



Montgomery County Microgrid Opportunity



Overview For The Rockville Community

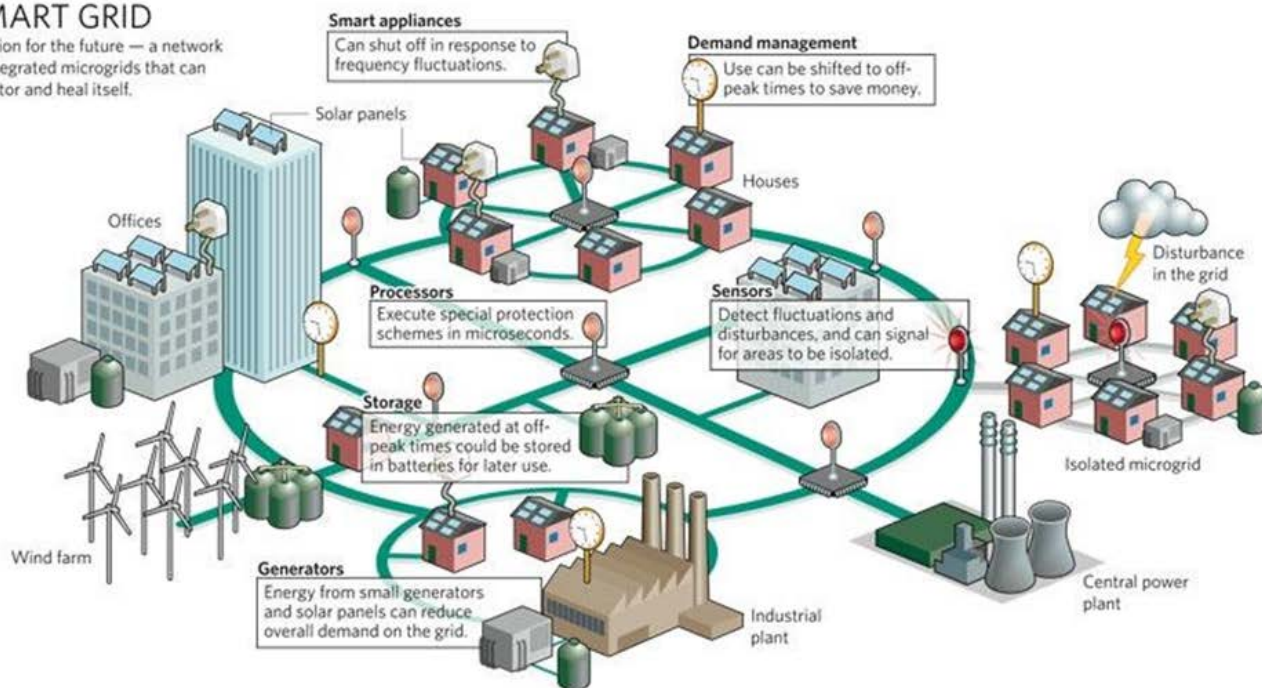
November 14, 2017

Electric Distribution System of the Future

- Guiding the development of smart grid technologies has been PHI's vision to empower its customers, improve system reliability, facilitate the integration of distributed and renewable generation resources, and achieve operational efficiencies to create a smarter grid in a safe and secure manner
- Since its merger with Exelon, Pepco continues its commitment to grid modernization

SMART GRID

A vision for the future — a network of integrated microgrids that can monitor and heal itself.



Electric Distribution System Improvements

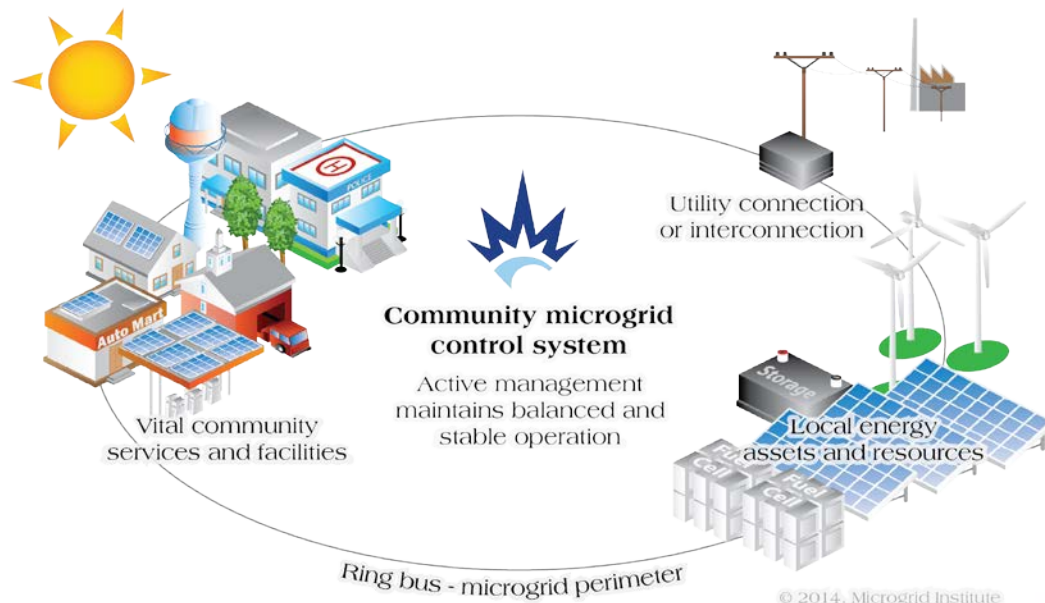
- Over the last 5 years, Pepco has invested \$750 million in its distribution system to improve day to day reliability
 - The frequency and duration of outages in Maryland has improved by nearly 50% since 2013.
- However, similar to other areas, the Pepco system is not invincible to major weather events
- Multi-day outages lead to major disruption for our customers
 - Montgomery County's Department of Emergency Management and Pepco follow their emergency plans to manage life threatening situations
- Public purpose microgrids are a solution to allow our customers to fulfill their essential needs until full power is restored.

Major Grid Events Across the United States

| Year | Event | Customers Without Electric Power |
|------|---|----------------------------------|
| 2017 | Hurricane Maria – Puerto Rico | 3 million |
| 2017 | Hurricane Harvey – Texas, Louisiana | 400,000 |
| 2017 | Hurricane Irma - Florida, Georgia, South Carolina | 7.6 million |
| 2016 | Hurricane Hermine – Florida, Georgia | 350,000 |
| 2015 | Wind Storm – Washington | 161,000 |
| 2012 | Hurricane Sandy - 17 states including Maryland | 7 million |
| 2012 | Derecho - 9 states including Maryland | 3.8 million |

What is a Microgrid?

- Definition: A small network of electricity users with a local source of supply that is usually attached to a centralized grid but is able to function independently if required.
- Public purpose microgrids serve the customers within the microgrid as well as the greater community.
- Participants should be critical community assets that provide important community functions (community centers, hubs, emergency services, hospitals, gas stations, etc.).

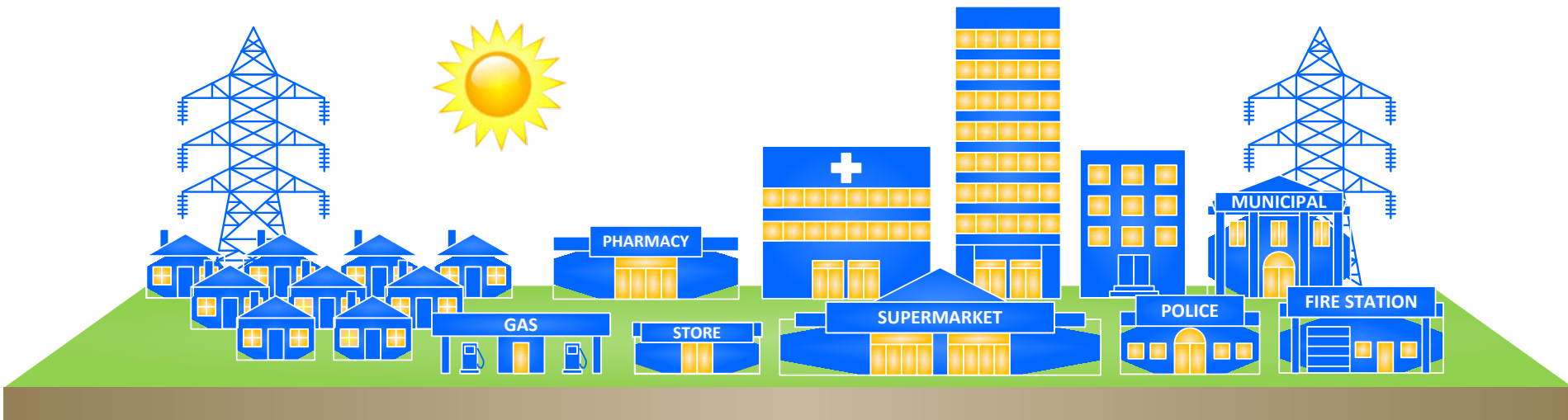


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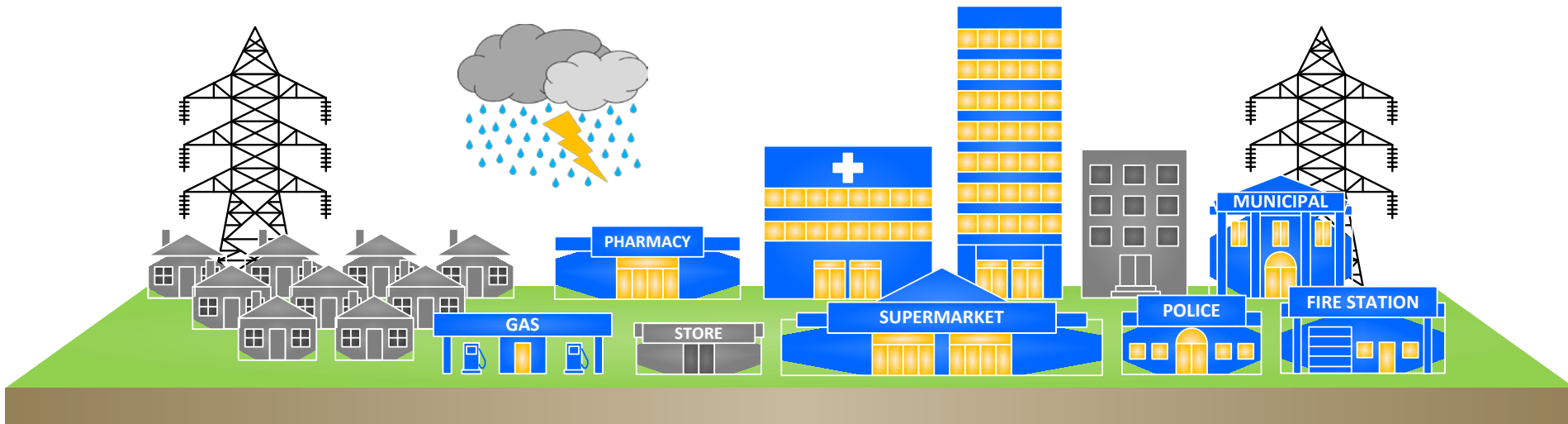
An Exelon Company

Normal Operating Day



- The local distribution grid provides electric power to the entire community.

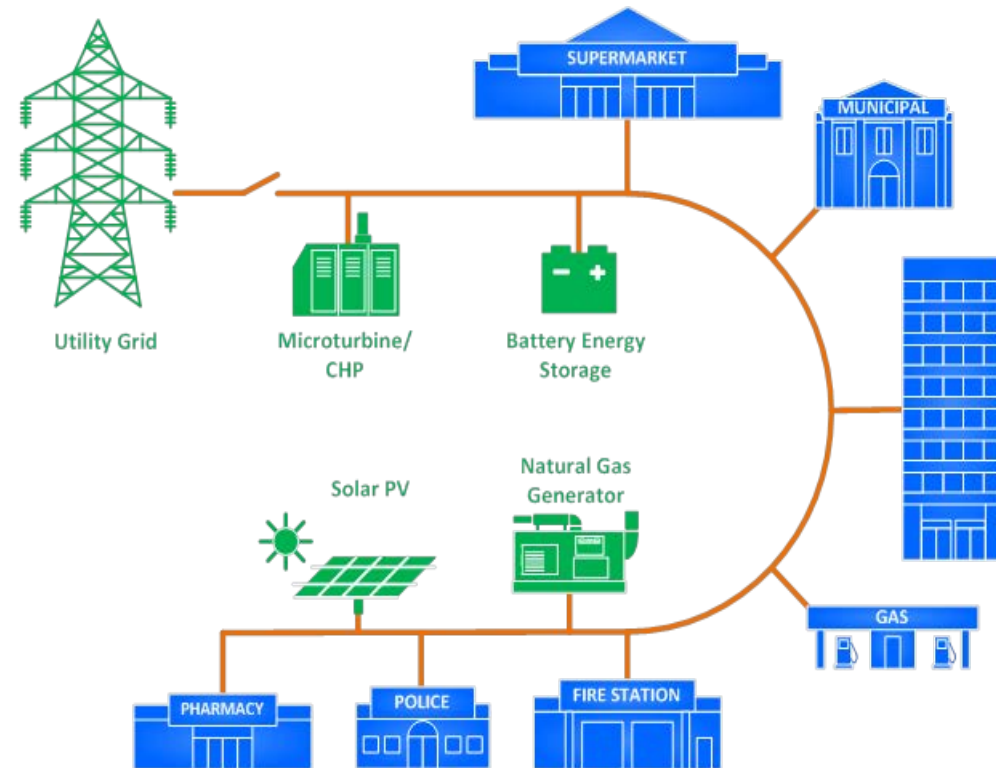
Grid Disturbance – Microgrid Operating Day



- Following a disturbance in the local grid, the microgrid will “switch” on.
- The microgrid allows essential businesses and facilities to continue operations and serve the public while full power is restored to the rest of the community.

Proposed Power Sources for Rockville Microgrid

- The facilities on the microgrid may be powered by a variety of sources including
 - Microturbines/Combined Heat & Power (CHP)
 - Battery Storage
 - Natural Gas Generators
 - Solar PV
- These technologies are more environmentally friendly than backup diesel generators.
- Collectively these technologies provide a more resilient level of service than diesel generators.



Public Purpose Microgrid Benefits

- Public access to essential services and stores
- Significant reduction in outage times and loss of business
- Safety and Security
- Building a strong portfolio of sustainable energy measures (solar generation, GHG reduction, energy efficiency, loss reduction, etc.)
- Preventing/reducing the need for running environmentally unfriendly diesel generators on essential facilities
- Gaining knowledge of emerging technologies
- Community involvement
- Supporting business growth and job creation

Montgomery County Microgrid

- Per the Exelon merger commitment, Pepco agreed to submit a public-purpose Microgrid proposal to the Maryland Public Service Commission. Pepco has worked with Montgomery County to review several locations for hosting the microgrid.
- Sections of downtown Rockville emerged as an ideal location that could serve the community during periods of prolonged outages.
- Identified participants include emergency response services, government (county and city) services, multiple grocery stores and gas stations, and a pharmacy.

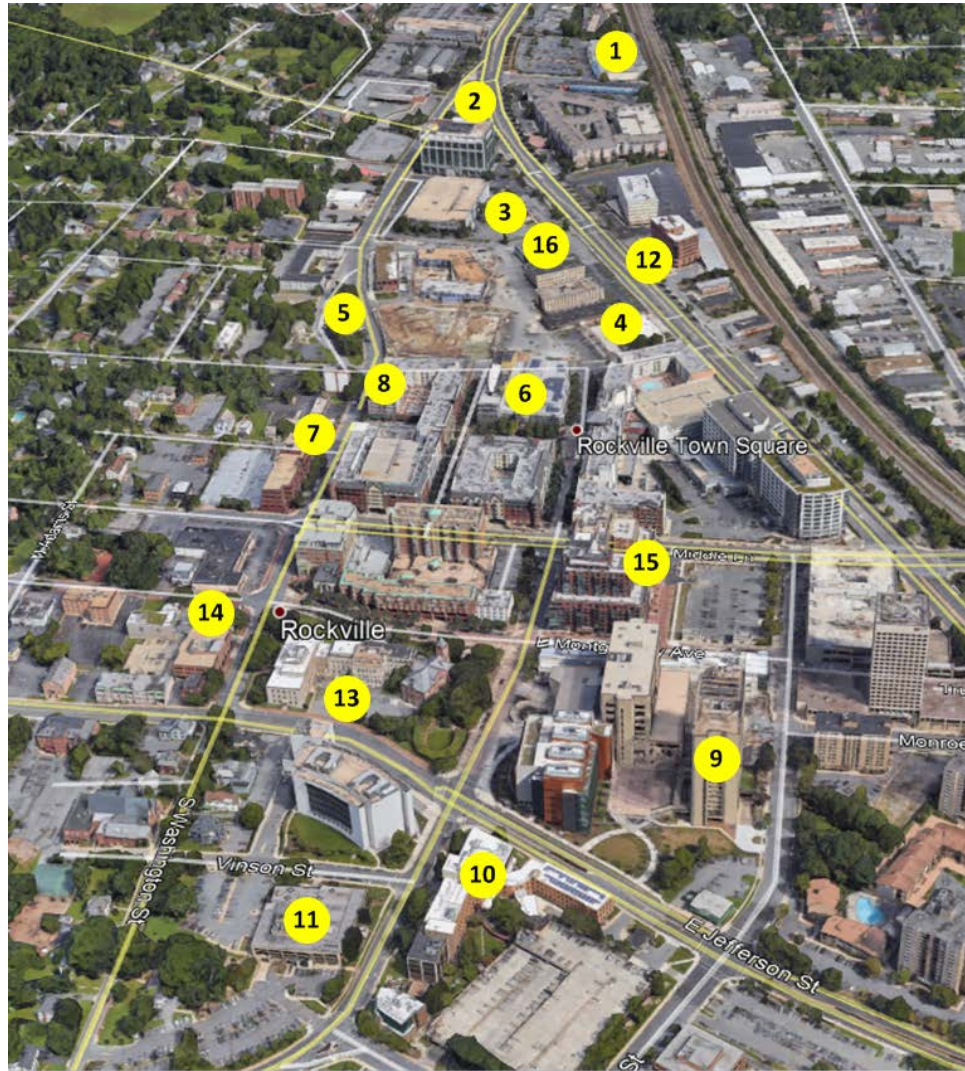


About the Montgomery County microgrid project

- This microgrid project would create an electrically resilient safe harbor in the center of the city in the case of a major power grid event (e.g. severe weather).
- Rockville would become a hub for the community and its infrastructure to recover from a major disruption.
- The Montgomery County community would have access to uninterrupted nearby emergency response services, food, gas, ATMs, and pharmacy services.
- The City of Rockville and its coordination with County emergency services would greatly benefit.



Rockville (population 298,484 within 5 mile radius)



Public Value Categorization

Category 1

Public Health
& Safety

- 4. Fire Station
- 9. Executive Office Bldg/Judicial Ctr
- 10. Council Office Bldg
- 14. Police Station

Category 2

Essential
Public Needs

- 1. Grocery Store #1
- 2. Gas Station #1
- 3. Grocery Store #2
- 5. Gas Station #2
- 7. Gas Station #3
- 8. Grocery Store #3
- 16. Pharmacy

Category 3

General
Public Needs

- 6. Library [1]
- 9. Executive Office Bldg (non-EMS)
- 11. City Hall
- 12. HHS
- 13. Grey Court House
- 15. Hotel

Other

- 6. Innovation Center [1]

[1] Duplicate numbers indicate collocated participants

Rockville Microgrid Development

- In order to create this microgrid, Pepco would make modifications to its current electrical infrastructure in the vicinity of Rockville Town Center by installing a new distribution line from Pepco's nearby Rockville substation.
- Pepco would transfer the potential microgrid customers onto the new distribution line.
- Work in the downtown Rockville area may include accessing existing manholes, service boxes, and poles as well as other distribution facilities in the area.
- Construction work for the line would occur over approximately a 6-9 month period and may require short-term street/sidewalk closures or traffic modifications.



Next Steps

- If Rockville is selected as the location to host the County's microgrid Pepco will:
 - Continue to conduct outreach in the Rockville area for both microgrid participants and the greater public to ensure the microgrid will serve as a hub to the community during emergencies.
 - Coordinate with the County and City for planning and deployment of the microgrid including:
 - Necessary construction permits.
 - Emergency management logistics during a major outage event.
 - Submit a completed proposal to the Public Service Commission by February 15, 2018 requesting notice of approval by June 1, 2018.
 - If approved, the microgrid will be completed within 5 years.