

# District Energy Systems and Microgrids



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- Why a microgrid?
- Assets
- Financial support
- Regulatory

# Why a Microgrid?

## Intelligence Moving to The Edge of the Grid: Local Generation + Dynamic Load Management

### Major Trend #1:

*New and expanded distributed energy resources:*

- Clean DG
- Smart buildings
- Storage



### Major Trend #2:

*Grid evolving: As older centralized resources retire, distributed resources increase market share.*

- Inter-coordinated
- Self-scheduling
- Self-healing



# Key Assets of the Microgrid



- **Smart Buildings**
  - Grid Aware Buildings
  - Modulate consumption vs. price, comfort
- **On-Site Generation**
  - Combined Heat & Power
  - Intermittent renewables - solar, wind
  - Geothermal
- **Storage**
  - Firm up intermittent renewables
  - Ride through disruptions
  - Sell services to the grid
  - Electric vehicles
- **Communications Infrastructure & Information Management**
- **Command and Control Infrastructure**
- **Power Flow Management**
  - Ensure stability and reliability of microgrid network
  - Stay within voltage and current limits

- Make the best use of what you already have
- Focus on projects that make real progress toward goals
- Maximize use of non-customer \$
- Minimize risks of large bets on particular technology
- Find opportunities for test-bedding
- Scale up with increasing speed and confidence

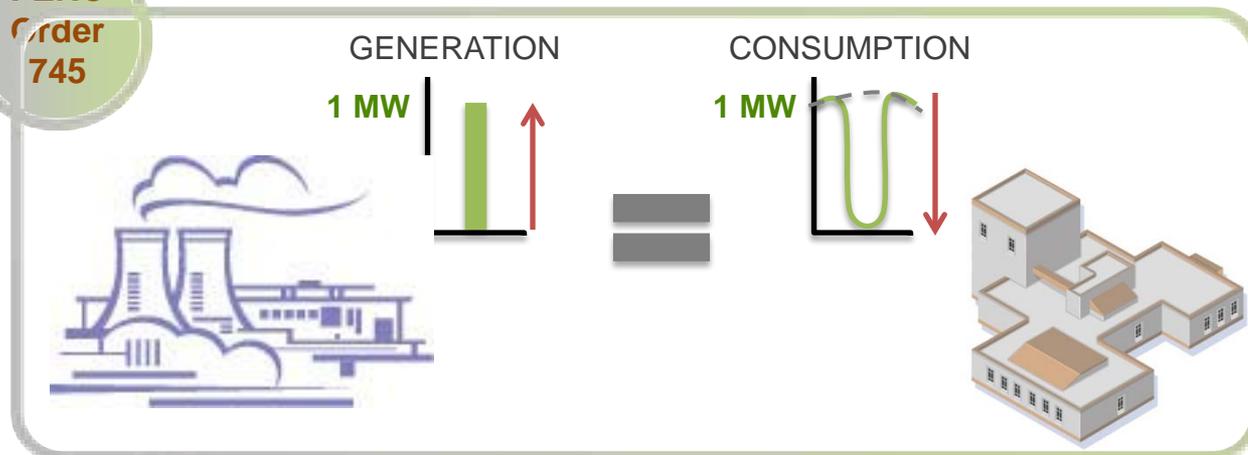
## Financial support: Sources



- Customer \$
- Cost Reductions/hedges/stabilizers
- Improve retail procurement
- Financial assistance
- Wholesale electricity market revenues

# Financial support: Recent regulatory developments help!

FERC  
Order  
745

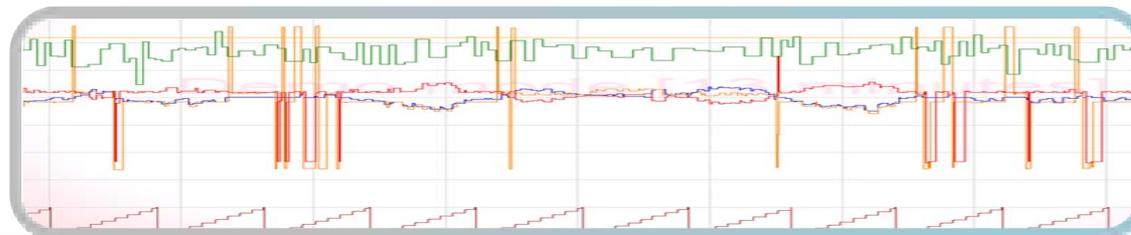


- Increased supply, decreased demand paid on the same terms

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- Demand resources can provide reserves, regulation; fast-responding regulation is paid for performance



## Wholesale

- Demand Resources - Real-Time Energy Market
- Demand Resources - Day-Ahead Energy Market
- Demand-Side Ancillary Services Program
- Baselines

## Retail

- Regulation as “public utility”
- Utility costs w/microgrids
- Net metering

# Smart Grid in Action: Con Edison Smart Grid Demonstration Project



Goal: Deploy smart grid technology within New York City  
 Demonstrate ability to integrate and optimize distributed energy resources  
 Enhance efficiency, reliability and economic savings for the utility & customer.

- Using VPower™, Viridity's Network Operations Center serves as one of the Microgrid Coordinators for Con Edison's smart grid deployment
- As additional buildings and campuses are enrolled in the program, Viridity is one of the distributed resource management hubs that ensures proper integration of demand and distribution





Viridity Energy Inc.,  
Network Operations Center  
Philadelphia, PA

VPower™

Lower Manhattan  
10 Buildings



Long Island City  
LaGuardia CC  
2 Buildings



**ISO**  
New York ISO  
Control Center  
06/18/2011

**NYCEDC 2 Locations**

Brooklyn Cruise Terminal  
Brooklyn Army Terminal



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**THANK YOU!**

