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Eversource Curtis St New Britain, CT – SCOPING STUDY

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Executive Summary

QGM Consulting (Padraic Hagan and Austin Malik) conducted an energy efficiency scoping study at Eversource located at 66 Curtis Street New Britain, CT 06450 on Monday March 9, 2026. QGM analyzed the buildings' electric and natural gas use as well as associated Greenhouse Gas emissions. Objectives were to identify and quantify potential Energy Efficiency Measures (EEMs) for energy reduction, possible Connecticut Natural Gas Corporation incentive consideration, and estimated Greenhouse Gas reduction potential for any corporate initiatives or 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 Curtis St New Britain 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	New BMS: Demand Control Ventilation	$6,000	15,000	4,000	26.4	19%	$50,000	8.3
2	New BMS, Reduce Compressor Use	$300	2,200		0.6	0%	$0	Imm.
3	Replace AHU in Basement; Eliminate Hot Deck/Cold Deck Operation	$9,100	61,000	400	20.0	15%	$500,000	54.9
4	Add HW Pump VFD and Eliminate Bypass	$300	2,000		0.6	0%	$10,000	33.3
5	Add Fan VFD on RTU-1 and VAVs	$1,000	5,000		1.5	1%	$25,000	25.0
6	Full Envelope Assessment and Repair	$4,000	9,000	3,000	19.1	14%	$35,000	8.8
TOTAL		$20,700	94,200	7,400	68.1	0	$620,000	30.0

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

General Facility Description

The Curtis Street New Britain facility consists of two buildings originally constructed in 1929:

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

The main building is heated and cooled primarily with packaged rooftop units (RTUs) and a ground mounted air-cooled chiller. RTUs and AHUs are controlled with an aged Building Management System (BMS) that includes some pneumatic controls with occupied/unoccupied scheduling and adaptive/optimal startup. Facility personnel indicate there is a near-future plan to install a new DDC BMS that will include demand control ventilation (DCV).

Additional spot heating and cooling for the garage building is achieved with split system heat pumps and unit heaters (UHs).

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

Typical building occupancy is 6:00 AM – 5:00 PM, Monday through Friday with limited 24-hour occupancy during emergency and storm events. Occupied building operations are estimated to be 3,700 annual hours.

Monthly Billing Analysis

Natural gas historical energy data was provided by facility staff. Bill examples included the past 13 months of natural gas metered use and billed cost, and all accounts were summed for overall site gas use. There is an additional meter at the site with no historical data at the time of this report. Actual natural gas use is estimated to be ~15,000 – 20,000 total CCF annually for this campus.

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.

The most recent 12 months are summarized below:

Most Recent 12 Month Summary						
Energy Usage and Costs	Costs	Energy			MT CO2 Emitted	Unit Costs
	$	kWh/CCF	mmBTU	% of total		
Electric (kWh)	$ 51,000	358,600	1,223.5	67%	87.9	$ 0.14
Natural Gas	$ 5,520	5,735	595.3	33%	31.6	$ 0.96
Total	**$ 56,520**		**1,818.8**	**100%**	**119.5**	

*Additional billing history for gas meter associated with main building believed to be missing

Natural gas costs as accounted throughout this analysis have the monthly per-meter "customer charge" (~$165) removed, for assessment of natural gas marginal cost only. $0.1428/kWh was used as an electric rate based upon Eversource Facilities' third-party electric supply costs for similar type facilities. A summary of modeled monthly electric use and monthly metered natural gas use is shown below:

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Monthly Utility Bill Summary							
Estimated Monthly Electric				Natural Gas			
Month	Electrical Use (kWh)	Estimated Cost ($)	Estimated Blended Rate ($/kWh)	Month	Natural Gas Use (CCF)	Total Cost ($)	Blended Rate ($/CCF)
Jan-25	19,941	$ 2,848	$ 0.14	Jan-25	1,200	$ 1,320	$ 0.96
Feb-25	21,114	$ 3,015	$ 0.14	Feb-25	1,050	$ 1,176	$ 0.96
Mar-25	24,130	$ 3,446	$ 0.14	Mar-25	750	$ 887	$ 0.96
Apr-25	28,654	$ 4,092	$ 0.14	Apr-25	350	$ 502	$ 0.96
May-25	30,498	$ 4,355	$ 0.14	May-25	200	$ 358	$ 0.96
Jun-25	38,206	$ 5,456	$ 0.14	Jun-25	50	$ 213	$ 0.96
Jul-25	38,709	$ 5,528	$ 0.14	Jul-25	0	$ 165	
Aug-25	41,222	$ 5,887	$ 0.14	Aug-25	5	$ 170	$ 0.96
Sep-25	38,206	$ 5,456	$ 0.14	Sep-25	0	$ 165	
Oct-25	31,838	$ 4,547	$ 0.14	Oct-25	300	$ 454	$ 0.96
Nov-25	23,963	$ 3,422	$ 0.14	Nov-25	580	$ 723	$ 0.96
Dec-25	22,119	$ 3,159	$ 0.14	Dec-25	1,250	$ 1,368	$ 0.96
TOTAL	**358,600**	**$ 51,208**	**$ 0.14**	**TOTAL**	**5,735**	**$ 5,520**	$ 0.96

*Additional billing history for gas meter associated with main building believed to be missing

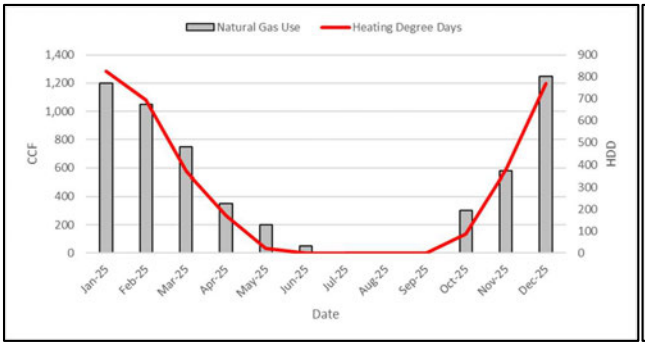
The energy use intensity (EUI) shown below is an indicator of building performance in terms of energy use (kbtu) per building square foot:

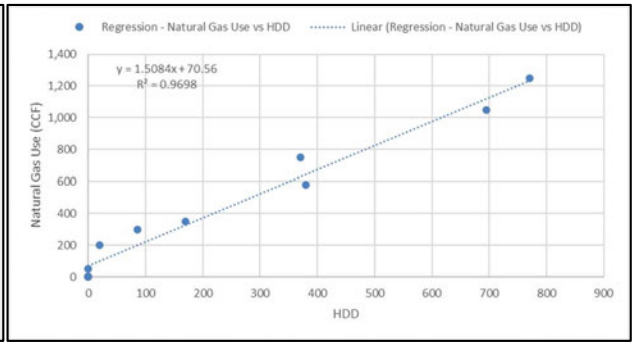
Building Energy Use Intensity (EUI)			
Utility	Site EUI	Source EUI	Unit
Natural Gas	12	13	kbtu/sf
Electricity	25	70	kbtu/sf
TOTAL	**37**	**83**	**kbtu/sf**

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

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. Energy Star publishes median data by building type for overall comparison.

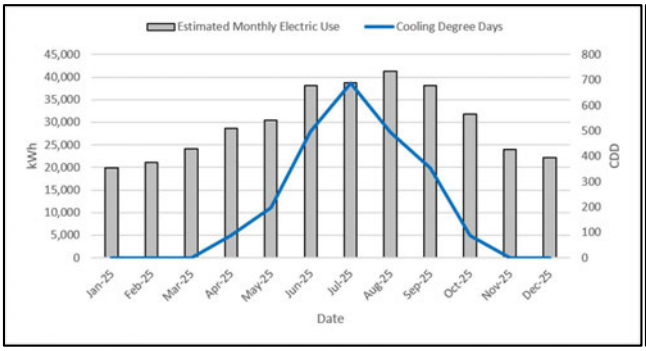
Additionally, data was analyzed to understand the impact of weather on the site and natural gas use (actual metered use) and heating degree days (HDD), as seen below:

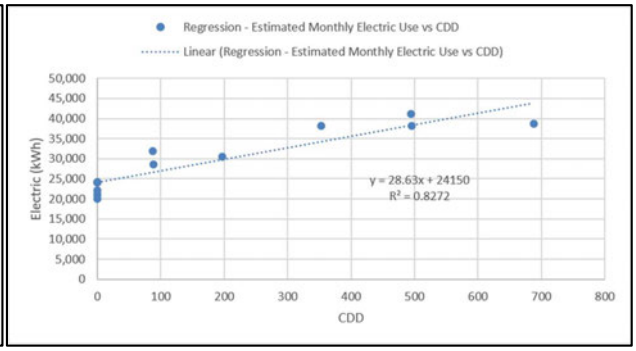




The first graph indicates a visual relationship between natural gas use and HDD, suggesting a majority of the natural gas is used for building heating. Summer month natural gas use can likely be attributed to service hot water. The regression further shows that site natural gas use has a strong, statistically significant relationship to HDD, with an R^2 value of 0.97.

For electrical consumption, weather data for the site was utilized similarly to help generate a monthly site profile. Below are graphs for the estimated monthly site electrical use and cooling degree days:



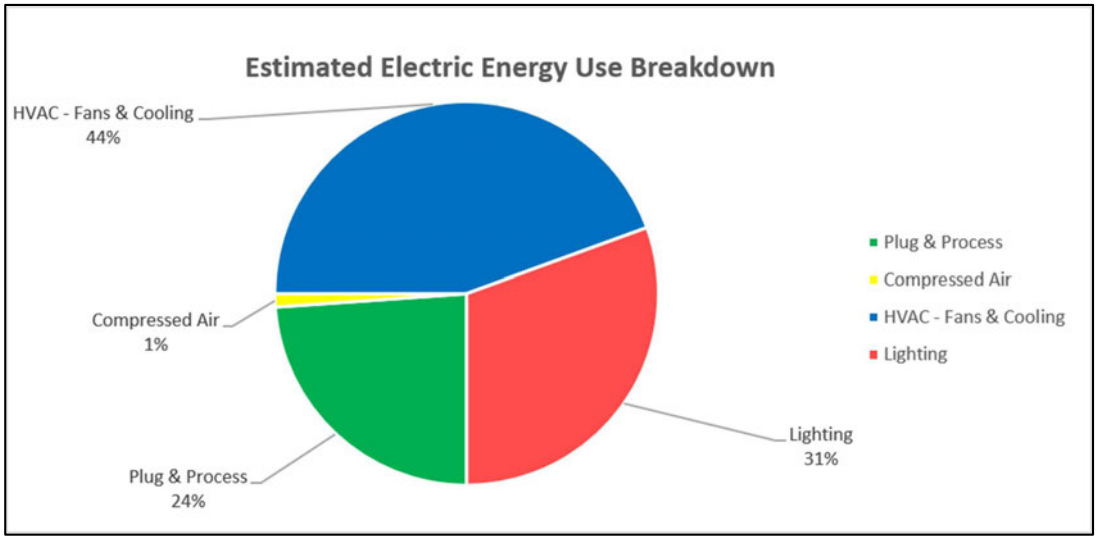


The regression above was developed to help model site monthly electrical use. The R^2 regression shows a statistically significant relationship to CDD, with an R^2 value of 0.83 as the site's usage is driven by the outside weather. The Department of Energy Superior Energy Performance (SEP) program qualifies that a statistical relationship exists 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. These results should be considered high level and were sourced from motor nameplates, typical load factors, and estimated operational hours. Actual data logging is required to confirm these assumptions.



Estimated End Use Breakdown - Electricity	
Electric End Use	**Energy Use (kWh)**
Plug & Process	86,000
Compressed Air	4,000
HVAC - Fans & Cooling	160,000
Lighting	110,000
TOTAL	**360,000**

Natural Gas Use

Walkthrough data indicates that site service hot water is provided through electric hot water heaters. All site natural gas use is for comfort heating.

Equipment Inventory:

Equipment inventories for current equipment were gathered during the walkthrough. Below are tables for HVAC and boiler equipment on site.

Eversource New Britain Boiler Equipment					
Quantity	**Type**	**Make**	**Model**	**Max Input (MBH)**	**Max Output (MBH)**
1	Hydronic Boiler	Smith Cast Iron Boiler	19A-S/W	1,137	750
1	Hydronic Boiler	Smith Cast Iron Boiler	19A-S/W	1,137	750

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Eversource New Britain Boiler Pumps		
Description	Quantity	HP
Circulation Pump	2	3

Eversource New Britain HVAC Equipment Inventory								
Type	Manufacturer	Model	Serial #	Cooling Ton	MBH	Fan HP	CFM	Notes
Packaged Roof Top Unit	AAON			9				Name plate was unreadable
Exhaust Fan	Soler & Palau USA, INC	DB08				0.25		
Exhaust Fan	Soler & Palau USA, INC	DB08				0.25		
Packaged Roof Top Unit	AAON	RQ-005-8-V-GA02-232	202-401-AYGE38031	5	81	2		
Split System - condenser	Mitsubishi	PUZ-A24NHA7	25U26364C			0.11		
Split System - wall unit	Mitsubishi	PKA-A24KA7	2YM02778	2	26	0.07		
Split System - condenser	Mitsubishi	PUZ-HA36NKA	36U10945			0.1	3880	
Split System - ceiling unit	Mitsubishi	PLA-A36EA7		3	36	0.3	1020	
Humidifier	Nortec	NHMC 30	600369421001					
Air Handling Unit	Magic Aire	90-HBAW-4	W050440S15			1.5		
Air Handling Unit	Magic Aire	90/120 - BMW/BMX Blower Section	W050849387			1.5		
Air Handling Unit	Magic Aire	60-BNW-6-4	961285805			1		
Air Handling Unit								No name plate available
Air Cooled Chiller	Trane	CGAM 052A 2V02 AXD2 A1A1	U20C80333	52		2.5		
Split System - condenser	Mitsubishi	PUZ-HA24NHA1	28U03455			0.1		
Split System - wall unit	Mitsubishi	PVA-A24AA7		2	24	0.2	744	
Single Stage Gas Furnace	Trane	XR80						

Eversource New Britain Compressor Inventory							
Make	Model	HP	Estimated Capacity (CFM)	Compressor Control Type	Cooling	Voltage	Estimated Annual Run Hours
Quincy	QT-5	5	17.7	Recip	Air Cooled	460	1,000
**Annual run hours estimated*							

Eversource New Britain Dryer Inventory			
Make	Model	Rated CFM	Type
Quincy	ZDHT35	35	Non-Cycling

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

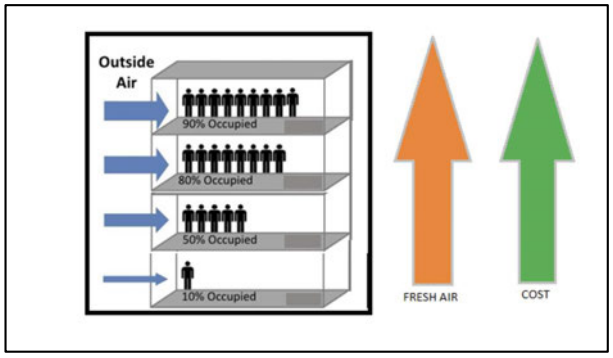
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Site Energy Efficiency Measures/Recommendations

EEM – 01 – Consider Building Management System Upgrade – Demand Control Ventilation

Building HVAC operation and controls did not include Demand Control Ventilation (DCV). DCV uses CO_2 sensors in the return airstream or space served to monitor the level of CO_2 in the space and modulate outdoor air dampers to introduce only as much outdoor air as needed. Modern DCV controls would offer a significant increase in the ability to modulate the introduction of outside air based on occupancy.

The graphic below illustrates how DCV modulates the intake of fresh air based on occupancy:



It is recommended that the site consider modern DCV controls for all areas as a facet of the proposed BMS upgrade. Savings are estimated based on overall site occupancy profiles during all periods, assuming high occupancy during peak daytime hours, average occupancy during mornings and evenings, and low or no occupancy during overnights and weekends.

- **Estimated Annual Energy Savings:** **15,000 kWh and 4,000 CCF**
- **Estimated Annual Cost Savings:** **$6,000**
- **Estimated Implementation Costs:** **$50,000**

Next Steps:

- Spot readings are recommended to confirm equipment loading assumptions and schedules.
- The site is encouraged to discuss potential control upgrades with a reputable mechanical/controls vendor.

EEM – 02 – Consider Integrating Air Compressor with New BMS

An upgrade to a new, fully DDC HVAC controls system will eliminate any existing pneumatic controls, reducing run hours on the building air compressor. Remaining compressed air demand will solely be from minor hand tool use in the lab/testing areas.

Savings assume a reduction in the compressor's annual run hours by 75%:

- **Estimated Annual Energy Savings:** **2,200 kWh**
- **Estimated Annual Cost Savings:** **$300**

- **Estimated Implementation Costs: n/a**

Next Steps:

- It may be of value to investigate remaining compressed air use to determine if it can be eliminated entirely with use of electric hand tools or other solutions.
- The site is encouraged to continue with planned control upgrades.

EEM – 03 – Consider New RTU-1 to Replace Hot Deck/Cold Deck

2nd floor perimeter and parts of the 1st floor in the main building are served by an aged hot deck/cold deck design AHU mounted in the basement. The photo below shows controls for this AHU, the status of which are not known:



Hot deck/cold deck systems work by supplying two separate air streams to space at all times, and lead to frequent periods of simultaneous heating and cooling. Discussion with facility staff indicates there is a near term plan to replace this aged piece of equipment with a modern AHU.

It is recommended that the site install variable air volume (VAV) boxes with electric or HW reheats to meet HVAC needs for these spaces and allow variation of heating/cooling airflow for these spaces based on actual demand.

Savings are estimated from modeled existing case hot deck/cold deck use and modeled proposed single airstream VAV system with reheats, eliminating the majority of the simultaneous heating and cooling as well as ~25% of the nominal fan energy.

- **Estimated Annual Energy Savings: 61,000 kWh and 400 CCF**
- **Estimated Annual Cost Savings: $9,100**
- **Estimated Implementation Costs: $500,000 (high level estimate)**

Next Steps:

- Datalogging is recommended to confirm air handling unit run hours and loading.

- The site should discuss potential equipment replacement and redesign with a local vendor to develop scope of work and cost quotations.

EEM – 04 – Add VFDs to Hot Water Pumps & Replace the Bypass

The site utilizes hydronic boilers in order to supply heat to various locations on site. This hot water is circulated with (2) constant volume pumps that do not utilize variable frequency drives. HW needs are modulated with an existing bypass, which reduces the flow according to demand, but does not reduce pump motor energy. HW circulation pumps are seen in the photo below:



Replacing the existing bypass and retrofitting a VFD would allow for the pump motor speed to match the demand for hot water and the ability to reduce speed when demand is lower.

Savings are estimated based on an average 45% reduction of the pump's electrical energy:

- **Estimated Annual Energy Savings:** 2,000 kWh
- **Estimated Annual Cost Savings:** $300
- **Estimated Implementation Costs:** $10,000

Next Steps:

- Spot readings are recommended to confirm pump run hours and loading.
- The site should discuss potential equipment replacement with a local vendor to develop scope of work and cost quotations.

EEM – 05 – Consider Installing VAVs and a Fan VFD for RTU-1

RTU-1 was noted to supply constant flow volume to its areas served on the 2nd floor of the main building, some of which include VAV boxes that are not currently modulating.

It is recommended that the facility consider replacing any existing constant volume terminal airflow equipment with VAV boxes and retrofit a VFD to the supply fan on RTU-1.

Savings assume an average 45% reduction in supply fan energy across its annual operation:

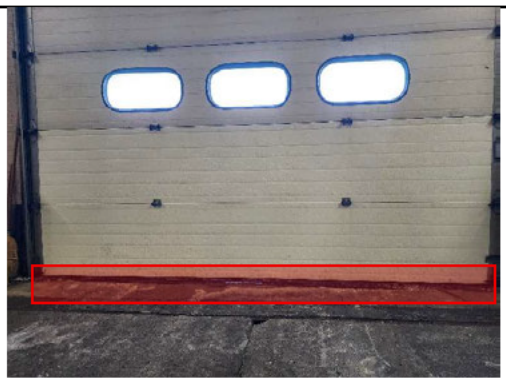
- **Estimated Annual Energy Savings:** 5,000 kWh
- **Estimated Annual Cost Savings:** $1,000
- **Estimated Implementation Costs:** $25,000 (some duct work and VAV installation required)

Next Steps:

- Spot readings are recommended to confirm equipment loading assumptions and schedules.
- The site is encouraged to discuss potential control upgrades with a reputable mechanical/controls vendor.

EEM – 06 – Consider Building Shell Gap Remediation

Gaps and cracks were noted at door and window seals along the building perimeter. Additional gaps are likely at other building intersections, as evidenced by significant signs of water infiltration along the exterior western wall, as seen in photos below:



Visible daylight under bay and man-doors indicate aged seals that should be replaced.



Notable water staining at multiple sites along exterior west wall of the main building indicate significant water infiltration through window seals and other building plane intersections.

Insulation and air sealing are understood to be original construction and have likely degraded significantly. 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 thermal shell survey and remediate any identified gaps.

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:** 9,000 kWh and 3,000 CCF
- **Estimated Annual Cost Savings:** $4,000
- **Estimated Implementation Costs:** $35,000 including survey costs

Next Steps:

- The site is encouraged to discuss building shell survey and remediation with a specialized vendor.
- The site should also discuss this effort with a utility representative for possible incentives to offset some of the survey and implementation costs through the custom program.

Sustainability Considerations

Background

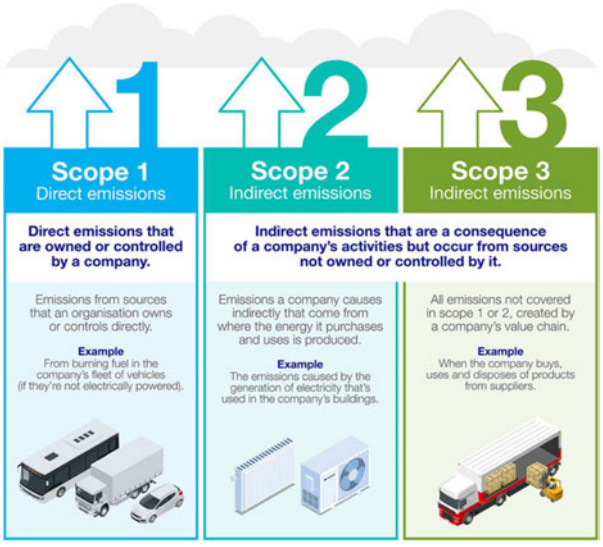
Site and portfolio sustainability is best guided by the framework and methodology set forth in ASHRAE Standard 228-2023 *Standard Method of Evaluating Zero Net Energy and Zero Net Carbon Building Performance* (available for purchase here: https://www.ashrae.org/technical-resources/bookstore/ansi-ashrae-standard-228-standard-method-of-evaluating-zero-net-energy-and-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.

Emissions Scopes

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



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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:

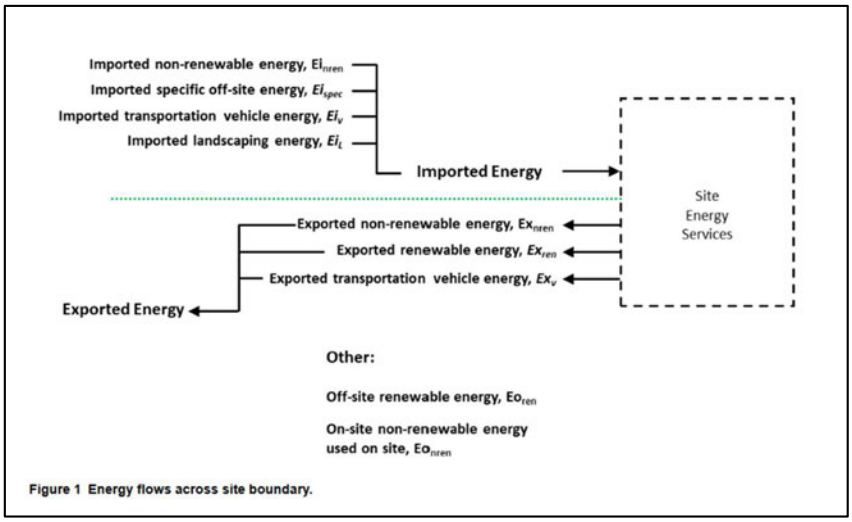


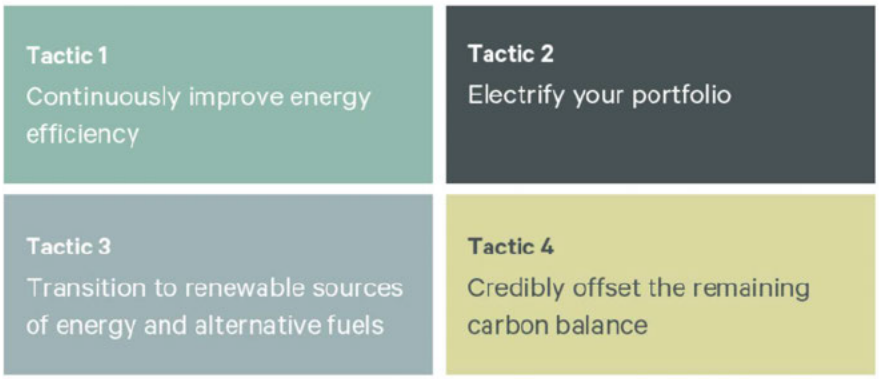
Figure 1 Energy flows across site boundary.

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:

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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:

ESCT New Britain Service Center 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.

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:

- Site to review suggestions in report (and calculation assumptions) and discuss internally if any interest to move forward with any of the recommended opportunities (and work closely with utility on potential offers/process).
- Most attractive measures in terms of energy savings, operational efficiencies, and potential utility incentives include:
  - BMS upgrade and control strategies
  - AHU equipment replacement and elimination of the hot deck/cold deck system
- QGM would like to have a virtual report out to discuss this report. The goal of the meeting is to 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.