## CHP Systems: Added Value for Microgrids

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## **Topics to Be Covered**

Evolution of the Electric Power Supply Industry What is Combined Heat & Power Description of Case Study Estimated Performance Estimated Costs Estimated Savings

### **Evolution of the Electric Power System**



Source: Journal of Database Marketing & Customer Strategy Management (2010)

### What is Combined Heat & Power

Combined Heat and Power (CHP) systems <u>sequentially</u> produce both electricity and useful heat at a facility

- Typically, 60% to 85% efficient
- Uses any environmentally acceptable fuel
- Natural gas is most common



# **Description of Case Study**

Host Facility: Large Hospital in Maryland Electricity use: 28,500 MWh/year (Grid-Supply) Natural gas use: 76,400 MMBtu/year

<u>Microgrid 1:</u> 4,000-kW E-G 200-kW Solar PV 600-kW Battery Microgrid 2: 4,000-kW CHP 200-kW Solar PV 600-kW Battery

## Estimated Microgrid 2 Performance

**Electricity use (MWh/year):** 

4,000-kW CHP :	26,200
200-kW Solar PV:	440
600-kW Battery:	1,020
Electric Grid:	<u>    840  </u>
	28.500

Natural gas use:(MBtu/year):From CHP System:66,350 (Equivalent)From Gas Utility:10,050

76,400

Estimated Capital Cost Net of Incentives, Tax Off–Sets, Etc. (Million Dollars)

### Microgrid 1 (E-G)

- E-G System: \$4.5
- All Other Items: 2.0 \$6.5

### Microgrid 2 (CHP)

- CHP System: \$0.0\*
  - All Other Items: 2.0 \$ 2.0

\* Lead Host facility pays \$5.0 million net cost

## Estimated Savings (Million Dollars)

## \$4.5 saved by installing CHP!