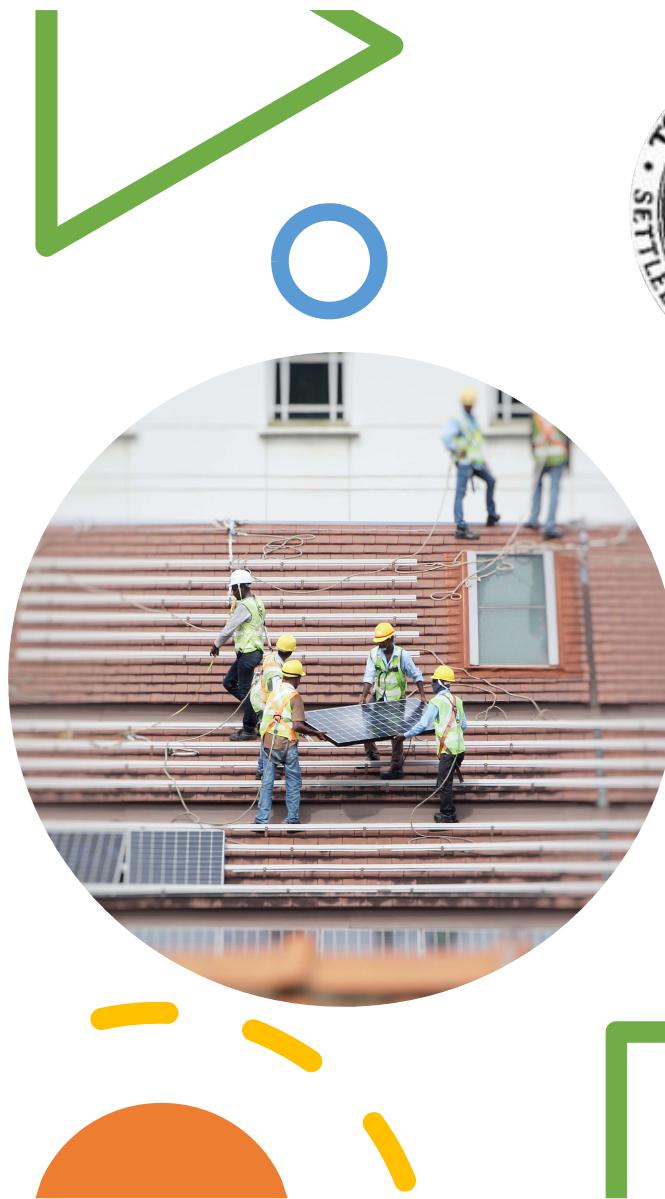


Energy Resilience in Milton



Town Center Microgrid Project

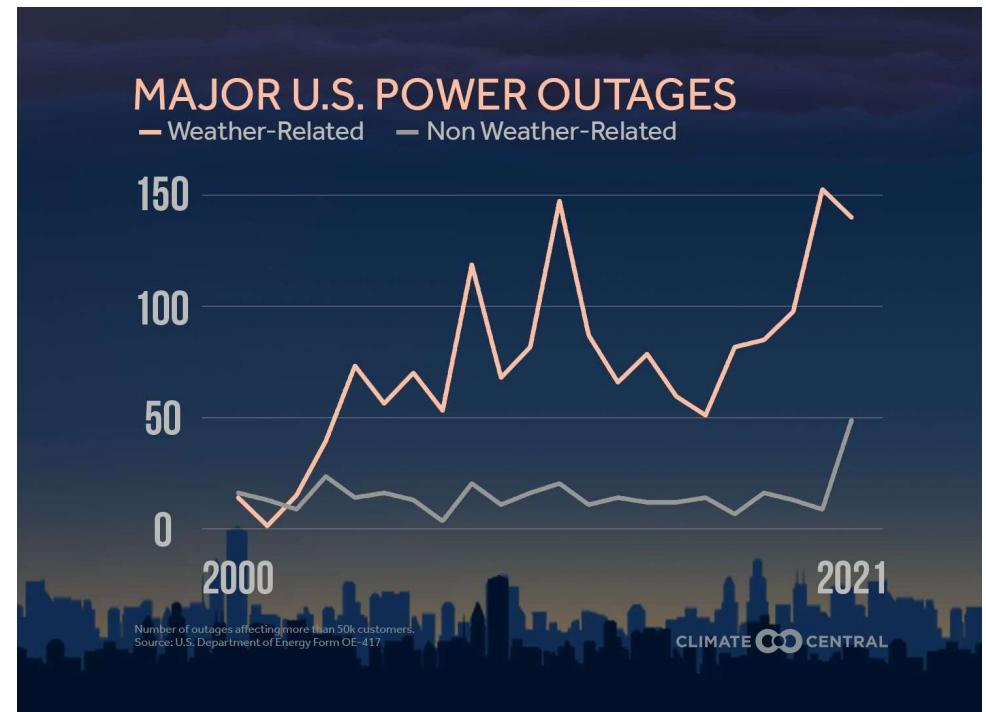


Agenda

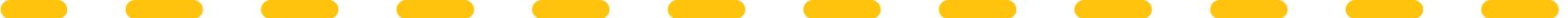
- ▶ Project History & Background
- ▶ Energy Audit Findings
- ▶ Proposed Microgrid System
- ▶ Next Steps

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



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

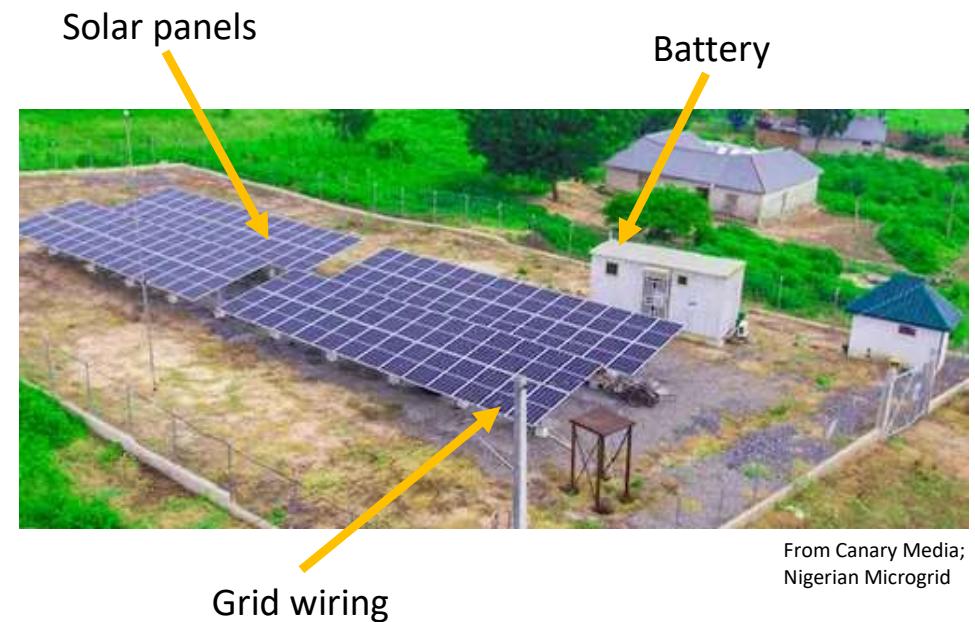
Promotes energy efficiencies and other sustainability provisions

Project Timeline



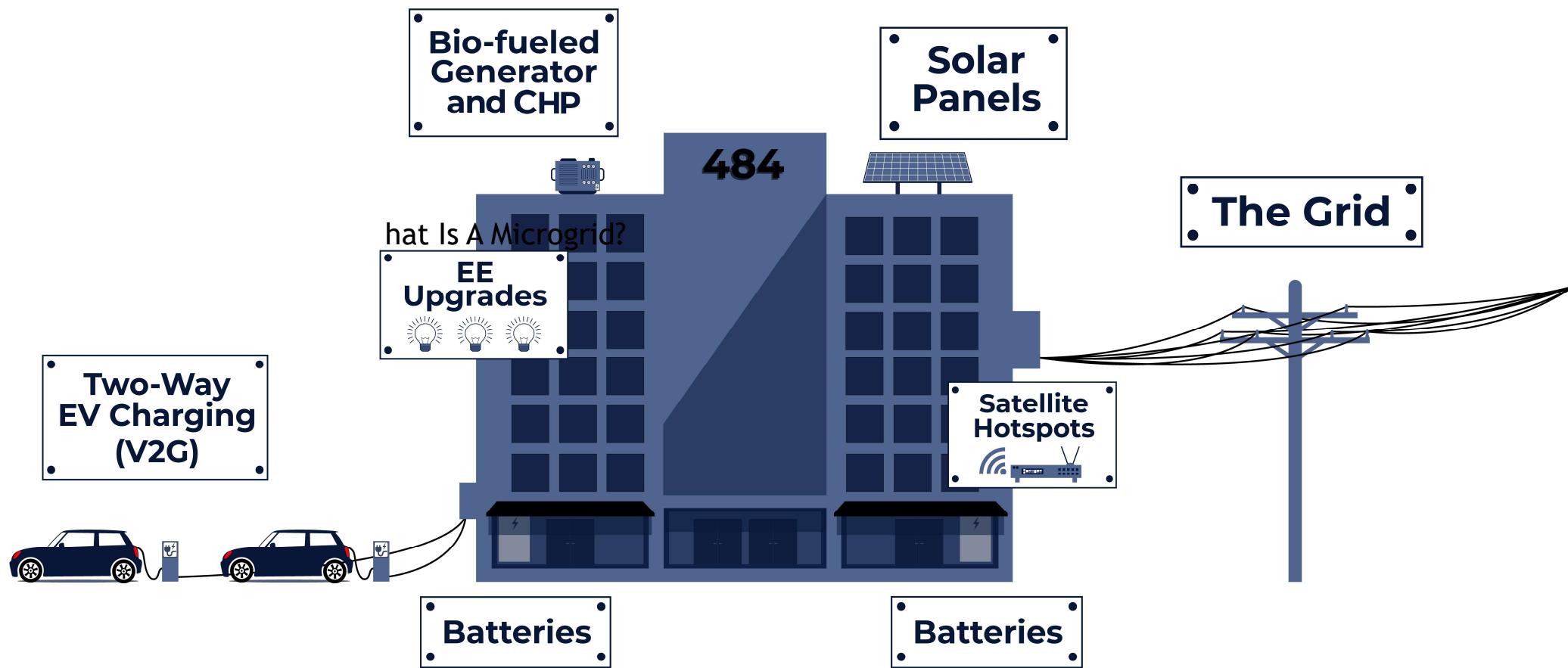
What Is A Microgrid?

"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

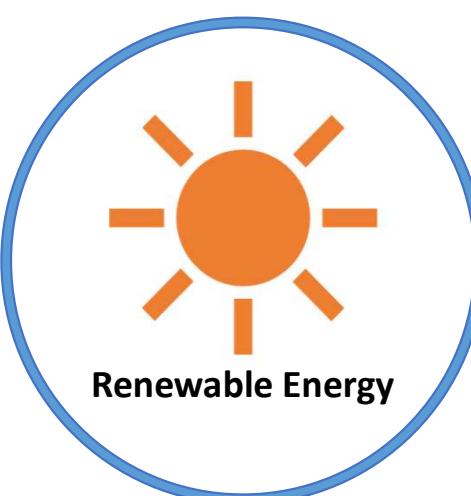
What Is A Microgrid?



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

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

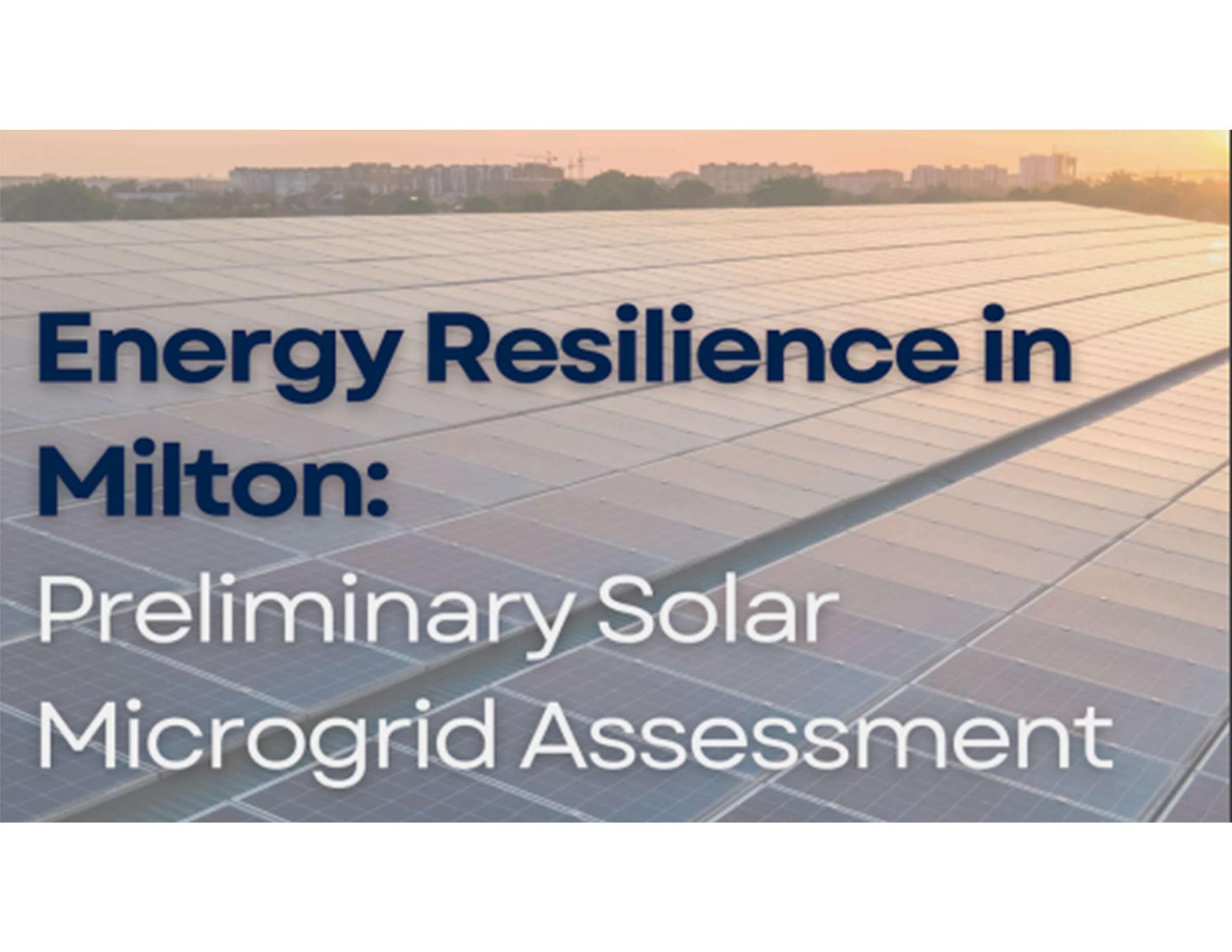
Stage 2

Interviewed Winter Valley and Town managers

to identify the major needs, goals, limitations, and plans for each facility, and to ensure Town and WV objectives are met

Energy Audit Findings

- All three sites have a combination of roof, parking lot, and open space to meet most of their current energy use with on-site solar
- No energy efficiency upgrades are necessary to add on-site solar to meet demand, but minor energy efficiency upgrades would be advisable
- Select installations of air source heat pumps, conversion to LED lights, additional insulation, and replacement toilet and sink aerators would all increase building efficiency

A large solar panel array is shown in the foreground, with a city skyline in the background under a sunset sky.

Energy Resilience in Milton: Preliminary Solar Microgrid Assessment

Key Feasibility Takeaways



405 kW

Rooftop, ground mount, and canopy solar energy generation

382kW

Battery energy storage system (BESS) assets across the three facilities

\$1,996,000

Total project cost

79%

Project costs can be offset through incentives and loans

\$424,300

“Resilience Gap” that will require grants and/or capital funding to fill

Solar Power Installation



Town Hall

89 kW via a parking lot solar canopy , which is about 87% of our current energy consumption

With our existing **28.3 kW** panels, we will generate more energy than we use!

Milton PD

177 kW of solar PV in several arrays: three rooftop arrays, two parking lot canopies, and one ground mount array

The system is deliberately oversized to accommodate a potential community-shared solar program for which **52 kW** would be available annually

Winter Valley

139 kW of rooftop solar PV arrays on all buildings except building #5 due to roof space constraints

BESS Installation



- Town Hall
 - 54 kW battery, which is sized to meet the current monthly maximum coincident electricity demand of the Town Hall for four hours
- Milton PD
 - 40 kW battery sized to meet the current monthly maximum coincident electricity demand of the Police Station for four hours
- Winter Valley
 - Four 54 kW batteries at buildings #1-4 and two 36 kW batteries at building #5 and the Office

BESS Design



- Proposed design has one battery per building in the microgrid system
- Batteries are scaled to be either 36kW, 40 kW, and 54 kW
- Batteries are about 3 feet wide, 4 feet tall and 8 feet wide on a concrete pad
- About the size of a twin bed with a boxspring or a picnic table



Costs of PV and BESS Installation



Milton, MA	Measure	BESS		
		PV kW	kW	Cost
Town Hall	Solar PV	89		\$ 225,000
	BESS		54	\$ 178,000
			Sub Total	\$ 403,000
Police Department	Solar PV	177		\$ 354,300
	BESS		40	\$ 129,700
			Sub Total	\$ 484,000
Winter Valley	Solar PV	139		\$ 347,500
	BESS		288	\$ 761,500
			Sub Total	\$ 1,109,000
Totals All Measures		405	382	\$ 1,996,000

Project Costs



Milton, MA	Measure	PV kW	kW	Total Cost	BESS (prior to 30% ITC)	Resilience		Resilience Gap as Percent of Total Cost	Approximate Amount Financed (net of 30% ITC)
						Amount Financed	Gap Payment Required for 10 Yr Payback		
Town Hall	Solar PV + BESS	89	54	\$ 403,000	\$ 306,200	\$ 96,800	24%	\$ 214,340	
Police Department	Solar PV + BESS	177	40	\$ 484,000	\$ 411,500	\$ 72,500	15%	\$ 288,050	
Winter Valley	Solar PV + BESS	139	288	\$1,109,000	\$ 854,000	\$ 255,000	23%	\$ 597,800	
Totals		405	382	\$1,996,000	\$ 1,571,700	\$ 424,300	21%	\$ 1,100,190	

Environmental Impact



- Milton Town Hall and Milton PD can be entirely powered by solar energy and remove 170 metric tons of carbon emissions every year – equivalent to the energy use of over 20 homes!
- Over 10 years, the combined emissions reductions from this project will be 2,580 metric tons of carbon

2,580 Metric Tons of Carbon Dioxide (CO₂) equivalent
This is equivalent to greenhouse gas emissions from:



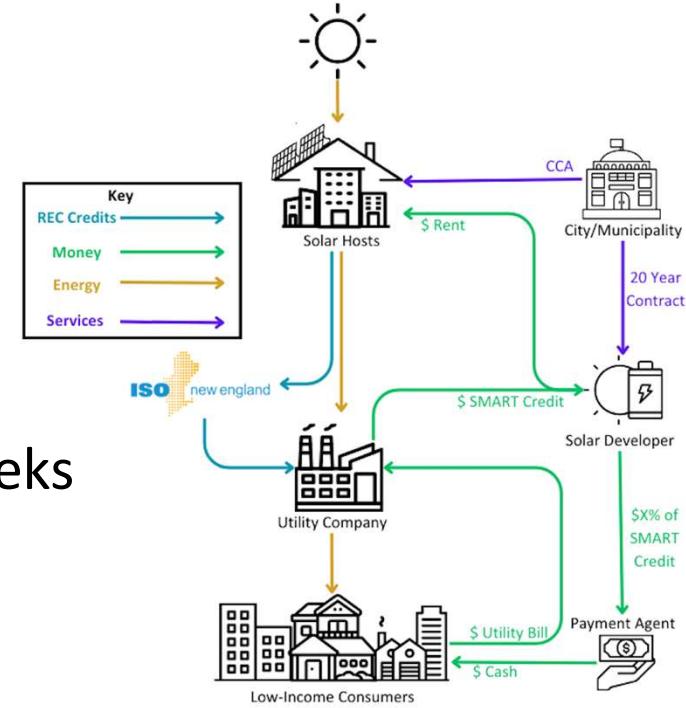
This is equivalent to CO₂ emissions from:



Next Steps

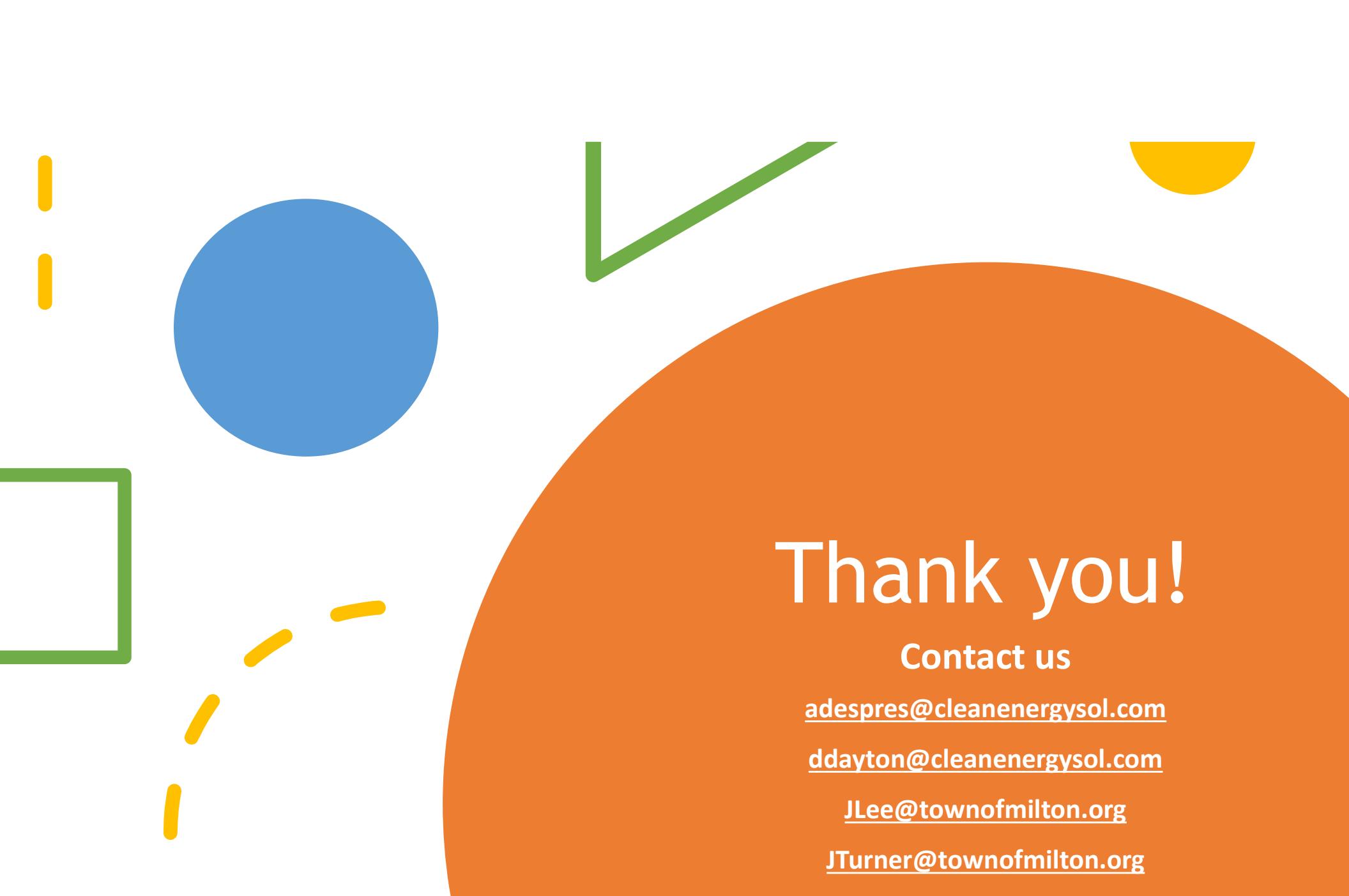


- Your feedback tonight and over the next two weeks will be incorporated into a final feasibility report
- Our draft report is available at townofmilton.org/microgrid
- Milton was awarded almost \$150,000 through the MA Clean Energy Center's EmPower program to start implementation work at Winter Valley





Community Feedback



Thank you!

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