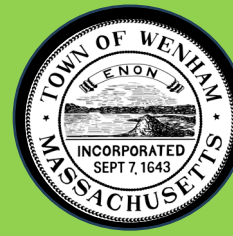


A Tale of Two Town Halls

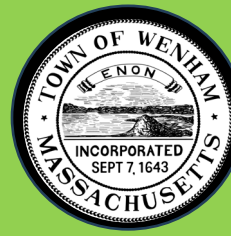
Decarbonization of Neighboring Historic Town Halls in Hamilton and Wenham

Victoria Masone, P.E.
Energy Manager for the Towns of Hamilton and Wenham



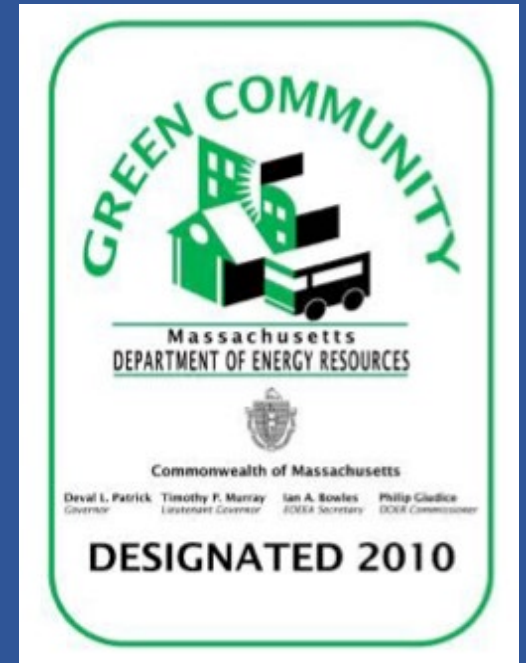
OUTLINE

- Brief History of Energy Initiatives in Hamilton and Wenham
- Evolution to Greenhouse Gas Reduction Initiatives
- Hamilton Town Hall Renovation and Decarbonization
 - How we got there
 - Funding
 - Challenges / Opportunities
- Wenham Town Hall Decarbonization
 - How we got there
 - Funding
 - Challenges / Opportunities
- Wrap-up



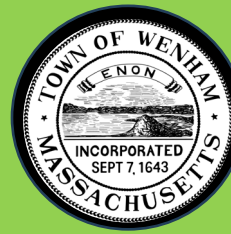
ENERGY INITIATIVES

- ❖ Hamilton and Wenham were two of the thirty-five pioneer Green Communities in May 2010
- ❖ Hired a part-time shared Energy Manager in 2014 (me!)
- ❖ Pursued GC grants, LED Streetlight Retrofit (both Towns), Lighting, HVAC Controls, Projects for RSD
 - ❖ Hamilton received \$1,034,848 in GC funding through 2023
 - ❖ Wenham received \$1,025,118 in GC funding through 2023



❖ Developed Renewables

- ❖ Hamilton installed 1 MW ground mount solar array on capped municipal landfill in 2018
- ❖ Wenham installed 137 kW rooftop solar array on Hamilton Wenham Library in 2022

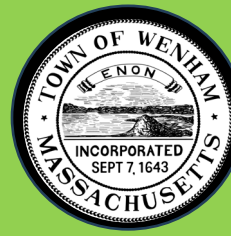


EVOLUTION TO GHG REDUCTION INITIATIVES

- ❖ Both Towns adopted Climate Resolutions at their 2022 Annual Town Meetings
 - ❖ 20% Reduction in Municipal GHG Emissions by 2025
 - ❖ 50% Reduction in Municipal GHG Emissions by 2030
 - ❖ 75% Reduction in Municipal GHG Emissions by 2035
 - ❖ Net Zero by 2040
- ❖ Hamilton installed public-access DC Fast Chargers in 2023 using EVIP grant funds



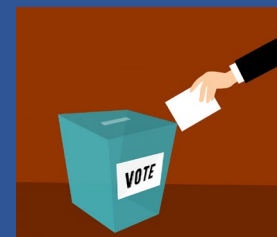
- ❖ Hamilton contracted for 100% renewable electricity supply for all municipal accounts in 2023
- ❖ Wenham fully electrified the COA in 2024, eliminating all gas to the building



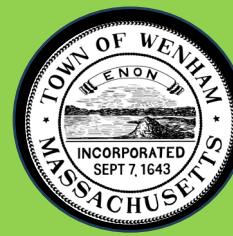
HAMILTON TOWN HALL RENOVATION AND DECARBONIZATION

How we got there...

- ❖ Renovation/Preservation project was conceptualized in **2016** to bring building up to code and conduct exterior preservation (ADA, Sprinklers, Insulation, Roof, Historic Elements).
- ❖ Building Committee established in **2017**.
- ❖ Town requested CPC funding in **2017** and **2019** for alternatives analysis and design, approved at Annual Town Meetings (ATM).
- ❖ Bids were opened for Renovation/Preservation project in **2020** and Town went to Special Town Meeting (STM) for construction funding. STM voted **YES** on required debt exclusion.
- ❖ Town conducted municipal vote (ballot) in April **2020**, required for debt exclusion. Voters voted **NO**.
- ❖ Town went to April **2021** ATM with lower ask for debt exclusion (shifted more of project to CPC). ATM voted **YES** on required debt exclusion.
- ❖ Town conducted second ballot vote in April **2021**, required for debt exclusion. Voters voted **NO**.
- ❖ Building Committee disbanded in June **2021**.



To be Continued...



HAMILTON TOWN HALL RENOVATION AND DECARBONIZATION

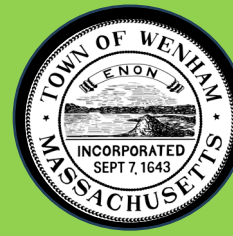
How we got there continued...

❖ Project divided into two projects in Fall **2023**; Renovation/Preservation and Energy/Decarbonization

	Renovation Project	Energy Project
Scope Elements	<ul style="list-style-type: none">• Exterior Preservation• ADA Accessibility• Fire Sprinkler• Full Interior Renovation	<ul style="list-style-type: none">• Geothermal Heating and Cooling• Full HVAC Replacement• Mechanical Systems and Controls• Electrical Upgrades• LED Lighting• Rooftop Solar
Price Tag	\$6.5M	\$2M
Funding Sources	\$4M CPC / Municipal Bond \$2M Free Cash Transfer \$500K CPC Cash Grant	Energy Services Contract (ESCo) Potential GC Decarbonization Grant Local MassSAVE Incentives Federal Direct-Pay Incentives

STM voted **YES** on all articles in Fall 2023!

❖ July 2024 – Bids Opened for Renovation Project. Campbell Construction low-bidder at **\$7.5M**

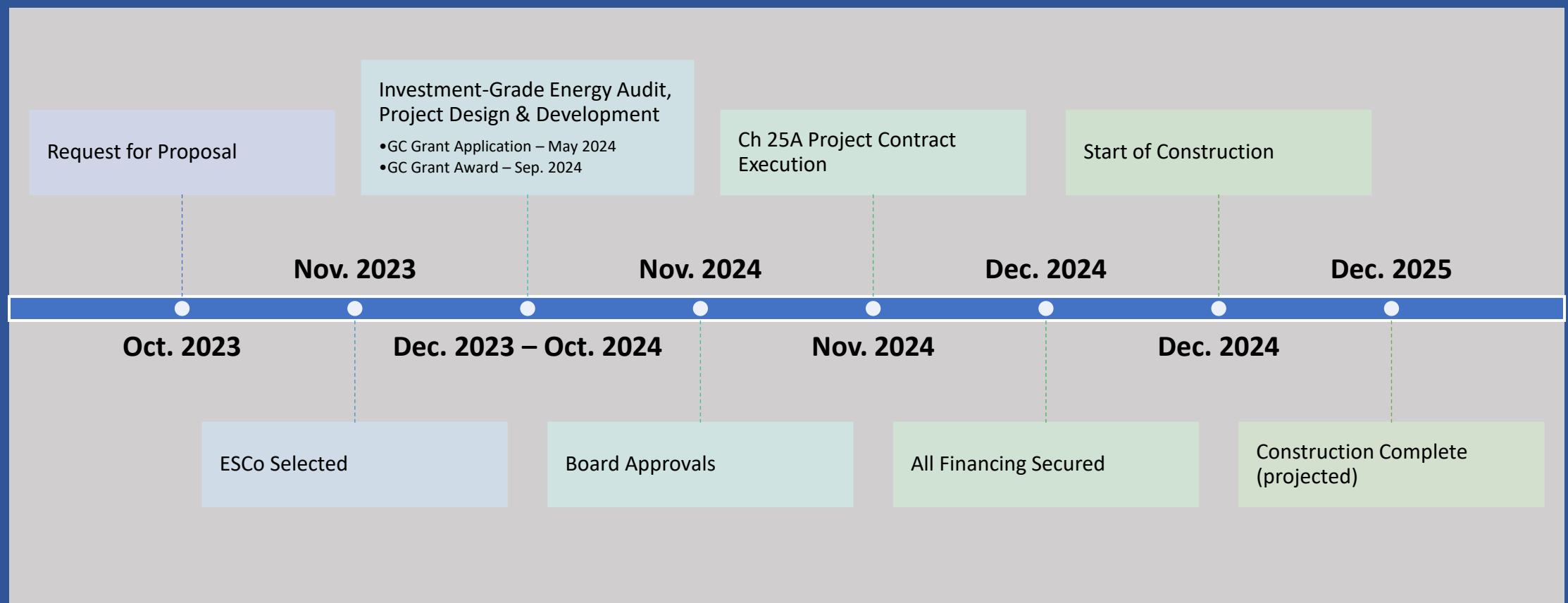


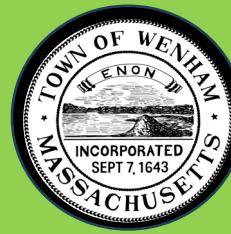
HAMILTON TOWN HALL RENOVATION AND DECARBONIZATION

How we got there continued...

- ❖ **May 2024** – Town applied for GC Decarbonization Grant for \$500k hoping to boost Town support for the project. Received notice of award in the Fall. Worked with NGrid in applicable incentives. META Grant for OPM Services.
- ❖ **Fall 2024** – Town asked STM for additional CPC funding and an additional Free Cash Transfer to close the gap between the estimate and the as-bid pricing. STM voted **YES**. No impact to the tax rate.

Meanwhile...we had an ESCo Procurement to complete.



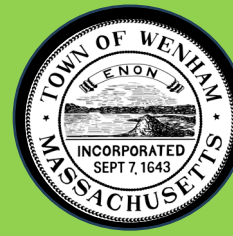


HAMILTON TOWN HALL RENOVATION AND DECARBONIZATION

December 2024 – we broke ground!



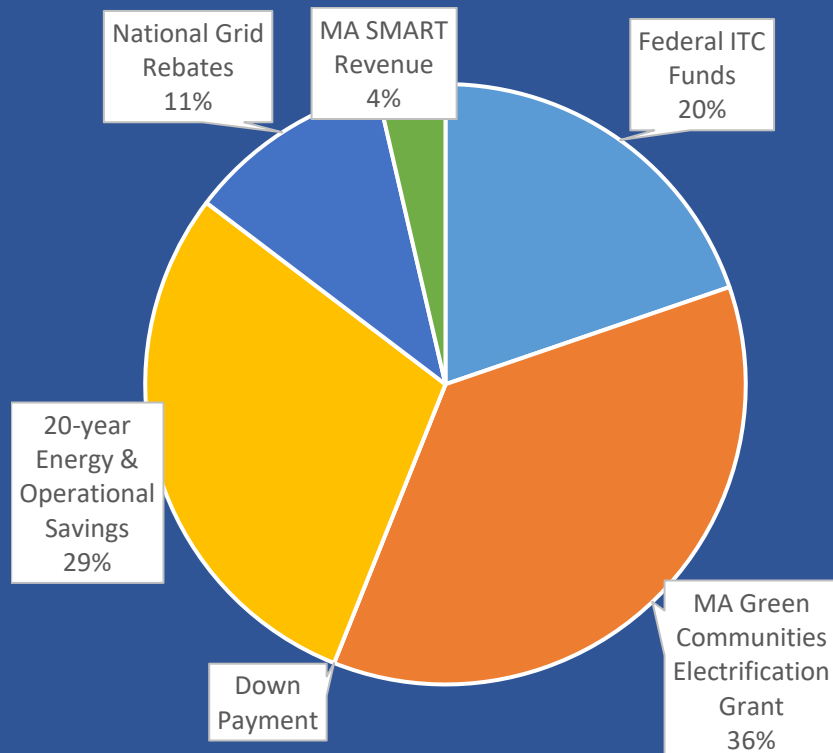
Project Concept: 2016 ————— Eight Year Development Period —————> Project Kickoff: 2024



HAMILTON TOWN HALL RENOVATION AND DECARBONIZATION

Final Energy Project Funding and Energy Savings Pictures

Project Value	\$1,377,371
Federal ITC Funds	\$272,037
Green Communities Decarbonization Grant	\$500,000
20-year Energy & Operational Savings	\$403,372
National Grid Rebates	\$151,923
MA SMART Revenue	\$50,039



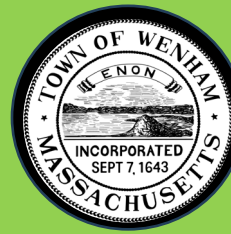
	Electric (kWh/year)	Thermal (therms/year)	Energy Spend (\$/year)
Baseline	55,960	5,754	\$22,991
Baseline Adjustment	+17,379	+926	+\$5,726
Adjusted Baseline	73,339	6,680	\$28,717
Lighting, Plug Loads, BMS Upgrades	-23,384	0	-\$5,659
Geothermal System	+17,736	-6,680	-\$6,677
Solar PV	-56,432	0	-\$13,656
Post-Project Energy Use	11,259	0	\$2,725

Baseline Adjustments

- 100% cooling at the building's baseline SEER
- Mechanical ventilation in compliance with ASHRAE 62.1
- Slightly expanded building footprint

Major sources of Savings

- Ground source heat pump system operating at high COP (/SEER) year-round
- Energy recovery ventilation to partially offset OA conditioning load
- Networked, generation 4 LED lighting with integrated controls
- Solar PV production; offset grid-purchased electricity 1:1 (behind the meter & net metered)
- Installation of a web-based, IOT-ready and open-source Building Management System for control of all building systems

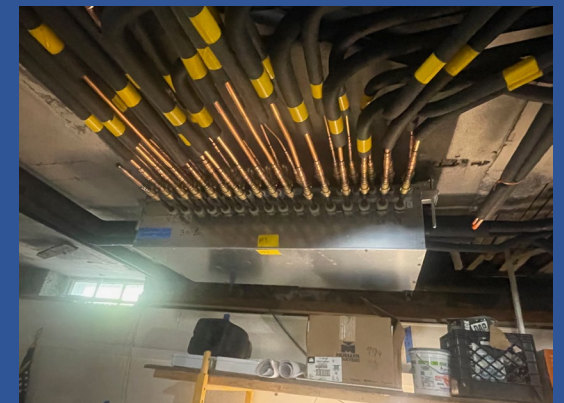


HAMILTON TOWN HALL RENOVATION AND DECARBONIZATION

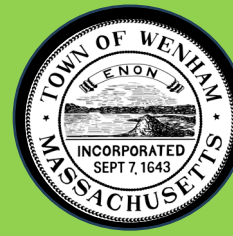
Before



After



❖ Projected Completion Date: Spring, 2026



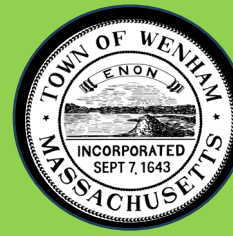
WENHAM TOWN HALL DECARBONIZATION

How we got there...

- ❖ Weatherization and LED lighting completed through GC grant funding in **2019** and **2023**
- ❖ HVAC Upgrade project was conceptualized in **2022** to utilize ARPA funds. Initial concept was to replace in-kind (natural gas boiler and air-cooled chiller) for \$500,000
- ❖ META Grant funded an electrification study of Town Hall in **2022**, Study completed in **2023**
- ❖ Engineering design was not funded – could not get from META concept of electrification to bid documents
- ❖ Hamilton has success with ESCo approach - Wenham conducts their own ESCo procurement in August **2024**
- ❖ Wenham applies for Green Communities Decarbonization grant in Fall **2024**, receives award in March **2025**. Works with NGrid on Heat Pump incentives
- ❖ Wenham applies for CPC funding in January **2025** to fund remaining \$390K
- ❖ ATM votes to approve CPC funding in April **2025** - we are fully funded and construction starts in June.

Project Concept: 2022 → Project Kickoff: 2025

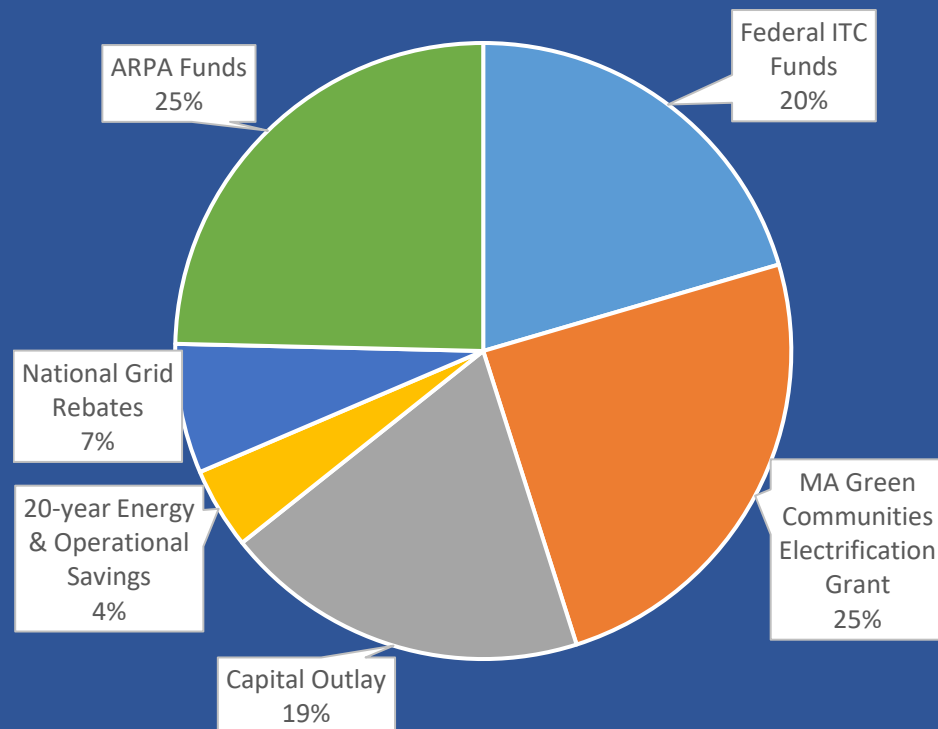
Three Year Development Period



WENHAM TOWN HALL DECARBONIZATION

Final Energy Project Funding and Energy Savings Pictures

Project Value	\$2,030,293
Federal ITC Funds	\$415,618
Green Communities Decarbonization Grant	\$500,000
Capital Outlay / CPC Funding	\$390,000
20-year Energy & Operational Savings	\$86,660
National Grid Rebates	\$138,015
ARPA Funds	\$500,000



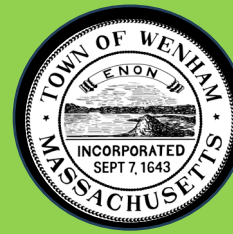
	Electric (kWh/year)	Thermal (therms/year)	Energy Spend (\$/year)
Baseline	61,770	4,098	\$22,539
<i>Baseline Adjustment</i>	<i>+ 8,025</i>	<i>-60</i>	<i>+\$1,879</i>
Adjusted Baseline	69,795	4,038	\$24,418
Geothermal System	+7,441	-4,038	-\$5,307
Post-Project Energy Use	77,236	0	\$19,111

Baseline Adjustments

- 100% cooling at the building's baseline SEER
- Mechanical ventilation in compliance with ASHRAE 62.1

Major sources of Savings

- Ground source heat pump system operating at high COP year-round
- Energy recovery ventilation to partially offset OA conditioning load
- Canopy Solar over Parking Lot – to be developed in parallel.



WENHAM TOWN HALL DECARBONIZATION

Before

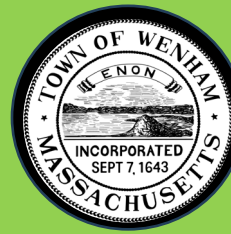


Site of old chiller is now open space; considering EV chargers

After...



❖ Projected Completion Date: December 2025



CHALLENGES / OPPORTUNITIES

❖ Compiling Different Fundings Sources / Associated Timelines



❖ Solar Interconnection / Group Study Delays



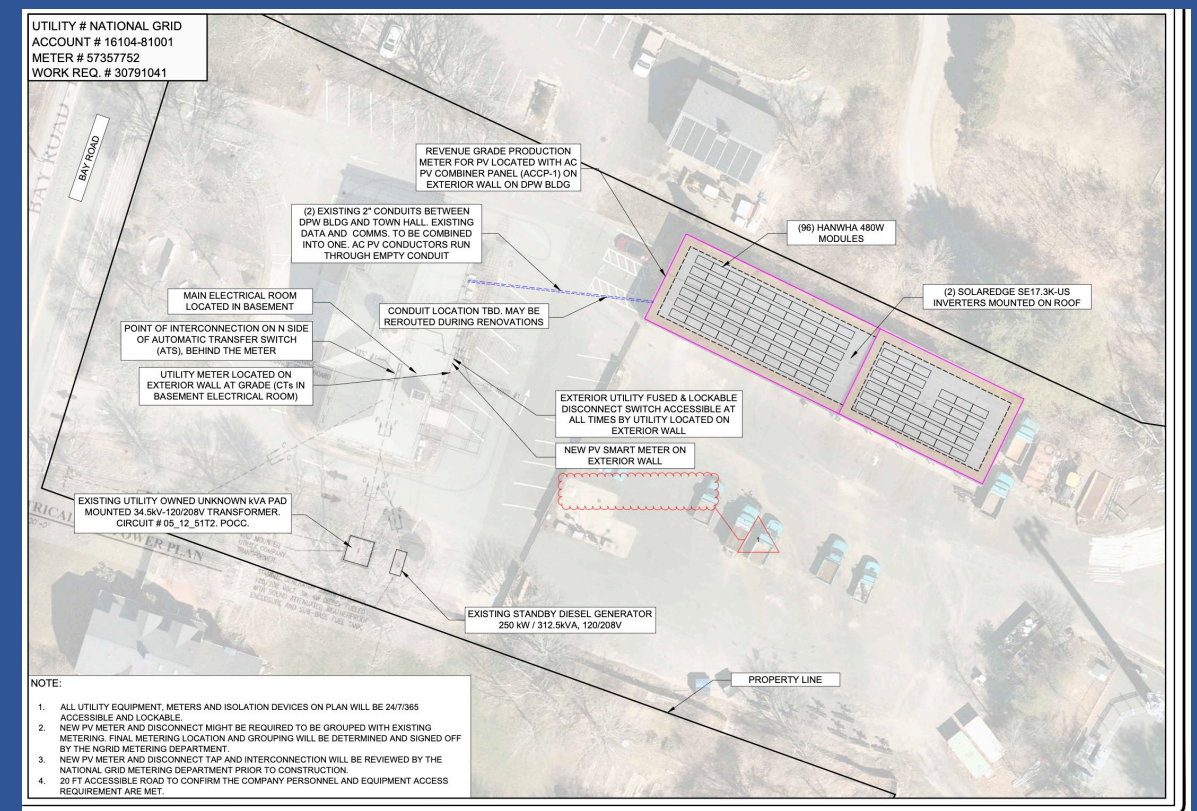
❖ Engaging Volunteer Committees in Decision-Making

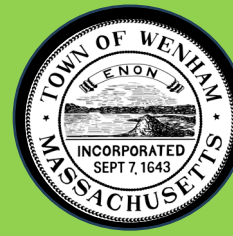


❖ Satisfying all stakeholders!



BRANCH CIRCUIT CONTROLLER (BCC) SCHEDULE											
ELECTRICAL						PHYSICAL			REMARKS		
TYPE	VOLTAGE	PHASE	HERTZ	MCA	# PORTS	WIDTH X LENGTH X HEIGHT IN.	MANUFACTURER MODEL	TYPE	RATINGS	FEATURES	INSTALL
1	208	1	60	1.57	16	10"x44.5"x21.5"	mitsubishi CMB-P1016NU	①	⊖	①	①
1	208	1	60	0.38	4	10"x23.5"x15.5"	mitsubishi CMB-P104NU	①	⊖	②	①
1	208	1	60	1.19	12	10"x23.5"x15.5"	mitsubishi CMB-P1012NU	①	⊖	①	①
① MAIN BRANCH CONTROLLER ② SUB BRANCH CONTROLLER ③ PROVIDE SECONDARY DRAIN PAN AND CONDENSATE DRAIN PIPING											
VARIABLE REFRIGERANT FLOW (VRF) SYSTEM COMPRESSOR UNIT SCHEDULE											
PERFORMANCE				ELECTRICAL				PHYSICAL		REMARKS	
CAPACITY (TONS)	HEATING (MBH)	GPM	WPD (FT WG)	MCA	MOP	VOLTAGE	PHASE	WEIGHT (LBS)	MANUFACTURER MODEL	TYPE	FEATURES
4	206.6	50.7	-	79	125	208	3	-	mitsubishi	①	④





THANK YOU!

Please ask your questions!



Victoria A. Masone, P.E.

Energy Manager, Towns of Hamilton and Wenham

e: vmasone@hamiltonma.gov

p: (978) 853-5112