

ET Summit 2023

Presented by



DOE Research & Deployment for Commercial Building Efficiency



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U.S. DEPARTMENT OF
ENERGY

Office of
**ENERGY EFFICIENCY &
RENEWABLE ENERGY**

DOE's Building Technologies Office Ecosystem

Building Codes Appliance Standards

- Support code development, adoption, and compliance
- Develop test procedures and standards



Emerging Technologies

- Develop next-gen tech that achieves stretch goals
- Address market barriers through innovative technologies
- Modeling tools that enable scaling of decarbonization solutions – code adoption, building design, and market identification
- Analysis to identify gaps and needs

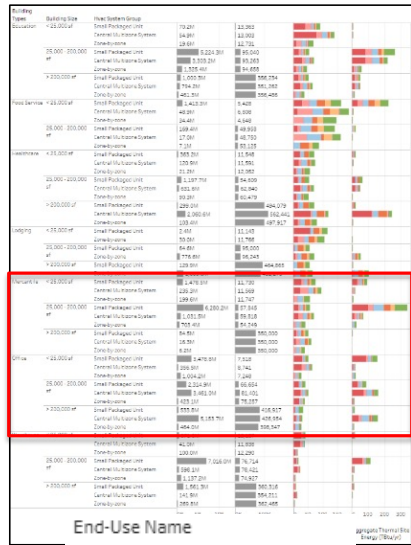
Residential Buildings Integration (RBI)

Commercial Buildings Integration (CBI)

- Demo tech & solutions
- Provide savings at scale
- Accelerate market adoption

US Building Typology Segments Commercial

by NREL Building Stock Analysis



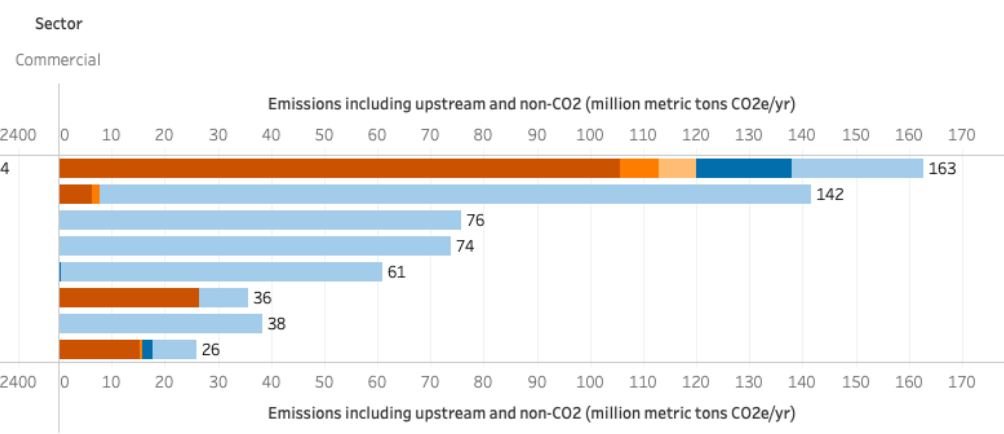
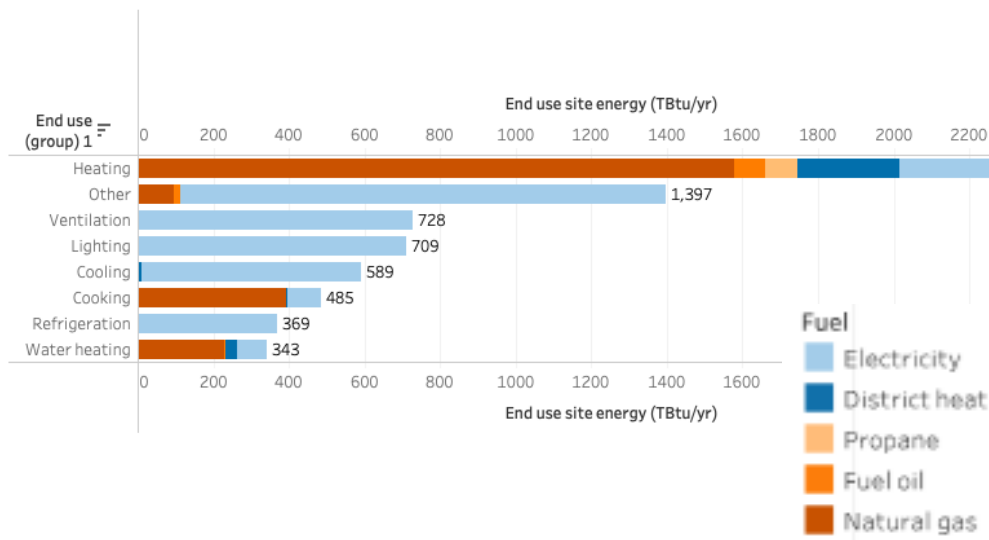
- End-Use Name
- electricity_fans
 - electricity_pumps
 - electricity_water_systems
 - onsite_fuel_water_systems
 - electricity_cooling
 - natural_gas_cooling
 - electricity_heating
 - natural_gas_heating

Building Type	Size (sf)	System	Total Building Floor Area (ft ²)	Average Building Floor Area (ft ²)	Avg. Thermal End Use Intensity (kBtu/ft ²)	Aggregate Thermal Site Energy (TBtu/yr)
Mercantile	< 25,000 sf	Small Packaged Unit	1,478.5M	11,730		
		Central Multizone System	235.3M	11,569		
		Zone-by-zone	199.6M	11,747		
	25,000 - 200,000 sf	Small Packaged Unit	6,280.2M	57,845		
		Central Multizone System	1,031.5M	59,818		
		Zone-by-zone	703.4M	54,249		
	> 200,000 sf	Small Packaged Unit	84.5M	350,000		
		Central Multizone System	16.3M	350,000		
		Zone-by-zone	6.2M	350,000		
Office	< 25,000 sf	Small Packaged Unit	3,478.8M	7,518		
		Central Multizone System	356.5M	8,741		
		Zone-by-zone	1,004.2M	7,248		
	25,000 - 200,000 sf	Small Packaged Unit	2,314.9M	66,654		
		Central Multizone System	3,461.0M	81,401		
		Zone-by-zone	423.1M	75,257		
	> 200,000 sf	Small Packaged Unit	533.8M	416,917		
		Central Multizone System	5,153.7M	426,954		
		Zone-by-zone	464.0M	398,347		

Published: May 3, 2022; Updated: Dec 22, 2022; <https://public.tableau.com/app/profile/nrel.buildingstock/viz/USBuildingTypologySegmentsCommercial/Segments>

Commercial Sector Segmentation Analysis – End Uses

Site energy by end use - Commercial (CBECS 2018)



Select Current CBI Technology Focus Areas



- Electricity emissions factors are Average Emissions Rates (AER) from Cambium 2022, Midcase Scenario, year 2024
- Fuel emissions factors include pre-combustion and combustion components for all GHG, based on [Draft PDS-01, BSR/RESNET/ICC 301-2022 Addendum B, CO2 Index](#)



The Buildings Upgrade Prize (Buildings UP)

Launched in January 2023, Buildings UP is designed to rapidly scale energy efficiency and efficient electrification building upgrades in communities across the country. The prize is envisioned to consist of four phases over approximately five years.

Application support prizes were available for up to 50 new and under-resourced teams.



Phase 1: Concept

- \$22M+ in prizes to teams + technical assistance
- Applications due by July 18, 2023
- Seeking 20–60 teams to join the “coopetition.”



www.heroX.com/buildingsUP

Prize Goals

Buildings UP aims to address persistent non-technical barriers to improving building energy efficiency and reducing on-site emissions (e.g., administrative, financial, social, and other barriers).

Buildings UP is a capacity-building prize to support teams with solutions that:

- **Accelerate building upgrades** for efficiency and on-site emissions reductions beyond current best practices in the applicant's identified area of focus
- **Demonstrate scalability and replicability** across building type(s), climate zone(s), and/or community type(s)
- **Advance holistic and lasting energy efficiency and efficient electrification** initiative development
- **Benefit underserved communities** by ensuring that benefits accrue to equity-eligible buildings,* their occupants, and surrounding communities.

*Equity-eligible buildings include buildings in disadvantaged communities; low- and moderate-income (LMI) households; and underserved commercial, nonprofit, and public buildings.



10+ Years of Better Buildings Partnerships

900+ Partners

2.5 Qbtu

Energy saved

\$15.3 B

Cost savings

155 MMT

CO₂ avoided

13.2 B

Square feet

3,500

Industrial facilities

\$28 B

Funding extended by
financial allies

Better Climate Challenge

Portfolio-wide reduction in GHG emissions of at least 50% in 10 years

Goal Parameters

- Reduction includes Scope 1 & 2 emissions
- Baseline up to 5 years back from join date
- Encouraged to establish an absolute target, but intensity-based targets will be accepted
- Establish an energy efficiency target that will contribute towards the 50% carbon emissions reduction. This target is intended to encourage prioritizing energy efficiency when pursuing a decarbonization plan
- No use of carbon offsets (RECs and PPAs still in)



Better Climate Challenge Partners



Better Buildings Solution Center

More than 3,000 solutions are available publicly in the Better Buildings Solution Center

Showcase Projects:

- Large and small buildings
- All sectors
- Specific building types such as schools, hospitals, hotels, grocery stores, universities, civic centers, libraries, offices, and labs

Implementation Models (Playbooks):

- Overcome barriers: finance, data, energy management, staff training, community and customer outreach, partnering with utilities, and more
- Multi-faceted and applicable across sectors

Additional Resources, Toolkits, Case Studies



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