a portion of the cost of onsite generation related to the microgrids.

AEP-Ohio's microgrid proposal is still pending before the Commission. A decision regarding the proposal is expected to be issued by the summer of 2018. This pilot microgrid proposal likely will be limited to one microgrid. Further, non-medical facilities (such as fire stations and police stations) will also be eligible to host the pilot microgrid if the Commission approves AEP-Ohio's proposal. However, medical facilities in AEP-Ohio's territory that are interested in the pilot project should monitor the case for this potential opportunity.

The benefits of microgrids

Reliability and resiliency – According to the U.S. Department of Energy, the U.S. suffers more power outages than any other nation in the developed world.[5] Microgrids can help protect customers from these outages. Microgrids provide a reliable source of power independent from the electric grid as well as an additional sense of security in emergency situations. In addition, microgrids have proven to be resilient in major blackouts, hurricanes and floods.

Economic benefits – Not only can microgrids provide power to hospitals when an emergency occurs, but they can also financially benefit hospitals. Because microgrids can interconnect with the electric grid, microgrid owners can use DERs to provide valuable

services, such as demand response and frequency regulation, to the regional electric transmission market. In addition, hospitals can substantially reduce their energy costs by generating their own electricity. Depending on the cost of energy, a microgrid owner can potentially earn money by generating its own power rather than purchasing electricity from its local utility or a competitive energy supplier.

Reduction of carbon footprint – Microgrids can also reduce carbon dioxide emissions. Many microgrids include renewable resources into the DERs located within the microgrid. These renewable resources can be used in conjunction with a diesel generator or combined heat and power generator, which provides redundancy and reduces reliance on fossil fuel powered generation. In addition, energy storage systems allow microgrid owners to more effectively use solar energy resources and reduce overall demand on the electric grid.

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[1] For a more technical definition of "microgrid," see https://energy.gov/sites/prod/files/2016/06/f32/The%20US%20Department%20of%20Energy%27s%20Microgrid%20Initiative.pdf

[2] https://www.epa.gov/sites/production/files/2015-07/documents/valuing_the_reliability_of_combined_heat_and_power.pdf

[3] http://www.ase.org/resources/chp-kept-schools-hospitals-running-amid-hurricane-sandy

[4] AEP-Ohio, PUCO Case No. 16-1852-EL-SSO, Joint Stipulation and Recommendation at pgs. 12-14 (August 25, 2017).

[5] http://www.offthegridnews.com/grid-threats/study-us-power-grid-has-more-blackouts-than-entire-developed-world/

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