

Connected Communities: Enabling the Grid Integrated Future

August 2023



Connecting Customer Technologies and the Energy System

THE WAY ELECTRICITY IS GENERATED AND CONSUMED IN THE U.S. IS QUICKLY CHANGING



Urgency to decarbonize end uses and the electricity grid

Increasing: deployment of variable energy resources, and efficiency

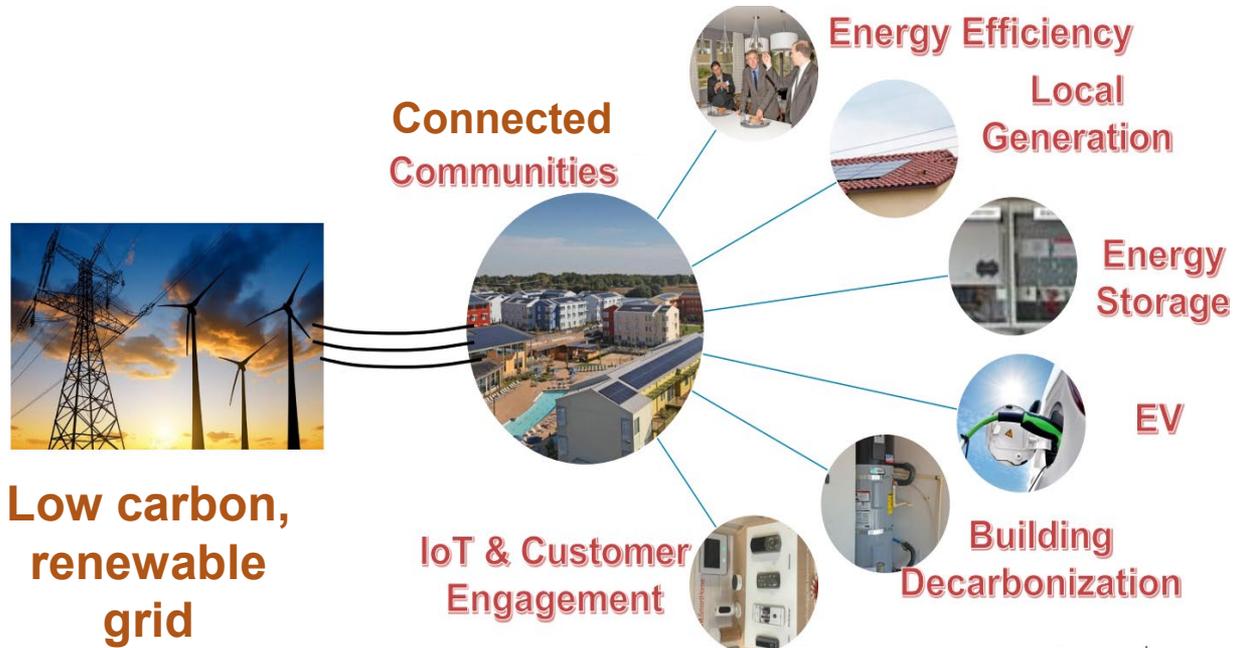
Increasing electrification of vehicles and buildings

Need to modernize fragile electricity system infrastructure

Need to decarbonize buildings, meet customer needs, and save money

Connected Communities envisions the future state of a low carbon grid serving decarbonized end uses using scaled demonstration

The Vision of an Integrated Energy System

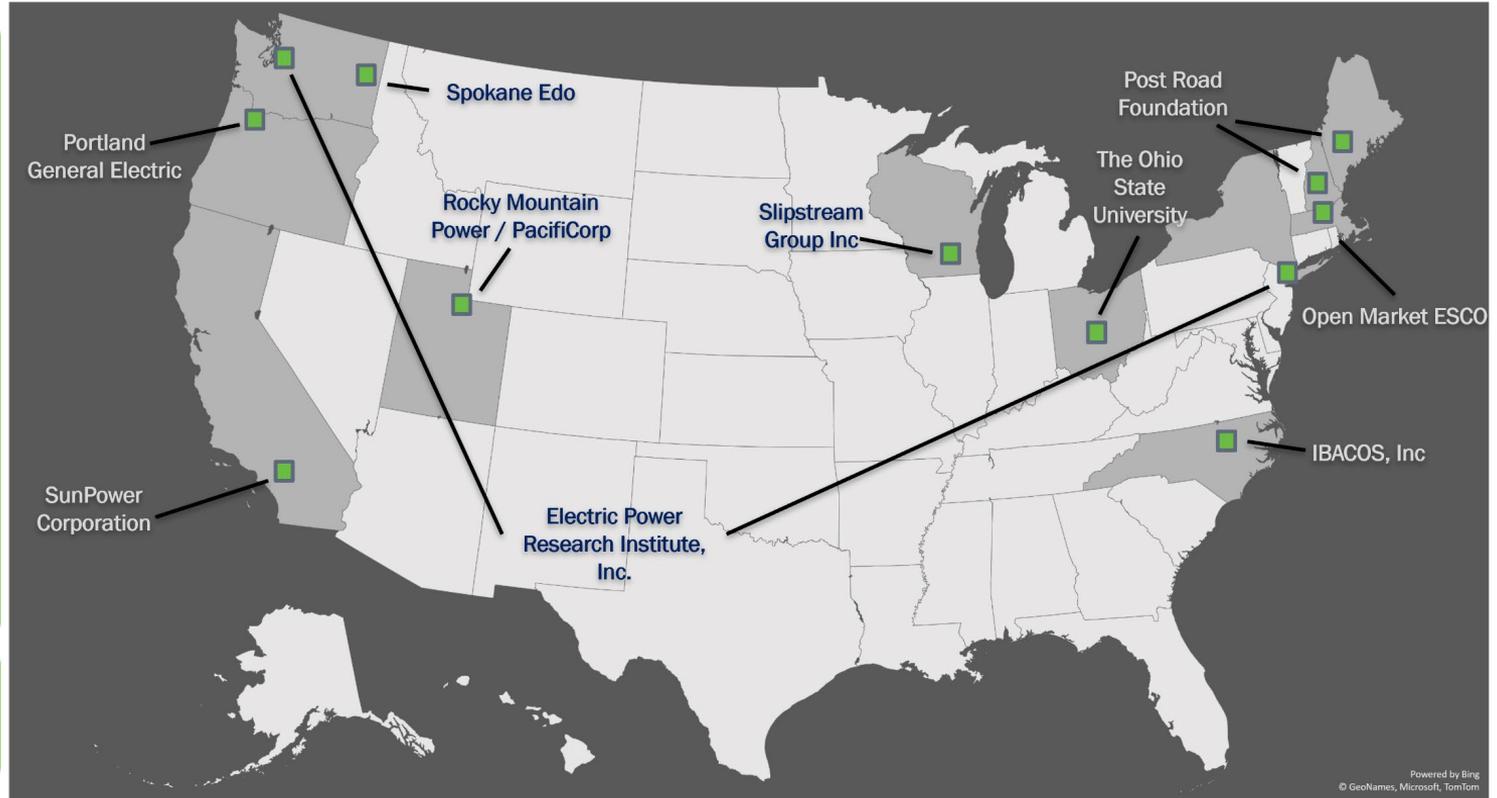


Connected Communities demonstrations are designed to leverage measured data and test grid integration technologies to enable “right sizing” of the future low carbon energy system with decarbonized end uses

Location of Selected *Connected Communities* Projects

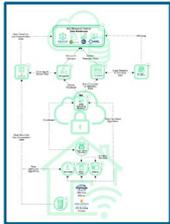


10
Selected
Projects
total \$61
Million in
funding

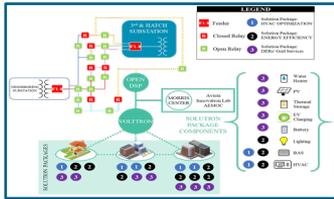


www.energy.gov/eere/buildings/articles/meet-does-newest-connected-communities-grid-interactive-efficient-buildings

Multiple lenses into Connected Communities



Commercial and residential electric ZNE demos in CA, NC, WA

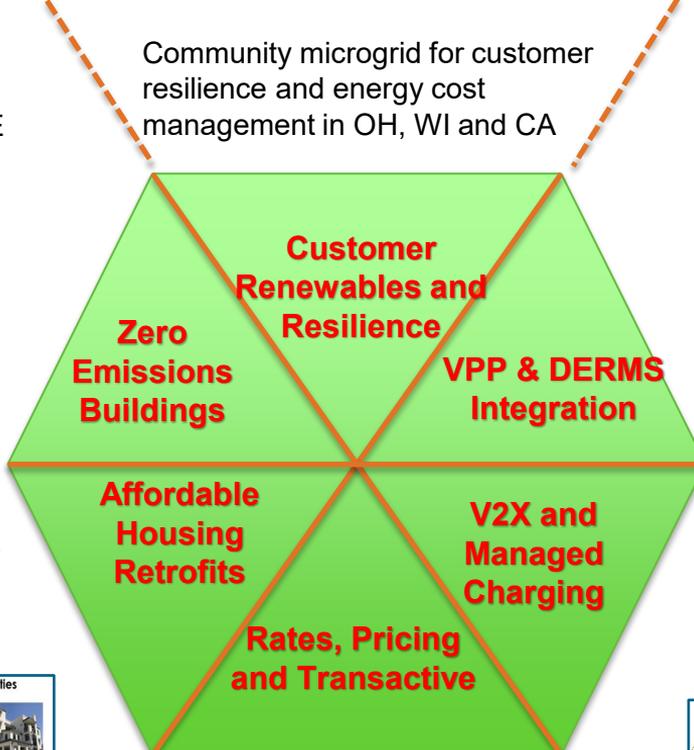
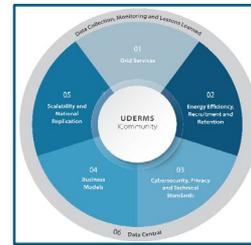


Community deployment of 120V HPs and ESCO model for electrification retrofits in NY, MA and WA



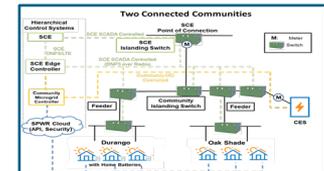
Community microgrid for customer resilience and energy cost management in OH, WI and CA

Utility DERMS deployment with multiple building types incl. LMI communities in OH, NY, OR, UT, NC and WA

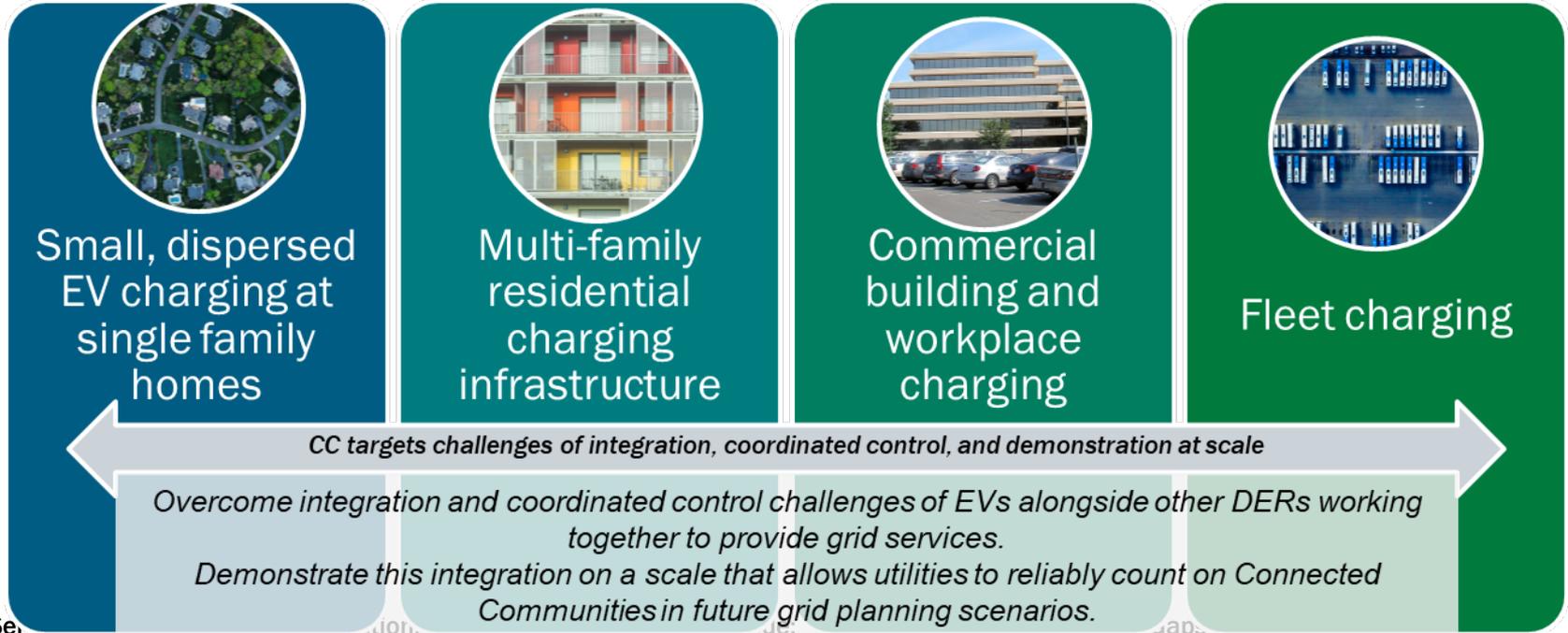


Key Idea / Takeaway:
Evaluate feasibility of two-way market interactive "prices-to-devices" concept for rural co-ops in NH to manage load

Using V2B with EVs for customer resilience in CA; V2G and fleet charging in affordable housing in WA



Example: Overview of EV Integration in Connected Communities



Grid Se...

- ✓ Voltage Regulation
- ✓ Frequency Support

- ✓ Capacity
- ✓ Congestion relief

- ✓ V2G/V2B
- ✓ DR

- ✓ Load Shift
- ✓ Load Shed

- ✓ control strategy in conjunction with other DERs and user requirements
- ✓ Permitting requirements

Connected Communities: Enabling equitable decarbonization

Open Market ESCO

- Pilot new approaches to “Resiliency as a Service” for vulnerable communities to optimize battery storage design and financing
- Demonstrate financeable pathways for existing multifamily buildings to transform into decarbonized, grid integrated buildings



Community Roots Housing & NYCHA

- Demonstrate grid integration in a high rise multifamily with 120V heat pump deployment
- Evaluate potential for managed EV charging, and enabling ride sharing in electrified multifamily communities in Seattle

Decarbonization in affordable housing communities



Understand ZNE + Electrification in infill settings (LINC)

All Electric Zero Carbon new construction affordable housing

Understanding behavioral load shapes + ZNE/electrification in UMF communities

Heat Pump retrofits in existing multifamily housing

Mixed fuel + renewable retrofits

Electrification ZNE retrofit in 50-yr old community

Summary of Funded Projects

Applicant	Region					Building Type						DERS					EE	Addressing Equity
	Northeast	South	Midwest	Mountain	Pacific	New	Existing	Single-Family	Multifamily	Commercial	Industrial	PV	Battery	EV Charging	CHIP/District	Wind		
IBACOS, Inc.		X				X	X	X				X	X	X			ZERH- 30% new, 10-15% existing homes	N/A
Edo					X		X	X	X	X		X	X	X			440-900 MWh reduction 7.5-15%	Project serves the majority of Spokane's designated Opportunity Zones
The Ohio State University			X				X		X	X		X	X	X	X		10% or 35% vs 2017 EPC	N/A
Portland General Electric					X		X	X	X	X		X	X	X			10%	Reducing energy burden of low income residents and exploring new ways to reach historically underserved populations
SunPower Corporation					X	X		X				X	X	X			38-57% - ZERH	N/A
Post Road Foundation	X						X	X		X	X	X	X	X			16%	One Maine community will likely be in Madison, which is a Qualified Opportunity Zone.
Slipstream Group Inc.			X				X		X			X	X	X			39%	N/A
Rocky Mountain Power / PacifiCorp				X		X	X		X	X		X	X	X			30-50%	Includes 5 affordable multi-family buildings
Electric Power Research Institute, Inc.	X				X		X		X			X	X	X			30%	Include affordable housing communities
Open Market ESCO	X						X		X			X	X	X			30% reduction - 4,700 MWh/year	Up to 2000 existing multi-family units

Discussions

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