



CONNECTICUT
GREEN BANK

Connecticut Green Bank

Financing Resiliency and
Clean Energy Improvements

4/22/2016



Who is the CT Green Bank?



To lead the green bank movement by accelerating private investment in clean energy deployment in Connecticut to achieve economic prosperity, create jobs, promote energy security and address climate change



Support the Governor's and legislature's energy strategy to achieve cleaner, cheaper and more reliable sources of energy while creating jobs and supporting local economic development

Energy Challenges in Connecticut



High Cost

CT has THE highest cost for electricity in the "lower 48"



Old, Energy Inefficient Building Stock

CT has some of the oldest and most energy inefficient building stock



Need for "Cleaner / Cheaper" Energy Sources

Programs that will diversify our energy mix into renewable/clean power

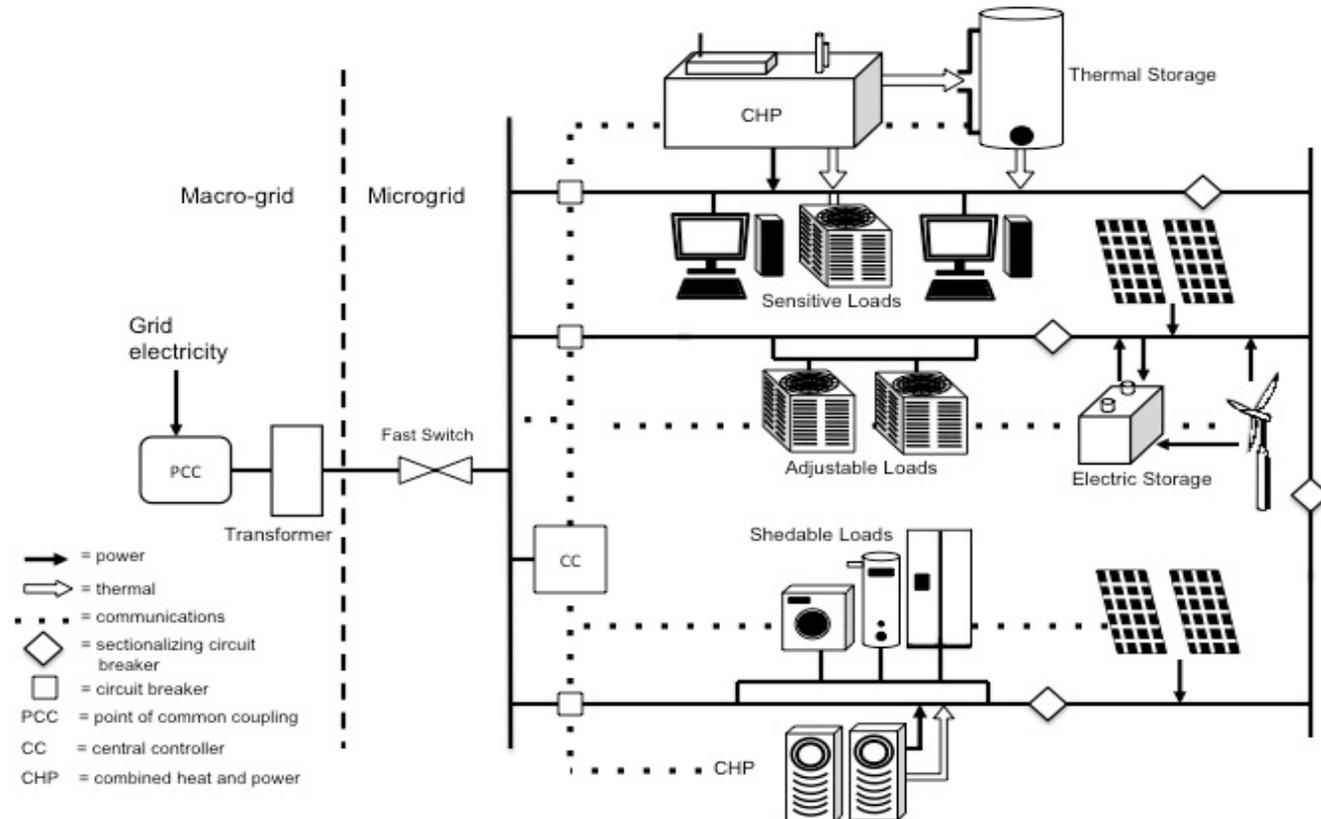


"More Reliable" Grid

5 major storms in 2 years with widespread outages

What are microgrids?

- **Microgrids** are small, self-contained electricity, heat and/or cooling distribution systems that coordinate and distribute energy supplied from [multiple] generation sources to a network of users in a spatially defined area.



Benefits of Microgrids



The Microgrid, even though not a replacement of the national grid, improves certain aspects of the grid.

Microgrids have much smaller financial commitments.

Use renewable resources hence are more environmentally friendly with lower carbon footprints.

Require fewer technical skills to operate and rely more on automation.

Are isolated from any grid disturbance or outage.

Think hospitals, grocery stores, police and fire stations, etc.

A dark, atmospheric photograph of a city skyline at night. Several skyscrapers are visible, with one building in the center having a sign that says "HOSPITAL". Bright lightning bolts are striking the buildings, illuminating the scene. The overall mood is dramatic and emphasizes the importance of reliable power during storms.

When storms strike,

Clean energy can help keep the lights on.

Economic Feasibility – Costs & Revenues



Project Costs

“Overnight”

- Equipment & Labor
- Design & Engineering Fees
- Grid & end user integration
- Siting & Permitting
- Taxes
- Warranty/Insurance

Ongoing

- Debt
- O&M
- Fuel

Project Revenue

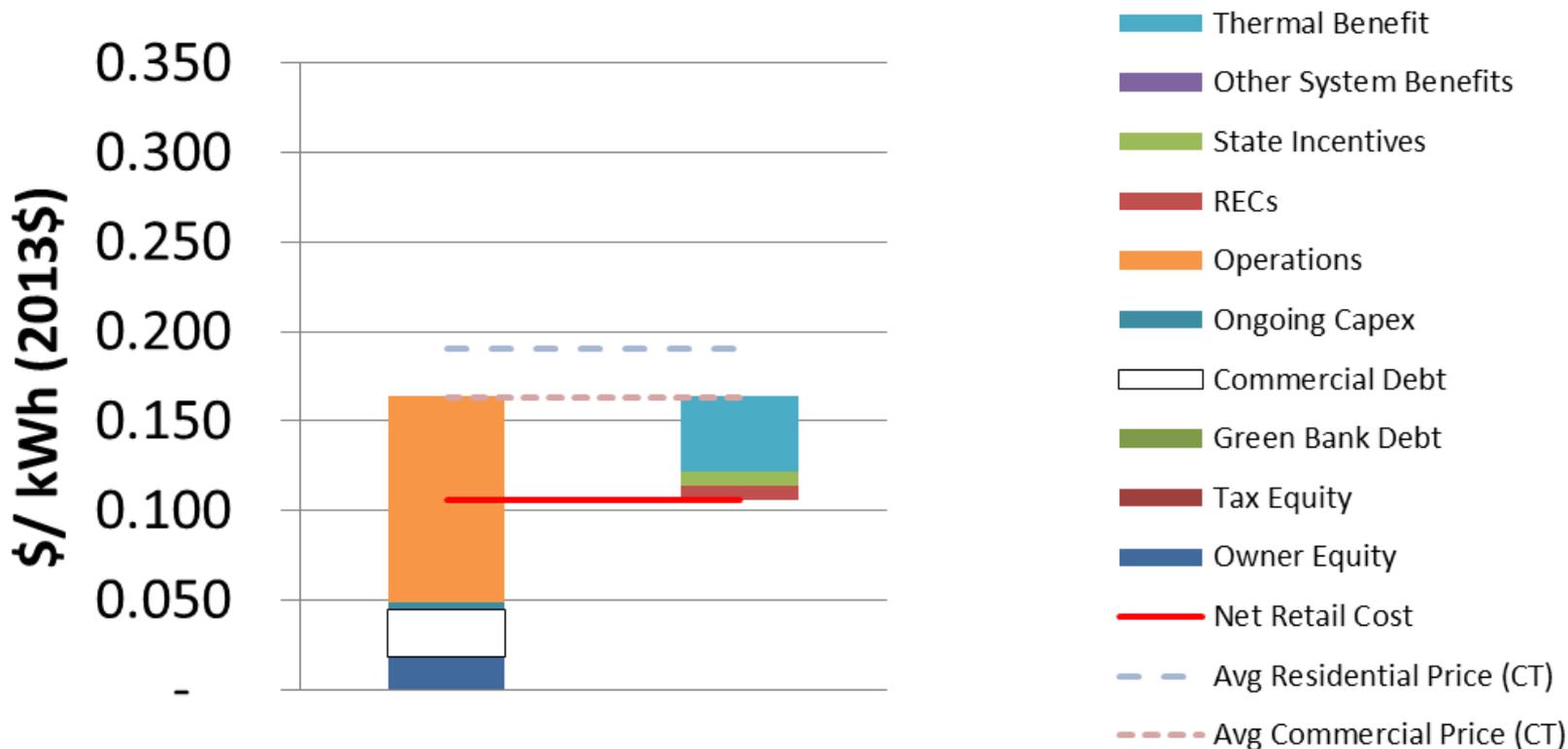
- End users
 - Direct offset to energy purchases
- Public sources
 - Federal, state & local incentives
 - Other grants
- Regulatory/Energy Markets
 - Renewable energy credits
 - Net metering/Virtual net metering
 - Demand response
 - **Other?**
 - **Capacity payments?**
 - **Reliable power tariff?**
 - **Ancillary grid services?**
 - **Carbon pricing?**

Financing Feasibility – “bankable”?



CGB seeks projects where revenue less cost over time (max. financing period of useful life of equipment) is sufficiently valuable to attract affordable capital needed to build the microgrid

Electricity Revenue Requirement (over 20 Year Life)



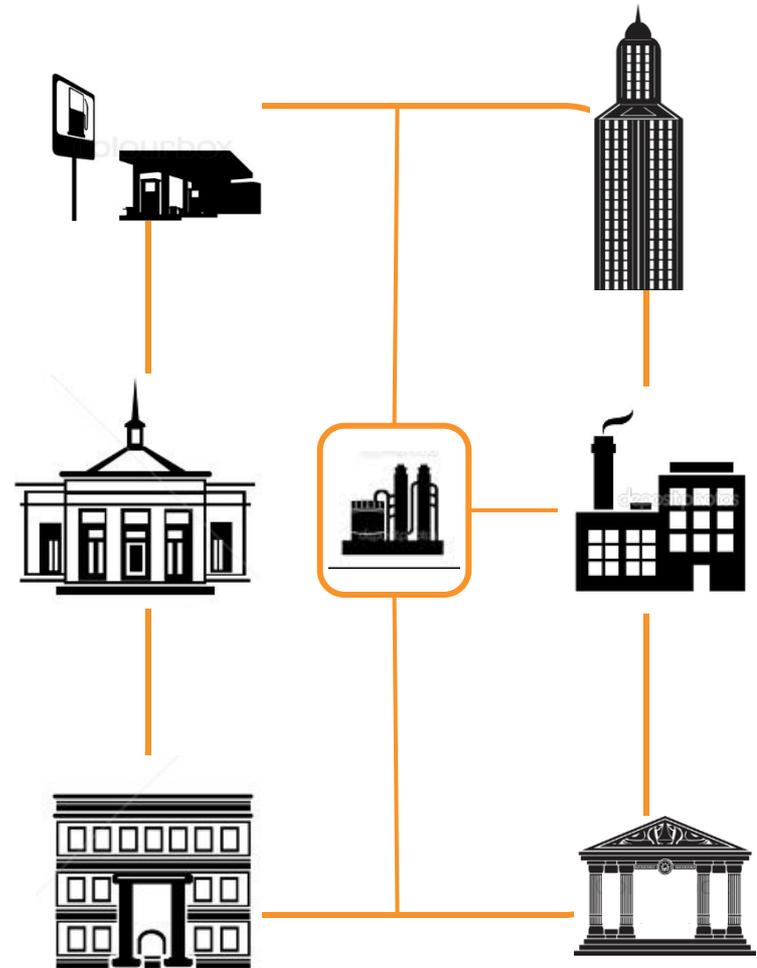
What is the Goal?



- **Microgrids confer multiple benefits.** What benefits are we trying to capture? For whom?
 - Reduced energy costs?
 - Reduced GHG emissions?
 - Increased energy security, resiliency and reliability?
 - Public sector end users? Private sector?
- Some benefits may be achieved only at a cost premium. Understanding goals and beneficiaries upfront is important to later identify gaps in the business model and to craft solutions.

C-PACE: Buildings are Collateral for System

- Private capital provides 100% low-cost, long-term financing securing through senior tax lien and repaid through property bills
- Capital costs are assessed to end-users on a pro-rata basis based on their projected 'benefit' (e.g. energy savings/R)ECs/et
- Microgrid developer locks in repayment of fixed costs over 20 years. Microgrid owner/operator signs short term ESAs with customers for energy supply, delivery, reliability, etc.



C-PACE + Resiliency



- Commercial PACE requires a payback – the savings-to-investment ratio must be at least 1.0
- Resiliency measures don't necessarily create direct energy savings
- Savings can derive from avoided insurance premium costs, but more savings or revenue sources would be needed to cover the financing costs
- One method is to bundle improvement measures together so it saves \$\$ in the aggregate

Residential PACE + Resiliency



"Qualifying improvements" means any renovation or retrofitting of qualifying real property to reduce energy consumption or installation of a system for clean energy, as defined in section 16-245n, or customer-side distributed resources, as defined in section 16-1, permanently fixed to such qualifying real property to service qualifying real property, and, (A) improvements to address water conservation, (B) waste reduction, **(C) health and safety issues, including, but not limited to, asbestos, mold and lead remediation, and (D) resiliency measures, including, but not limited to, flood-resistant construction and hurricane resistant construction;**

"Qualifying residential real property" means a single-family or multifamily residential dwelling of four or fewer units that meets the qualifications established for the residential sustainable energy program;

Residential PACE + Resiliency



- **R-PACE** provides low interest loans for energy and conservation related improvements
 - Improved building stock
 - Energy savings
 - Financing over longer terms for deeper improvement measures
- Guidelines for eligible products, but full payback not a requirement. The financed improvements represent **public benefits**.
- PACE can defer or eliminate future costs on the property
 - Including raising a home in a flood zone



CONTACT INFO



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