

# Resilience in Public Facilities



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# 3D+E equation redefining the energy world...

## 1 Decarbonization



Huge growth forecast for variable renewables

Solar PV and Storage  
are expected to count for **32%**  
of new capacity additions by 2030

**MORE  
ELECTRIC**

## 2 Digitization

Proliferating automated devices connecting the “grid of things”

Big data integration  
Internet of Things will connect **50bn devices** by 2020



Global energy  
consumption will  
increase by 40% in  
next 25 years ...  
and electricity  
consumption will  
increase by 80%

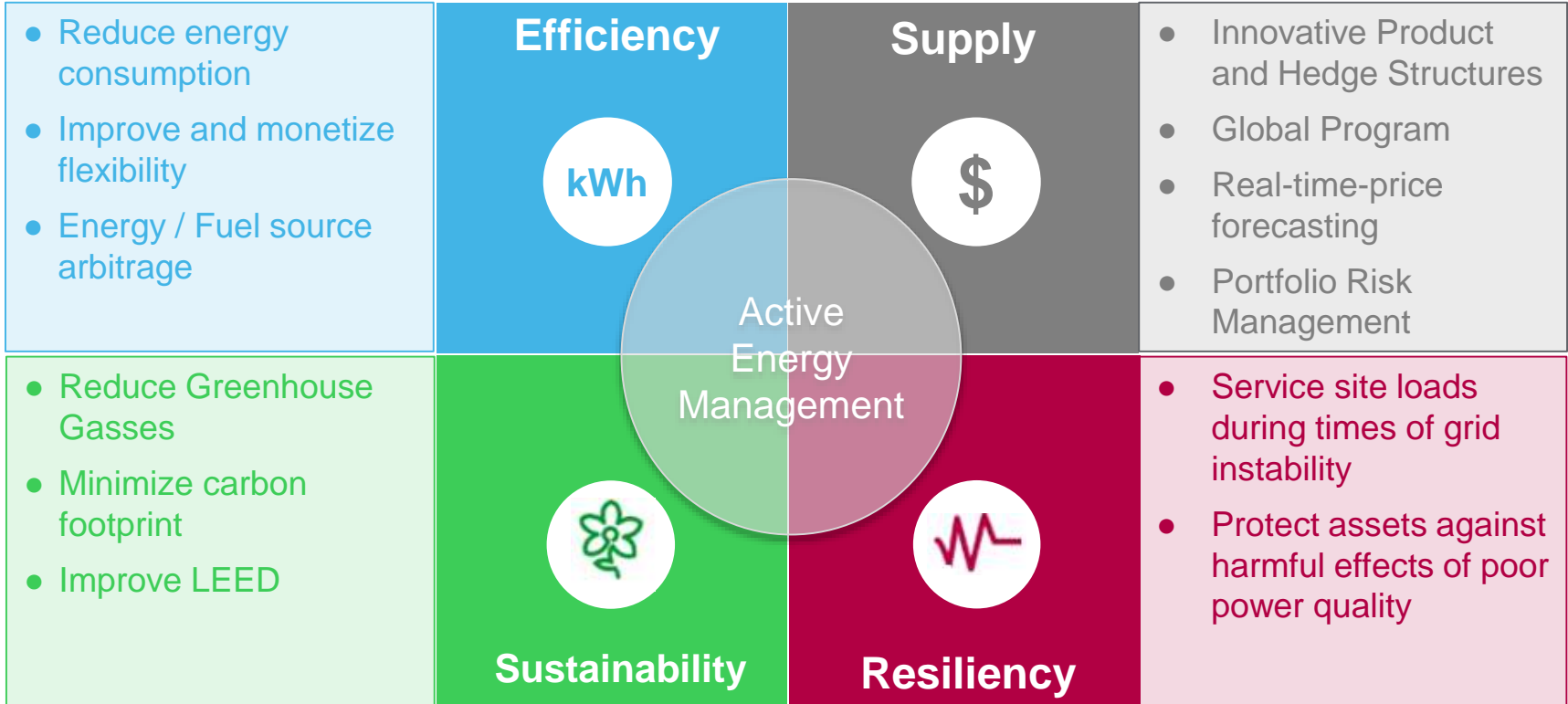
## 3 Decentralization

Expanding energy consumerism  
(smart homes, self-generation, EVs, financing services)

Prosumer challenge  
**57%** of consumers consider becoming power  
self-sufficient

# Unlocking Active Energy Management with Microgrids

## Microgrid Value Propositions



# Microgrid Business Models

## CAPEX (or EPC) Business Model

Developer builds and delivers the turnkey energy solution. You own, operate and maintain it – or, we can provide ongoing services.



## OPEX (As a Service or PPA/Lease) Business Model

Developer and an Investor Partner build, own, operate, and maintain the turnkey energy solution. You buy electricity from the Investment Partner at an indexed PPA/Lease price.





# Cases Studies

## Montgomery County – Schneider/Duke Energy Renewables Microgrid Project:

- Generate energy locally
- Ensure resiliency of two critical facilities from widespread and long power outages
- Improve building infrastructure and capability
- Reduce greenhouse gas and other emissions
- Stabilize long-term costs
- Leverage public private partnerships to build “Microgrids-as-a-Service”
- Create replicable models for other facilities and governments

Montgomery County Correctional Facility



Public Safety Headquarters



# Case Study – Town of Fairfield, Public Safety



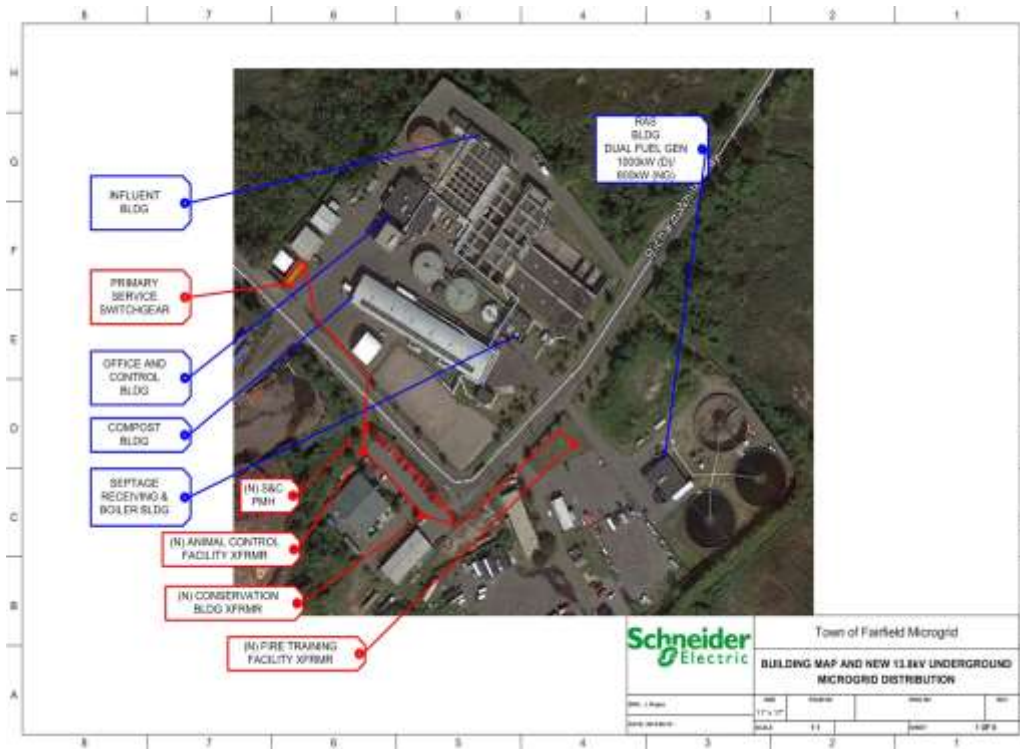
- \$1.2 M project funded through CT DEEP's 2013 Microgrid Pilot Program
- Commissioned July, 2016
- Critical facilities, emergency communications, cell phone tower

## Project Summary

- Community microgrid serving police station, fire department and homeless shelter
- 350 kw natural gas generator, 60 kw cogeneration, 46 kw solar
- Control and distribution in grid dependent and island mode



# Case Study - Town of Fairfield Waste Water Treatment Plant

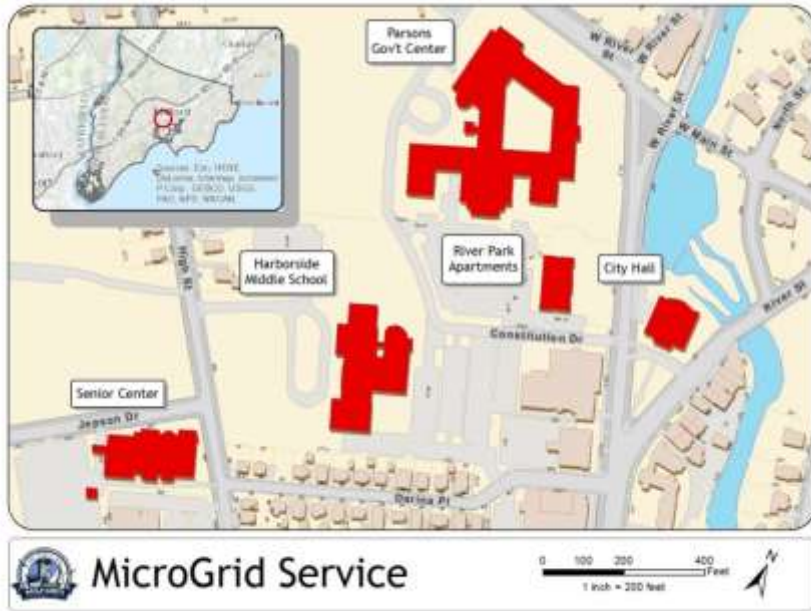


## Project Summary

- \$2.5 M HUD/CDBG funding
- Mix of new and existing generation: diesel and natural gas, recips, fuel cell & solar
- Treatment plant, State Fire training center, animal shelter & Town fleet refueling station
- Supports a community of 56,000
- Operational in early '18



# Case Study - City of Milford



## Project Summary

- \$2.9 M CT DEEP Round 2 award
- 5 Critical Facilities: City Hall, Government offices, Senior Center, Middle School & Senior apts.
- grid parallel operation, islandable
- 400 kW CHP
- 40 Kwh BESS
- Future 120 kW PV
- Generation owned & operated by a third party
- Operational Fall '18



Thank You



# Duke Energy: Boston One Campus Advanced Microgrid



**Boston One Campus Stats**

**240,000+** square feet

Serves as North American **HQ**

**2** Building Campus

**750+** employees

**1 of 5** Global R&D Centers



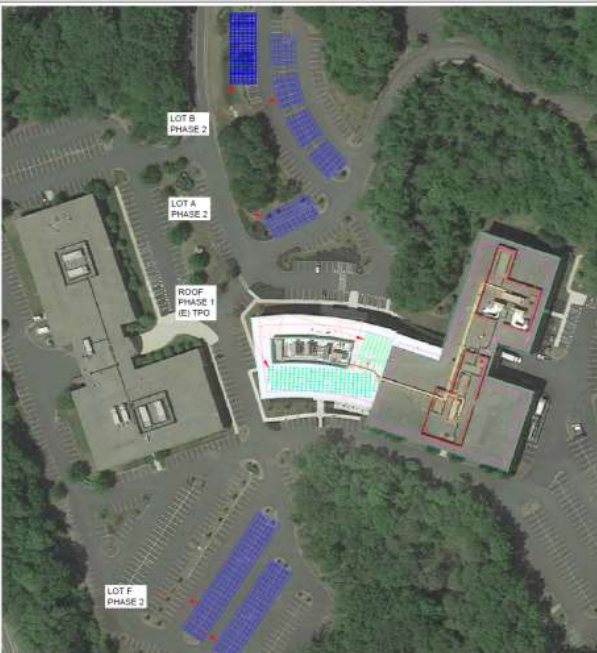
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**Microgrid Living Laboratory (R&D environment)**  
**Microgrid Showcase**

Life Is On



# Microgrid as a Service



## Resources:

- 400 kW PV (rooftop and carport)
- 500 kW, 1 MWh EcoBlade storage (Li-Ion)
- 400 kW natural gas generator (existing)

## Load Control:

- Schneider Electric Building Management System
- Fast load shedding (via Masterpact breakers)
- Electric Vehicle charging stations