

New England Energy Conference & Exposition

NEECE-18 Panel II

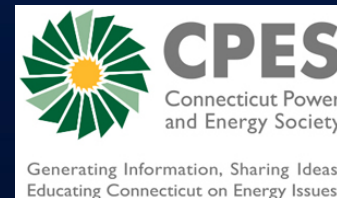
Resiliency: From Cyclones to Cyber Security

Public University Micro-Grid Campuses

Stanley Nolan, Director

Utilities Operations and Energy Management

North Falmouth, MA, June 4-5, 2018



UConn

UCONN – Public University #18

- Founded in 1881
- Main Campus in Storrs, CT
- 5 Regional Campuses
- Land Grant & Sea Grant College
- 4,318 Acres
- 362 Buildings total 12.5 Million Sq. Feet
- 2018 US News and World Reports

UCONN Growth Initiatives

- UCONN 2000 and 21st Century
 - As of July 2017 \$3.6 billion in Construction
- Next Generation Connecticut
 - \$1.5 billion over 10 years
 - Construction, Renovations, Infrastructure
- Bioscience Connecticut
 - \$864 million in Genomics and Personalized Med

Growth 2015 - 2035

- Premier Research University
- \$1.5 billion capital program for Science, Technology, Engineering, and Math (STEM)
 - Academic Facilities: \$841.4M
 - Deferred Maintenance: \$580.1M
 - Residential Life Facilities: \$172.5M
 - Parking Facilities: \$70.0M
 - Equipment: \$172.6M
 - Regional Campuses: \$152.0M
- 1.7 million GSF new construction by 2025
- Master Plan & Framework Consultant



UCONN Values

- Committed to leadership in campus sustainability for our generation and for the next generation
 - American College and University Presidents' Climate Commitment
 - Climate Action Plan – Carbon Neutral by 2050
 - 2020 Vision for Campus Sustainability & Climate Leadership
- Economic Impact
 - Technology Incubation Program is home to 21 startup companies
 - \$1.5 billion in direct economic impact
 - \$1.9 billion in indirect economic impact
 - Research \$373 million to Connecticut
 - \$202M State and Local Tax Revenue Annually
 - 24,000+ UCONN Supported Jobs
 - \$11.80 Return for Every State Funded \$1.00



UCONN Partnerships

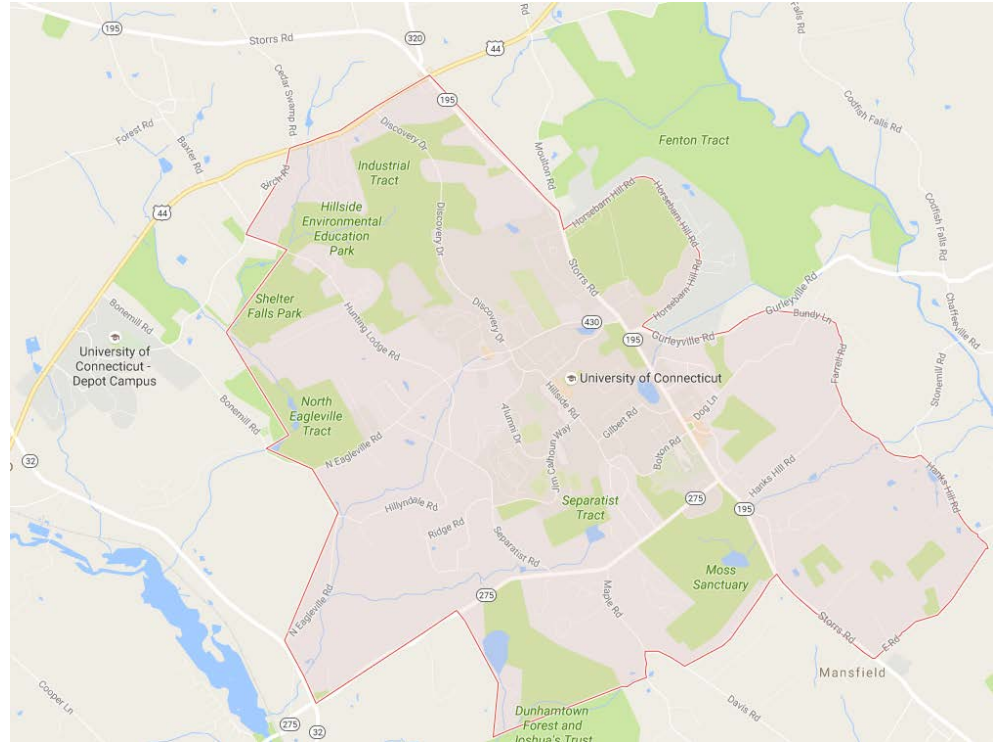
- Strategic Energy Management Plan
 - Memorandums of Understanding
 - Eversource
 - CNG
 - Caterpillar Solar Turbines
- DEEP Lead by Example Program
 - Energy Services Performance Contracts
 - Consolidated Edison
 - Renewables
 - Comprehensive Energy Solutions



Energy Savings Performance Contracts repurpose energy inefficiencies to fund infrastructure improvements

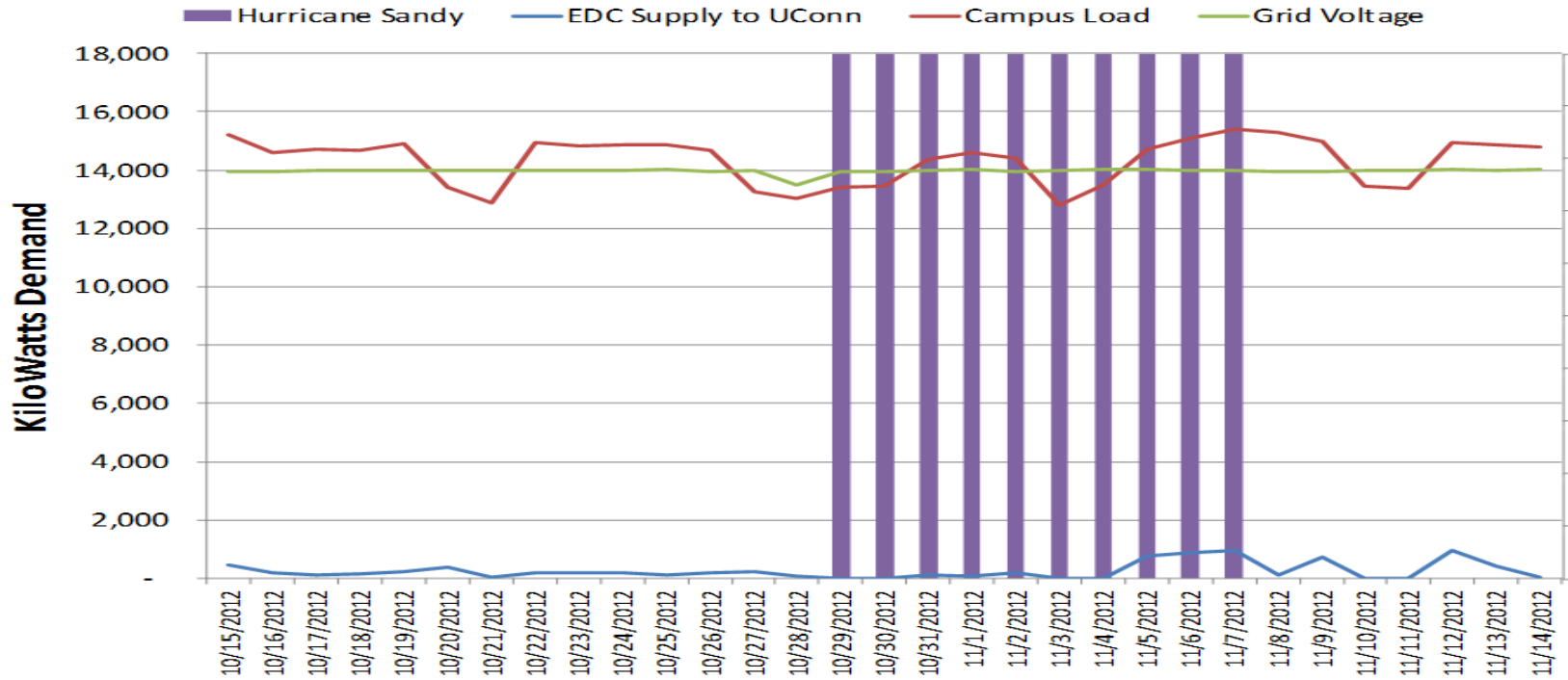
UCONN Resiliency = Clean Heat and Power

- Black Start Micro-grid to serve 170th
- Supplies all Utilities except Gas
 - On Site Fuel Storage #2 Oil
 - 24.9 Megawatts of Generation
 - 336,000 PPH of Steam
 - 18,000 tons of Chilled Water
 - Water, Reclaim Water, and Sewer
 - Serves Town of Mansfield
- Current Population of 40,350
(or approx. 8,070 households)
- \$235M Physical Plant Budget



Mission Resiliency

UCONN Storrs Campus Cogeneration Micro-grid During 2012 Hurricane Sandy



Strategic Energy Management (SEM) Plan

- **Electrical Resiliency**

- Fully redundant N+1 electrical system that can support the entire campus, without load shedding, should any one source drop
- Installing a Supplemental Tri-generation Plant at Storrs
- Adding Cogeneration at Regional Campuses
- Peak Shaving and Demand Reduction Programs

Strategic Energy Management (SEM) Plan

▪ **Steam Resiliency**

- Fully redundant N+1 System produces steam from Clean Heat and Power sources where possible
- Efficiently distribute high pressure steam to, and return pumped condensate from buildings

▪ **Chilled Water Resiliency**

- Fully redundant N+1 System provides Chilled Water from Steam for year around efficiency
- Efficiently distribute CHW to and from central plants

Strategic Energy Management (SEM) Plan

▪ **Availability**

- System Interconnection
- On Site Fuel Reserves
- Hedged Natural Gas Commodity and Transportation
- Battery Storage
- Ice Storage

▪ **Controls/Data Security**

- N+1 Computer Network
- Limited Access
- Encryption
- Firewalls
- Dark Fiber Loops
- Probing