

Light Commission April 30, 2024 meeting minutes

To: Light Commission: Commissioners
Light Department: J. Kowalik, General Manager
From: Jean-Jacques Yarmoff, Secretary
Date: May 31, 2024
Re: Light Commission Meeting, April 30, 2024

A quorum being present, Chair Wolf brought the meeting to order at 4:04 pm. The meeting was held in person and with remote internet access, both available to public participation. A recording of the meeting is made available to the public at the following [link](#).

Participated in meeting:

Commissioners: Commissioners Frechette, Smith, Wolf and Yarmoff participated in person.
Commissioner Hull was excused.
Light Department: General Manager, J. Kowalik.

Marblehead Land Acknowledgment declaration was read by Commissioner Frechette.

Comments from the Public

Albert Jordan, Roosevelt Ave, commented on

- pole replacement: the fact that there is a double pole at a busy intersection is a hazard as it prevents clean light of sight, and

- lights remain on in the Public Library: can somebody do something about it?

General Manager response: there is a sequence to moving wires, and MMLD seems to have done its part with regards to the pole in question.

Post Meeting Note: The General Manager exchanged with the director of the Public Library, who explained that, as it is still a work site, lights have to remain on; the status of the building will change shortly.

Sue Wigglesworth and other abutters on Lincoln Ave were interested in understanding better the situation of the planned work on the Tioga way parcel. See below.

Approval of minutes of previous meetings

The minutes of the executive meetings of September 5, 2023 and October 24, 2023 have been approved by e-mail exchanges since the last board meeting.

The minutes for the January 30, 2024 public session, January 30, executive session and February 27 public session have been sent to the commissioners for review prior to this meeting.

Vote #2024-08 Motion to approve the minutes of the January 30, public session, January 30, executive session and February 27 public session was moved by Commissioner Frechette and seconded by Commissioner Smith. **Unanimous.**

Outstanding items from previous meetings

Tioga way schedule. This will be part of the General Manager updates later in the meeting.

Monthly Financial Reports. The Business Manager, Matt Barrett proposed a new format for the monthly financial reports that takes into account the previous request of commissioners: it now shows both the actuals and the yearly forecast. This is very helpful to follow the financials of the Light Department month to month as business evolves during the year.

MIT Sloan School presentation - Time of Use study

Fianza Fadilla is an MBA student at the MIT Sloan School, working with the Sustainability Lab, who has been focusing on strategies to encourage Marblehead residents to shift consumption: he is presenting his work, a few days before graduation. The enclosed slides explain: a) the Problem statement; b) Proposed Improvements; c) Results from data analysis; d) results from an online survey of Marblehead residents.

Key takeaways from the work are shown on slide page 9:

1. Communication is key. Having multiple channels of communication to promote programs, changes, alerts and provide clear, understandable explanations is essential to educate people and prevent misinformation;
2. Implementation of dynamic pricing involves several considerations: fitting the wholesale price pattern to better incentivize customers to shift and managing complexity. As the goal is to induce behavior change, preparation for implementation could take years, involving data exploration and pilot projects before launching the program;
3. Customers emphasize the publication and advertisement of programs, especially for home batteries and solar systems as part of the solution. They also highlight the importance of usage monitoring and advocate for adjusting the rate structure based on survey results.

Commissioners and MMLD staff were invited to participate in the poster review session that will take place at the MIT Sloan School on May 8: the General Manager and Commissioner Yarmoff indicated that they would like to participate.

DOE Prize - Application for geothermal network project

The Marblehead Housing Authority is working on a project to build about 100 new units at Broughton Rd. There are efficiency goals but geothermal is not mandated, even though it might be the most energy efficient way to heat and cool the building. Logan Casey found out that a DOE prize could help finance the study of such a project: as MMLD does not have the bandwidth to organize such a project currently (with high priority projects of rebuilding Village 13 substation and the Tioga way Utility Scale battery) a group of residents organized to apply to this DOE prize, highlighting innovative technologies to store energy, studying MMLD potentially selling energy, and possibly controlling the geothermal loop as an energy storage system and a way to continue to lower rates.

If such a project were possible at Broughton road, it could become a blueprint on how to run geothermal projects in town. To our knowledge, there is one electric utility in Oklahoma that has incentivized many (thousands!) geothermal projects, while in MA, Eversource and National Grid are each studying one pilot (in Framingham and Lowell).

If we win the DOE prize, the Housing Authority would be the recipient of the money for the project highlighted (see slide page 9). Answer after May 16.

General Manager Updates

Village 13 update The landbridge components (to protect the sewer pipe) have been delivered. During installation, large rocks were found that could have affected the sewer pipes if moved. Concrete was poured *in situ* in two trenches and the bridge installed on this foundation. The distribution manager Greg Chane organized to get help from line crews from Danvers, Brooklyn and Middleton to relocate the high-tension wires. It is now possible to receive the transformers at any time. The date to receive the transformers has shifted from May 6 and we do not have a definite date for delivery. Testing will take place at Virginia Transformer's facility and is not yet scheduled.

Tioga Way. Surveyors started working last week to create a detailed survey of the plot, mapping the parts that are wetland. We will receive this detailed survey from Bayside Engineering in the next few weeks. From this, MMLD will be able to determine areas to accommodate the utility scale battery contemplated, as well as the department's storage areas (for poles, ...). Details of how to prepare the site for the battery have yet to be worked out (stilts / slab, ...) Drainage of the site is also an issue that could be mitigated with this project. Next steps will be:

- receiving a detailed survey; - evaluating possible battery locations; - studying access to the site.

Residents who are abutters are encouraging MMLD to discuss the plan for the development of the site earlier rather than later. The Light Department has organized public meetings in the past for other issues and will plan one to hold such a meeting to inform abutters and residents.

Grants. Massachusetts did not meet the threshold for FEMA grant disaster relief after the January 2024 storms. CZM Grant, see next paragraph. Separately, MMLD is participating in a DOE Grid Resilience and Innovation Partnership (GRIP) grant, in a project involving several other municipal light plants, Taunton, Hingham, Braintree, Concord and Middletown (ENE communities) and Wakefield, Peabody and Marblehead (MMWEC coordination). A further coordination meeting regarding this grant request will take place on May 14th, at which point next steps will become clear. MMLD is currently requesting over \$16M for projects shown on slide page 11, (solar rooftop, solar canopy and level 3 bus EV charging).

Fence at 80 Commercial street. The project is on-going. As the fence area along the sidewalk was cleared, it became obvious that there is no retaining wall or other structures to mark the property side of the sidewalk, see pictures on page 12. This will have to be rebuilt, using the precast supports for the land bridge that were not used at Village 13. In addition, a monopole will be given to the project to hold up the gangway to the commercial dock, freeing up the sidewalk completely. While timing is tight, the project is on track to be completed by June 30.

National Grid forecasts. The General Manager participated in a meeting with National Grid to update the load projections in our geographic area (which includes Salem and Swampscott), see slide page 12. Unlike prior meetings where the update to forecasts largely caused by new developments, the changes are now caused by the on-going electrification of transportation and building heating and cooling. While Marblehead would have liked to understand the 15 year planning methodology used by NG for Swampscott (which would likely be applicable to Marblehead), the forecasting team was not part of this meeting. National Grid, while well aware that all of Marblehead electricity comes from a Salem substation, had no comment with regards to resiliency or battery storage plans.

Hiring updates. MMLD made an offer to fill the IT position to Chris Dunbar, offer which was accepted. Chris will start in his position on July 1st. The General Manager is now looking at the Engineering position for which a job position description has been drafted and shared with the commission.

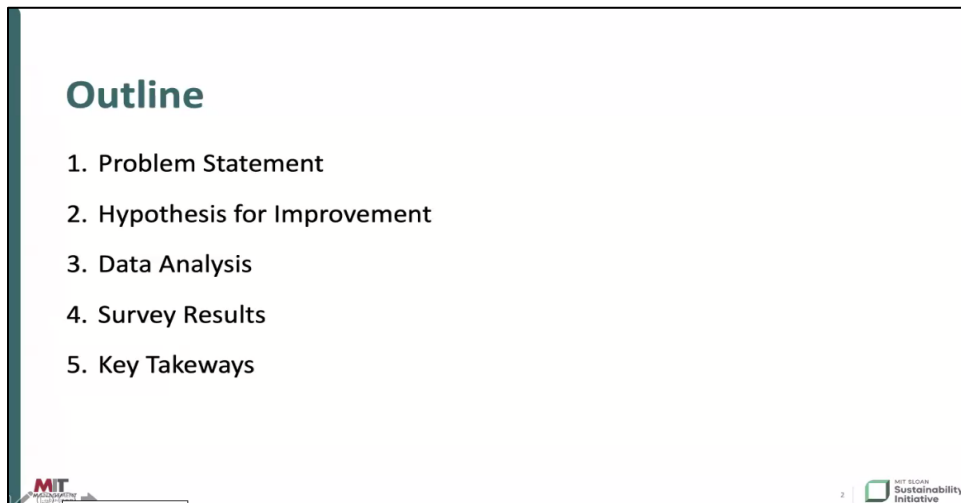
Executive Session Chair Lisa Wolf proposed to enter Executive Session Motion to conduct strategy sessions in preparation for negotiations with nonunion personnel or to conduct collective bargaining sessions or contract negotiations with nonunion personnel. Not to return to Open Session. Motion was moved by Commissioner Yarmoff and seconded by Commissioner Frechette. Votes: Simon Frechette: Yes; Adam Smith: Yes; Lisa Wolf: Yes; Jean-Jacques Yarmoff: Yes.

Executive Session started at 6:04 pm.

The Executive Session concluded at 7:01 pm at which point a motion to adjourn was proposed, seconded and, after a roll call of the four commissioners present voting unanimously in favor, adopted.

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Documents presented during the April 30, 2024 Light Commission Meeting



Problem statement

MMLD identifies **lowering the current peak demand up to 10%** as a critical issue to lower GHG emissions, and to cut reliance on high-priced electricity (energy, transmission, and capacity).

Why?

- lower the overall price
- prevent additional GHG-generating peaking electricity generation
- limit infrastructure upgrades in Marblehead
- contribute to reduced GHG emissions
- achieve goal to reach 85% GHG-free electricity by 2033



Go, see, and assess

- Through interviews, literature reviews, and site visit, it has been revealed that there is an **opportunity to move towards the implementation of dynamic pricing** as a solution to shift peak electricity consumption.
- Time of Use pricing **has been implemented in Groton** and has successfully shifted their peak consumption.

Identify Root Causes

- MMLD **has infrastructure** for implementing dynamic pricing (AMI meters, data), but data at a more granular level has not been explored yet; data is currently retrieved for billing as monthly consumption data. On the other side, MMLD **lacks the labor specializing** particularly in preparation to implement, including roles such as project manager, IT, and communication.
- MMLD **has programs** to shift consumers' behavior: e.g. WiFi thermostat and EV fast charger incentives, **but with a low adoption rate**.
- MMLD **has not identified customers' perspectives** and acceptance towards dynamic pricing (specifically, Time of Use pricing to replace their current fixed rate scenario).



Proposed improvement

PRICING

Time of Use/ToU
Critical Peak Pricing/CPP
Critical Peak Rebate/CPR

Interviews
Data Analysis

BEHAVIORAL

Connected Homes
Incentive Programs
Red Alert Notification

Interviews
Customers Survey

TECHNOLOGY

Home Solar & Battery
Large Scale Battery
Renewables Contract
Infrastructures



Key takeaways from interviews

Interviews with MMWEC, Groton/GELD, Qilowatt, and MIT Sloan Instructors...

What?

- Town that has high adoption in **incentive programs** tends to have higher acceptance in dynamic pricing.
- The challenge for a town in dynamic pricing: installing AMI meters (expensive) while **maintaining low rates**.
- Groton is a town in Massachusetts that has already implemented **exclusive dynamic pricing** (Time-of-Use) of electricity by far and spent **six years to prepare** for implementation.

How?

- Dynamic pricing scenarios in electricity could be determined by the one that is **closer to wholesale price**.
- Method to formulate dynamic pricing: (1) analyzing **energy market data**; (2) **easy rate to understand** but shows the market prices change effectively; (3) utilize **smart meters** data; (4) analyze **demographics**
- In determining compulsory/opt-in/opt-out: (1) **acceptability**, (2) consumers **responsiveness**, (3) equity and **fairness**
- **Compulsory**; if it is **regulated** by the state, for example in California and Colorado. **Opt-in** for bigger cities, e.g. Chicago.



Why dynamic pricing?

Learn from Groton...

mymeter.grotoelectric.org



Welcome to the Groton Electric Usage Portal!

the power UTLET

More Important Information Regarding Time of Use Rates

Groton ToU Pricing	Period	Summer Rates	Winter Rates (December – March)
	8PM – 4PM Off-Peak	\$0.05	\$0.07
	4PM – 8PM Peak	\$0.50	\$0.43



- GELD is **one of the first utilities** in New England to implement **exclusive dynamic pricing**.
- The **implementation took six years**, including three years of data analysis with a consultant, a three-year pilot project, and full implementation over the past eight months.
- The **pilot project** involved the division of the community into **six control groups**. There was **pushback** from customers with high usage.
- **Effective communication** through multiple channels is key. This includes electricity usage **monitoring** and a **newsletter** with clear explanations.

Data Analysis



Why data analysis?

Dynamic Pricing Types

- **Real-Time Pricing (RTP):** electricity rates fluctuate throughout the day based on actual market conditions
- **Time-of-Use (TOU):** varies the cost depending on the time of day
- **Critical Peak Pricing (CPP):** significantly increases rates during periods of exceptionally high demand
- ... and many more! (mix, Critical Peak Rebates, Variable Peak Pricing, Hourly Pricing, Demand Charges, etc.)

Data Analysis

Objective:

- to determine whether the hourly Time-of-Use pricing scenario throughout the day **accurately replicates the shape of the wholesale price pattern** as determined by ISO-NE using **Spearman coefficient metric**
- to provide a **qualitative description of three key aspects:** the suitability of real-time pricing, the variety of dynamic pricing types, and the complexity of scenarios related to the implementation of dynamic pricing.

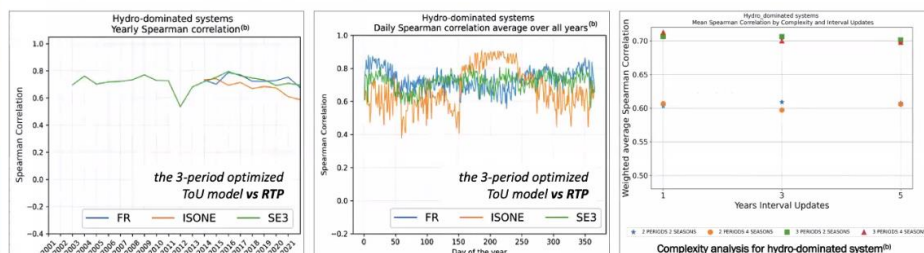
Input Data: ISO-NE Day Ahead Pricing 2011-2022, Groton Pricing Data

Literature: (1) Electricity Retail Rate Design in Decarbonizing Power Systems: A Cross-country Analysis of Time-of-use Rates (Reboul, 2023) (2) Electricity Retail Rate Design in a Decarbonizing Economy: An Analysis of Time-of-Use and Critical Peak Pricing (Schittekatte, et. al., 2022)



What the literature says...

ISO-NE utilizes 22% of its resource mix from renewables and hydro, with **hydro itself accounting for 10% of the total resource mix**^(a).



	Unique rates per TOU period	Within day TOU periods	Update TOU coefficients	Update partitioning of hours within-day TOU period
Benchmark TOU	Season x Day type x TOU period	1-3 / 4-6 / 7-9 / 10-12 / 13-15 / 16-18 / 19-21 / 22-24	Annually using a regression with as input the preceding years of price data (1y or 3y)	Does not change over the considered test period
Optimized TOU	Season x Day type x TOU period	Max. 3 periods (>= 3 hours each and repeatable)	Annually using a regression with as input the preceding years of price data (1y or 3y)	Annually using a partitioning algorithm with as input the preceding years of price data (1y or 3y)

TOU design with three within-day periods, two day-types, and two seasons strikes a balance between design simplicity and accuracy in reflecting wholesale price patterns^(b).

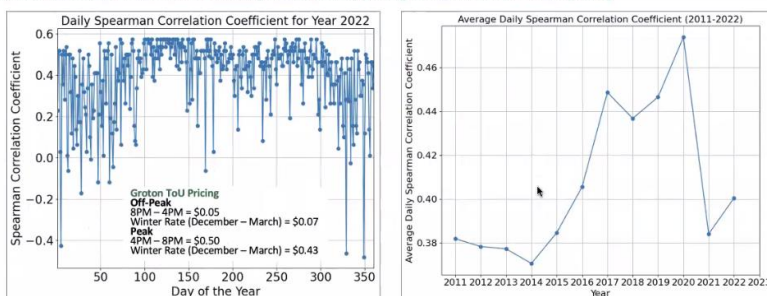


(a) ISO New England, 2023
(b) Reboul, 2023



What the data says...

Spearman correlation between ISO-NE day-ahead hourly pricing vs Groton Time-of-Use pricing



Key Takeaways:

- *The efficient TOU scheme reflects the dynamics of wholesale electricity markets and provides consumers with the right incentives to shift their demand.*
- *A simpler TOU scenario does not accurately capture the pattern of wholesale prices, as evidenced by a lower Spearman correlation coefficient, indicating a trade-off between simplicity and precision.*



Online survey overview



~1,300 contacts
69 respondents (5.3%)
6 days (Apr 23rd-28th, 2024)

Divided into five sections:

1. Customer Participation in Electricity
Incentive Programs
2. Electricity Consumption **Awareness**
3. Electricity Consumption **Behavior**
4. **Understanding Pricing Scenarios:** Fixed vs. Dynamic Electricity Rates
5. Customer Participation **Preferences in Dynamic Electricity Pricing Programs**



Incentive programs

12 programs being offered in Marblehead

1. Connected homes: incentive for home battery
2. Connected homes: electric hot water heater incentive
3. Connected homes: monthly EV incentives
4. Connected homes: mini-split controller incentive
5. Connected homes: monthly Wi-Fi thermostat incentive
6. Connected homes: monthly EV level 2 fast charging incentives
7. EV new car incentives for trade-in from ICE car
8. EV and PHEV charger incentives
9. Appliance rebates on ENERGY STAR®-certified appliances
10. Energy audit services
11. Heat pump rebates
12. Electric yard equipment rebates

Key results

- **Top 3 programs with the highest awareness:** energy audit services (46% are aware), appliance rebates (42%), and heat pump rebates (26%)
- **Programs with the lowest awareness:** electric yard equipment rebates (68% not aware), EV and PHEV charger incentives (61%), and connected homes: monthly Wi-Fi thermostat incentive (58%)
- **Top 3 most participated programs:** energy audit services (57%), appliance rebates (52%), and heat pump rebates (21%)

Reasons for not participating

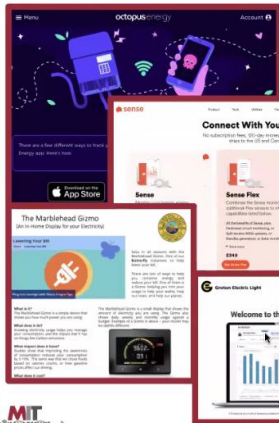
- not aware of these programs (35%)
- did not understand how to participate (21%)
- did not think they would benefit (8%)
- *and many more...*
 - o home ownership
 - o high cost to replace car or heating system

What they said...

- "There has been little effort to **publicize** these programs."
- "Marblehead Light...Why don't you **advertise** these?"
- "I am not convinced all of these suggestions are better for the **environment.**"
- "Marblehead actively **discourages alternative energy** sources by virtue of their highly imbalanced energy rate structure (they buy at half the rate at which they sell)."
- "I wish **solar roof tiles** were allowed and **storage battery** had a monetary incentive."



Consumption awareness and behavior



Awareness: key results

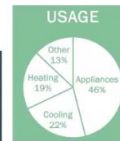
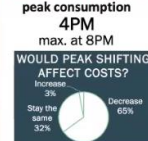
- Would usage monitoring change habits?:
- (1) yes, would use it **strategically** (46%)
 - (2) yes, would use less (32%)

How would people like to monitor usage



Preferred media to receive high demand alert: text message (SMS) (70%), email (38%), and mobile app notification (29%)

Behavioral perception: key results



- What *motivates* consumption shift: **cost** (61%), **environment** (30%)
- Would you *respond to high demand alert*? likely & very likely (81%)

What they said...

- "Love the idea of **monitoring** my home electrical usage **from my phone.**"
- "The most useful things... (a) approve **batteries for home use** and (b) correct the **unfavorable rate structure...**"
- "Increase rates during peak periods, consumers will respond."



Dynamic pricing

Scope: RTP, ToU, CPP, and ToU+CPP

Key results

- 25% of respondents **somewhat** understand dynamic pricing or do **not** understand it **at all**.
- The highest preference is for **Time-of-Use (43%)**.
- 59% of respondents **strongly prefer or prefer** dynamic pricing over a fixed rate, due to:
 - environmental impact (52%)
 - cost (17%)
- Only 28% of respondents **have participated** in dynamic pricing before.
- For 64% of respondents, a **mix of ToU and CPP** is the most complex scenario, with **none selecting ToU alone**.
- Preference in participation (strongly prefer and somewhat prefer):
 - Compulsory (58%)
 - Opt-in (57%)
 - Opt-out (41%)

What they said...

- "I think if whatever dynamic model is used... **simpler is better**... if too complex then users won't understand and probably will not even try."
- "Why do I have to pay for the **peak use caused by large users**." – "My fear is that **costs will go up**."
- "Either the Town **requires** the scheme, or it doesn't work."
- "I think that an **opt-out** program gives consumers a choice but **helps more consumers participate**."



Key takeaways

1. **Communication is key.** Having multiple channels of communication to promote programs, changes, alerts, and provide clear, understandable explanations is essential to educate people and prevent misinformation.
2. The implementation of dynamic pricing involves various considerations: fitting the **wholesale price pattern** to better incentivize customers to shift and managing **complexity**. As the goal is to induce behavior change, preparation for **implementation could take years**, involving data exploration to determine pricing scenarios, pilot projects, and then launching the program live.
3. Customers emphasize and urge the **publication and advertisement** of programs, especially for **home batteries and solar systems**, as part of the solution. They also highlight the importance of **usage monitoring** and advocate for **adjusting the rate structure** based on survey results.



Decarbonize Massachusetts Municipalities by enabling public electric utilities to run geothermal networks

Team ENERGIZING PUBLIC POWER: NETWORKED GEOTHERMAL

Members are: Jean-Jacques Yarnoff, Engineer and elected Light Commission member; Eileen Mathieu, Member of the Green Marblehead Implementation Committee; Kurt James, Member of Marblehead Housing Production Implementation Committee; Kevin Colcord, Management Consultant and member of the Light Commission Strategy Working Group; Michele Bell, Member of Sustainable Marblehead; Cathy Hoog, Executive Director, Marblehead Housing Authority and Salem Housing Authority

- Marblehead is a small seaside community in Massachusetts, trying to lower its emission of Greenhouse Gases in both municipal and private buildings. The town is located on a peninsula and subject to increasingly severe storms. This relative isolation is causing the town to explore disaster recovery options. An opportunity arises with the planned construction of a large housing development dedicated to handicapped and low-income families.
- The challenges are to provide this development with cheap, decarbonized energy for heating and cooling, while also increasing the resiliency of the community.
- The project will study the feasibility of a **Networked Geothermal system** to
 - Serve as an **Energy Storage** facility over – hours, - weeks, and – months;
 - Provide **Energy, sold as a Utility Service** to ensure a cost as low as possible;
 - Help **Regulate** the electric Distribution Grid and **Stabilize Consumption**.
- Marblehead Light Commission; Marblehead Municipal Light Department (MLD)
- Sustainable Marblehead; Marblehead Fair Housing Committee; Marblehead Housing Authority



MMLD started operations in 1894, in this recently renovated building





Village 13 update

- Precast concrete land bridge sections delivered early – April 12; installation started 4/15
- Large, shallow ledge precluded the installation of precast footing sections; poured-in-place concrete footings installed instead
- Excellent cooperation among all involved local parties: MMLD, Mhd DPW & W&S, SESD, Bayside Engineering, & Cairns Construction
- Virginia Transformer 4/16 delivery schedule delay: 5/6 to 5/20 (in production) and 5/6 to 6/3 (production not started)
- Two minor VT contract issues identified...resolution in process
- 26 Heritage Way - easement signed



Tioga Way update

- Completed the wetlands flagging of the full parcel by wetlands scientist John Dick
- Completed topo survey field work of the entire parcel by Bayside Engineering survey team
- Bayside survey will indicate the size of developable sections of the parcel, within 100 feet and 50 feet of wetlands



Federal & State grant applications & use

- **FEMA** – storm-related damage reimbursement claim Jan 10-13, 2024. *Mass did not meet the FEMA minimum-level storm damage threshold*
- **Mass CZM** grant 2022-2024. *Grant funds include Hammond Park child-safe park railings, Commercial St extension sidewalk installation, boat ramp hoist monopole installation, and ledge removal from the Commercial St extension. **All improvements must be completed by June 30.***



Marblehead Proposed Projects

Proposed Projects	Estimated Cost
1. Public Schools - Neighborhood Resiliency Centers- Rooftop Solar PV (6 schools) Battery Electric Storage System (4 schools)	\$12,631,610
2. MHS Parking Lot Solar PV Canopy – Clean Transportation Center Level 2 & 3 EV charging incl bus charging	\$2,996,842
3. Brown School – Community Shelter and Clean Energy Service (CES) Center Level 2 & 3 EV charging incl. bus charging	\$595,000
Total:	\$16,223,452



DOE GRIP Grant – Financial Impact

Federal GRIP Grant Impacts on Project Costs	MMLD Contribution
Retail Price (no discount)	100%
IRA Investment Tax Credit (IRA ITC)	70%
IRA ITC + Coal Closure - Energy Community Tax Credit (ECTC) – based on location	60%
IRA ITC + DOE GRIP Grant	35%
IRA ITC + ECTC + DOE GRIP	30%



80 Commercial Fence & Gates

- Site prep has begun
- Trench dug for UG electric conduit for electric gate
- Premier Fence has been a very responsive vendor
- Removal of the old fence from the lower driveway to the Hammond Park entrance has exposed a varying (not straight) roadway edge and uneven roadway and sidewalk elevation...making the the sidewalk edge and elevation more critical...and requiring a solid fence line footing



System Planning MMLD's future power needs

- April 11 technical meeting held with National Grid (NGrid), MMLD, and MMWEC participating.
- NGrid plans by geographic area. Mhd is in the Salem Swampscott area. Future area system load and power quality needs are based on an internally generated 15-year load forecast.
- MMLD & MMWEC discussed our 5-year load forecast methodology.
- MMLD proposed working with NGrid forecasting team to apply their 15-year methodology, comparable to their Swampscott forecast.
- MMLD also identified the need for increasing resiliency in future grid infrastructure planning.
- Ngrid did not share any specific plans for planned Salem/Swampscott area grid upgrades. No comments on battery storage plans in the area

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