UCONN's SmartBuildings CT

ENERGY STAR® Portfolio Manager®

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EVERSOURCE ENERGY UI SCG CNG

What Is SmartBuildings CT?

ENERGY STAR® Portfolio Manager®

- We work with commercial and industrial customers in Connecticut to provide information about the operation and maintenance of buildings and their systems to help building owners and operators:
  - Lower building energy usage and costs
  - Lower carbon emissions
  - Reduce water usage
  - Improve building occupant experience
  - Upgrade building data analysis methods and technologies
- Our work is focused on implementing systems and solutions that provide better information to decision-makers for investments, operations, and maintenance of buildings.
- **Support EPA's Portfolio Manager online tool for commercial & industrial organizations in Connecticut.**
- **Help organizations setup EPA PM *automatic data exchange in their portfolios*.**
- **Provide education on building energy analytics: How to act on the data**

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Muni's We've Supported Since 2012

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- Ansonia
- Bloomfield
- Bolton
- Branford
- Bridgeport
- Brookfield
- Brooklyn
- Cheshire
- Chester
- Clinton
- Deep River
- Derby
- East Hartford
- East Haven
- Easton
- Fairfield
- Greenwich
- Hamden
- Ledyard
- Litchfield
- Lyme
- Manchester
- Marlborough
- Milford
- Monroe
- New Britain
- New Haven
- North Branford
- North Haven
- Orange
- Plymouth
- Pomfret
- Shelton
- Simsbury
- Southbury
- Stonington
- Stratford
- Tolland
- Trumbull
- Washington
- West Hartford
- West Haven
- Weston
- Wilton
- Windham
- Woodbridge
- Woodbury

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Portfolio Manager (PM) Capabilities

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- ENERGY TRACKING. Know how meters match to buildings. Know your total Site Energy kBtu by converting unlike units of energy usage (kWh, ccf, gallons). Know how your total building energy changes over time.
- WEATHER NORMALIZATION. Know your Weather-Normalized Site Energy in kBtu. Know if changes in Site Energy are due to weather or performance of building.
- GET YOUR BENCHMARK. Know your ENERGY STAR Rating or Energy Benchmark Comparison*
- SHARE YOUR DATA. One internal shared database for building and energy information
- STRATEGIC ENERGY MANAGEMENT SUPPORT. Select and plan projects. Correlate energy changes to projects.
- GET RECOGNIZED. Share your achievements.

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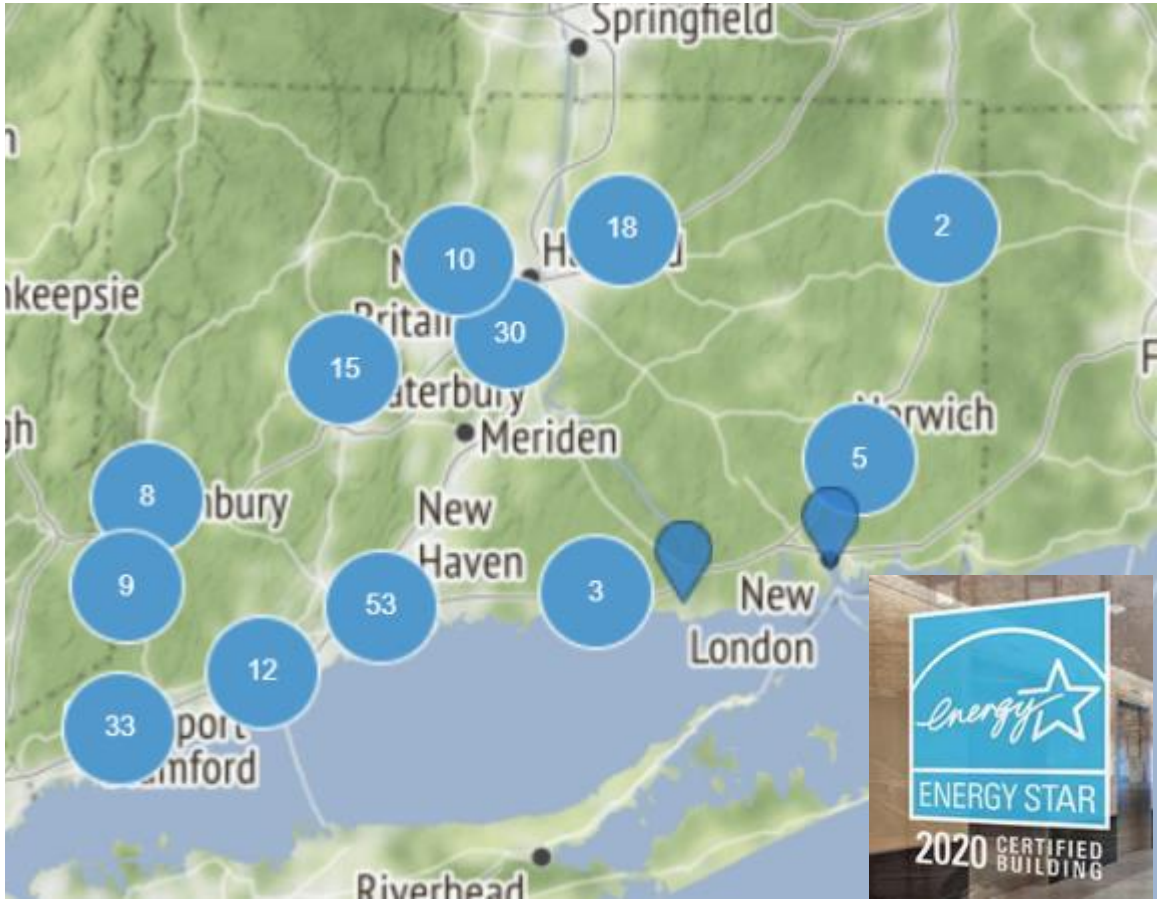
Get ENERGY STAR Certified

ENERGY STAR® Portfolio Manager®



210 Buildings ENERGY STAR Certified Since 2013 in CT

The difference one building can make

Compared with their peers, an ENERGY STAR certified office building, on average:

- Uses 35% less energy
- Generates 35% fewer greenhouse gas emissions
- Costs $0.54 less per square foot to operate.

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Example: What you can learn

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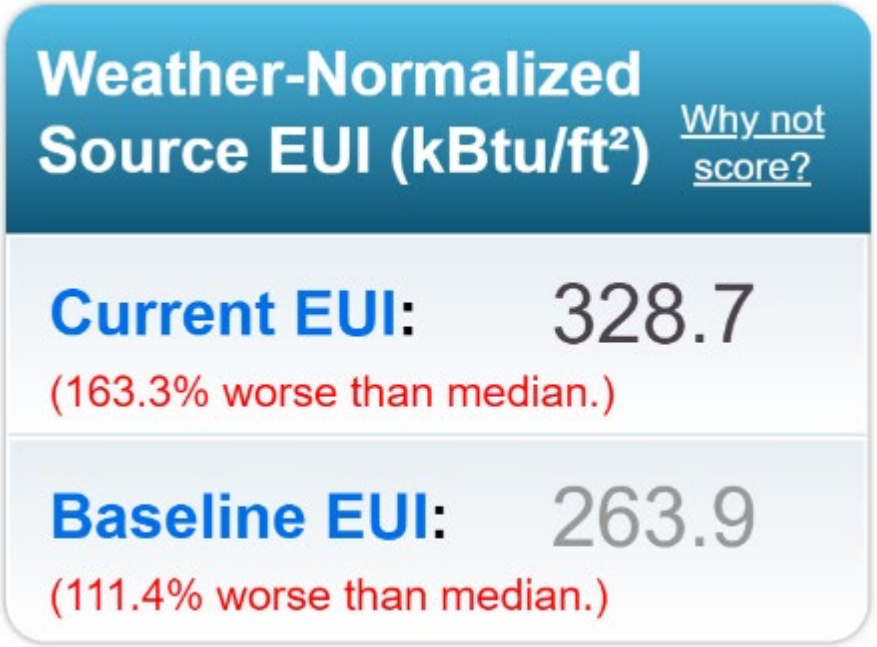
Your Benchmark



What Can I Learn?

- Do I have a high performing or low performing building?
- Is my building performance improving since my baseline year?
- Should I perform a building audit to find out why my building is performing so poorly?
- I've installed EE measures, why is my building still performing so poorly?

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Example: What you can learn

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Your Metrics Summary

Metrics Summary

Metric	Jun 2011 (Energy Baseline)	Jan 2019 (Energy Current)	Change
ENERGY STAR Score (1-100)	43	97	54.00 (125.60%)
Source EUI (kBtu/ft²)	144.4	63.0	-81.40 (-56.40%)
Site EUI (kBtu/ft²)	75.0	26.6	-48.40 (-64.50%)
Energy Cost ($)	722,860.66	339,025.06	-383835.60 (-53.10%)
Total GHG Emissions Intensity (kgCO2e/ft²)	5.6	1.8	-3.80 (-67.90%)
Water Use (All Water Sources) (kgal)	Not Available	Not Available	N/A
Total Waste (Disposed and Diverted) (Tons)	Not Available	Not Available	N/A

What Can I Learn?

- Do I have a high performing or low performing building?
- Is my building performance improving since my baseline year?
- How much money am I saving comparing any two years?
- What is my carbon footprint, and is it improving?
- Am I lowering my water and waste usage?

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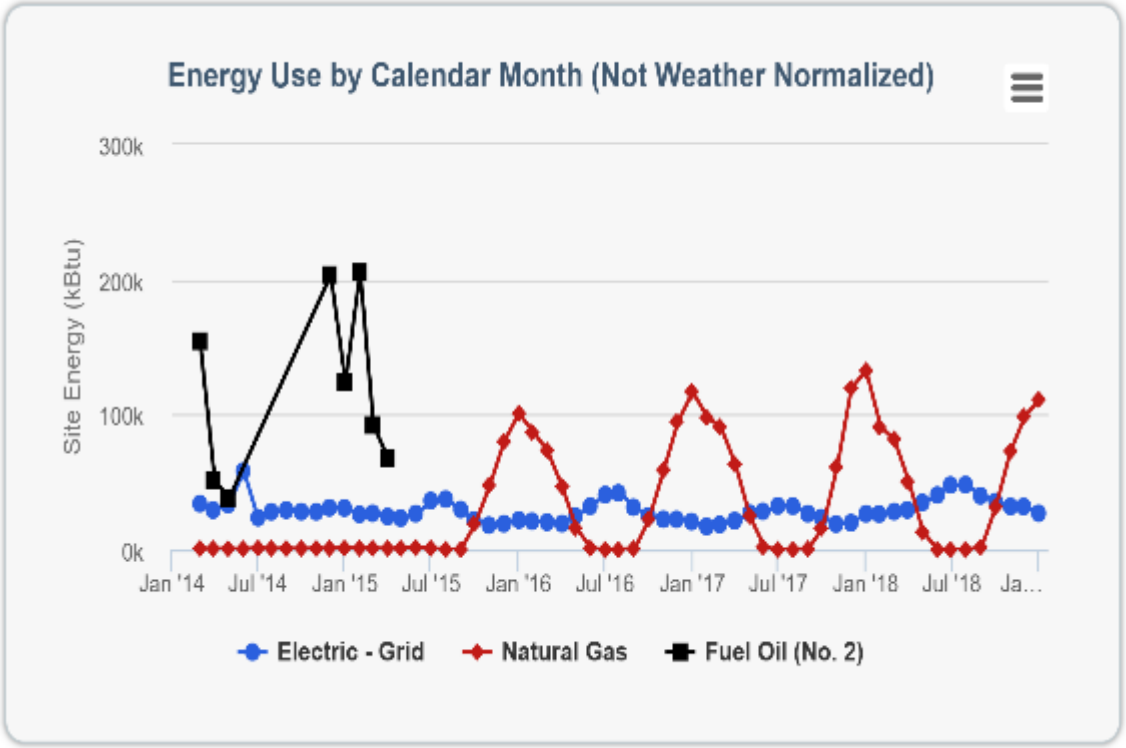
Example: What you can learn

Energy Use Trend



What Can I Learn?

- What fuels are used in my building?
- Are my heating and cooling peaks increasing or decreasing over time?
- How large is my cooling peak during the summer?
- Do I have a problem with my heating system?

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Example: What you can learn

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Understand the Benchmark and Goal Setting

Metrics Comparison for Your Property & Your Target Change Time Period

Metric	Nov 30 2013 (Energy Baseline)	Jan 31 2019 (Energy Current)	Target*	Median Property*
ENERGY STAR score(1-100)	13	11	75	50
Source EUI(kBtu/ft²)	164.5	175.0	87.3	113.5
Site EUI(kBtu/ft²)	69.0	73.0	36.5	47.4
Source Energy Use(kBtu)	8995077.9	9569423.1	4775858.3	6207423.3
Site Energy Use(kBtu)	3773766.4	3994329.5	1993469.5	2591012.6
Energy Cost($)	140799.21	154936.81	77325.07	100503.28
Total GHG Emissions(Metric Tons CO2e)	263.2	279.2	139.3	181.1

* To compute the metrics at the target and median levels of performance, we will use the fuel mix associated with your property's current energy use.

What Can I Learn?

- Why is my ENERGY STAR rating so low compared to similar properties?
- How much energy do I need to save to attain ENERGY STAR certification?
- How much money could I save annually if I achieve a median rating or an ENERGY STAR rating?

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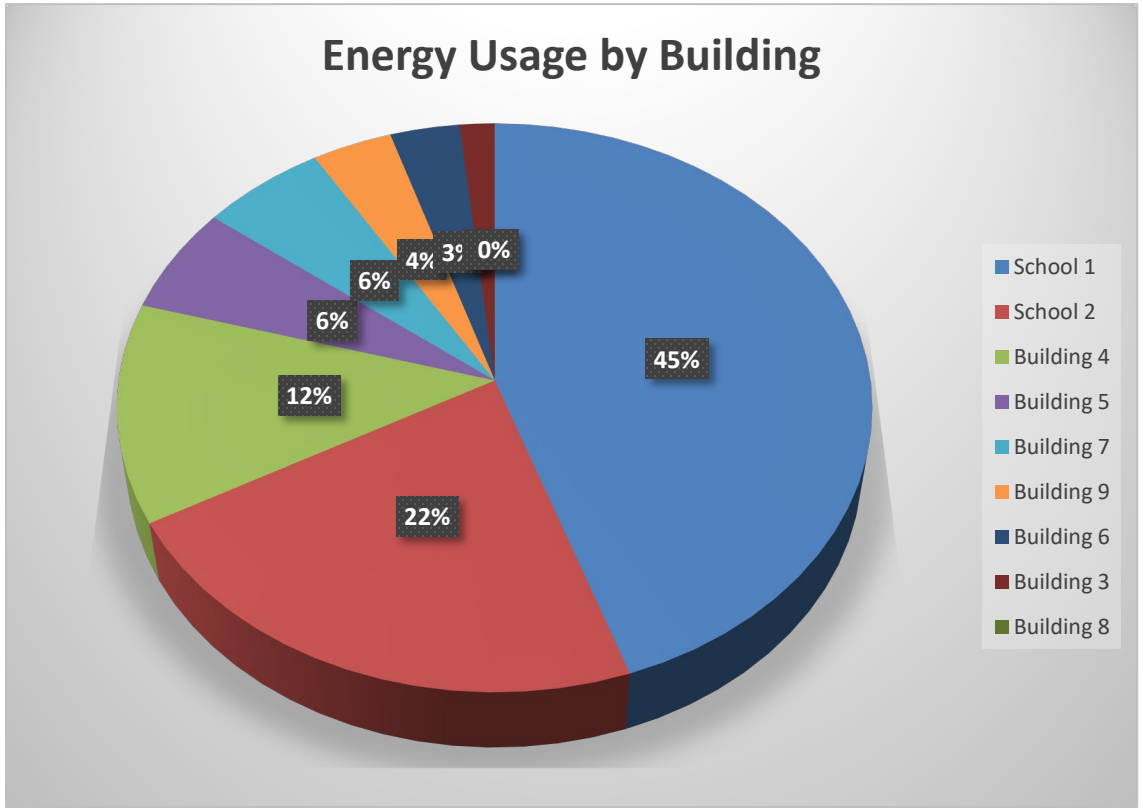
Example: What you can learn

Energy Usage By Building



What Can I Learn?

- Which buildings are my highest energy users?
- Where should I focus my effort?

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Example: What you can learn

Advanced Reporting
1000+ Metrics

Year Ending	Electricity Use - Grid Purchase and Generated from Onsite Renewable Systems (kWh)	Electricity Use - Grid Purchase and Generated from Onsite Renewable Systems (kBtu)	Natural Gas Use (kBtu)	Site Energy Use (kBtu)	Weather Normalized Site Energy Use (kBtu)	Total GHG Emissions (Metric Tons CO2e)	Site EUI (kBtu/ft²)
1/31/2019	3,321,300	11,332,276	9,816,860	21,149,136	21,534,342	1,371	141

Year Ending	Energy Cost ($)	Electricity (Grid Purchase) Cost ($)	Natural Gas Cost ($)	Energy Cost Intensity ($/ft²)
1/31/2019	580,582.57	554,207.72	26,374.85	3.87

What Can I Learn?

- What is the breakdown of my annual energy usage by fuel type in kBtu?
- What is the difference or change in any metric comparing one year to another?
- What is the breakdown of my total energy cost by fuel by building?

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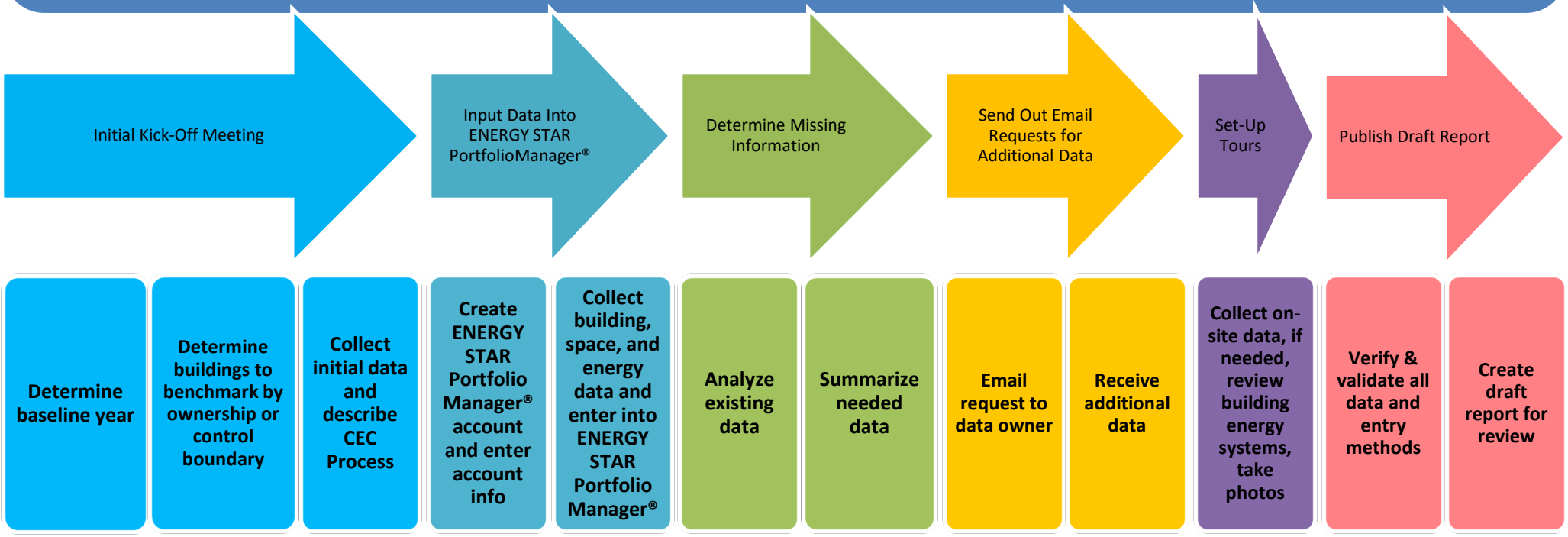
Building Energy Benchmarking Process

Let Us Support Your Process



Project Data Collection Required

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- **Buildings**
  - Identify which buildings to benchmark with street addresses
  - Pull assessor sheets to get sq. footage, year built, other information
  - Operating data for the buildings. (Use templates)
  - Match electric and gas meters to the buildings.
- **Utility Information**
  - Complete list of account numbers for Eversource, UI, CNG, and SCG with match to buildings.
  - Identify oil and propane and collect billing data in excel format to upload.(Delivery date, amount, and cost).
  - Identify if there is separate cost data for 3rd party suppliers and receive 3rd party billing data in excel format to upload.
  - Solar lease statements for all solar systems.

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EPA PM Benchmarking Summary

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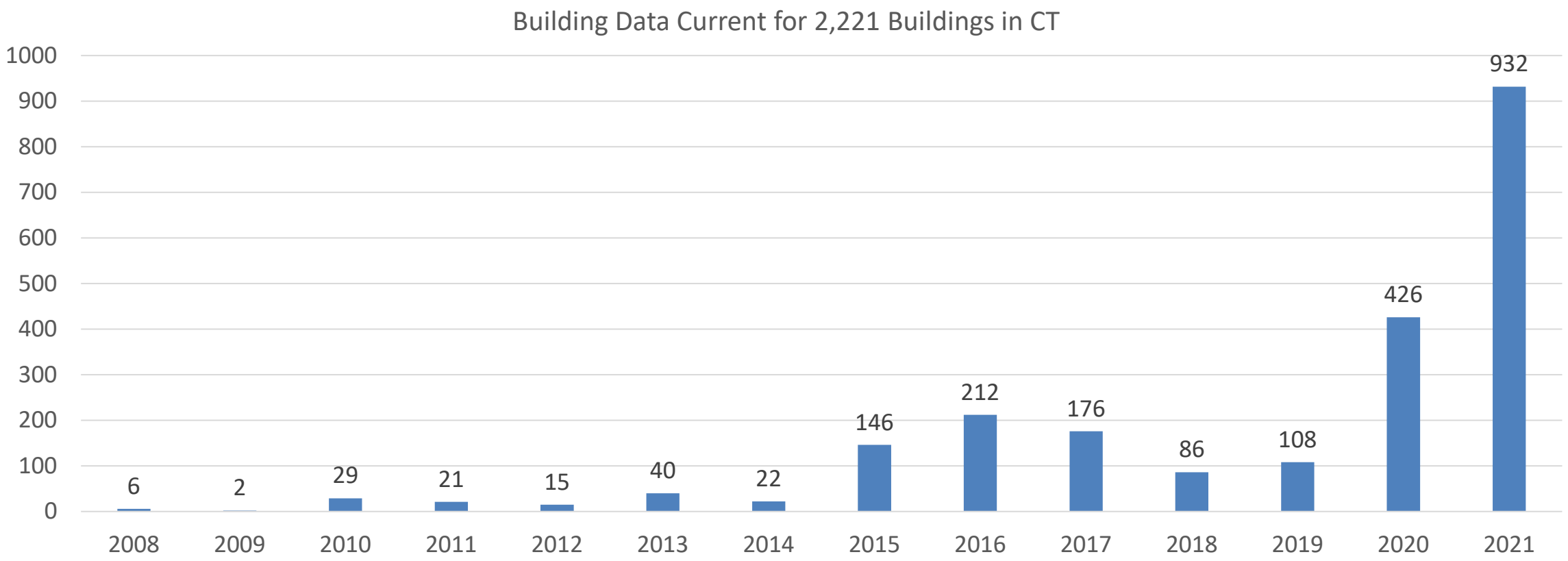

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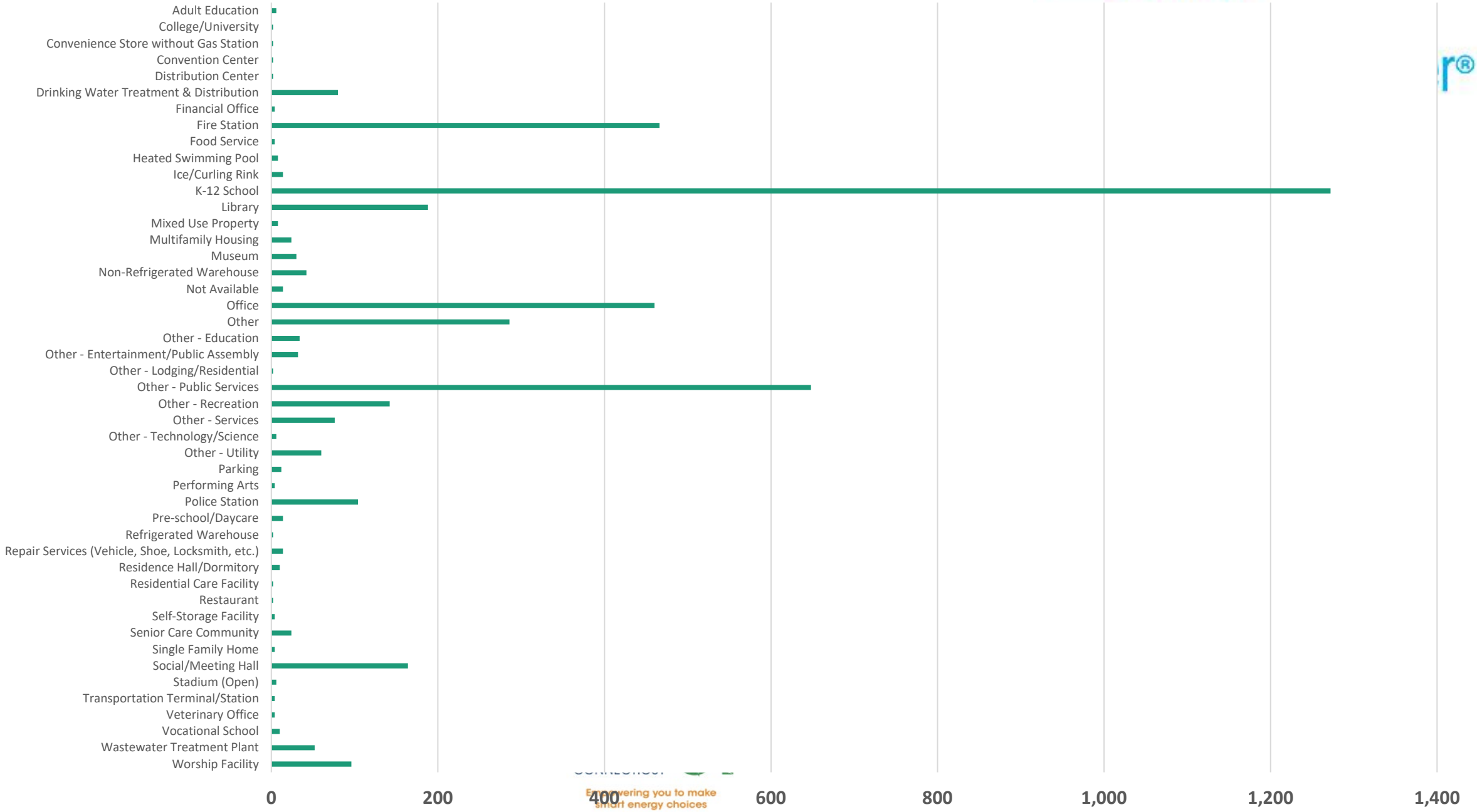
Adult Education
College/University
Convenience Store without Gas Station
Convention Center
Distribution Center
Drinking Water Treatment & Distribution
Financial Office
Fire Station
Food Service
Heated Swimming Pool
Ice/Curling Rink
K-12 School
Library
Mixed Use Property
Multifamily Housing
Museum
Non-Refrigerated Warehouse
Not Available
Office
Other
Other - Education
Other - Entertainment/Public Assembly
Other - Lodging/Residential
Other - Public Services
Other - Recreation
Other - Services
Other - Technology/Science
Other - Utility
Parking
Performing Arts
Police Station
Pre-school/Daycare
Refrigerated Warehouse
Repair Services (Vehicle, Shoe, Locksmith, etc.)
Residence Hall/Dormitory
Residential Care Facility
Restaurant
Self-Storage Facility
Senior Care Community
Single Family Home
Social/Meeting Hall
Stadium (Open)
Transportation Terminal/Station
Veterinary Office
Vocational School
Wastewater Treatment Plant
Worship Facility
0
200
400
600
800
1,000
1,200
1,400

Portfolio-Wide Reductions
Baseline vs. Current Year for 2,060* Buildings

- Annual Energy Savings: 189 MMBTU
  - 5,632,003,354 kBtu Baseline
  - 5,443,048,948 kBtu Current
  - 3% Reduction
- Annual GHG Emissions Reductions: 26,000 MTCDE
  - 350,001 MTCDE Baseline
  - 324,001 MTCDE Current
  - 7% Reduction

*@7-8% of buildings had incomplete or irregular baseline energy data, so outliers removed from reduction stats