DISTRICT ENERGY: Deploying Clean Energy Microgrids in the Nation’s Capital

Prepared for the Department of Energy and Environment

September 2015
Microgrids 101: An Introduction
What are Microgrids?

- Small energy system capable of balancing captive supply and demand resources to maintain stable service within a defined boundary
- Combines distributed generation (DG) resources
- Can work as an “island,” separate from the large grid, in case of outages
The Three Types of Microgrids

1. **Isolated microgrids**, islands, and other remote sites are not connected to a local utility grid.

2. **Island-able microgrids** are fully interconnected and capable of both consuming and supplying grid power, but can also maintain some level of service during a utility outage.

3. **Non-synchronous microgrids** are connected to utility power supplies, but aren’t interconnected or synchronized to the grid (can consume power from the grid but can’t supply it).
What is District Energy?

- Uses steam or hot and chilled water to provide heating and cooling to many buildings
- Often include combined heat and power (CHP) plants to meet both electric and thermal needs
Microgrid and DG Technology

Cogen & Thermal:
• Gas or diesel cogeneration
• Combined Heat Power (CHP)

Renewable Energy:
• Fuel cells and microturbines
• Solar Photovaltaic (PV)
• Geothermal

Storage and Controls:
• Storage capacity (batteries, Flywheel)
• Energy management and automation systems
Why Microgrids and District Energy?

- Microgrids combine local energy assets, resources, and technologies into a system to satisfy host requirements.
- Provides economies of scale that are necessary to make alternative and renewable fuels practicable.
- More reliable, efficient, cost-effective energy infrastructure for the community.
Operational Benefits

Microgrids improve system reliability, reduce costs, and provide other operational benefits:

• Cut energy demand and fuel use by integrating renewables, demand management, and reducing energy losses
• Lower maintenance costs and operational expenses
• Improved reliability and resiliency of electricity and thermal systems
• ‘Future proof’ energy systems by allowing easy integration of newer, more efficient technology as it is developed
Microgrids support community infrastructure and environmental sustainability:

- Cut carbon emissions, other waste, and pollution
- Improve grid security and system efficiency
- Reduces the need for new transmission and distribution infrastructure
- Boost economy through infrastructure investment and local job creation
- Create competitive advantage for local businesses
- Back-up power for critical community infrastructure
Microgrids improve the bottom line for property owners and local businesses:

• Reduced energy costs and more predictable energy expenditures for property owners and businesses
• Displaces the need to install separate space heating and cooling and hot water systems in each building, reducing building capital costs
• Retain more money in the local economy
• Increase investment through public private partnerships
Thank You

Urban Ingenuity
7735 Old Georgetown Road, Suite 600
Bethesda, MD 20814
301-280-6600
info@urbaningenuity.com