REDACTED

Eversource 20 Barnabas Rd Newtown, CT – SCOPING STUDY

Utility/Site Contacts

[redacted]
Facilities Supervisor West
Eversource Energy
[redacted]

Justin Marmaras
Principal
QGM Consulting
860-515-6331
m@qgmconsulting.com

Padraic Hagan
Senior Energy Advisor
QGM Consulting
860-634-6298
phagan@QGMconsulting.com

Austin Malik
Associate Energy Advisor
QGM Consulting
austin.malik@qgmconsulting.com

Executive Summary

QGM Consulting (Padraic Hagan and Austin Malik) conducted an energy efficiency scoping study at the Eversource service center located at 20 Barnabas Road Newton, CT 06470 on Monday February 2nd, 2026. QGM analyzed the buildings' electric and natural gas use and associated Greenhouse Gas emissions. Objectives were to identify and quantify potential Energy Efficiency Measures (EEMs) for energy and estimated Greenhouse Gas reductions for corporate initiatives and reduction targets.

Included in this report is a list of potential EEMs with savings and implementation cost estimates. Please note that the values presented in this report are meant to provide an order of magnitude and are not final values or guarantees for the determination of incentives. A measure summary is provided in the table below.

Eversource Newton Service Center - Scoping Study Measure Summary								
EEM#	Energy Efficiency Measure (EEM)	Estimated Annual Cost Savings	Estimated Annual Energy and GHG Savings			Potential GHG Reduction	Estimated Project Cost	Simple Payback
#	Description	$	kWh	CCF	GHG (MT CO2e)	% Site GHG	$	years
1	Building Shell Gap Remediation	$2,000	5,000	700	5.3	2%	$20,000	10.0
2	Occupancy HVAC Controls for Main Conference Room	$300	600	100	0.7	0%	$1,000	3.3
3	HVAC Air Balancing	$2,000	5,000	300	3.1	1%	$20,000	10.0
4	Replace Garage Bay Heaters with Gas-fired IR Heaters	$4,000		3,000	16.5	6%	$25,000	6.3
TOTAL		$8,300	10,600	4,100	25.6	9%	$66,000	8.0
Electrification Measures								
5	Replace Hot-Water UHs and CUHs with Electric Heat	($15,000)	(178,000)	8,000	(7.8)	-3%	$5,000	n/a
6	Replace Hydronic Boiler System with Electric Heat	($10,000)	(111,000)	5,000	(4.8)	-2%	$5,000	n/a
TOTAL		($25,000)	(289,000)	13,000	(12.6)	-4%	$10,000	n/a

These are the measures identified during the assessment walk through; additional measures might become evident with more time on site. Simple paybacks do not include potential non-energy benefits which may include maintenance savings, labor savings, water savings, etc. unless otherwise indicated.

REDACTED

General Facility Description

The Barnabas Road Newtown facility consists of two buildings originally constructed in 1991:

- ~57,000 SF mixed use main building consisting of offices, conference rooms, operations centers, workrooms, and shop areas
- ~9,000 SF garage building used for fleet vehicle maintenance

The main building has had recent renovations, including replacement of (35) variable air volume (VAV) and fan powered terminal (FPT) boxes and replacement of (2) rooftop units (RTUs). RTUs are cooling and ventilation only, with heating provided by a natural gas fired hot water (HW) boiler and HW reheats in the VAVs. RTUs and VAVs are controlled with an up-to-date Automated Logic Building Management System (BMS), with occupied/unoccupied scheduling, adaptive/optimal start/stop, and demand control ventilation.

Additional spot heating and cooling for operations center areas is achieved with split system heat pumps, electric baseboard, and vestibule and maintenance areas with HW cabinet unit heaters (CUHs) and unit heaters (UHs) respectively.

Lighting systems are LED with motion/occupancy controls. Lighting controls are reported to be commissioned and work well.

The maintenance garage building is heated with direct-fire natural gas units in the garage bays, and a combination of packaged units and a hot water loop from an aged natural gas HW boiler in the remainder of the building.

Typical building occupancy is 5 AM – 5 PM, Monday through Friday with limited weekend hours. 24-hour occupancy occurs during emergency and storm events. Occupied building operations are estimated to be 3,700 annual hours.

Monthly Billing Analysis

Natural gas data was received in the form of a natural gas bill. This information included the most recent natural gas billing rates and quantity of natural gas used, along with the previous 12 months of natural gas use.

Electric use is metered but not billed at this site, with annual use provided; monthly use was modeled based on annual use, the site's footprint, hours of operation, equipment and estimated utilization, and an example monthly load profile from a similar site. $0.1428/kWh was used as an electric rate based upon Eversource Facilities' third-party electric supply costs for similar type facilities.

The most recent 12 months are summarized below:

REDACTED

Most Recent 12 Month Summary						
Energy Usage and Costs	Costs	Energy			MT CO2 Emitted	Unit Costs
	$	kWh/CCF	mmBTU	% of total		
Electric (kWh)	$ 79,497	556,704	1,899.5	43%	136.5	$ 0.14
N. Gas (CCF)	$ 31,857	24,143	2,506.0	57%	133.0	$ 1.32
Total	**$ 111,354**		**4,405.5**	**100%**	**269.5**	

A monthly summary of electric and thermal use is shown below:

Monthly Utility Bill Summary							
Estimated Monthly Electric				Monthly Natural Gas			
Month	Electrical Use (kWh)	Estimated Cost ($)	Estimated Blended Rate ($/kWh)	Month	Natural Gas Use (CCF)	Total Cost ($)	Blended Rate ($/CCF)
Feb-25	37,456	$ 5,349	$ 0.14	Feb-25	3,986	$ 5,260	$ 1.32
Mar-25	39,508	$ 5,642	$ 0.14	Mar-25	2,870	$ 3,787	$ 1.32
Apr-25	43,869	$ 6,265	$ 0.14	Apr-25	1,808	$ 2,386	$ 1.32
May-25	46,691	$ 6,668	$ 0.14	May-25	855	$ 1,128	$ 1.32
Jun-25	58,492	$ 8,353	$ 0.14	Jun-25	249	$ 329	$ 1.32
Jul-25	59,262	$ 8,463	$ 0.14	Jul-25	95	$ 125	$ 1.32
Aug-25	63,110	$ 9,012	$ 0.14	Aug-25	127	$ 168	$ 1.32
Sep-25	58,492	$ 8,353	$ 0.14	Sep-25	361	$ 476	$ 1.32
Oct-25	48,744	$ 6,961	$ 0.14	Oct-25	1,477	$ 1,949	$ 1.32
Nov-25	36,686	$ 5,239	$ 0.14	Nov-25	2,680	$ 3,536	$ 1.32
Dec-25	33,864	$ 4,836	$ 0.14	Dec-25	4,563	$ 6,021	$ 1.32
Jan-26	30,529	$ 4,360	$ 0.14	Jan-26	5,072	$ 6,693	$ 1.32
TOTAL	**556,704**	**$ 79,497**	**$ 0.14**	**TOTAL**	**24,143**	**$ 31,857**	$ 1.32

The energy use intensity (EUI) shown below is an indicator of building performance in terms of energy use (kbtu) per building square foot:

Building Energy Use Intensity (EUI)			
Utility	Site EUI	Source EUI	Unit
Natural Gas	38	40	kbtu/sf
Electricity	29	81	kbtu/sf
TOTAL	**67**	**121**	**kbtu/sf**

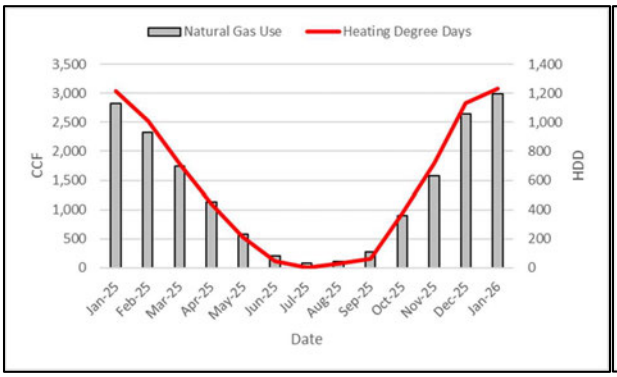
Source-site ratio per national average, source:
https://portfoliomanager.energystar.gov/pdf/reference/Source%20Energy.pdf

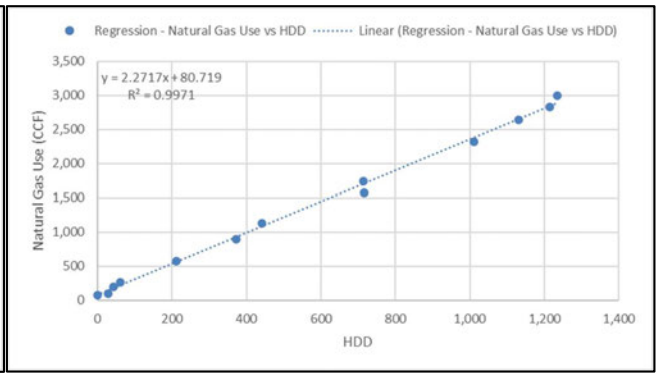
QGM CONSULTING

REDACTED

The EUI metric can be used to baseline existing energy use for future comparison or to compare this building to similar buildings of this type (general office space/fitness center). Energy Star publishes median data by building type for overall comparison.

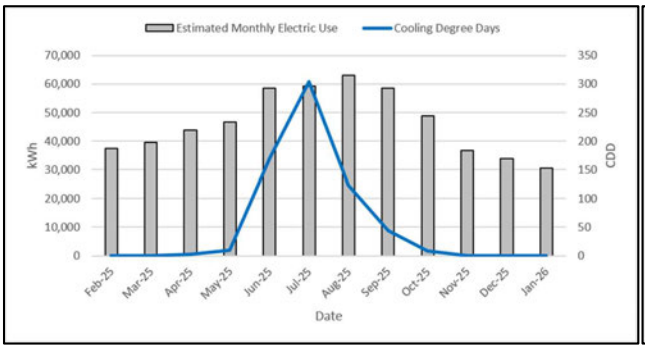
An analysis was carried out with actual natural gas use and heating degree days (HDD), as seen below:

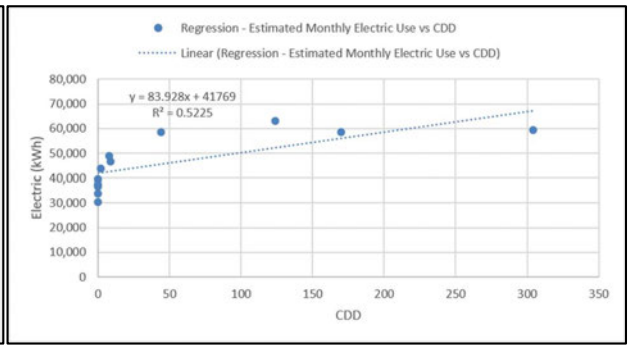




The graph indicates a strong visual relationship between natural gas use and HDD, suggesting the majority of natural gas is used for building heating. Summer month natural gas use can likely be attributed to service hot water. The regression further shows a strong, statistically significant relationship to HDD, with an R^2 value of 0.99.

Additional modeling of estimated monthly electrical data was conducted to help determine potential load profile as it is assumed by-month building electric load will be impacted by the impact of weather/occupancy on the site based on results of the NG correlation exercise. Below are graphs showing the relationship between modeled monthly use and cooling degree days:



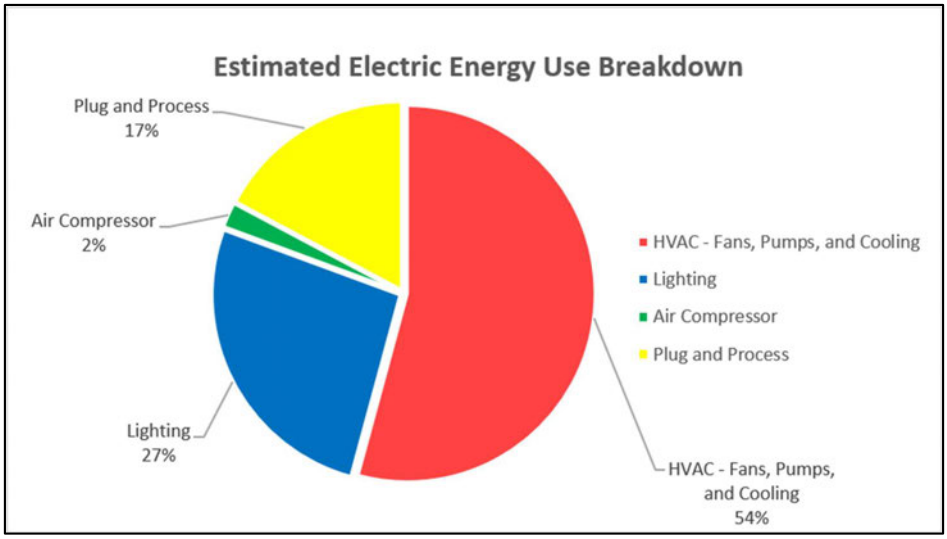


The regression suggests that campus monthly electrical use has a statistically significant relationship to CDD, with an R^2 value of 0.53, indicating a reasonable model fit. The Department of Energy Superior Energy Performance (SEP) program qualifies that a statistical relationship exists between the two variables with an R^2 value of > 0.5, and a strong relationship with an R^2 value of > 0.75.

Mechanical System Energy Use Breakdown

Electric Use

Based on the initial walk-through, the following electric energy use breakdown was developed based on estimates. These results should be considered high level and were sourced from motor nameplates, typical load factors, and estimated operational hours. Actual data logging would be required to confirm these assumptions.

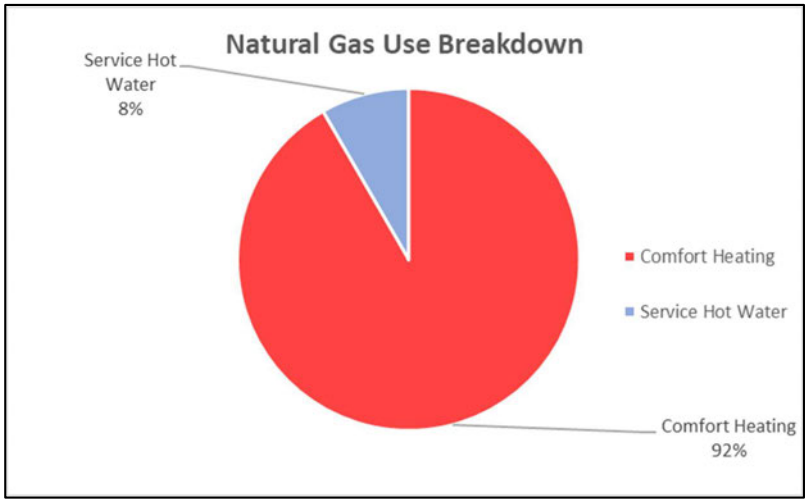


Estimated End Use Breakdown - Electricity	
Electric End Use	**Energy Use (kWh)**
HVAC - Fans, Pumps, and Cooling	302,000
Lighting	147,000
Air Compressor	12,000
Plug and Process	96,000
TOTAL	**557,000**

Natural Gas Use

Based on the initial walk-through and provided billing data, the following site natural gas use breakdown was developed. As above, these results should be considered high level and were sourced from equipment nameplates, typical load factors, and estimated operational hours. Actual data logging would be required to confirm these assumptions.

REDACTED



Estimated End Use Breakdown - Natural Gas	
Natural Gas End Use	**Energy Use (CCF)**
Comfort Heating	22,000
Service Hot Water	2,000
TOTAL	**24,000**

Equipment Inventory:

During the initial walkthrough, site equipment inventories were created to better understand the current equipment.

REDACTED

HVAC Equipment:

Eversource Newtown Service Center HVAC Equipment Inventory								
Tag	**Type**	**Manufacturer**	**Model**	**Cooling Ton**	**MBH**	**Total Fan HP**	**Max CFM**	**Notes**
AHU-1	Air Handling Unit	Trane	CSAA021		101.38	16.08		Serves main building
AHU-2	Air Handling Unit	Trane	CSAA021		101.38	16.08		Serves main building
MAS-1	Make up Air Unit	Reznor	-					Not in service
(4)	Packaged RTU	Trane	YHC060F4RHA1R	5	104	1.4		Serves garage
-	RTU	Reznor	Preeva					Serves main building
-	Packaged RTU	Trane	YSC092H3RHA29K	7.5		4.7		
-	Condenser	Trane	4TTA7048A4			0.2		
-	Ceiling-Suspended Indoor Unit	Mitsubishi	PCA-A30KA7	2.5			670	
-	Condenser	Mitsubishi	PUY-A30NHA7				1940	
	Ceiling-Suspended Indoor Unit	Mitsubishi	PKA-A12HA7	1				
-	Condenser	Trane	PUY-A12NKA7					
VF-1	Variable Air Volume Box	Trane	VPWF12-SQ04		32.4	0.125	1,120	
VF-4	Variable Air Volume Box	Trane	VPWF10-SQ03		17.3	0.33	800	
VF-5	Variable Air Volume Box	Trane	VPWF12-SQ04			1	1,400	
VF-6	Variable Air Volume Box	Trane	VPWF10-SQ03		20.3	0.33	940	
VF-8	Variable Air Volume Box	Trane	VPWF06-SQ02		8.6	0.125	400	
VF-10	Variable Air Volume Box	Trane	VPWF10-SQ03		20	0.33	930	
VF-12	Variable Air Volume Box	Trane	VPWF12-SQ04		26.8	0.33	1,240	
VF-13	Variable Air Volume Box	Trane	VPWF06-SQ02		11.7	0.125	435	
VF-14	Variable Air Volume Box	Trane	VPWF06-SQ02		7.7	0.125	285	
VF-15	Variable Air Volume Box	Trane	VPWF10-SQ03		23.1	0.33	855	
VF-16	Variable Air Volume Box	Trane	VPWF06-SQ02		9.7	0.125	360	
VF-17	Variable Air Volume Box	Trane	VPWF08-SQ03		19.4	0.33	720	
VF-18	Variable Air Volume Box	Trane	VPWF08-SQ03		11.7	0.33	540	
VF-19	Variable Air Volume Box	Trane	VPWF08-SQ03		15.6	0.33	720	
VF-20	Variable Air Volume Box	Trane	VPWF08-SQ03		15.6	0.33	720	
VF-21	Variable Air Volume Box	Trane	VPWF08-SQ03		17.8	0.33	660	
VF-22	Variable Air Volume Box	Trane	VPWF08-SQ03		15.3	0.33	570	
VF-23	Variable Air Volume Box	Trane	VPWF06-SQ02		8.1	0.125	300	
VF-24	Variable Air Volume Box	Trane	VPWF06-SQ02		9.8	0.125	455	
VF-25	Variable Air Volume Box	Trane	VPWF06-SQ02		8.7	0.125	405	
VF-26	Variable Air Volume Box	Trane	VPWF08-SQ03		12.5	0.33	580	
VF-27	Variable Air Volume Box	Trane	VPWF08-SQ03		17.1	0.33	635	
VF-28	Variable Air Volume Box	Trane	VPWF08-SQ03		16.6	0.33	615	
VF-29	Variable Air Volume Box	Trane	VPWF06-SQ02		9.7	0.125	360	
VF-30	Variable Air Volume Box	Trane	VPWF08-SQ03		17.4	0.33	645	
VF-31	Variable Air Volume Box	Trane	VPWF10-SQ03		18.7	0.33	865	
VF-32	Variable Air Volume Box	Trane	VPWF08-SQ03		11.7	0.125	540	
VF-33	Variable Air Volume Box	Trane	VPWF08-SQ03		13.5	0.125	500	
VF-34	Variable Air Volume Box	Trane	VPWF08-SQ03		12.4	0.33	575	
VF-35	Variable Air Volume Box	Trane	VPWF06-SQ02		7.8	0.125	290	
VF-36	Variable Air Volume Box	Trane	VPWF08-SQ03		14.8	0.33	685	
VF-37	Variable Air Volume Box	Trane	VPWF08-SQ03		14.8	0.33	685	
VF-38	Variable Air Volume Box	Trane	VCCF10				1,000	Cooling only
VF-39	Variable Air Volume Box	Trane	VPEF-6"-02SQ		6.8	0.125	240	Has electric reheat (2 kW)
VF-41	Variable Air Volume Box	Trane	VPEF-6"-02SQ		8.5	0.125	250	Has electric reheat (2.5 kW)
-	Exhaust Fan	Greenheck	G-95-D				1,059	
EF-2	Exhaust Fan	Greenheck	GB-80-4			0.25		
-	Exhaust Fan	Greenheck	GB-130-4X-QD					

REDACTED

Eversource Newtown Unit Heaters		
Location	Type	Quantity
Main Building	Fan coil	4
Main Building	Cabinet	3
Garage	Fan coil	3
Garage	Radiative	4

Compressed Air Equipment:

Eversource Newtown Compressor Inventory							
Make	Model	HP	Estimated Capacity (CFM)	Compressor Control Type	Cooling	Voltage	Estimated Annual Run Hours
Powerex	2 X 5hp	10	45	Recip	Air Cooled	460	1,000
**Annual run hours estimated*							

Eversource Newtown Dryer Inventory			
Make	Model	Rated CFM	Type
Altec Air	RAD-007SA-1	75	Non-Cycling

Eversource Newtown Air Receivers	
Location	Capacity (Gallon)
Integrated with Compressor	150

Chiller Summary:

Chiller Summary			
Manufacturer	**Model**	**Cooling Ton**	**Volts**
Trane	RTAC 1554	155	460

Boiler Equipment:

Eversource Newtown Boiler Summary						
Quantity	**Type**	**Make**	**Model**	**Max Input (MBH)**	**Max Output (MBH)**	**Service Point**
2	Hydronic Boiler	Weil McLain	P-LGB-6-W	650	450	Main Building
1	Hydronic Boiler	Weil McLain	GV-5	140	122	Garage

Eversource Newtown Boiler Pumps		
Description	Quantity	HP
Main Building Boiler Supply	2	1.5
Main Building Boiler Return	2	0.25

Service Hot Water Heaters:

Eversource Newtown Hot Water Heater Summary					
Quantity	**Make**	**Model**	**Max Input (MBH)**	**Max Output (MBH)**	**Service Point**
1	AO Smith	BTX-300	300	78	Main Building
1	Bradford-White	D25T1253N	125	-	Garage

Best Practices

The Newtown facility was observed to be following several energy Best Practices:

- Use of LED lighting in most/all areas with aggressive controls
- VFD control of HW and CHW
- Scheduled nighttime/weekend temperature setback in most/all areas
- Demand Control Ventilation and Adaptive/Optimal Start/Stop HVAC control strategies in place

Recent Energy Efficiency Projects Overview

The campus has completed several energy efficiency projects in recent years. Listed below are some of the various completed energy projects:

- Upgrade to LED Lighting and advanced lighting controls
- Campus-wide DDC control of HVAC systems
- Upgrades to energy-savings equipment on replacement

With the projects described above, QGM Consulting was challenged to find additional energy efficiency measures (EEMs) and sustainability projects. Potential recommendations are outlined below, some of which may require some additional analysis and monitoring.

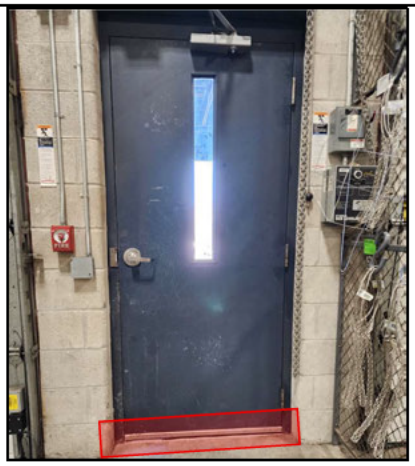
Site Energy Efficiency Measures/Recommendations

EEM – 01 – Consider Building Shell Gap Remediation

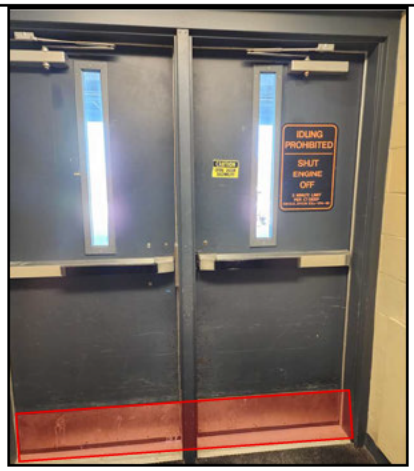
During the walkthrough of the site, gaps and cracks were noted at door and window seals and are suspected at roof/wall transitions. Insulation and air sealing are understood to be original construction and have likely degraded over time. Envelope gaps are thus allowing the infiltration/exfiltration of untempered air and increasing the load on HVAC equipment. It is recommended that the site perform a comprehensive building and

REDACTED

thermal shell survey and remediate any identified gaps. Pictures below detail some of the observed building shell gaps:



Exterior door with degraded seals allowing air infiltration



Exterior door with degraded seals allowing air infiltration

Savings were estimated assuming improvements in thermal envelope as well as a reduction in outdoor air infiltration during both heating and cooling seasons:

- **Estimated Annual Energy Savings:** 5,000 kWh and 700 CCF
- **Estimated Annual Cost Savings:** $2,000
- **Estimated Implementation Costs:** $20,000 including survey costs

Next Steps:

- Facility staff are encouraged to discuss building shell survey and remediation with a specialized vendor.

EEM - 02 – Control Main Conference Room Heating and Cooling via Occupancy

An innovative control strategy noted in use at other Eversource sites is the control of auditorium and conference room HVAC equipment based on an occupancy schedule. These spaces see highly variable occupancy, particularly post-COVID. Setting these large and intermittently occupied spaces to unoccupied setpoints for significant periods of non-use (much as many sites do with lighting) reduces the associated energy expenditure, while still allowing a quick recovery for occupancy.

Areas of potential opportunity at the Newtown facility include the main conference room/auditorium. The example below summarizes a potential before and after schedule – assuming average consistent use in the 10 AM – 2 PM period of weekdays:

REDACTED

HVAC Schedule - Existing and Proposed with Occupancy Control																
Existing Schedule								Proposed Schedule - Estimated Reduced Hours								
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
12:00 AM								12:00 AM							
1:00 AM								1:00 AM							
2:00 AM								2:00 AM							
3:00 AM								3:00 AM							
4:00 AM								4:00 AM							
5:00 AM		X	X	X	X	X		5:00 AM							
6:00 AM		X	X	X	X	X		6:00 AM							
7:00 AM		X	X	X	X	X		7:00 AM							
8:00 AM		X	X	X	X	X		8:00 AM							
9:00 AM		X	X	X	X	X		9:00 AM							
10:00 AM		X	X	X	X	X		10:00 AM		X	X	X	X	X	
11:00 AM		X	X	X	X	X		11:00 AM		X	X	X	X	X	
12:00 PM		X	X	X	X	X		12:00 PM		X	X	X	X	X	
1:00 PM		X	X	X	X	X		1:00 PM		X	X	X	X	X	
2:00 PM		X	X	X	X	X		2:00 PM		X	X	X	X	X	
3:00 PM		X	X	X	X	X		3:00 PM							
4:00 PM		X	X	X	X	X		4:00 PM							
5:00 PM		X	X	X	X	X		5:00 PM							
6:00 PM		X	X	X	X	X		6:00 PM							
7:00 PM								7:00 PM							
8:00 PM								8:00 PM							
9:00 PM								9:00 PM							
10:00 PM								10:00 PM							
11:00 PM								11:00 PM							
Occ Hrs	0	14	14	14	14	14	0	Occ Hrs	0	5	5	5	5	5	0
UnOcc Hrs	24	10	10	10	10	10	24	UnOcc Hrs	24	19	19	19	19	19	24

Implementation of this strategy may be possible via programming within the existing controls or require the installation of new thermostats or local controls and occupancy sensors. The table below shows estimated costs and savings from the implementation of this type of control.

- **Estimated Annual Energy Savings:** 600 kWh and 100 CCF
- **Estimated Annual Cost Savings:** $300
- **Estimated Implementation Costs:** $1,000

Next Steps:

- Datalogging is recommended to confirm equipment loading assumptions and schedules.
- The site is encouraged to discuss potential control upgrades with an ALC representative or internal resources.

EEM – 03 – Consider HVAC Balancing

Discussion with facility personnel indicates that portions of the main building are receiving insufficient air flow resulting in cold spots throughout the site, primarily in the VP office suite area in the southwest corner of the building.

Hot/cold complaints and drafts are indicators of the need for HVAC equipment air balancing. The balancing process consists of surveying airflows against design capacities, checking/exercising dampers, and tuning fans and airflows to optimize delivery of tempered air.

Energy savings were estimated based at an overall 2% reduction in estimated annual HVAC energy use. Savings are modest for this measure but compliment an existing operational need for air balancing.

- **Estimated Annual Energy Savings:** 5,000 kWh and 300 CCF
- **Estimated Annual Cost Savings:** $2,000

QGM CONSULTING

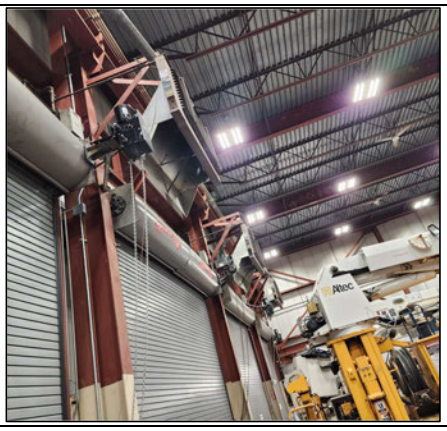
- **Estimated Implementation Costs: $20,000**

Next Steps:
- Datalogging is recommended to confirm equipment loading assumptions and schedules.
- The site is encouraged to discuss potential testing and balancing with a reputable local vendor.

EEM – 04 – Consider Replacing Bay Heaters with Gas-fired IR Heaters

Currently the site employes hydronic bay heaters over each garage bay. Below are photos of the heaters:





These direct-fire units provide heat for the garage bays and while still operational, are aged and replacement parts are becoming difficult to procure.

Facility staff might consider replacement of these heaters with natural gas-fired infrared radiant heaters. Lab testing and use at other sites indicates that use of radiant heaters, which heat surfaces rather than total air mass, can use significantly less natural gas to achieve occupant comfort in difficult spaces such as garage bays with frequently open doors.

Savings are often suggested to run in the 20 – 50% range compared to forced hot air heating for these types of spaces. Savings for the report assume a conservative 20% reduction in existing natural gas use:

- **Estimated Annual Energy Savings: 3,000 CCF**
- **Estimated Annual Cost Savings: $4,000**
- **Estimated Implementation Costs: $25,000**

Next Steps:
- Datalogging is recommended to confirm equipment loading assumptions and schedules.
- The site is encouraged to discuss potential control upgrades with a reputable mechanical vendor.

REDACTED

EEM – 05 – Replace Hot Water Unit Heaters and Cabinet Unit Heaters with Electric Heat

Currently the site employes hydronic unit heaters and hydronic cabinet unit heaters for heating purposes. Below are photos of each type of unit:





Discussion with facility staff indicates that replacement with electric resistance heat is under consideration for low first cost, ease of installation, and ease of maintenance. Heat pump units were discussed as potential replacements but may not be a good fit due to placement costs and higher maintenance concerns.

Savings are estimated electric resistance units are 99% efficiency as compared to existing 80% efficient HW units. Natural gas use would be replaced by electricity, with no significant change to greenhouse gas reductions. This would be a cost saving measure as electricity is not billed at this site.

- **Estimated Annual Energy Savings:** 8,000 CCF and -178,000 kWh
- **Estimated Annual Cost Savings:** n/a
- **Estimated Implementation Costs:** $5,000

Next Steps:

- Facility staff should review equipment selection with a mechanical vendor or local supplier if planning to self-install.

EEM – 06 – Replace Natural Gas Hot Water Boiler System with Electric Heat

As noted in the equipment discussion above, natural gas hydronic boilers are used to provide comfort heating for the garage building, along with bay heaters and packaged RTUs. The boiler provides HW for UHs, CUHs, and (2) inline duct heaters. It is recommended to consider replacement of the hydronic boiler that serves the garage with electric resistance heaters, as discussed above for the main building.

Savings are estimated, assuming replacement of an ~80% efficient natural gas boiler with 99% efficiency resistance heat for low first cost and overall cost savings.

- **Estimated Annual Energy Savings:** 5,000 CCF and -110,000 kWh
- **Estimated Annual Cost Savings:** n/a

- **Estimated Implementation Costs: $5,000**

Next Steps:

- Facility staff should review equipment selection with a mechanical vendor or local supplier if planning to install.

Additional Recommendations – Future Equipment Replacements

Consider New Hydronic Boilers for Main Building

It is understood that the current hydronic boilers on site are aged and will reach end of life in the near future. It is recommended that when these boilers are replaced, site staff consider equipment efficiencies, procuring the highest efficiency equipment for replacements. Condensing boilers, with peak combustion efficiency 95%+, are a logical choice for future equipment installation. It should be noted that condensing boiler efficiency will vary based on loading and required HW temperature and will often be lower than their stated peak efficiency. Condensing boilers additionally have a higher maintenance burden than traditional units, which should be considered as well as the overall energy use.

Consider Replacing Natural Gas Water Heater with an Electric Water Heater

It is understood that the current service HW heaters on site are also aged and will reach end of life in the near future. It is recommended that when these hot water heaters are replaced, they also be switched to condensing boilers. Service HW heaters typically deliver water at a much lower temperature than for HVAC use and can run at peak condensing/efficiency most or all annual run hours.

Facility staff indicate a preference for tanked units, rather than tankless on-demand, due to capacity and maintenance concerns.

Sustainability Considerations

Background

Site and portfolio sustainability is best guided by the framework and methodology set forth in ASHRAE Standard 228-2023 *Standard Method of Evaluating Zero Net Energy and Zero Net Carbon Building Performance* (available for purchase here: https://www.ashrae.org/technical-resources/bookstore/ansi-ashrae-standard-228-standard-method-of-evaluating-zero-net-energy-and-zero-net-carbon-building-performance). The site is not known to have a present net-zero strategy; however, the ASHRAE standard presents a strong method to:

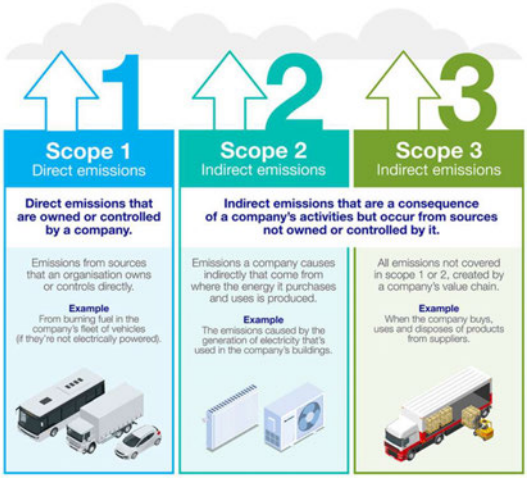
- Assess current building energy use and carbon emissions
- Establish a baseline
- Develop milestones
- Develop a plan to reach milestones

The data and information shown below are intended to help develop an understanding of where current portfolio sustainability goal aligns with current position.

REDACTED

Emissions Scopes

Emissions reporting is generally addressed across three Emissions Scopes, as seen below:



An important aspect of developing a sustainability plan is the determination of which emissions scopes will be targeted for reduction. The majority of sustainability planning at the time of this report is focused on Scopes 1 and 2, although large corporations with significant supply and delivery chains have begun to address Scope 3 as well. The focus of the sustainability plan in this report is on Scope 1 and 2 emissions.

ASHRAE Standard 228-2023 *Standard Method of Evaluating Zero Net Energy and Zero Net Carbon Building Performance*

ASHRAE 228-2023 includes the following diagram illustrating energy flows into, from, and out of a site:

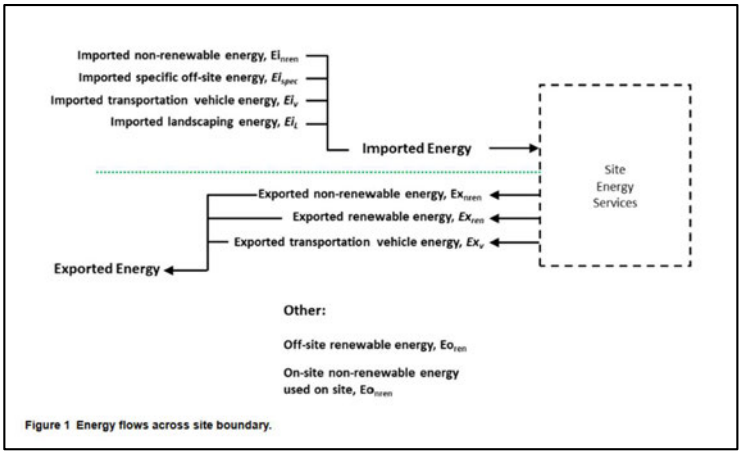


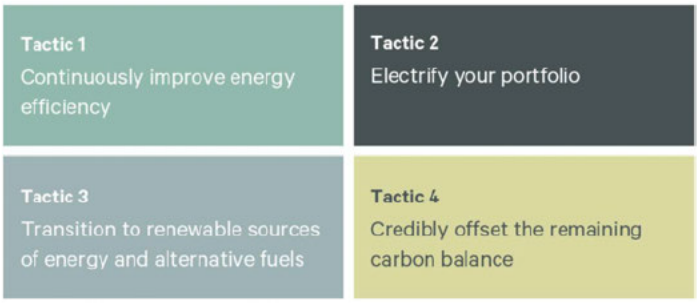
Figure 1 Energy flows across site boundary.

REDACTED

The difference between energy flow into a site, and energy flow out, is site net energy. The primary goal of sustainability is to reduce this net energy, and therefore, net carbon emissions associated with the site and its operation.

Sustainability Plan

With a carbon baseline established and a goal and timeframe put in place, the next step is to develop a sustainability plan to reduce site net energy and carbon. A four-step plan, as outlined in an article from CBRE (Decarbonizing Commercial Real Estate | CBRE) and shown in the chart below, is recommended:



The table below details the four-step plan with narrative descriptions and progress to date for the target site. Note that the process is by nature to be repeated for continuous improvement and consideration of new technologies:

Eversource Newtown Sustainability Plan			
Step	Description	Progress	Notes
1	Efficiency/Conservation	50%	In process, identifying and determining measures
2	Electrify Remaining Loads	0%	Identify and electrify remaining energy loads
3	Renewable Energy Offset	0%	Onsite or purchased renewable electricity
4	Offset Remaining Loads	0%	Purchase RECs on open market, consider portfolio offsets

Step 1: Efficiency and Conservation

Identify possible efficiency and conservation measures at the target site to reduce energy use and associated carbon. This step is in progress at this site – this study has identified several possible measures for the reduction of energy use. These measures should be considered for implementation.

Step 2: Electrify Remaining Loads

Site net energy loads not able to be reduced should be considered for electrification. This step is under consideration with possible electric replacement of some existing natural gas loads.

Step 3: Renewable Energy Offset

Offset of site electrical energy use via renewable energy: either generated onsite or through purchasing of renewable energy from sources such as community solar or solar farms as well as energy brokerage.

Step 4: Offset Remaining Loads

Lastly, the site may consider RECs and/or purchased carbon offsets to meet the remaining site net carbon. ASHRAE 228-2023 rigorously defines each of these categories and is strongly recommended as a guideline for these efforts and associated accounting.

Repeat: Steps 1 – 4

A sustainability plan should be viewed as a process of continuous improvement. The site is encouraged to consider additional opportunities and technologies as they become available and more economical.

Next Steps:

- Eversource Newtown staff to review suggestions in report (and calculation assumptions) and discuss internally if there is any interest in moving forward with any of the recommended measures.
- Most attractive measures in terms of energy savings, operational efficiencies, and possible natural gas utility incentives include:
    - Building Shell Remediation
    - Natural gas IR radiant heaters in the Garage Building
    - Air Balancing
- QGM would like to have a virtual report-out to discuss this report to answer questions and determine which, if any, of the suggested ECMs are to be acted upon in the near to intermediate future.
- For those ECMs that require input from designers, site is suggested to initiate the process sooner than later. Site is encouraged to get contractors/vendors to site to review and provide budgetary costs.