



HINGHAM MUNICIPAL LIGHTING PLANT

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Board Members

Laura Burns, Chair
Michael Reive, Vice-Chair
Tyler Herrald, Secretary

MEETING HINGHAM MUNICIPAL LIGHT BOARD

April 8, 2025
Zoom Meeting
<https://us02web.zoom.us/j/86583036213>

Meeting Called to Order

A meeting of the Board of Commissioners of the Hingham Municipal Light Plant (HMLP) was called to order by the Board's Chair, Laura Burns, at approximately 4:00 pm on Tuesday, April 8, 2025.

Present:

Board Members: Laura Burns -Chair
Michael Reive -Vice-Chair
Tyler Herrald -Secretary

HMLP: Thomas Morahan -General Manager
Mark Fahey -Asst. General Manager
Joan Griffin - Business Manager
Stephen Girardi - Engineer
Brianna Bennett - Sustainability Coordinator

Guests: David Shpigler - President of The Shpigler Group
Glen Purcell - Vice President of the Shpigler Group

Ms. Burns read the following disclaimer into the record:

This meeting is being held remotely as an alternative means of public access pursuant to Chapter 107 of the Act of 2022 and all other applicable laws temporarily amending certain provisions of the Open Meeting Law. You are hereby advised that this meeting and all communications during this meeting may be recorded by the Hingham Municipal Light Plant in accordance with the Open Meeting Law. If any participant wishes to record this meeting, please notify the chair at the start of the meeting in accordance with M.G.L. c. 30A, § 20(f) so that the chair may inform all other participants of said recording.

HMLP Sustainability Plan- David Shpigler - The Shpigler Group

David Shpigler, President of the Shpigler Group, and Glen Purcell, Vice President of the Shpigler Group, presented their Grid Modernization Assessment for Hingham Light. Mr. Shpigler provided the executive summary which outlined the seven topics that will be discussed in this meeting.

1. AMI Options
2. Grid Modernization Use Cases
3. Business Case
4. Power Supply
5. System Analysis
6. Implementation Strategy
7. Next Steps

Mr. Shpigler stated that AMI is feasible and there are three different network architectures that should be explored; LoRa WAN, mesh and point-to-multipoint. LoRa WAN is lower cost and “no frills”, mesh and point-to-multipoint are more robust with more capabilities. It is Mr. Shpigler’s recommendation that HMLP accept bids from all three network architectures.

Mr. Shpigler stated that it is important to leverage the chosen network to support both customer-facing and system-facing system capabilities. He stated that they looked at connect/disconnect to be bundled with the AMI deployment and found that it would be financially prudent and would provide value. Ms. Burns questioned whether the “disconnect” is physically in the meter or is it in the software. Mr. Shpigler responded that it is both - there is a disconnect switch located in the meter, but the software in the AMI headend can manage it so that you could remotely disconnect and reconnect a meter. Ms. Burns asked if they were more expensive than regular meters and Mr. Shpigler stated in the affirmative. Mr. Shpigler stated that he modeled this presentation this way to isolate these meters in certain locations.

Mr. Shpigler stated that Time of Use (TOU) is an area that he has identified as “tremendously valuable”. Since HMLP does not currently have AMI meters, they are not able to suggest a specific structure or rates at this time; however, they are able to run data that they have obtained from typical scenarios and model out the impacts and that is where the sufficient value is seen. He reinforced the belief that any upgraded customer information system (CIS) that is purchased should have TOU capabilities.

In addition, the potential for a Distributed Energy Resource Management System (DERMS) was reviewed. He believes that given the interest of third-party battery energy storage systems, that some of the demand response programs may be warranted in the future that DERMS platforms could offer value. Mr. Shpigler stated that he would advocate for a smaller scaled down version as a larger one does not justify the investment. Ms. Burns asked if it scales up easily or must it be replaced entirely. Mr. Shpigler responded that it would be best to consider a system that is scalable rather than a large one that would have to be replaced in five to ten years. Ms. Burns asked if DERMS platforms are standalone or integrated with the software for AMI. Mr. Shpigler stated that it was a bit of both; there is a huge advantage to integrating the systems together with the AMI but the idea is to put a CIS first and then come in with AMI and DERMS after that. He said that when soliciting bids for the AMI, one should inquire about the kind of DERMS interfaces that are embedded in the given system or the capabilities that they have as a third-party integration. Ms. Shpigler explained that it is important to identify a DERMS that offers integrated data from the AMI headend as well as the SCADA system to give a more robust reporting capability.

Mr. Shpigler analyzed the potential benefit of a centralized call center. The centralized call center would offer value to HMLP as long as the pricing structure is properly established. Mr. Shpigler has

benchmarked the rate and modeled it after industry norms and practices and it would fit well. The analysis is not just a call center but rather a broad customer care center that bundles a customer portal and prepayment system. Any bid would solicit a CIS that already has these two systems built in. Ms. Burns questioned whether any of the estimates for these items portioned part of the expenses to the water system or is it just a total price. Mr. Shpigler responded that the customer portal and prepayment system were looked at solely for the electric operation but it would be made available for water. The idea is that the apportionment would be in the customer care payment functionality and operational efficiencies.

The total estimated cost for everything put together is \$4.5 million over five years. The majority of that cost is the AMI system at \$2.8 million and the remaining \$1.7 is for everything else (CIS, DERMS, centralized call center). An annualized rate of return of 17.8% has been calculated which Ms. Shpigler believes makes for a strong and robust business case for full system payback within 7 years.

Mr. Shpigler stated that our power supply portfolio is in a good position, managed well, and offers good diversity; therefore, it meets key operational and strategic objectives. He did mention that HMLP could explore options to have bulk power purchase agreements to cover more of the base and cut down on spot market purchases.

Based on the strategic visioning sessions that were held at the beginning of this project, twelve (12) automation cases have been identified for consideration. Six (6) cases are customer-facing and the other six (6) are system-facing. The customer-facing items are things the customer can see or experience, whereas, the system-facing items are system analytics, conservation voltage, DERMS, FLISR (fault isolation), and Geographic Information System (GIS) upgrade. Of the twelve cases, nine offer positive value (see below) when looking at the next ten years (2026-2035). The optimized business case offers over \$1.1 million of positive value with an annual Internal Rate of Return of 17.8% with an 8% peak funding of \$2 million.

Program Comparison - Ranked						
	PV - Benefits	PV - CapEx	PV - OpEx	Terminal Value	NPV	Rank
ToU/Dynamic Rates	\$ 1,072,362	\$ 18,519	\$ 10,736	\$ 93,272	\$ 1,136,379	1
GIS Upgrade	\$ 1,190,081	\$ 138,889	\$ 80,521	\$ 98,776	\$ 1,069,448	2
Connect/Disconnect	\$ 806,887	\$ 54,917	\$ -	\$ 60,771	\$ 812,741	3
CIS Upgrade	\$ 722,438	\$ 166,667	\$ 96,625	\$ 39,828	\$ 498,974	4
DERMS	\$ 647,689	\$ 260,525	\$ 120,781	\$ 48,446	\$ 314,828	5
Centralized Call Center	\$ 1,244,600	\$ 1,046,705	\$ 8,052	\$ 85,358	\$ 275,202	6
Customer Portal	\$ 401,506	\$ 222,444	\$ 21,472	\$ 26,982	\$ 184,571	7
Analytics	\$ 238,552	\$ 90,035	\$ 18,788	\$ 19,457	\$ 149,186	8
Prepaid Metering	\$ 316,423	\$ 170,335	\$ 26,840	\$ 125	\$ 119,372	9
FLISR	\$ 3,238	\$ 21,560	\$ 12,078	\$ -	\$ (30,400)	10
Conservation Voltage Reduction	\$ 204,459	\$ 240,888	\$ 40,260	\$ 15,867	\$ (60,822)	11
Distribution Automation	\$ 84,757	\$ 170,904	\$ 40,260	\$ 4,564	\$ (121,842)	12

**FLISR, Conservation Voltage Reduction, and Distribution Automation all have a negative NPV (Net Present Value) so they would not offer positive value.

In order to accommodate the twelve (12) programs, there would be switches built in so that we could turn them on and off. Mr. Shpigler stated that we would have three different network architectures so that we can collect metering data, customer-facing data and system-facing data. Since the twelve programs are ranked, he explained #1 TOU/Dynamic Rates.

- TOU (#1) has the most value. Based on those network architectures for TOU, he calculated the benefits and capital operating expenses over the 120 months and it is \$1.07 million. The capital expense is \$18,000, operating expense is \$10,000 and at the end of 10 years, there is still another \$93,000 of value left over (Terminal Value) so, instead of \$1.07 million, it would have a Net Present Value (NPV) of \$1.1 million. Mr. Shpigler said that when looking at the TOU, he sees that demand levels are increasing and the revenue associated with the power delivery is going down so this could be a good tool to obtain better alignment

- GIS Upgrade (#2) and CIS Upgrade (program #4) will also add a lot of value and functionality as well as streamline processes that are currently being done manually which will enhance the overall modernization scheme.
- Connect/Disconnect (#3) can reduce some of the operating expenses associated with rolling trucks for these meter issues as well as bad debt.
- DERMS (#5) will have value when looking at TOU and it can assist in demand management capabilities and maximize the yield on that as well as on third party resources.
- Centralized Call Center (#6) would be a negotiated term and in the model provided the labor has been capitalized. As long as the pricing structure is in place there will be value.
- Customer Portal (#7) and Prepaid Metering (#9) are listed separately but they would be bundled together in one application.
- Analytics (#8) will leverage some of the AMI data.

Ms. Burns asked what other benefits could analytics deliver to HMLP and to save money. Mr. Shpigler stated that analytics can “right size” transformers in real time. Availability of transformers is limited and the cost is exorbitant so analytics would maximize the yield of those that are already in place by identifying those that are overloaded or underloaded and swap them rather than purchasing another. A second benefit would be power quality. Power quality issues come up when there is a disturbance on the line that can damage either a customer’s residence or HMLP’s infrastructure. Monitoring the analytics can identify and resolve issues before damage is done.

- FLISR (#10), Conservation Voltage Reduction (#11) and Distribution Automation (#12) all have negative value because the expenses outweigh the benefits. In addition, Mr. Shpigler stated that the overall system efficiency is very good, our voltage profile is very flat and our feeders are very short. He did state that FLISR may be beneficial because there is one problematic feeder that could benefit from some reconductoring and tie lines to improve the reliability. Ms. Burns asked for a brief explanation of what the FLISR does. Mr. Shpigler stated that FLISR stands for Fault Location Isolation Service Recovery so it diagnoses problems and isolates, and then handles them remotely, switching on an automated basis. This would allow for service to be restored quicker to a larger number of customers while the crew still works on the issue. Mr. Shpigler stated that the figures that are shown on the chart are for the FLISR for the one problem feeder.

Ms. Burns asked if Mr. Shpigler could explain prepaid metering. Mr. Shpigler explained that prepaid metering allows customers to pay in advance for their consumption. We currently use “post pay” because the customer uses the electricity, then the meter reader the consumption, and the customer is billed after the fact. Prepaid metering allows customers to have more visibility and control over their consumption because of all the AMI reporting. He stated that this can be very helpful for customers struggling with finances because they can budget during the month by signing up for alerts to see their consumption patterns. Ms. Burns asked for an explanation of the benefits of prepaid for HMLP. Mr. Shpigler said that (1) elimination of truck rolls for disconnect/reconnect, (2) reduction of bad debt, and (3) time value of money because HMLP has access to the funds earlier are all significant benefits to prepaid metering.

Use Case	Initial NPV	Viable?
ToU/Dynamic Rates	\$1,136,379	Yes
GIS Upgrade	\$1,069,448	Yes
Connect/Disconnect	\$812,741	Yes, with AMI
CIS Upgrade	\$498,974	Yes
DERMS	\$314,828	Yes
Centralized Call Center	\$275,202	Yes
Customer Portal	\$184,571	Yes (with CIS and prepay)
Analytics	\$149,186	Yes
Prepaid Metering	\$119,372	Yes (with CIS and customer portal)
FLISR	-\$30,400	Maybe
Conservation Voltage Reduction	-\$60,822	No
Distribution Automation	-\$121,842	No

Procurement Phases



Referencing slide (page #6) above, with each “Use Case”, the analysis has allowed Shpigler to develop some hypotheses about the shape of the ultimate modernization strategy. There are four elements of procurement; CIS, AMI, GIS, and DERMS.

- Phase 1: CIS would align the elements of TOU, CIS Upgrade, Customer Portal and Prepaid Metering
- Phase 2: AMI would align the elements of Connect/Disconnect and Analytics
- Phase 3: GIS would have GIS upgrade
- Phase 4: DERMS would have DERMS

Mr. Shpigler stated that “Centralized Call Center” is not highlighted because you already have that capability today and a scaled-down “FLISR”/reconductoring is not a large procurement so we did not color code it.

Ms. Burns asked what the benefits we would expect from a GIS upgrade. Mr. Shpigler states that GIS currently has a lot of manual processing right now so automation would provide labor savings and increased productivity. In addition, he believes that HMLP would see asset optimization. Asset optimization would allow HMLP to load every meter so that it would be geolocated so that you have greater capabilities and understanding of the true condition of the system in the field. It will identify problems that need to be repaired or replaced in our infrastructure as well as areas that are under-stressed. GIS can allow you to get an extension of life on assets. Based on Mr. Shpigler’s analysis of the infrastructure, he stated that we have the potential to “extend asset life by 4% on average across the entire distribution.”

Referencing the Business Case Results slide (page #7):

- Mr. Shpigler explained that the optimized business case offers over \$1.1 million of positive value with an annual Internal Rate of Return of 17.8%. He used AMI as an example of benefits, and the values are around \$90,000/year for annual benefits whereas customer facing is around \$500,000 and system facing grows to almost \$400,000. He stated that AMI is the least valuable but the most expensive. The AMI is a loss leader and provides capabilities with these other elements.
- For Operating Expense (OpEx), the Total OpEx grows from \$100,000/year to \$300,000/year and the earnings are positive throughout
- Net Income positive all the way throughout and steady.
- Total Capital Investment (CapEx) is forecasted for a three-year build schedule so there is a big investment in year 1 through year 3 and then it drops significantly.
- Cumulative Cash Flow - starts out negative but ends in 2035 as a positive \$2,668,899.
- In the bottom left of the slide, the Net Present Value of \$1.1 million with an internal return rate of 17.8%. Peak Funding of \$2 million. Peak funding is a way to consider that once you start generating benefits off the system effectively, the benefits serve as a self-financing tool as part of the plan. Ms. Burns asked for clarification as to whether it is \$2 million for the projects or the \$4.8 million to get started and it is the \$4.8 million.

The same information is presented graphically using bar charts.

- Earnings and net income are positive throughout the forecast period (page #8)
- Once fully deployed, the project is forecasted to generate over \$1 million in annual benefits (page #9). TOU rates will offer significant relief against your power purchase requirements right now and then some of the system facing applications, like analytics.
- Capital Expense schedule (page #10) A total of \$4.5 million in capital is required over the planned three years of deployment
- Cash flow chart (page #11) The project deployment can expect to see positive annual cash flow by year 4 and full system payback by year 7. From year 4 to year 7 we would be out of active deployment and dealing with growth and maintenance issues. Ms. Burns questioned whether Mr. Shpigler would project a 20-year lifespan for the AMI meters which are the largest investment. Mr. Shpigler stated that he would expect a lifespan of between fifteen and twenty years.

Power Supply is presented by Glen Purcell of the Shpigler Group. HMLP's energy consumption shows three distinct historical periods over the past twenty years, with changing energy delivery.

- Initial Growth Period (2004-2009): There was significant growth and increased consumption with an average of 185.0M kWh annually.
- Peak Consumption Period (2010-2016): Reached the highest sustained levels averaging 206.9M kWh annually, with 2013 setting the all-time peak at 209.1 million kWh.
- Recent Period (2017-2023): Shows fluctuating but gradually declining consumption averaging 197.1M kWh annually
- HMLP has experienced a 9.03% decline in annual energy consumption from 2016 to 2023.

Mr. Purcell stated that peak load is important because it will determine the capacity in generation. Both page #13 and #14 show how HMLP has diverging efficiency and capacity trends which will present operational challenges for planning as well as the seasonal demand patterns showing significant variation across 2023-2024. Mr. Purcell explained that as demand grows the load during June through August and then starts decreasing that is where the cost factors will show how well the power supply is managed. The top contracts represent 82% of our total power supply costs with ISO Interchange alone accounting for 44% of all costs. Seven out of these ten major contracts operate below the portfolio acreage of \$0.14/kWh, demonstrating effective contract procurement and management. Mr. Purcell stated that in

looking at the total mix, he could not tell all of the types of ISO trading activity, but his assumption was that it is actually higher than the 70% clean energy source overall and well on our way to that 80% mark.

Key Issues
<ul style="list-style-type: none">• Additional systems/capabilities needed<ul style="list-style-type: none">○ AMI system w/ disconnect under glass○ Explore analytics, either as part of the AMI acquisition, or as a standalone○ Upgrade GIS○ Explore upgrade of CIS, with enhanced capabilities to support ToU, prepay, and customer portal○ Consider a DERMS system to integrate more detailed system and resource planning○ Deploy data management platform that integrates meter head end and accommodates time-of-use rates• New processes and system mapping required<ul style="list-style-type: none">○ Billing process tied into data management to eliminate manual processes and rework requirements○ Customer service functions aligned with system data capabilities○ OMS dynamically tied to CIS○ Integrate GIS across the entire organization

The Key Issues presented by Mr. Shpigler shows a number of elements of the technology roadmap that will need to be addressed for a successful implementation. He would recommend going out to bid with eight to 10 different AMI vendors that are well known in the industry. Mr. Shpigler said that there are four (4) major stages of activity for HMLP to ensure that systems implemented deliver the desired business results; (1) Requirements, (2) Procurement, (3) Plan Development, and (4) Deployment. The Requirement Stage establishes technical requirements that will be the foundation of the implementation. The Procurement Stage identifies the optimal vendor(s) system to implement through the RFP process. The Plan Development entails partnering up with vendor(s) and preparing operational design and architecture based on requirements prior to deploying new systems to ensure business process gains. The Deployment Stage deploys the new systems and tests prior to full scale implementation.

The Technology Implementation Roadmap (page #20) shows the strategic technology deployment path which offers the potential to seamlessly support successful modernization. Mr. Shpigler stated that the path would have CIS/Billing/Finance as the foundation, enabling GIS, AMI and Customer Portal in the earlier phases, followed by Outage Management System (OMS), Analytics, and TOU and then DERMS and advanced grid capabilities.

Mr. Shpigler cautioned that everything does not have to be done immediately. It is important to use a phased/staggered approach to ensure that the team does not suffer from “project fatigue” (see page #21). Once requirements are developed and system level architecture is set then you would build to your key performance indicators (KPI). KPIs are a great way to track efficiency and value in relation to specific goals and objectives. Hingham has a head start because we have gone through this project and have an idea of what is needed for grid modernization. Mr. Shpigler then stated that technical specifications and requirements would be drawn up with integration data mapping and the intermediaries between these systems. He cautioned that one must specify all the different versions of existing software that has to be integrated and then document the operational impacts (job changes and/or changes due to efficiencies). Then one must look at the deployment scope to determine how each technology will be phased in; single-

year or multi-year. The IT Department has many demands on it so again you have to be thoughtful about putting the documentation together in a clear and meaningful way. Mr. Shpigler is estimating a 15-month implementation during which the first four months are all focused on plan development. This would ensure that before the vendor comes on site for integration that we would work through the process flow, integration plan, configuration specifications, quality assurance and test scripts.

Mr. Shpigler stated that the goal is to now explore how to move from strategic assessment into successful implementation. He stated six specific tasks that need to be completed:

- Develop a dedicated task force/internal team to push the program forward with a dedicated focus.
- Develop specific technical requirements as the baseline for system design to ensure that you are getting what you need for your municipality.
- Develop a Request for Proposals (RFP) that cover all of the use cases of interest
- Issue RFP and begin to engage with vendors
- Choose vendor(s) and work to design systems
- Prepare change management efforts alongside - and not after- the initial deployment stage.

Ms. Burns asked if our choice for CIS has an impact on the AMI meter choice. Mr. Shpigler responded that we need to ensure we are not purchasing such a proprietary system that you are locked into their requirements, hardware and services. Mr. Reive stated that he appreciated the past history data of where we are on our loading and peaks, but he would have liked to see forecasting and more about where we are going in the future. In addition, Mr. Reive said that he wants to have a dynamic system with modules that can be activated later so that we can grow with the industry. Mr. Shpigler agreed with Mr. Reive and reiterated his comment about not having a proprietary system that lacks flexibility. He also addressed Mr. Reive's question about Honeywell as an AMI vendor, stating that "they are still in the game but not one of the major players."

There is not ample time to discuss any other items on the agenda so another meeting will have to be scheduled for April 22, 2025. Next steps in regards to this presentation will be discussed at the April 22, 2025 meeting.

Motion to adjourn the meeting.

Mr. Reive: "Aye"

Mr. Herrald: "Aye"

Ms. Burns: "Aye"

Meeting adjourned at 5:11 pm