Holistically Valuing DERs in Municipalities

A Discussion

A [Paraphrased] Quote….

"The single purpose, single technology programs are so simple to administer, but that is not what's needed to address the State's climate challenges and decarbonization mandates today and going forward"

Deputy Commissioner of Department of Energy Resources in Massachusetts

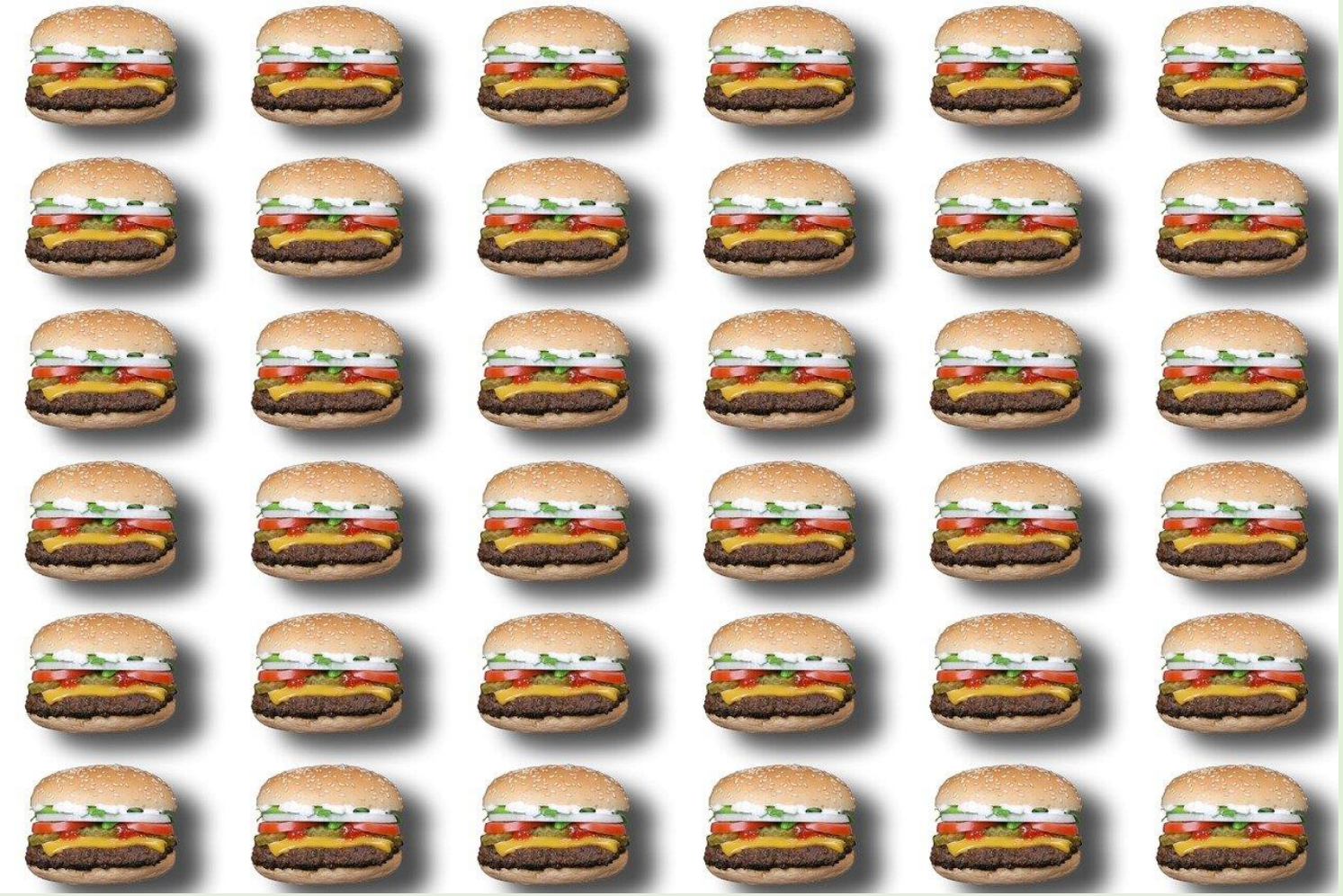
A Question….

How can communities gain the necessary understanding of the interdependencies of energy usage and energy systems with individual livelihoods – from daily to intergenerational – to make informed decisions and take effective climate action?

Some Answers….

- "This topic is too complex for most communities today to understand" [Prescription? Impose mandates?]
- "It's a matter of education" [How long with that take? Where do we find all the teachers?]
- "Feeling the pain" [How is that implemented and by whom?]
- "You have to convert everything to $$$ and cents" [How is that credibly determined?]
- "Experiment.. Employ agile deployment" [Most communities are reluctant to experiment]
- "Follow a trusted, respected, similar community that has done it and can explain it." [Every community can cite reasons that they are special]
- "Sense of opportunity and/or threat (FOMO)" [Is it genuine? Is it sustaining?]

PRESCRIPTION



EDUCATION

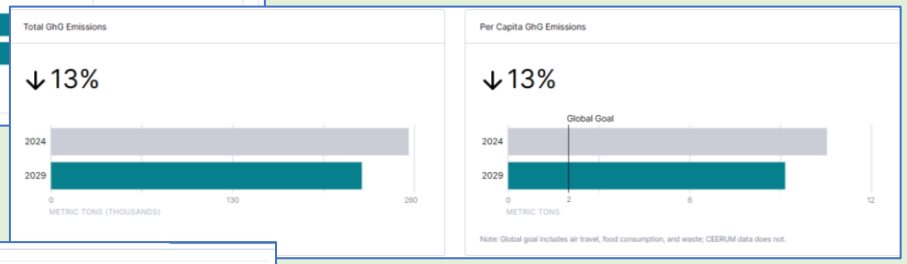
Simplification & Simulation

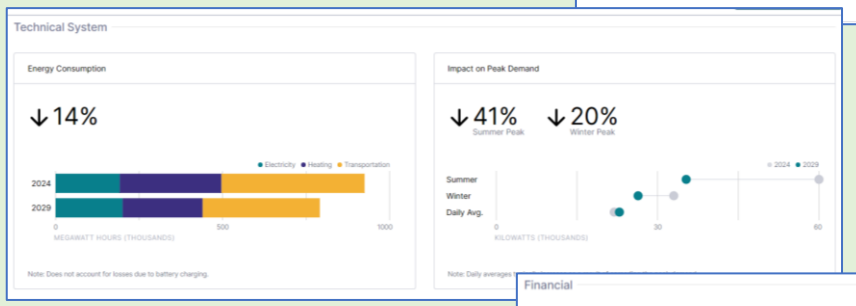
BEACON CLIMATE

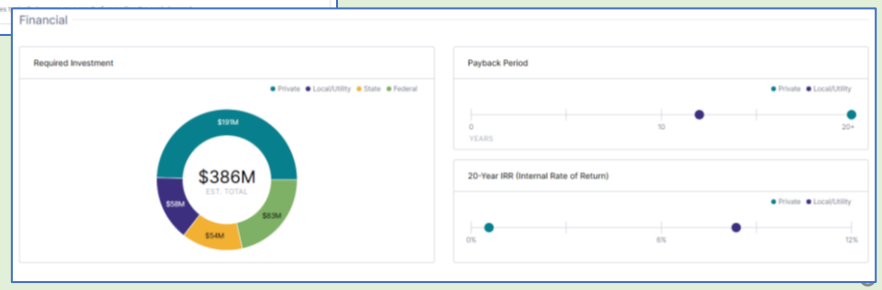
CEERUM™

1. Set Adoption and Local Incentive Rates

2. Assess Energy, Carbon, Economic & Financial Impact/Tradeoffs







$$$ & Cents

The Loft

Services and Requirements

2/3/2025

	Services	Resilience Priority	Normal	Estimated Capacity Outage	Recovery
1	Heating/Cooling	High	Zero-carbon system maintains comfortable	Maintain essential services with sustainable power	Prioritize quick restoration of full system capabilities
2	Meetings/Office/Training	High	Space for community meetings, workforce and youth training	Limited use; prioritize emergency and recovery coordination - command center setup, communication hub, strategic planning for recovery	Restore to full capacity to continue community programs
3	Workspace, Repair, Assembly Tools	High	Tools and workspace available for community and training programs, in emergency space can also be used for recovery measure	Tools available for emergency community repairs	Support rebuilding and repair efforts in the community
4	Water/Ice	High	Drinking water and ice for cooling during events and hot days	Critical supply of potable water and ice for cooling	Ensure ongoing access to clean water for all recovery stages
5	Child Care	Medium	Child care infrastructure still in discussion	Safe, supervised space for children during crises	Expand services to support recovery efforts for families
6	Restrooms/Showers	Medium	Adequate facilities support daily users and occasional events, Restrooms only - ADA Compliant	Ensure water supply and sanitation for extended stays	Scale up capacity to meet increased post-disaster needs
7	Food Prep and Storage	Low	Supports daily operations / lunch area	Non-perishable food distribution and minimal meal prep	Coordinate with local organizations for food supply and prep
8	Shelter	Low	Flexible spaces provide shelter as needed	Convert available spaces to accommodate displaced residents	Continue to offer extended shelter services as needed

The Loft

Solutions and Costs

2/3/2025

Solutions	Description	Costs: Capital Expenditures	Costs: Operating Expenses (Annual)	Constraints	References:
Clean Resilient Community Power (CCRH)	Utilizes a 60 kW solar PV system with 229 kWh combined battery storage to ensure power continuity and reduce carbon footprint. Includes HVAC systems and microgrid capabilities. Also looking at an electric school bus and V2G (vehicle to grid) features.	$430,000 total system cost, with PV system at $210,000 and batteries at $129,000. Electric bus system costs at $232,500. Microgrid controller costs at $17,450	Maintenance of solar panels and batteries, cost estimated based on system size and components, expected to be very miniminal (estimate to be under $2500/ year)	Interconnection with the grid. Space limitations for PV installation, reliance on sufficient sunlight, and initial high investment costs.	USDA, The Lofts, 8M Solar
Recovery	Training space (carpentry/test equipement/place to learn a skill); potentially useful during emergency times, community center,	Part of initial infrastructure investment, includes costs for components and resources.	Operating training spaces	Maintaining updated and effective training spaces.	The Lofts
Transportation	EV Bus, V2G System, Electric Charging Systen	School bus cost (after incentives): $	Power, vehicle upkeep	Maintaining the electric school bus.	The Lofts
Resilient Communications	These are things to be determined, potential options include satellite communications and emergency broadcast	Dependent on infrastracure added and resources used as a result of supporting resilient communications	Dependent on infrastracure added and resources used as a result of supporting resilient communications	Dependent on communications incorporated	USDA
Health & Wellbeing	These are things to be determined, potential options include medical supplies such as a first aid kit, AED machine, and perhaps wellness programs at The Lofts	Dependent on infrastracure added and resources used as a result of supporting health and wellbeing	Dependent on infrastracure added and resources used as a result of supporting health and wellbeing	Dependent on materials and programs incorporated	USDA
Security	Not applicable to The Lofts, Security measures deemed low priority	N/A	N/A	N/A	The Lofts

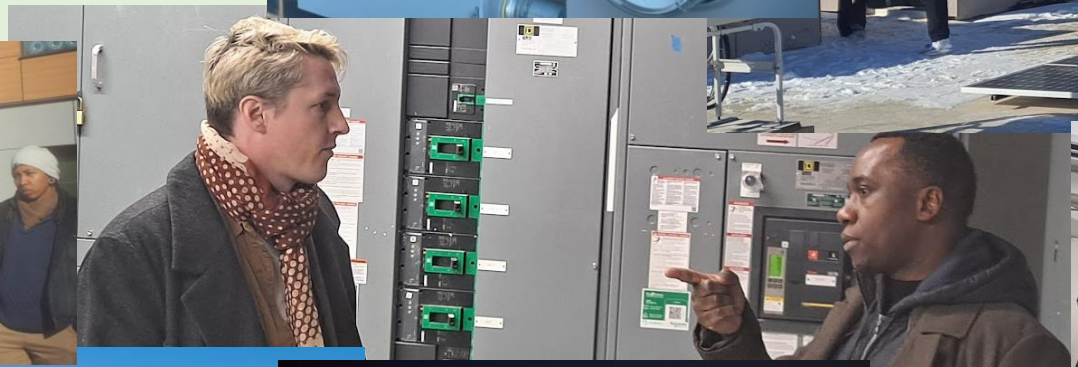
The Loft

Feasiblity Analysis Results - Clean Energy Community Resilient Hub (CCRH)/ Power

		Option 1: PV Only	Option 2: PV, Stationary Battery	Option 3: PV, Stationary Battery, Microgrid	Option 4: PV, Stationary Batter, Micogrid, V2G Bus
	Capital Costs (before incentives)	$210,000	$339,000	$356,450	$626,450
	Net Capital Costs (after incentives)	$126,000	$203,400	$178,225	$351,370
	Lifetime	General rule of thumb 25 years	Battery - generally between 10 and 15. **Total System - 18.75**	Microgrid - 12 -15 years. **Total System - 16.125 years**	V2G Bus - 12 - 15 years. **Total System - 14.8 years**
	Avg Annual O&M Cost	300 $/year	Battery - 450 $/year	Microgrid - 50$/year	V2G = 1200 $/year
1	Est. Annual Revenue Streams	$ -	$ 3,817	$ 3,817	$ 3,817
2	Est. Annual Savings	$ 19,211	$ 28,583	$ 28,583	$ 28,583
3	Est. Insurance Equivalent*		60 kW standby power generator: $20,000; 120 gallon propane tank: $1,150; Installation Fee: 15000 **Total: $36,150**	60 kW standby power generator: $20,000; 120 gallon propane tank: $1,150; Installation Fee: 15000 **Total: $36,150**	60 kW standby power generator: $20,000; 120 gallon propane tank: $1,150; Installation Fee: 15000 **Total: $36,150**
	Net Annual Savings:	$ 18,911	$ 31,950	$ 32,350	$ 31,200
4	Lifecycle IRR	14.5%	14.3%	16.7%	3.0%

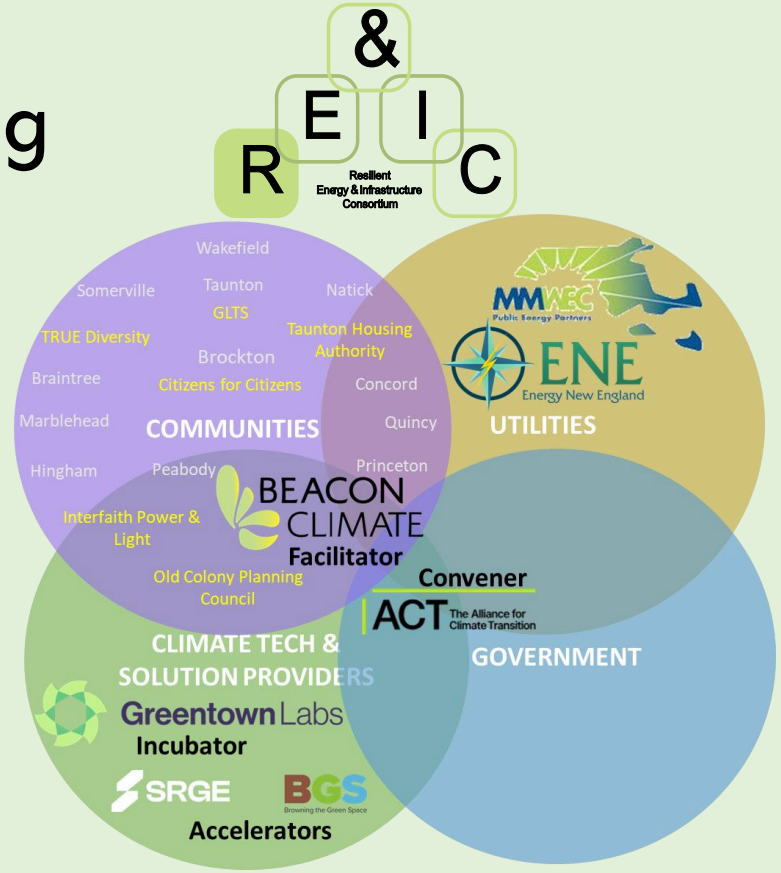
Trusted Example

- Kenzi Building



Opportunity/Threat

- Creating FOMO
- Reducing Barriers



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