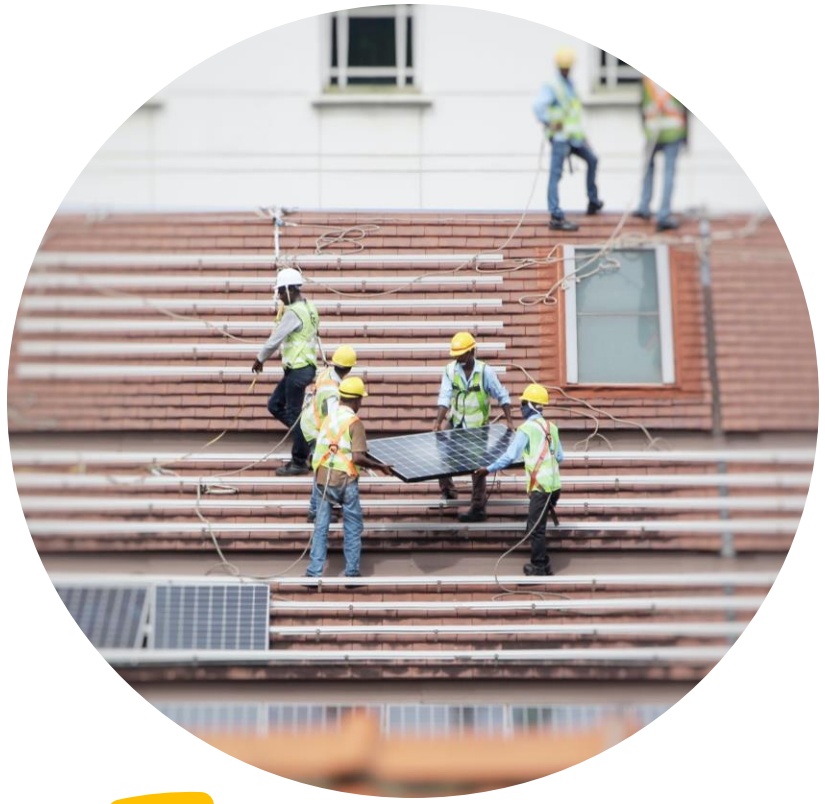
Energy Resilience in Milton

Town Center Microgrid Project

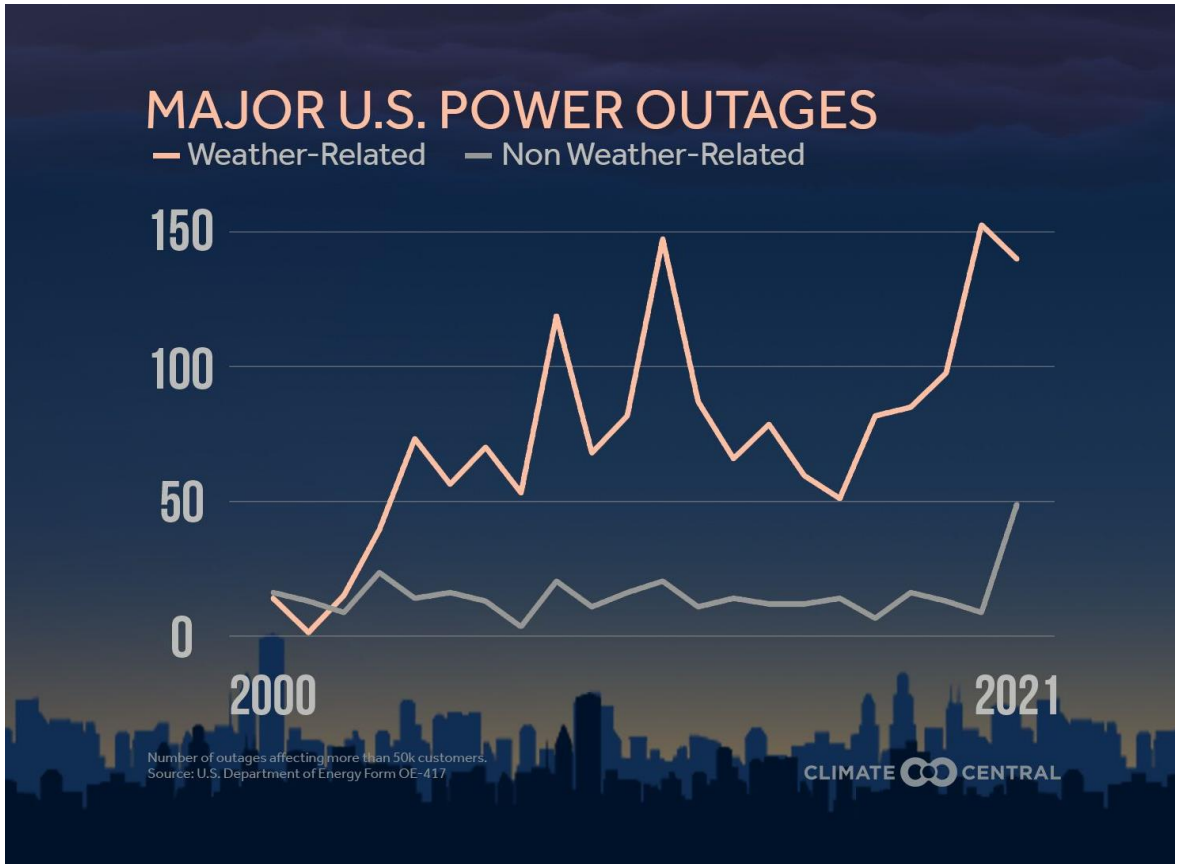


Four Key Questions

- Why are we doing this project?
- What is a microgrid?
- What does this project entail?
- What happens next?

Climate Change Threatens Our Grid

- Climate change is causing increasingly extreme weather events including extreme cold, heat waves, and severe storms, that stress or directly damage our energy infrastructure
- Power outages are becoming more frequent and more impactful in the face of more severe weather



Reducing Utility Costs

- Electricity prices have jumped 15.8% in the last year
- Town staff talked with Liz O'Rourke about utility burden among residents
- This effort can help reduce peak demand and potentially lower costs

Resources Provided to Help with Utility Bills

- State Information on Utility Bills
https://www.mass.gov/info-details/help-paying-your-utility-bill#can-i-get-assistance-with-my-fuel-bills?-
- MAPC Utility Bill Assistance Resources
https://www.mapc.org/planning101/utility-bill-assistance-massachusetts-resources/
- LIHEAP
https://www.mass.gov/service-details/learn-about-low-income-home-energy-assistance-program-liheap
- Eversource Discount Rate Application
https://www.eversource.com/nstar/CustomerCare/Residential/DiscountRate (You can also call 800-592-2000)
- Eversource Payment Assistance Programs
https://www.eversource.com/content/ema-c/residential/account-billing/payment-assistance
- LEAN Multifamily program provides energy efficiency upgrades
https://leanmultifamily.org/the-lean-multifamily-program/
- Arcadia
https://www.arcadia.com/

Reliable & Clean Energy is Critical

- Emergency services and municipal operations require a reliable flow of electricity to serve our community
- Reliable power for medical and assistive devices
- HUD requirements require Winter Valley to ensure emergency power in some buildings

Alignment with Town Goals

Municipal Vulnerability Preparedness Workshops

Priority Action #3
"Complete a feasibility study of microgrid power and renewable energy options for the town"

Milton Master Plan

Goal 6.2: Continue to provide Milton Residents With State-Of-The-Art Municipal Services & Continue to focus on implementing sustainability measures

Goal 6.3: Provide support to specific demographic groups in town & Support a growing elderly population wishing to "age in place"

Housing Production Plan

Promotes energy efficiencies and other sustainability provisions

Project Timeline

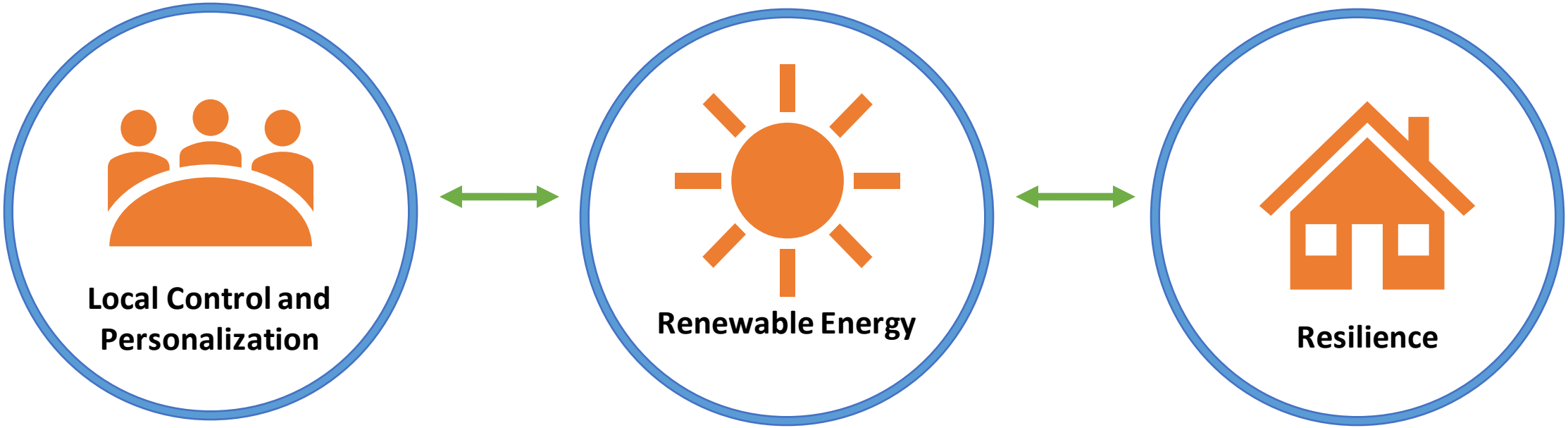
	1	2	3	4	5	6	7	8	9	10	11	12
Task 1: Kickoff Meeting												
Task 2: Energy Audit												
Task 3: Energy Load Assessment												
Task 4: Community Meetings												
Task 5: Initial Feasibility Study												
Task 6: Final Feasibility Study												

What Is A Microgrid?

"a small network of electricity users with a local source of supply that is usually attached to a centralized national grid but is able to function independently".

From Canary Media; Nigerian Microgrid

Why Microgrids?

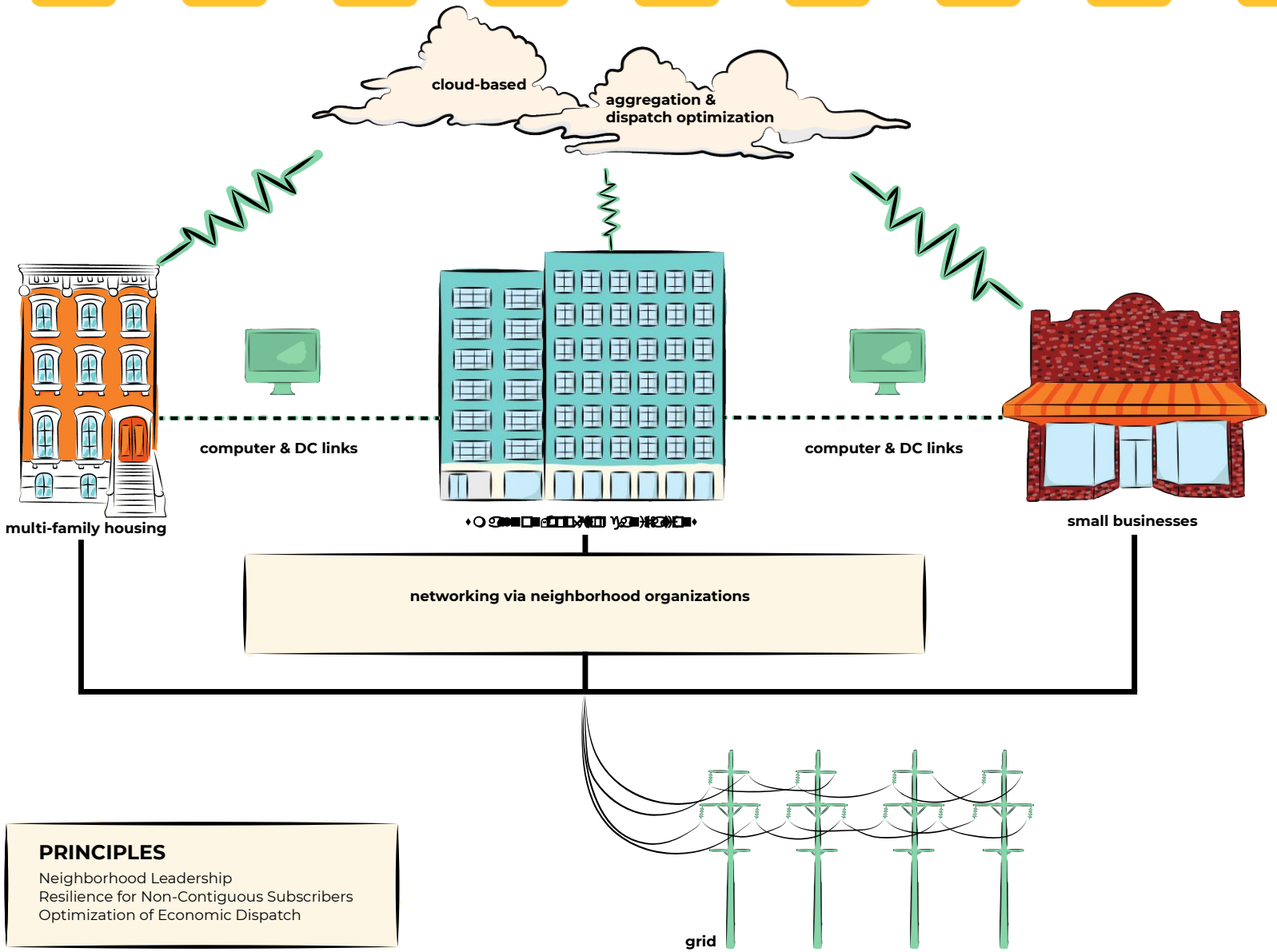


1. Microgrids give a personal experience
2. There is local control and user voice in design, installation, and operation

1. Solar microgrids reduce reliance on fossil fuels
2. Solar energy is cheaper than gas

1. “islanding” power through battery storage means more resilience
2. Adaptable to future challenges

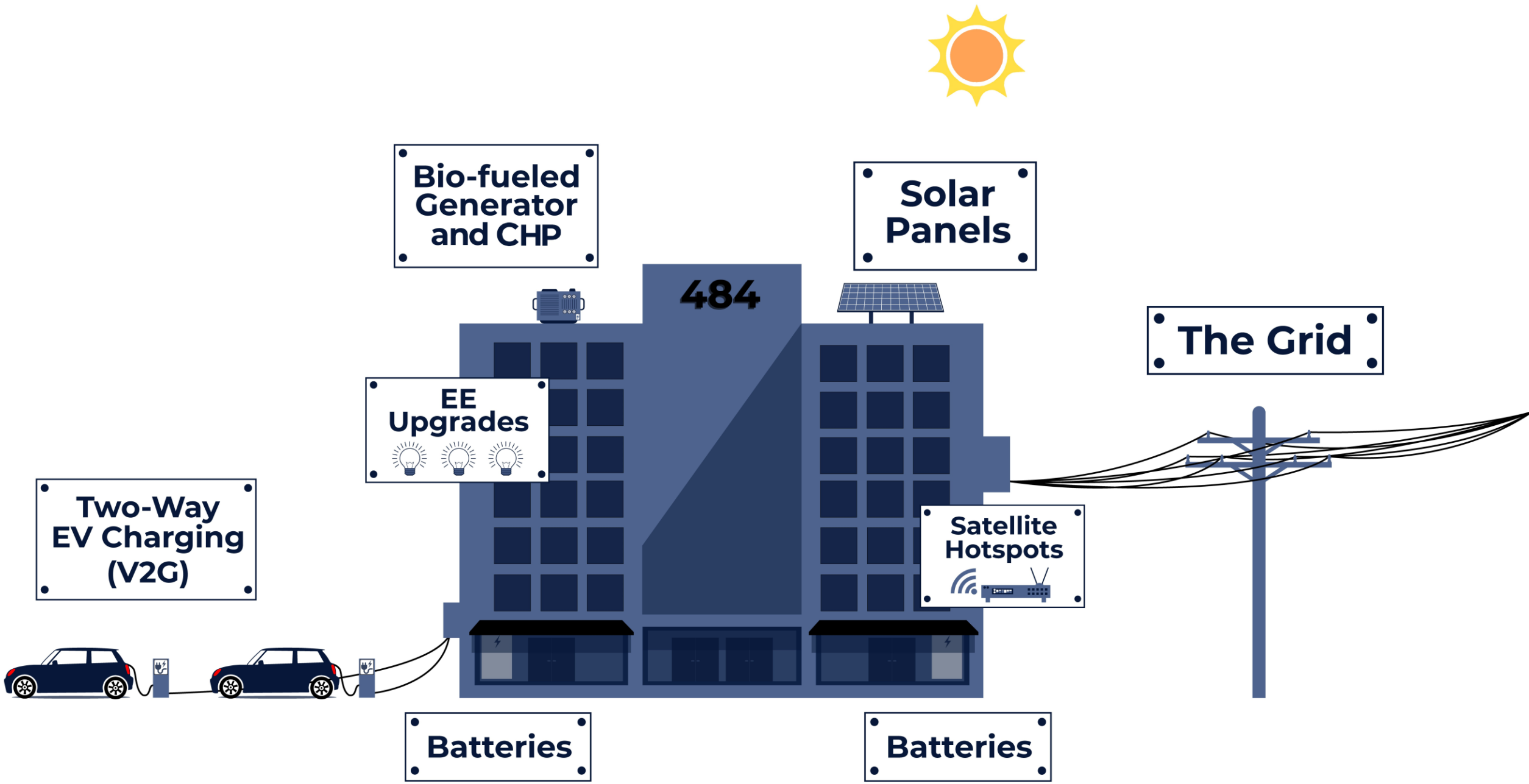
Microgrids: How It Works



PRINCIPLES

Neighborhood Leadership
Resilience for Non-Contiguous Subscribers
Optimization of Economic Dispatch

AMANDA GRIFFITHS | CLIMATE XCHANGE


Bio-fueled Generator and CHP
Solar Panels
484
The Grid
EE Upgrades
Two-Way EV Charging (V2G)
Satellite Hotspots
Batteries
Batteries

Winter Valley

What We've Done In Winter Valley So Far

Presented to the MRE Board of Directors in November 2022 and received their letter of support for our grant application

CESI Visits, Spring & Summer 2023

Completed an **energy audit** of the facility's current energy demand, energy efficiency, and capacity for supporting renewables

Held regular meetings with Town Staff and Winter Valley's Executive Director throughout the project

What is an Energy Audit?

Stage 1

Completed on-site inspections, data gathering and analysis

To find opportunities for:
1. Energy-efficiency improvements & savings
2. Solar energy installations
3. Resilience via energy storage
4. Electrification
5. Any necessary electrical and building upgrades

Stage 2

Interviewed Winter Valley and Town managers

To estimate costs, savings, other revenues, and investment supported

Energy Audit Findings: The Bottom Line

Winter Valley has critical needs and services which **require resilient energy**.

Complete Solarization is possible using two Model "ELM Microgrid 250" BESS units, 550 kWh version, made by Current Energy Storage Inc.

Total cost is about **$1.5 million** for total Solar and BESS.

Next Steps

01

Discussions with Eversource engineers

02

Town & WV discussions of resilience and heat pump trade-offs

03

Draft feasibility study

04

Final Community Meeting to review draft and provide inputs for final report

Key Takeaways

1. This project will end with a complete feasibility analysis and recommendations for how Milton could develop a community microgrid which will include Winter Valley, the Police Department, and Town Hall.
2. Energy Audit findings demonstrate that solarization of Winter Valley is feasible.
3. This project **does not include** the actual installation of a microgrid, nor does it commit us to a certain path

Community Meetings

Q & A

Thank you!

Contact us

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Energy Audit Findings: Need

- Resilience – 54 kW of backup will carry each of buildings 1-4 main meters but 80 kW more needed to power all residential units in each. Building 5 and the community building master meters would each require 36 kW.
- Shared space and offices in each building had maximum loads between 38 and 49 kW (winter peak) for 4 buildings and 17 kW (summer peak) for the 5th building in 2022. The community building peak was 48 kW in winter.
- Residential units are not demand-metered but likely have ~3 kW of maximum load each, since they are electrically heated (except for building #5 which is oil-heated) and cooled. The total coincident residential load in the first 4 buildings probably peaks at about **75-80 kW** each

Feasibility Analysis

- The total WV campus including apartments could be backed up by (e.g.) two Model “ELM Microgrid 250” BESS units, 550 kWh version, made by Current Energy Storage Inc., which we are planning for Cambridge Community Center
- Apartment resilience requires connecting automatic transfer switches to the central BESS & generators
- Based on recent bids, total cost would be about $1.5 million for WV Solar + BESS. Including new federal grants yields a financeable return on investment
- Town Hall and Police HQ (and future buildings) can be included in microgrid by cloud-based controls.
- Considering inter-building sharing of solar & BESS, to save $$ and space – both wired and community solar options

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- Energy Efficiency – Winter Valley has done excellent work on all energy systems and building envelope. Heat pumps could replace some heating and air conditioning. Water savings may be possible. Electrification essentially complete. No major electrical or structural upgrades urgent.
- Solar Energy – about **40%** of WV annal shared-spaces consumption could be replaced by solar panels on roofs of buildings 1-4 and the community building (about 140 kW in all). Some ground-mounted and canopy installations may add to this. Resident sharing possible via Community Solar
- Resilience – 54 kW of backup will carry each of buildings 1-4 main meters but 80 kW more needed to power all residential units in each. Building 5 and the community building master meters would each require 36 kW.
- Duration of Resilience depends on weather, behavior, and investment. (The combination of batteries, generators, and wiring of loads will require design detailing)
- Residential savings possible using heat pumps but utility allowances may offset
- Cell phone & internet backup – satellite "hotspot" recommended
- Shared space and offices in each building had maximum loads between 38 and 49 kW (winter peak) for 4 buildings and 17 kW (summer peak) for the 5th building in 2022. The community building peak was 48 kW in winter.
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- It is possible to share backup power among units by installing transfer switches which is already in the design for the new generator at building #5.

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