Town Of Truro – Town Hall

Climate Leader Communities Decarbonization Roadmap Report

24 Town Hall Rd, Truro MA

Prepared on November 5th, 2024

Hossam Mahmoud & Julian Joffe
HMahmoud@theRISEgroupinc.com; JJoffe@theRISEgroupinc.com

Contents

Contacts

Facility / Project Location			
Truro Town Hall 24 Town Hall Rd Truro, Massachusetts 02536			
Program Administrator Representative(s)			
Laura Selmer	Energy Efficiency Analyst	Cape Light Compact	(508) 375-6644 Laura.Selmer@Capelightcompact.org
RISE Engineering			
Hossam Mahmoud	Senior Energy Engineer	RISE	(774) 994-7269 HMahmoud@theRISEgroupinc.com
Julian Joffe	Senior Energy Engineer	RISE	(401) 230-7464 JJoffe@theRISEgroupinc.com
Site Contact(s)			
Jarrod Cabral	Director – Dept. Of Public Works	Town of Truro	(508) 214-0400 jcabral@truro-ma.gov

Executive Summary

Overview

Cape Light Compact has retained RISE to evaluate the energy consumption and a potential decarbonization pathway that includes standard efficiency, load reduction, and electrification measures for multiple buildings owned and operated by the Town of Truro, MA. The intent of this review is to summarize and benchmark the site's existing energy consumption with respect to the policies set forth by the Massachusetts Department of Energy Resources (DOER) and to create a Municipal Decarbonization Roadmap to meet 2030 and 2050 net-zero goals. These measures will help offset the site's reliance on fossil fuels, improve efficiency levels, and move toward the town's overall decarbonization goals. All costs, savings, and incentives[1] are representative of findings observed on site.

The efficiency measures listed within this report as energy conservation measures (ECMs) will decrease the site's energy consumption and support the decarbonization pathway. Further measures such as load reduction, renewables, and electrification, will also support the reduction of on-site fossil fuels and grid-based energy consumption. Incentives and tax credits may be available to help defer the cost of implementation. These tax credits and incentives are subject to change based on programs sponsored by the government, the utilities, or other parties involved in determining eligibility. The energy savings and project costs presented below are based on preliminary data and are subject to change pending confirmation of existing conditions and formal proposals being developed for the identified energy efficiency measures. The building management team is interested in pursuing electrification measures to reduce emissions and operating costs while maintaining or increasing occupant comfort within the space(s).

This report details potential decarbonization measures found at the Town Hall in Truro, Massachusetts.

Summary of Findings

Year	EUI (kBtu/sf/yr)	CEI (MTCO2e/sf/yr)
2022	63.0	0.0019
Current (2023 Usage)	59.0	0.0019
2030 Target	47.2	0.0012
2030 Projected	31.5	0.0000

Table 1: EUI & CEI Summary (Target Values Based on a 25% EUI and 35% CEI Reduction from 2022 Consumption Values)

[1] Further site review may be necessary to develop final incentive approval.

Measure Type	Estimated Electric Savings (kWh)	Estimate Propane Savings (Gallons)	Savings ($)	Incentive ($)	Net Cost ($)
ECM Pump Motors	2,872	-	$632	-	$5,000
Roof Insulation	-	134	$469	-	$26,026
Electrification	(17,536)	3,161	$7,206	$37,500	$217,500
Solar	19,341	-	$4,255	$13,680	$31,920
TOTAL:	4,677	3,295	$12,561	$51,180	$280,446

Table 2: Measures, Savings, and Cost Summary

Cost Savings are based on the estimated cost $0.22/kWh for electricity and $3.50/Gallon for propane.

Efficiency Measures	Load Reduction Measures	Electrification Measures	Renewables

Facility Overview

General Facility Information

Building Use

The Truro Town Hall building has two main structures connected by a narrow hallway and has varying records regarding its age. Formerly called Union Hall, the main (larger) wood-framed structure was built in 1848 and served as a meeting place for several organizations. Tax assessor records show that the site was transferred to the Town of Truro in 1988. Tax assessor records also show the construction year to be 2004. In 2004 the facility underwent significant changes which moved the building off its original footprint for a temporary period of time so that a basement could be excavated and built once the structure was moved back to its footprint. New framing and interior upgrades were implemented as well. A new wing for the building department was also added which introduced an additional 1,100 square feet. In 2018 a connector was built between the two structures and serves as a passageway and a main entrance. The site is currently occupied by typical departments found at town halls such as the town clerk, tax collector, building department, licensing department, health department, and the financial department. The space is comprised of various areas which includes offices, open office areas, and meeting rooms. The typical hours of use of this facility are Monday through Friday, 8AM-4PM. It is expected that the typical occupancy of this facility is over 40 people during the work week.

Gross Floor Area

Below is a summary of the building areas which notes the size of each floor and size of the space occupied:

Area Description	Floor Area
Full Building	10,128 Square Feet
1st Floor (Main Building)	2,628 Square Feet
2nd Floor (Main Building)	2,628 Square Feet
Basement (Main Building)	2,628 Square Feet
1st Floor (Side Building)	1,134 Square Feet
Basement (Side Building)	1,134 Square Feet
Entry Way/Connector	108 Square Feet

Table 3: Floor Area & Square Footage

Building Overview

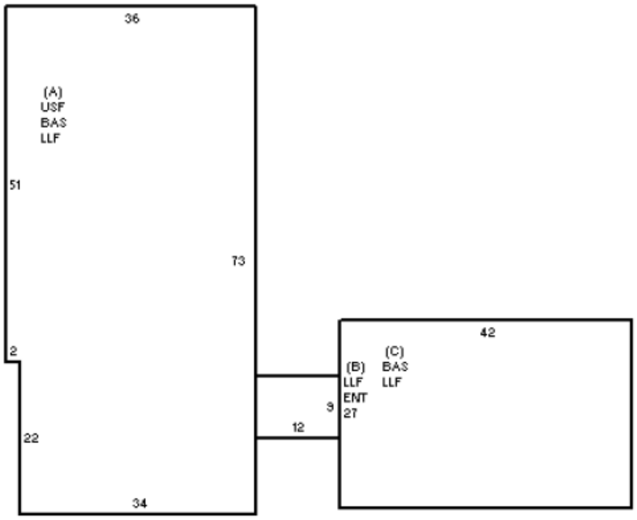
Year of Construction: 2004

Number of Stories: 1

Structure Material: Wood Frame

Building Type: Town Hall

Conditioned Floor Area: 10,128 sq. ft.



General Conditions of Facility

This facility is in good condition and operates sufficiently for the type of occupancy. As previously noted, there have been significant updates to the main building structure as the vast majority of the facility had been improved in 2004. The roof is shingled and in good condition although it is reaching an age at which if solar was added, the roof would need to be redone. The foundation is concrete. The flooring is mainly hardwood. Based on the age of construction and documentation found on-site, the insulation is up to building code from the early 2000s and sufficiently creates thermal barriers where intended. Additional insulation can be added to the roof when it is updated. Exterior doors and windows are in good condition and there is no identified weatherstripping that needs to be repaired. There are no renewables on-site although the possibility exists. The site utilizes a propane tank which serves the hydronic boilers. The high efficiency hydronic radiators all appear to be in very good condition. The facility has received an LED upgrade to remove fluorescent lamps in troffers, linear ambient, and surface mounted fixtures. There is a Building Management system although this can be improved especially as equipment focusing on site electrification is implemented.

System	Condition	Approximate Age	Useful Life (years)	Remaining Life (years)
HVAC – AHUs & Condensers	Moderate	22	25	9
HVAC – Boiler	Okay	12	20	8
DHW	Very Good	1	13	12
Windows	Okay	22	20	4+
Envelope	Good	22	-	-
Lighting Systems	Good	5	10	5
Renewable Energy Systems	N/A	-	-	-

Table 4: Facility and System Conditions

Site Summary

The Truro Town Hall was built in 1848 but was renovated significantly in 2004 and serves the Truro community with typical Town Hall operations. The site relies on electricity and propane to operate. However, to align with the local and state electrification goals there will be measures that will need to be implemented to net-zero carbon-based fuel emissions by the year 2050.

System	Description
Building Enclosure	The building is a wood framed building that was majorly renovated in 2003. The building envelope is original to construction with wall, attic and basement insulation R-values meeting the MA building code during the time of design. Roof insulation was visible in the rafters and appear to be fiberglass batts. The building envelope appears to be in good condition. The building has operable double hung double pane windows that appears to be in good condition.
Electrical Infrastructure	This facility utilizes a main distribution panel to feed several sub-panels providing downstream service to HVAC equipment, lighting, and plug loads. A transfer switch located in the main electrical room provides the necessary operation to power the facility with

	the backup generator. Although the current service is sufficient for the current operation, when the site moves forward with the electrification of their HVAC systems, additional electric panels and/or service may be needed and so a further study into the capacity and loading constraints on the existing electrical infrastructure will be required.
Carbon-Based Fuel Sources	There are two 300-gal propane tanks fueling the gas-fired condensing boilers. There is a 50kW diesel backup generator on site. There is no other carbon-based fuel source used on-site.
Lighting Systems	The lighting fixtures identified within the space are LED consisting of a mix of linear LED tubes in surface wraps and troffers.
HVAC	The HVAC system at this facility is comprised of (3) AC split systems with hydronic coils that provide heating, cooling and ventilation. Two of the AHUs serve the first floor and the third one serves the second floor and is located in the attic. Supplemental zone heating is provided by hydronic radiators. The hydronic heating is provided by (2) 210 MBH condensing boilers and (2) single speed 1HP pumps. (2) 5 Ton and (1) 20 Ton outdoor AC condenser are located outside the building perimeter and connect to the three AHUs to provide cooling. There is (1) ERV connected to the second floor AHU located in the attic. Some back of house areas have hydronic unit heaters.
Domestic Hot Water	The domestic hot water load is provided by (1) 52-gallon electric resistance water heater.
Building Controls	There is a Niagara central BMS system that is original to the building which uses Distech controllers and thermostats. The hydronic radiation units feature manually adjusted TRV thermostats.
Renewable Energy Systems	There are no existing renewable energy systems on-site. The south facing roof of the smaller structure and the west facing roof above the main structure is a desirable location that can potentially accommodate a solar array that can significantly off-set the site's electric consumption. Based on the age and elapsed time since the major renovation project, it is expected that the roof is reaching the end of its rated life and would need to be replaced before implementing solar PV.
EV-Charging	The town has plans to implement two EV-charging stations at this facility in the near future.

Table 5: Description of Systems

Energy Use Overview

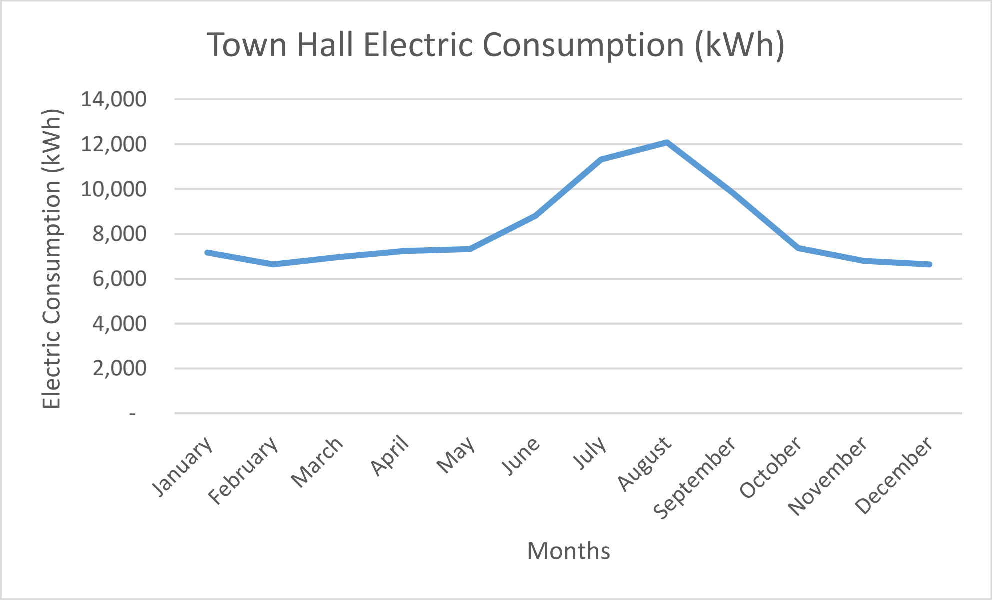
Electricity Consumption

The site has one electric account, Acct# 13828610025, that serves the entire facility. There is one electric meter (Meter# 5081304) feeding the 400A, 120/240V main distribution panel to energize the facilities sub-panels and downstream loads. The facility utilizes a diesel-powered generator (approximately 100kW) capable of providing back up power to a transfer switch back-fed into the facilities distribution panel. There is also a meter (Meter# 7645569) that is used for Level 2 EV charging at the site.

Normalized Electric Usage

Month	2022 Electricity Consumption (kWh)	2023 Electricity Consumption (kWh)	Normalized Electricity Consumption (kWh)
January	7,160	6,040	7,160
February	6,640	6,600	6,640
March	6,960	6,120	6,960
April	7,240	6,520	7,240
May	7,320	6,400	7,320
June	8,800	7,680	8,800
July	11,320	11,160	11,320
August	12,080	9,040	12,080
September	9,840	8,960	9,840
October	7,360	6,440	7,364
November	6,800	6,160	6,800
December	6,640	5,960	6,640
Totals:	**98,160**	**87,080**	**98,164**

Table 6: Electricity Usage (2022 Usage, 2023 Usage, & Weather Normalized to Represent an Average Year)



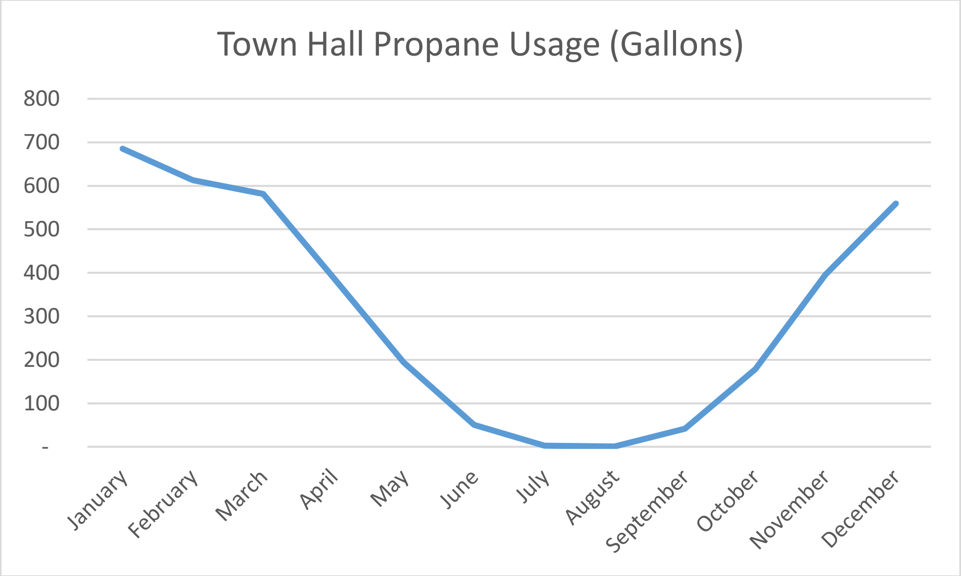
Deliverable Fuel Consumption (Propane & Diesel)

The site utilizes propane for the condensing hydronic boilers serving the site's heating load. The backup generator uses diesel fuel, but there is no available or reported diesel usage for this site.

Normalized Propane Usage

Month	2022 Propane Consumption (Gallons)	2023 Propane Consumption (Gallons)	Normalized Propane Consumption (Gallons)
January	710	519	685
February	575	542	613
March	500	501	581
April	314	303	388
May	175	171	194
June	47	46	50
July	3	-	3
August	1	1	1
September	39	9	42
October	155	105	179
November	305	434	395
December	472	630	559
Totals:	**3,295**	**3,261**	**3,690**

Table 7: Propane Usage (2022 Usage, 2023 Usage, & Weather Normalized to Represent an Average Year)



Energy Usage & Carbon Emissions Benchmarking

Energy Usage Intensity (EUI)

Energy Usage Intensity measures how much energy a facility uses with respect to its size. Based on the noted square footage and the available utility consumption data, the Truro Town Hall had an EUI of approximately 63.0 kBtu/Sqft/yr in 2022 which is over the national median reference value of 56.1 kBtu/Sqft/yr reported for "Social/Meeting Hall" by Energy Star Portfolio Manager Data. A "Town Hall" is not included within the listed Energy Star EUI building usage types, so it is important to note that this site has an EUI that is reasonably in line with many other building types. Truro Town Hall's calculated EUI and comparison to Energy Star data implies that the facility operates sufficiently although there is clearly room for improvement.

https://portfoliomanager.energystar.gov/pdf/reference/US%20National%20Median%20Table.pdf

Carbon Emissions Index (CEI)

Benchmarking the carbon emissions of any facility begins with identifying the quantity and types of the fuels used to operate a facility. Organizations such as local, state, and federal governments continue to implement regulatory compliance policies requiring carbon emissions of buildings to be calculated and benchmarked against ordinance defined emission limits.

For Climate Leader Communities in the state of Massachusetts, the carbon emissions index is a measure of Metric Tons (MT) of CO2e/sf/yr which accounts for the different carbon emissions values of each unit of fuel type considered. Based on the noted square footage of the facility and the quantities used of each fuel type, this facility has a CEI of 0.0019 MTCO2e/sf/yr. The only on-site fossil fuel use reported at this site is propane (although the generator requires diesel that is not reported within MEI data). The target carbon emissions reduction percentage is based on the total emissions from on-site fossil fuels.

EUI & CEI Benchmarking

The Climate Leader Communities program in Massachusetts requires the use of a greenhouse gas emission baseline in Metric Tons of CO2. This report utilizes DOER's MassEnergyInsight (MEI) data provided by Cape Light Compact. As noted in the table below, the decarbonization road map required by Climate Leaders lists that both emissions from onsite fossil fuels in buildings and the energy usage intensity must be reduced by the noted percentages in the noted years.

Suggested Emission Reduction Timeline

Targets	2027	2030	2040	2050
Reduce emissions from onsite fossil fuels in buildings	-20%	-35%	-60%	-100%
Zero emission vehicles (ZEVs) in light-duty fleet adoption	5%	20%	75%	100%
Zero emission vehicles (ZEVs) in medium-/heavy-duty fleet adoption	0%	20%	50%	100%
Energy Use Intensity reduction *(deep energy retrofits/retro commissioning)*	-20%	-25%	-25%	-30%
Total Emissions Reduction Goals (% of 2022 emissions)	**>15%**	**>35%**	**>65%**	**>95%**

https://www.mass.gov/doc/climate-leader-communities-municipal-decarbonization-roadmap/download#:~:text=The%202021%20Climate%20Law%2C%20statewide,reduction%20by%20calendar%20year%202030.

Town Hall - EUI				
Year	**Electricity Usage (kWh)**	**Propane Usage (Gal)**	**EUI (kBtu/sf/yr)**	**2030 EUI Compliance**
2022	98,160	3,295	63.0	-
2023	87,080	3,261	59.0	-
2030 (Projected)	93,483	-	31.5	Compliant

Table 8: EUI Benchmarking

Town Hall - CEI					
	Propane CO2e (MT/yr)	**Total CO2e (MT/yr)**	**CEI (MT/sf/yr)**	**2030 CEI Target - 35% Reduction (MT/sf/yr)**	**Compliance**
2022	18.98	18.98	0.0019	0.0012	-
2023	18.78	18.78	0.0019		-
2030 (Projected)	-	-	-		Compliant

Table 9: CEI Benchmarking (2030 Projected Emissions are Based on the Implementation of the Proposed Measures)

Decarbonization Overview

The process of decarbonizing a building involves implementing measures to reduce or eliminate carbon dioxide (CO2) emissions associated with its operation. The goal is to make buildings more energy-efficient, use cleaner energy sources, and overall contribute to a lower carbon footprint. Here are key strategies for decarbonizing a building, which include Energy Efficiency (Foundational), Load Reduction, and Electrification measures:

The start to the decarbonization process takes a whole-building approach similar to the energy efficiency process; the site is subject to an energy audit. Opportunities to upgrade the building envelope are identified and implemented. Here, envelope insulation and fenestration deficiencies are rectified to reduce heating and cooling loads. At this point, the site considers installing energy efficient equipment including but not limited to lighting, HVAC systems, appliances and any equipment specific to building use. The transition from fossil fuel-based heating systems to electric heat pumps for space heating and cooling needs to be considered at this part of the process. In concert, smart building technologies like controls based on occupancy or other parameters can be implemented to further reduce energy load.

Installing on-site renewable energy systems such as solar panels or wind turbines to generate clean, renewable electricity needs to be a part of the plan with the goals of electrification and decarbonization in mind. When the site's electric loads are reduced through energy efficiency and optimization, renewable energy systems like solar panels can be properly sized. Energy storage solutions to store excess energy generated by renewable sources, such as batteries, are part and parcel and will improve overall energy resilience.

Implement energy storage solutions, such as batteries, to store excess energy generated by renewable sources for later use, improving overall energy resilience.

Decarbonizing a building requires a holistic approach that considers both operational and embodied carbon, as well as the entire lifecycle of the structure. It often involves a combination of technological innovations, design considerations, and policy support to achieve meaningful reductions in carbon emissions.

Proposed Measures

Type	Measure Description	Implementation Difficulty	Cost Implication ($/$$/$$$)
Efficiency Measure 1	ECM Pump Motors	Medium	$$
Load Reduction Measure 1	Roof Insulation	Medium	$$
Electrification Measure 1	Air-to-Water HP Hydronic Boiler Replacement	High	$$$
Electrification 2	Ducted AHU HP Units / LEV Kit	High	$$$
Renewable Energy Generation	Solar PV	High	$$$

Table 10: Proposed Emissions Reduction Measures

Efficiency Measures	Load Reduction Measures	Electrification Measures	Renewables

Efficiency & Load Reduction Measures:

The noted efficiency and load reduction strategies shown in the table above provide an overview of measures that can be explored before electrification options to immediately reduce the facility's consumption. Although some measures are more difficult to implement than others, any of these measures will either reduce the consumption to operate or will support the HVAC system by reducing envelope losses (i.e. Insulation) and in turn, reduce the load on the HVAC system that is required to meet desired temperature setpoints.

ECM Pump Motors:

The existing pump motors serving the hydronic heating system and the domestic hot water system are not variable speed controlled and can be replaced with Electronically Commutated Motors (ECM) to reduce the energy required to circulate hot water. Using ECMs will reduce the speed of the motor based on the demand for hot water to terminal units and in turn reduce the electricity consumed to do so.

Incentives: Mass Save prescriptive incentives based on type and motor horsepower.

Roof Insulation:

Based on the history of the facility, the roof is just a few years away from reaching the end of its useful life. In conjunction with the need for a new roof in the near future, this site will also need to reduce its overall heat load by reducing thermal envelope losses for decarbonization benchmarking requirements. Furthermore, for this site to reach its CEI and EUI goals, implementing solar will be a critical component moving forward. To do so, however, a new roof will need to be installed. When assessing the needs for this site to reach energy and carbon emissions reduction targets, it is recommended to provide additional insulation in the roof at the same time as the roof replacement. Even if solar is not implemented, the roof will need to be replaced and additional insulation should be added to reach an approximate resistance value of R-49.

Incentives: Mass Save custom incentives are available for roof and attic insulation and are determined by the program administrators upon review.

Electrification Measures:

Replacing the gas-fired equipment via electrification with Heat Pump technology will reduce the carbon footprint of the facility. Although there may be challenges with implementation due to the nature of retrofitting new equipment to an existing system, the electrification pathway coupled with the previously noted load reduction strategies will not only support the movement away from fossil fuel, but it will also support decarbonization.

There are a variety of opportunities at this facility to electrify the heating system, but to also improve the efficiency of the cooling system. It is recommended to replace the existing condensing boilers with an Air-to-Water heat pump system to electrify the hydronic heating system. s. The (3) condenser units outside provide the cooling capabilities to these AHUs and can be converted to Heat Pump condenser units.

There are a variety of opportunities at this facility to electrify the heating system as well as improve the efficiency of the cooling system. The proposed solution to electrify the HVAC system at Town Hall is multifaceted based on the existing equipment types and sizes. It is recommended to replace the existing condensing boilers with an Air-to-Water heat pump system, and reconfigure the AHUs, so that they utilize heat pump technology.

We recommend approaching HVAC electrification in two phases. Phase 1 is converting AHU 1, 2, and 3 to heat pump since they're at the end of their useful life. The units can be replaced with new ducted heat pump system coupled with Energy Recovery Ventilator (ERV) with CO2 sensors. Converting the AHUs and outdoor condensing units would include replacing the (2) 5 Ton units, like-for-like, with heat pump units. The 20 Ton unit, however, would require an LEV kit which is a system that can convert larger systems to heat pump technology as current market availability for 20 Ton heat pump units are not yet available. The ERV will allow the system to provide building code required ventilation while reducing energy and; heating and cooling peak loads. The new heat pump ducted systems will be the primary source of heat.

Phase 2 will involve replacing the boiler with an air-to-water heat pump when it reaches the end of its useful life. The hydronic system will act as a supplemental source of heat to the Phase 1 ducted heat pumps. The proposed air-to-water system will need carful engineering design by an engineering professional where the existing hydronic infrastructure and distribution will be assessed for conversion.

Additionally, it is recommended that the electrical infrastructure and loads are checked by a professional electrical engineer.

Incentives: Heat Pump incentives may vary depending on the current Mass Save program at the time of install but is currently $2,500/ton for qualified equipment.

Code Triggers:

OA Ventilation:

Replacing the existing systems with electrification measures will trigger the requirement for outdoor air ventilation. This can be performed by the addition of an Energy Recovery Ventilator (ERV). Not only do ERVs ensure that the proper ventilation rates are met by supplying the proper amount of fresh air to occupied spaces, but they also utilize a heat exchanger allowing for enthalpy (heat energy) within the air exhausted from the space to be re-used. Doing so enables the HVAC system to operate at higher efficiencies while meeting code requirements. An ERV in conjunction with interior CO2 sensors will allow for the system to provide the required code ventilation rate based on demand and will improve ventilation while recovering heat within the return air flow before it is exhausted improving the overall efficiency of the system.

Renewables

Solar Photovoltaic (PV) Array

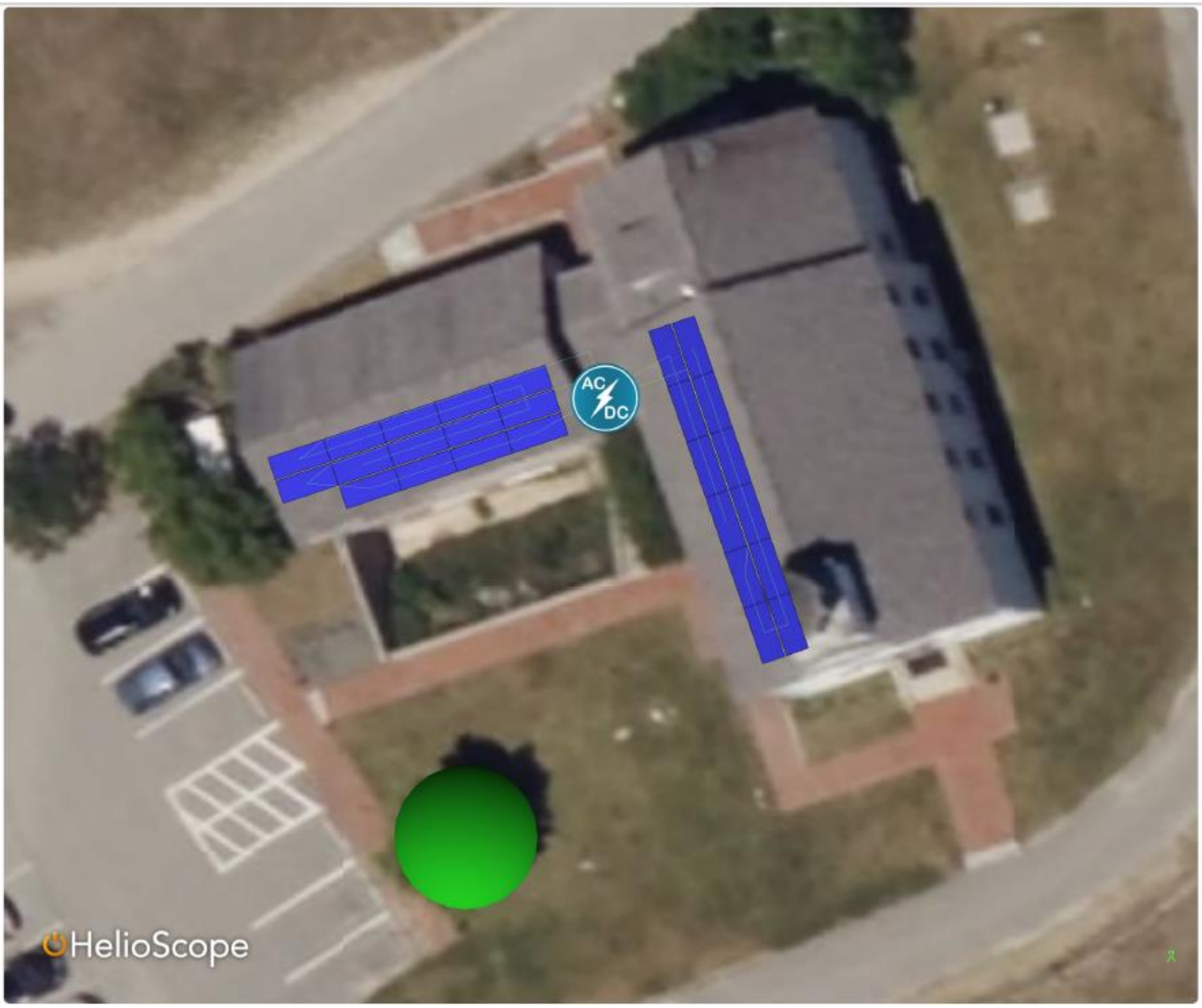
Solar Photovoltaic (PV) systems harness sunlight to generate electricity, where semiconductor materials convert sunlight into direct current (DC) electricity. These systems consist of solar panels made up of interconnected solar cells, inverters to convert DC electricity into usable alternating current (AC), mounting structures, and often include energy storage solutions such as batteries for storing excess energy. Ideally in the northern hemisphere, solar panels are south facing to receive the most direct sunlight.

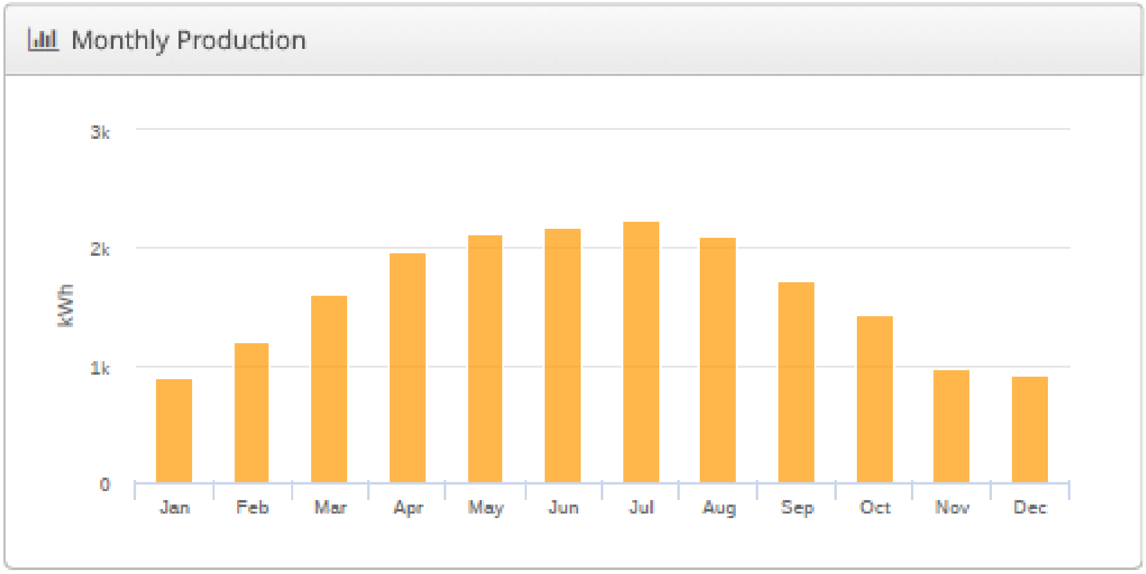
The main structure's roof has a south-facing sloped roof (smaller structure) and a west-facing sloped roof (main structure). There is one tree that could impact the south facing roof, but modeling has shown that it does not impact the production and performance of the system. Solar PV modules in the north-east United States are most effective and receive the most solar irradiance when facing south-west leading to a high-performance ratio seen in the solar simulation performed for this site.

The usable roof space in the south and west facing directions would be large enough to provide the building with approximately 20 percent of its electrical needs. As electrification measures are implemented and propane use is reduced/eliminated, the site will consume additional electricity to meet the required heating load. In this case, solar generation would significantly support the required reduction of the sites EUI and CEI. Nevertheless, the system was modeled, and a summary of results can be found below.

PV System Summary	
Module DC Nameplate	15.2 kW
Total Estimated Annual Production	19,340 kWh
Performance Ratio	81.9%
Total Estimated Cost (Est. $3/Watt Installed)	$45,600
Total Tax Credits (Est. 30% Credit, 179d)	$13,680
Total Cost Savings (Est. $0.22/kWh)	$4,255
Payback (After Tax Credits)	7.5 yrs

Table 11: Proposed PV System Summary


AC
DC
HelioScope


Monthly Production
3k
2k
1k
0
kWh
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

Resiliency

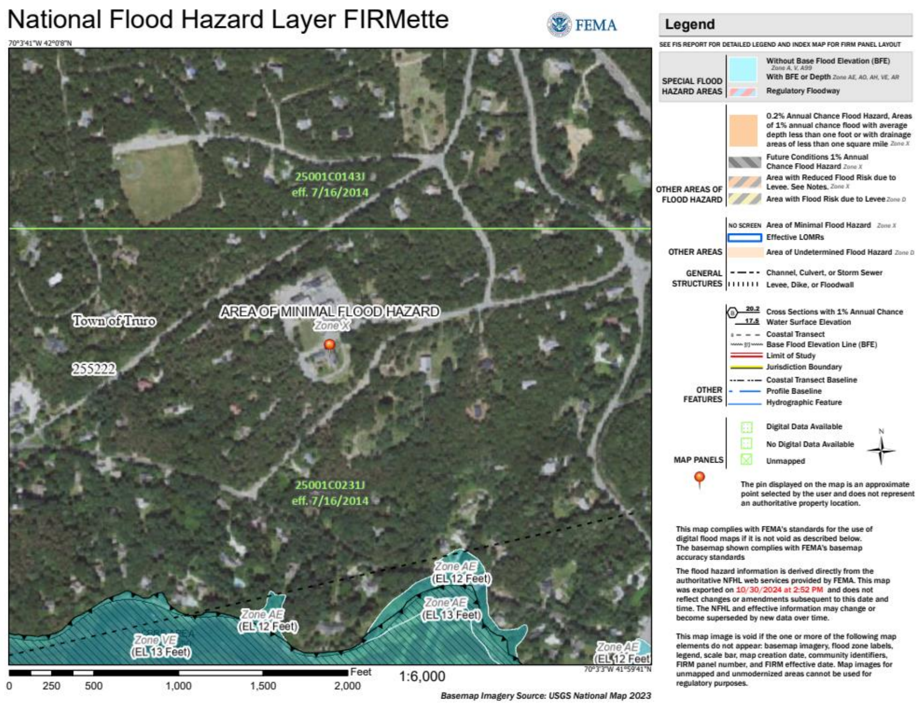
Backup Generator

A 100kW diesel backup generator is currently utilized by the facility. This generator is a crucial component to enhance and maintain reliability, resilience, and energy availability. In the event of a power outage or service disruption, the backup generator can quickly and automatically kick in, allowing the facility to operate in brief outage periods. This ensures a continuous and reliable power supply to critical loads, even during emergencies or natural disasters.

The backup generator seems to be in good condition and sufficiently sized for the site. This existing backup generator, while helpful, is still a fossil-fuel consuming piece of equipment. Further studies and development of a Solar PV system in conjunction with a battery storage system would support the facility with phasing out of fossil fuel use.

Coastal Flooding

The following depicts the National Flood Hazard FIRMette for the site location. The image below shows localized flood hazard data derived from the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRMs), which can help stakeholders identify flood risk and facilitate informed decision-making to mitigate potential risks. Based on this data, the building is in an area of minimal flood hazard. This indicates a low risk of flooding, with less than 0.2*% annual chance of flood events (500-year flood zone). Properties within this zone generally have a low probability of flood damage, and flood insurance is not typically required but may still be recommended for added protection. Incorporating flood-resistant designs and infrastructure ultimately safeguards lives and property and can reduce design costs when done in conjunction with designing for emission reduction measures.



Next Steps

It is recommended that you consider moving forward with the sustainable measures identified in this report. These measures represent a valuable opportunity to decarbonize the building while reducing energy usage and costs while leveraging available efficiency and sustainability incentives to decrease the overall implementation costs.

THREE EASY STEPS TO PARTICIPATE

- **Step #1:** Review your report with your Engineer and elect which measures to move forward with.
- **Step #2:** Sign proposal and schedule the installation of energy efficiency and microgrid improvements to ensure immediate meaningful energy savings and resiliency.
- **Step #3:** Recognize sustainable energy savings on a monthly basis!

Please be sure to contact Hossam Mahmoud, Sr. Energy Engineer at RISE engineering to take advantage of these opportunities today. I can be reached at hmahmoud@therisegroupinc.com or (774)-994-7269.