DANVERS ELECTRIC DIVISION

Efficiency Review

March 12, 2019

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0.0 – EXECUTIVE SUMMARY

0.1 – Background

Danvers Electric Division's (Danvers Electric) mission statement reads: "Danvers Electric is committed to providing high quality, reliable and affordable electricity and other related services to its customers. We strive for operational and customer service excellence through the efforts of Town officials and our dedicated employees."

Given the essential nature of its services and the breadth of its customer base, Danvers Electric needs to ensure that it has both fiscal strength and cost-effective, fluid, reliable operations. To continue to meet those goals, the Town engaged Baker Tilly to perform an efficiency "audit[1]" to "ensure the Division is fulfilling the goals of its mission statement in the best possible way."

0.2 – Audit Scope and Approach

The scope of the efficiency review included an evaluation of Danvers Electric's financial policies and reserve funds in place, the current rate structures and special rate programs, and the financial software system used. Detailed procedures that were performed by Baker Tilly are included in each subsequent section of this report and were based on the following guiding activities:

Key Activities:

1. Obtained and reviewed key internal documents detailing Danvers Electric's financial policies, rate structures, and financial software.
2. Interviewed key process owners at Danvers Electric and the Town of Danvers to discuss financial policies, rate structures, and financial software issues and concerns.
3. Reviewed best practice guidance and compared to Danvers Electric.
4. Identified and documented areas for improvement and recommendations.

[1] The word "audit" and the work done on this project by Baker Tilly do not constitute an audit under generally accepted auditing standards of the American Institute of Certified Public Accountants

0.3 – Organization of this Report

This report is organized as follows for each area:

1. Background and current process
2. Observations and recommendations
3. Detailed testing procedures performed by Baker Tilly

0.4 – Summary of Observations and Recommendations

Our observations and recommendations are detailed as follows:

Table 1 – Summary of Observations and Recommendations

#	Review Area	Observation	Recommendation
1.	1.0 Financial Policies	1.2.1 Danvers Electric currently has no reserve or restricted cash policy.	Baker Tilly recommends Danvers Electric establish a reserve policy that designates how much should be reserved and used in the future. Having strong reserves allows Danvers Electric to pay for infrastructure and operations without having to increase debt or customer rates. Danvers Electric should regularly forecast its operating and capital projects cash needs to ensure the proper balance between unrestricted cash needs and reserves.
2.	1.0 Financial Policies	1.2.2 Although Danvers Electric has adequate restricted cash, there is not adequate unrestricted cash on hand based on the 2017 Financial Statements.	Baker Tilly recommends reviewing the amount of unrestricted cash on hand needed going forward. Per the Standard & Poors “S&P” report, Danvers Electric currently has 204 days of cash on hand. Moody’s recommends having 250 days unrestricted cash on hand: See section 1.1 for additional calculation and comparison.
3.	1.0 Financial Policies	1.2.3 Danvers Electric currently has over $14.6 million in the rate stabilization fund. These funds have not been designated for a specific purpose except to provide cash flow in the event that revenues are unexpectedly low or rates suddenly change.	Establishing a rate stabilization fund is good governance and financial management and we commend Danvers Electric’s foresight in establishing this reserve. The purpose of this reserve fund is to provide sufficient funding for the cost of maintaining, repairing, and operating the system during extended periods when expenditures are higher and/or revenues are lower than budgeted while offsetting the need for rate increases and spending changes during the fiscal year. This may also include high levels of seasonality,

#	Review Area	Observation	Recommendation
			residential conservation rate structure, and exposure to extreme weather conditions. Maintaining a rate stabilization reserve may depend on the exposure to significant revenue and expenditure volatility, as well as determination if other reserves have adequately addressed the utility's exposure to revenue volatility. Rate stabilization reserves are typically funded or replenished in years when revenues are higher than expected, and this may be accomplished in a single year or over multiple years. Baker Tilly recommends management regularly review the amount currently reserved in the rate stabilization fund. Best practices in the industry include setting caps and other targets for use of the funds. A typical cap amount is up to one year's revenues.
4.	1.0 Financial Policies	1.2.4 Danvers Electric currently has three reserve accounts (customer deposits and escrow fund, depreciation fund, and the rate stabilization fund).	Baker Tilly recommends Danvers Electric consider establishing additional reserve accounts using current excess funds to better determine what funds will be used for in the future, as well as determine which reserve fund(s) would be most beneficial and needed in the future. See section 1.1 for additional explanation and possible options for other reserves.
5.	1.0 Financial Policies	1.2.5 There is currently not an all-inclusive funding plan that forecasts Danvers Electric's plan to pay long-term liabilities and future major projects.. While Danvers Electric currently has individual funding plans in place for the Net Pension Liability, debt and OPEBs, all liabilities and estimable future costs should be included in this plan.	Baker Tilly recommends management establish a cash flow funding plan that includes debt payments, PERAC, OPEB, and future capital projects costs, to determine the total cash needed in the future to help determine financial next steps. Next steps may include establishing additional reserves or reviewing cash levels prior to issuing any additional debt. Bond ratings agencies consider an organization's plan for funding debt and other large obligations, such as pensions and OPEBs in awarding a bond rating. Best practices are for long-term cash flow forecasts to be updated at least annually.

#	Review Area	Observation	Recommendation
6.	1.0 Financial Policies	1.2.6 An investment policy has not been established by Danvers Electric.	Baker Tilly recommends management follow the Town of Danvers investment policy or establishes their own investment policy. The Town of Danvers investment policy allows funds to be invested in United States Treasury Obligations, Certificates of Deposit, Repurchase Agreements, and Money Market Funds, including the Massachusetts Municipal Depository Trust. The policy further defines length of deposits and other restrictions. Baker Tilly also recommends that Danvers Electric invest all funds in interest bearing accounts.
7.	2.0 Rate Structures	2.2.1 At the moment, Danvers Electric does not have approved time of use (TOU) rates. Its current electric rates have not been updated for many years, and current rates do not reflect the time-varying nature of electricity supply costs. In Danvers' current resource planning, power costs are summarized by $/MWh according to the ISO-NE weekday peak (5x16) time-frame. Thus, Danvers is able to determine time-varying energy costs by this ISO-NE peak time-frame.	At a minimum, we recommend the development of optional TOU rates based on seasonality (summer vs. winter months) and peak period (on-peak vs. off peak) based on the ISO-NE peak hours definition: > On-peak hours: 7 AM – 11 PM on all non-holiday weekdays Off-peak hours: Weekday hours between 11 PM – 7 AM and all weekends and holidays

#	Review Area	Observation	Recommendation
8.	2.0 Rate Structures	2.2.2 Danvers Electric's Purchased Power & Fuel Adjuster ("PP&FA") revenues appears to be tracked appropriately on a rolling 12-months basis of actual versus forecasted purchased power and fuel costs and actual versus forecasted retail kWh sales. Further, Danvers calculates a new PP&FA $/kWh charge based on the cumulative over- or under-collection of revenues and examines the charge's impact to average customers' bills. While the PP&FA-related costs and potential $/kWh charges are examined monthly, the PP&FA charge does not actually change on customer bills on a defined time-frame (i.e., whether monthly, semi-annually, annually, etc.). While this may be prudent given certain key factors, such as the seasonality of purchased power/fuel costs, ISO-NE market conditions, extreme weather affecting retail sales, and/or availability of cash reserves, the utility's decision to update (or to not update) the resulting PP&FA charge for a given month is normally outlined in a form of a policy or tariff document.	We recommend that Danvers formalize a policy on the administration and update of the PP&FA charge. Best practices for such a policy include mention of the historical tracking of actual versus forecasted costs and revenues and when the utility may make updates to the PP&FA charge, which may be a result of the aforementioned factors. Having a defined framework of when the utility may be evaluating the update of the PP&FA provides more transparency to customers on how these costs are recovered outside of base rates.
9.	2.0 Rate Structures	2.2.3 Danvers Electric utilizes an internal cost of service (COS) model that analyzes customer class cost of service based on historical costs and functionalization of these cost categories for purposes of allocating costs to customer classes. The COS model shows that approximately 31% of the utility's costs are fixed while only 2% of the utility's revenues are actually	We recommend that Danvers Electric move to include more fixed costs in the customer monthly fixed charge and update its base rates to be more in line with its cost of service.

#	Review Area	Observation	Recommendation
		recovered in a customer's monthly fixed charge.	
10.	2.0 Rate Structures	2.2.4 Regarding the electric vehicle rate program, Danvers Electric currently does not offer any rebates, which is actually quite typical for utilities across the state that have similar programs.	In anticipation of the growth of the electric vehicle industry, we recommend that Danvers Electric explore options for providing customers with rebates or bill credits to perform charging during night off-peak hours to encourage during these off-peak utility electric load periods.
11.	3.0 Financial Software	3.2.1 Danvers Electric uses a financial system implemented in 1995 with minimal functionality and lack of flexibility, requiring manual paper processes and time-consuming data manipulation. In addition, no work management system is being utilized, which results in less standardization and formality around the engineering/design, work order, materials, and capitalization processes. These technology impediments and lack of reporting capabilities impairs the Division's ability to perform meaningful analysis of financial data and leads to inefficiencies in general.	Baker Tilly recommends that Danvers Electric begin the process of developing business requirements for each functional area, with the goal of evaluating new software platforms to gain efficiencies in operations, optimize its use of data and enhance its financial reporting capabilities.
12.	3.0 Financial Software	3.2.2 Division employees interviewed as part of this project state that materials being pulled from the warehouse are not consistently documented or "checked out" which leads to discrepancies in inventory and project cost and capitalization/fixed asset records.	Training should be given to employees on the importance of properly checking out materials and the role this plays in accurately costing projects and the related impact on customer rates. Additionally, implementing technology such as a work management system and integrated barcode scanning solutions will improve and expedite the materials process and potentially encourage employees to check out materials properly.
13.	3.0 Financial Software	3.2.3 Prior to the creation of the IT Director position in 2016 and Information Systems Project Manager in 2017, most systems specific to the Electric Division,	Baker Tilly recommends that IT and Electric Division staff prioritize implementation of the Electric related aspects of the Town's IT strategic plan to ensure proper staffing is in place to address the needs of the Electric

#	Review Area	Observation	Recommendation
		including the financial system, were supported independently by vendor partnerships with the Electric Division, with the former MIS department providing back-end and technical support, as requested. These new hires allowed for IT staff to dedicate portions of their time to the Electric Division for town-wide initiatives (e.g. fiber optic). Presently, the Town is transitioning to an organization-wide IT department to support Schools, Library, and Town operations, including the Electric Division. This new department will likely consist of three teams: Infrastructure, Customer Service, and Business Solutions.	Division. Specifically, staff support is needed for operational technology, corporate IT systems/applications, coordination with other divisions on town-wide projects and initiatives impacting the Electric Division, and support required for utility applications and the financial/ERP system to be implemented. Although there is currently an IT steering committee which includes individuals from each division, including the Electric Division, Baker Tilly recommends that more formalization be developed around committee meetings and members of the committee. Currently, members of the committee are those individuals most directly involved in IT related functions from each Division. In addition, there should be executive level representation on the committee. If not already established, a charter should be developed to identify the purpose and authority of the IT steering committee as well as the frequency of meetings. The IT steering committee should provide strategic direction and oversight of technology initiatives, including prioritization of IT projects. With executive level personnel on the committee, this will allow for an adequate level of authority to ensure IT resources and projects are fairly allocated and prioritized.
14.	3.0 Financial Software	3.2.4 The Electric Division is heavily reliant on software vendors for IT support, whereas there may be opportunities to utilize the IT department for more cost-effective and timely services.	Baker Tilly recommends that the Town's IT Department continue to work with staff in the Electric Division to determine the extent to which IT staff can provide support services around Danvers Electric's systems/applications, for potential costs savings and response time versus using vendor support.

We do not recommend that Danvers Electric attempt to implement all recommendations at once. The recommendations can be ranked by relative priority and overall impact and can serve as a roadmap for when Danvers should seek to execute the recommendations. However, given that each review area is relatively independent of one another, we have organized the relative ranking of the recommendations by each review area separately with action steps that Danvers can pursue to making these recommendations.

1.0 Financial Policies

Table 2 – Financial Policies

Recommendation ranking order	Recommendation	Recommendation Action Steps
1.2.6	Baker Tilly recommends management follow the Town of Danvers investment policy or establishes their own investment policy. The Town of Danvers investment policy allows funds to be invested in United States Treasury Obligations, Certificates of Deposit, Repurchase Agreements, and Money Market Funds, including the Massachusetts Municipal Depository Trust. The policy further defines length of deposits and other restrictions. Baker Tilly also recommends that Danvers Electric invest all funds in interest bearing accounts.	Danvers management should meet and discuss how they would like to invest their cash. The amount of risk Danvers is willing to accept will help determine how cash should be invested.
1.2.1	Baker Tilly recommends Danvers Electric establish a reserve policy that designates how much should be reserved and used in the future. Having strong reserves allows Danvers Electric to pay for infrastructure and operations without having to increase debt or customer rates. Danvers Electric should regularly forecast its operating and capital projects cash needs to ensure the proper balance between unrestricted cash needs and reserves.	Management should determine how best to establish and set uses for reserves, whether that be to pay down debt, decrease the pension liability, decrease the Other Post-Employment Benefits "OPEB" liability, save for rate volatility, save for MMWEC payments, etc. Reserves should be based on historical costs, as well as future needs. Future considerations should include the $17.5 million five year capital projects plan, MMWEC operations and maintenance costs, outstanding debt, future pension and OPEB funding, and the debt associated with the MMWEC nuclear project that amortizes in 2019 per the Standard & Poors "S&P" report.

Recommendation ranking order	Recommendation	Recommendation Action Steps
1.2.3	Establishing a rate stabilization fund is good governance and financial management and we commend Danvers Electric's foresight in establishing this reserve. The purpose of this reserve fund is to provide sufficient funding for the cost of maintaining, repairing, and operating the system during extended periods when expenditures are higher and/or revenues are lower than budgeted while offsetting the need for rate increases and spending changes during the fiscal year. This may also include high levels of seasonality, residential conservation rate structure, and exposure to extreme weather conditions. Maintaining a rate stabilization reserve may depend on the exposure to significant revenue and expenditure volatility, as well as determination if other reserves have adequately addressed the utility's exposure to revenue volatility. Rate stabilization reserves are typically funded or replenished in years when revenues are higher than expected, and this may be accomplished in a single year or over multiple years.	Danvers management should regularly review the amount in the rate stabilization fund and consider setting up a formal policy that establishes caps and other targets for use of the funds. Deciding on a cap amount depends upon a number of factors, including the purpose of the rate stabilization account, size of utility, and if there are other established reserves. Danvers management should determine the purpose of the rate stabilization fund prior to determining a calculation for the cap amount. For example, if the purpose of the fund is to decrease exposure to revenue volatility, per the 2018 American Water Works Association (AWWA) Cash Reserve Policy report, a typical cap amount to consider would be up to one year's operating revenues. Every utility has a different way of calculating their rate stabilization fund due to the various reasons one is established. See pg. 18 for best practice options for calculating a cap amount.
1.2.4	Baker Tilly recommends Danvers Electric consider establishing additional reserve accounts using current excess funds to better determine what funds will be used for in the future, as well as determine which reserve fund(s) would be most beneficial and needed in the future. See section 1.1 for additional explanation and possible options for other reserves.	In order to avoid customers misunderstanding of Danvers increasing funds, management may want to discuss specific purposes for the funds and reserve them in accounts such as an equipment replacement fund or a capital reserves fund.
1.2.5	Baker Tilly recommends management establish an all-inclusive funding plan for future debt payments and unfunded liabilities. This will help determine next steps	Similar to above, when determining how to reserve funds for the future, all liabilities that Danvers Electric currently has and foresees having in the future should be considered. Establishing a

Recommendation ranking order	Recommendation	Recommendation Action Steps
	which may include establishing additional reserves or reviewing cash levels prior to issuing any additional debt. Bond ratings agencies consider an organization's plan for funding debt and other large obligations, such as pensions and OPEBs in awarding a bond rating. For example, Danvers Electric previously contributed $5 million to fund the pension liability which helps improve the bond rating and reduced the timeline for fully funding the pension liability by ten years. Best practices are for long-term cash flow forecasts to be updated at least annually.	cash flow projection that includes all future liabilities and projects will help Danvers management determine what reserve funds are needed.
1.2.2	Baker Tilly recommends reviewing the amount of unrestricted cash on hand needed going forward. Per the S&P report, Danvers Electric currently has 204 days of cash on hand. This calculation includes the rate stabilization and depreciation funds. Moody's recommends having 250 days unrestricted cash on hand: See section 1.1 for additional calculation and comparison.	

2.0 Rate Structures

Table 3 – Rate Structures

Recommendation ranking order	Recommendation	Recommendation Action Steps
2.2.1	At a minimum, we recommend the development of optional TOU rates based on seasonality (summer vs. winter months) and peak period (on-peak vs. off peak) based on the ISO-NE peak hours definition: > On-peak hours: 7 AM – 11 PM on all non-holiday weekdays > Off-peak hours: Weekday hours between 11 PM – 7 AM and all weekends and holidays	To implement this recommendation, Danvers would need to determine which rate classes should have TOU rates, the non-time varying energy charge ($/kWh) for each rate class, and then the time varying energy charge. For the TOU energy charge component, Danvers would need to aggregate the variable purchased power costs for each TOU block to come up with the TOU energy charge. These changes would also require an update to Danvers Electric's tariff schedule through a formal rate proceeding.
2.2.3	We recommend that Danvers Electric move to include more fixed costs in the customer monthly fixed charge and update its base rates to be more in line with its cost of service.	In order to enact this recommendation, Danvers would need to update its cost of service model and make changes to the fixed monthly charges in its tariff schedule through a formal rate proceeding before its oversight body.
2.2.2	We recommend that Danvers formalize a policy on the administration and update of the PP&FA charge. Best practices for such a policy include mention of the historical tracking of actual versus forecasted costs and revenues and when the utility may make updates to the PP&FA charge, which may be a result of the aforementioned factors. Having a defined framework of when the utility may be evaluating the update of the PP&FA provides more transparency to customers on how these costs are recovered outside of base rates.	Danvers would need to develop a rate policy that indicates the parameters for when it seeks to make updates to the PP&FA charge.
2.2.4	In anticipation of the growth of the electric vehicle industry, we recommend that Danvers Electric explore options for providing customers with rebates or bill credits to perform charging during night off-peak	Danvers Electric should continue to gauge level of interest in electric vehicles in its service territory (i.e., number of customers) and the impact that it would have for increasing load during off-peak hours.

	hours to encourage during these off-peak utility electric load periods.	This recommendation would also be dependent on the implementation of TOU rates that would encourage off-peak electric vehicle charging.

3.0 Financial Software

Table 4 – Financial Software

Recommendation ranking order	Recommendation	Recommendation Action Steps
3.2.1	Danvers Electric uses a financial system implemented in 1995 with minimal functionality and lack of flexibility, requiring manual paper processes and time-consuming data manipulation. In addition, no work management system is being utilized, which results in less standardization and formality around the engineering/design, work order, materials, and capitalization processes. These technology impediments and lack of reporting capabilities impairs the Division's ability to perform meaningful analysis of financial data and leads to inefficiencies in general.	Baker Tilly recommends that Danvers Electric begin the process of developing business requirements for each functional area, with the goal of evaluating new software platforms to gain efficiencies in operations, optimize its use of data and enhance its financial reporting capabilities.
3.2.3	Prior to the creation of the IT Director position in 2016 and Information Systems Project Manager in 2017, most systems specific to the Electric Division, including the financial system, were supported independently by vendor partnerships with the Electric Division, with the former MIS department providing back-end and technical support, as requested. These new hires allowed for IT staff to dedicate portions of their time to the Electric Division for town-wide initiatives (e.g. fiber optic). Presently, the Town is transitioning to an organization-wide IT department to support Schools, Library, and Town operations, including the Electric Division. This new department will likely	Baker Tilly recommends that IT and Electric Division staff prioritize implementation of the Electric related aspects of the Town's IT strategic plan to ensure proper staffing is in place to address the needs of the Electric Division. Specifically, staff support is needed for operational technology, corporate IT systems/applications, coordination with other divisions on town-wide projects and initiatives impacting the Electric Division, and support required for utility applications and the financial/ERP system to be implemented. Although there is currently an IT steering committee which includes individuals from each division,

Recommendation ranking order	Recommendation	Recommendation Action Steps
	consist of three teams: Infrastructure, Customer Service, and Business Solutions.	including the Electric Division, Baker Tilly recommends that more formalization be developed around committee meetings and members of the committee. Currently, members of the committee are those individuals most directly involved in IT related functions from each Division. In addition, there should be executive level representation on the committee. If not already established, a charter should be developed to identify the purpose and authority of the IT steering committee as well as the frequency of meetings. The IT steering committee should provide strategic direction and oversight of technology initiatives, including prioritization of IT projects. With executive level personnel on the committee, this will allow for an adequate level of authority to ensure IT resources and projects are fairly allocated and prioritized.
3.2.2	Division employees interviewed as part of this project state that materials being pulled from the warehouse are not consistently documented or "checked out" which leads to discrepancies in inventory and project cost and capitalization/fixed asset records.	Training should be given to employees on the importance of properly checking out materials and the role this plays in accurately costing projects and the related impact on customer rates. Additionally, implementing technology such as a work management system and integrated barcode scanning solutions will improve and expedite the materials process and potentially encourage employees to check out materials properly.
3.2.4	The Electric Division is heavily reliant on software vendors for IT support, whereas there may be opportunities to utilize the IT department for more cost-effective and timely services.	Baker Tilly recommends that the Town's IT Department continue to work with staff in the Electric Division to determine the extent to which IT staff can provide support services around Danvers Electric's systems/applications, for potential costs savings and response time versus using vendor support.

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1.0 – FINANCIAL POLICIES

1.1 – Background and Current Process

Baker Tilly was engaged to perform the following tasks related to Danvers Electric's financial policies and accounts:

- Review current financial policies and reserve accounts.
- Compare current financial policies and reserve accounts with best practices.
- Provide recommendations regarding Danvers' financial policies and reserve accounts.

Financial Reserves

Maintaining an adequate level of reserves is necessary to ensure funds are available for operations, ongoing and emergency capital projects, and rate stabilization. Providing utility service requires the investment in, maintenance of, and operation of expensive, complex, and regulated infrastructure. Reserves are imperative for helping utilities maintain adequate cash flow requirements for operations, debt service and capital improvements. Currently, Danvers Electric has three restricted cash accounts/reserves and maintains them for the following areas:

1. Customer deposits and escrow fund

   This represents commercial and residential customer service deposits that are held in escrow. Danvers currently has over $500,000 in this fund. Per the Danvers Electric Service Policy Handbook, a deposit is required prior to establishing a new account and these deposits will be held for a minimum of one year. They will be refunded when all payments have been made on utility bills for the preceding twelve months.

2. Depreciation fund

   Pursuant to provisions of Massachusetts General Laws, cash in an amount equivalent to the Division's annual depreciation expense is transferred from unrestricted funds to the depreciation fund each year. Interest earned on the balance of the fund must remain in the fund. Such cash may be used for the cost of plant, nuclear decommissioning costs, and the costs of contractual commitments. Danvers currently has over $2.3 million in this fund. Per discussion with management, this amount is calculated annually and they will continue to monitor this fund for future capital costs.

3. Rate stabilization

   This represents amounts set aside to help stabilize short-term cost increases resulting from fluctuations in purchased power costs, as well as unappropriated MMWEC "flush of funds" proceeds.

   Danvers Electric currently has over $14.6 million in the rate stabilization fund. These funds have not been designated for a specific purpose except to provide cash flow in the event that revenues are unexpectedly low or rates suddenly change.

In observing industry best practices, we have found there are three main ways utilities determine the amount of the rate stabilization fund.

1. Some utilities identify a percentage of annual operation and maintenance expenses, revenues, or debt service as a rate stabilization reserve target.
2. Some utilities calculate the amount of the rate stabilization reserve by examining historical annual revenue or expense volatility and keep a reserve equivalent to offset this historical variability.
3. Another approach is to identify a historical year with the lowest electrical usage and set the reserve equal to the difference in revenue that would result from using the lowest electrical usage year versus the most recent year or a typical year based on current rates.

In addition to the above reserve policies for rate stabilization reserves, Danvers Electric should consider additional reserve funds that are commonly used in the utility industry. These include:

1. Operating Reserves
    a. These reserves allow a utility to manage potential risks, provide the ability to manage fluctuations in revenue, the ability to meet working capital needs, fiscal emergencies that can result from emergency repairs, natural disasters, and unforeseen economic influences.
    b. The most common metric for establishing a target amount of operating reserves is to establish the reserve with a specified number of days or months of operating expenses.
    c. Factors to consider include a utility's credit rating objectives, rate structure, usage variability, availability of other reserves, nonutility resources, use of contingencies, and seasonality of cash flow.
2. Capital Reserves
    a. Established to provide funds for unplanned or accelerated infrastructure replacements, smooth out the budgetary and rate impacts of fluctuating capital expenses and asset management considerations under a cash funding program, provide funds for replacement of equipment with a short service life, provide a source of funds for emergency capital expenses as a result of catastrophic events, or set aside revenues from fees or assessments specifically designated for system expansion or replacement.
    b. A best practice in determining the target amount of capital reserves is to base the amount on the annual amount of average routine capital additions.

3. Rehabilitation and Replacement Reserves

    a. Used to fund unplanned or accelerated infrastructure rehabilitation or replacement needs when assets wear out before their expected useful life ends or when a utility desires to accrue for its future rehabilitation and replacement needs.

    b. There are several potential methods of estimating an appropriate amount of rehabilitation and replacement reserves. Each method requires planning for future asset rehabilitation and replacement over a given period, forecasting the annual amount needed for rehabilitation and replacement over the life of the utility's assets, as well as estimating the amount that will be needed each year over a specific planning horizon.

    c. The annual amount needed for rehabilitation and replacement over the long-term can be estimated based on an asset management plan, the value of assets from the fixed asset register that will reach the end of their useful lives over the planning period, or the utility's annual depreciation expenses.

4. Equipment Replacement Fund

    a. Established to fund the periodic replacement of assets with relatively short useful lives.

    b. Assets defined as equipment include vehicles, computer equipment, office equipment, mechanical equipment, and other similar equipment with an expected life typically in the range of as few as three to as many as twenty years.

    c. There are two general methods of determining equipment replacement funds – annual deposits based on depreciation of existing equipment and maintenance of a minimum balance based on a percentage of the value of equipment.

5. Emergency Capital Reserves

    a. Used to fund replacement of critical assets damaged by catastrophic events such as a natural disaster.

    b. In determining the amount of emergency capital reserves that may be necessary, risk factors, critical facilities, and availability of other funds should be considered.

For example, as shown in Figure 1, financial strength account for 40% of the factor weighting when Moody's determines a utility's bond rating.

Figure 1 – 2017 Moody's Municipal Utility Scorecard Factors

EXHIBIT 1

Municipal Utility Scorecard Factors

Broad Scorecard Factors	Factor Weighting	Scorecard Subfactor	Subfactor Weighting
System Characteristics	30%	Asset Condition (Remaining Useful Life)	10%
		Service Area Wealth (Median Family Income)	12.5%
		System Size (O&M)	7.5%
Financial Strength	40%	Annual Debt Service Coverage	15%
		Days Cash on Hand	15%
		Debt to Operating Revenues	10%
Management	20%	Rate Management	10%
		Regulatory Compliance and Capital Planning	10%
Legal Provisions	10%	Rate Covenant	5%
		Debt Service Reserve Requirement	5%
Total	100%	Total	100%

As shown above, annual debt service coverage, days cash on hand, and debt to operating revenues all play a part in determining a utility's financial strength. The table below shows the target levels of annual debt service coverage, days cash on hand, and debt to operating revenue for each bond rating.

Figure 2 – 2017 Moody's Municipal Utility Financial Strength

Factor 2: Financial Strength (40%)

EXHIBIT 3

Financial Strength (40%)	Aaa	Aa	A	Baa	Ba	B and Below
Annual Debt Service Coverage (15%)	> 2.00x	2.00x ≥ n > 1.70x	1.70x ≥ n > 1.25x	1.25x ≥ n > 1.00x	1.00x ≥ n > 0.70x	≤ 0.70x
Days Cash on Hand (15%)	> 250 Days	250 Days ≥ n > 150 Days	150 Days ≥ n > 35 Days	35 Days ≥ n > 15 Days	15 Days ≥ n > 7 Days	≤ 7 Days
Debt to Operating Revenues (10%)	< 2.00x	2.00x < n ≤ 4.00x	4.00x < n ≤ 7.00x	7.00x < n ≤ 8.00x	8.00x < n ≤ 9.00x	≥ 9.00x

Financial Ratio Comparison

Table 2 shows a comparison of key ratios for Danvers Electric compared to a standard ratings agency measure (from Moody's) and utilities peer to the Division.

Table 5 – Financial Ratio Comparisons

Financial Ratio/Metric	Calculation	Danvers Electric (2017 financials)	Moody's (2017, Aaa)	APPA (2017, median)	Notes
Annual Debt Service Coverage	Net revenues / Debt service, expressed as a multiple	7.00	> 2.00	3.59	
Days Cash On Hand	(Unrestricted cash and liquid investments x 365) / Operating and maintenance expenses, expressed in days	231	> 250	N/A	If using unrestricted cash only, Danvers days cash on hand would be 44. Moody's calculation does include liquid investments. Unrestricted cash at 250 days per the 2017 financial statements would be $25,088,475.
Debt to Operating Revenues	(Long-Term Debt – Debt Service Reserve Funds) / Operating Revenue, expressed as a multiple	0.17	< 2.00	N/A	
Debt to Total Assets	(Long-term Debt + Current and Accrued Liabilities) / Total Assets and Other Debits	0.39	N/A	0.324	APPA excludes the net pension liability. Rating agencies include it. If included, Danvers Debt to Total Assets would be 0.49. Per the APPA 2017 Financial and Operating Ratios report, Debt to Total Assets for utilities with a customer size of 10,000 to 20,000 is 0.268.

As shown in the calculations above, Danvers Electric reserves are close to or exceed those recommended by Moody's. Having these reserves has allowed Danvers Electric to pay for infrastructure and operations without having to increase customer rates.

In addition, Danvers Electric has received a bond rating of "investment grade" from both Standard & Poor's and Moody's as shown below.

	Standard & Poor's	Moody's
Bond Rating (electric)	A+	Aa1

For reserves that may not be needed right away, Danvers Electric should consider investing this additional money to gain further proceeds for reserves. To help Danvers Electric determine how this additional money should be invested, please see below for Massachusetts law related to investments:

Massachusetts law Chapter 44, Section 55 has specific requirements for investing by MA municipal governmental units. These are detailed at this link: https://malegislature.gov/Laws/GeneralLaws/PartI/TitleVII/Chapter44/Section55.

The Town of Danvers investment policy is based on MA Chapter 44 and is a good source reference and guide for the Division to follow in developing its own specific investment policy.

1.2 – Observations and Recommendations

Baker Tilly makes the following observations and recommendations regarding Danvers Electric financial policies:

Table 6 – Observations and Recommendations Regarding Danvers Electric Financial Policies

Observation #	Observation	Recommendation
1.2.1	There is currently no reserve or restricted cash policy.	Baker Tilly recommends Danvers Electric establish a reserve policy that designates how much should be reserved and used in the future. Having strong reserves allows Danvers Electric to pay for infrastructure and operations without having to increase debt or customer rates. Danvers Electric should regularly forecast its operating and capital projects cash needs to ensure the proper balance between unrestricted cash needs and reserves.
1.2.2	Although Danvers Electric has adequate restricted cash there is not adequate unrestricted cash on hand based on the 2017 Financial Statements.	Baker Tilly recommends reviewing the amount of unrestricted cash on hand needed going forward. Per the S&P report, Danvers Electric currently has 204 days of cash on hand. The following are the recommended days of unrestricted cash on hand: Moody's: 250 days See section 1.1 for additional calculation and comparison.

Observation #	Observation	Recommendation
1.2.3	Danvers Electric currently has over $14.6 million in the rate stabilization fund. These funds have not been designated for a specific purpose except to provide cash flow in the event that revenues are unexpectedly low or rates suddenly change.	Establishing a rate stabilization fund is good governance and financial management and we commend Danvers Electric's foresight in establishing this reserve. The purpose of this reserve fund is to provide sufficient funding for the cost of maintaining, repairing, and operating the system during extended periods when expenditures are higher and/or revenues are lower than budgeted while offsetting the need for rate increases and spending changes during the fiscal year. This may also include high levels of seasonality, residential conservation rate structure, and exposure to extreme weather conditions. Maintaining a rate stabilization reserve may depend on the exposure to significant revenue and expenditure volatility, as well as determination if other reserves have adequately addressed the utility's exposure to revenue volatility. Rate stabilization reserves are typically funded or replenished in years when revenues are higher than expected, and this may be accomplished in a single year or over multiple years. Baker Tilly recommends management regularly review the amount currently reserved in the rate stabilization fund and create a formal policy that establishes caps and other targets for use of the funds. Deciding on a cap amount depends upon a number of factors, including the purpose of the rate stabilization account, size of utility, and if there are other established reserves. Danvers management should determine the purpose of the rate stabilization fund prior to determining a calculation for the cap amount. For example, if the purpose of the fund is to decrease exposure to revenue volatility, per the 2018 American Water Works Association (AWWA) Cash Reserve Policy report, a typical cap amount to consider would be up to one year's operating revenues. See pg. 18 for additional options for calculating a cap amount.
1.2.4	Danvers Electric currently has three reserve accounts (customer deposits and escrow fund, depreciation	Baker Tilly recommends Danvers Electric consider establishing additional reserve accounts using current excess funds to better determine what funds will be used for in the future, as well as

Observation #	Observation	Recommendation
	fund, and the rate stabilization fund).	determine which reserve fund(s) would be most beneficial and needed in the future. See section 1.1 for additional explanation and possible options for other reserves.
1.2.5	There is currently not an all-inclusive funding plan that forecasts Danvers Electric's plan to pay long-term liabilities and future capital projects. While Danvers Electric currently has individual funding plans in place for the Net Pension Liability and OPEBs, other liabilities and future capital projects should be included in this plan.	Baker Tilly recommends management establish a combined funding plan and cash flow projection for future debt payments, unfunded liabilities, and future capital projects. This will help Danvers Management make future financial decisions, which may include establishing additional reserves or reviewing cash levels prior to issuing any additional debt. Bond ratings agencies consider an organization's plan for funding debt and other large obligations, such as pensions and OPEBs in awarding a bond rating. Best practices are for long-term cash flow forecasts to be updated at least annually.
1.2.6	An investment policy has not been established by Danvers Electric.	Baker Tilly recommends management follow the Town of Danvers investment policy or establishes their own investment policy. The Town of Danvers investment policy allows funds to be invested in United States Treasury Obligations, Certificates of Deposit, Repurchase Agreements, and Money Market Funds, including the Massachusetts Municipal Depository Trust. The policy further defines length of deposits and other restrictions. Baker Tilly also recommends that Danvers Electric invest all funds in interest bearing accounts.

1.3 – Procedures Performed

Baker Tilly performed the following procedures in its review of Danvers Electric financial policies:

Table 7 – Procedures Performed during the Review of Danvers Electric Financial Policies

Procedures
1. Requested documentation from the Division on bonds, annual financial statements, management letter, capital improvements plan, retirement funding schedule, and Massachusetts law.
2. Interviewed key management and personnel at Danvers Electric that are responsible for financial decisions to gain an understanding of financial practices.

Procedures
3. Reviewed current policies and procedures around finances, including reserve funding, outstanding liabilities, investments and receivables.
4. Researched current best practices and Massachusetts law for reserve funding, investments, and liabilities.
5. Documented and summarized observations where Danvers Electric can enhance current financial areas.

2.0 – RATE STRUCTURES

2.1 – Background and Current Process

Baker Tilly was engaged to perform the following tasks related to Danvers Electric's rate structures:

- Review future rate demands
- Review rate categories (fixed costs, operations, power supply)
- Review special rate programs such as solar net metering; sundry charges and billing; construction billing; time of use rates; demand reduction; demand rates; electric vehicle; and conservation rebates

Future Rate Demands:

Load Forecasts:

Danvers Electric performs long-term 15-20 year load forecasts for its electric system. These forecasts are developed through the ForecastPro model and take into consideration several key factors/variables:

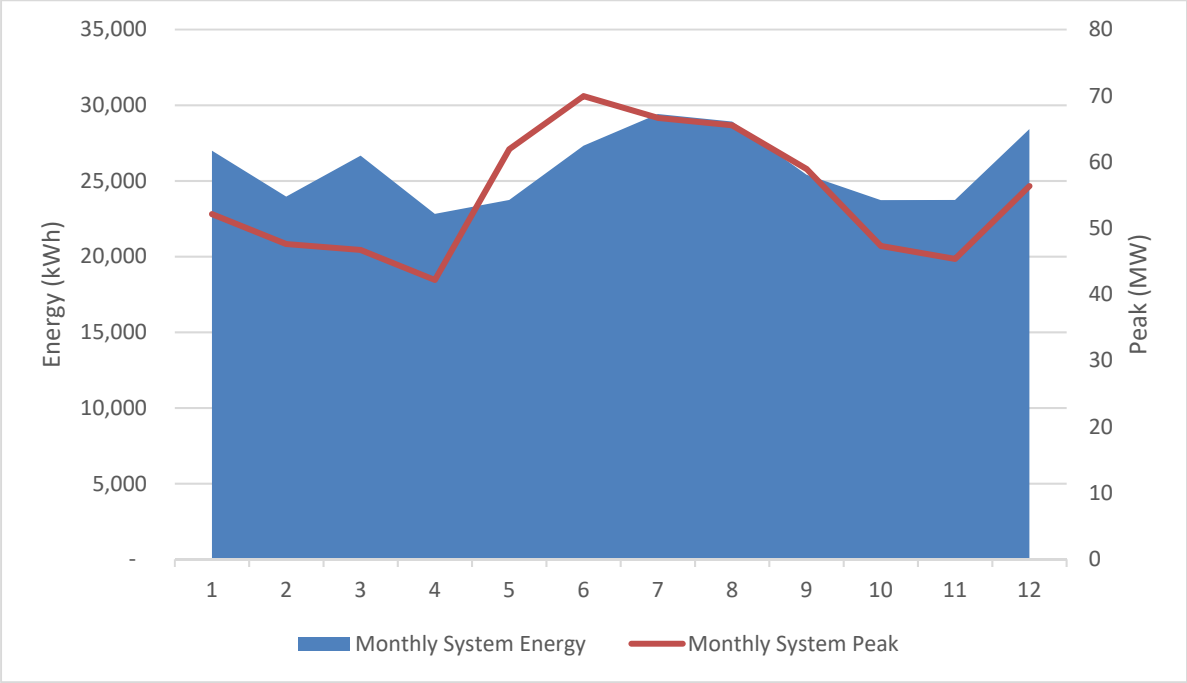
- Economy
- Weather, in terms of both Cooling Degree Days (CDD) and Heating Degree Days (HDD)
- Impacts of solar distributed generation

These load forecasts are important for not only forecasting Danvers Electric's load/energy needs, but also to help determine how much energy that Danvers will need to generate or procure to meet its system requirement. Danvers Electric's generation resource portfolio is a wide/diverse mix of power that comes from a number of power sources including:

- Danvers Electric's participant share of MMWEC's ownership of a number of generating facilities;
- Purchased hydropower from NYPA, through MMWEC;
- Bilateral purchase power agreements with different generating entities
- Solar photovoltaic (PV) project
- ISO New England (ISO-NE) market purchases

The overall management of Danvers Electric's generation resource portfolio in terms of determining the block of capacity and energy purchases to meet Danvers Electric's hourly system load is managed by Energy New England (ENE). On a monthly basis, ENE updates Danvers Electric's bulk power cost projections based on the forecasted Danvers Electric system peak and system energy requirements and also the various resources and their prices to meet these system requirements. This is an important step of the overall resource planning process to be able to match energy resources to Danvers Electric's system requirements, which may experience both monthly and diurnal variations. A simple illustration of Danvers Electric's system energy and peak demand by month is shown in the following figure.

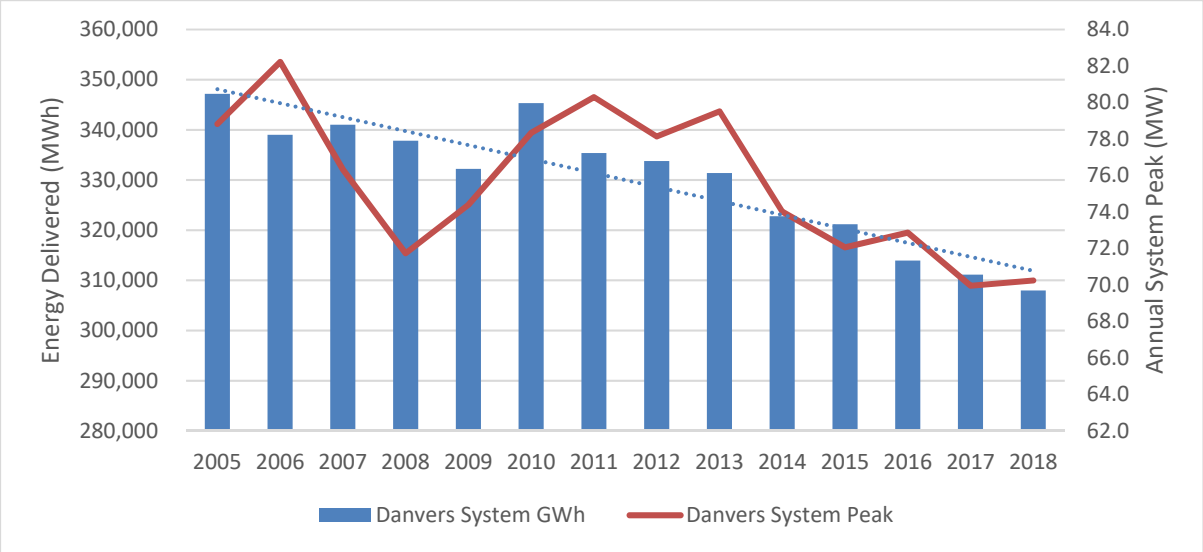
Figure 3 – Illustration of Danvers Electric's System Energy and Peak Demand by Month



Historical Load Trends:

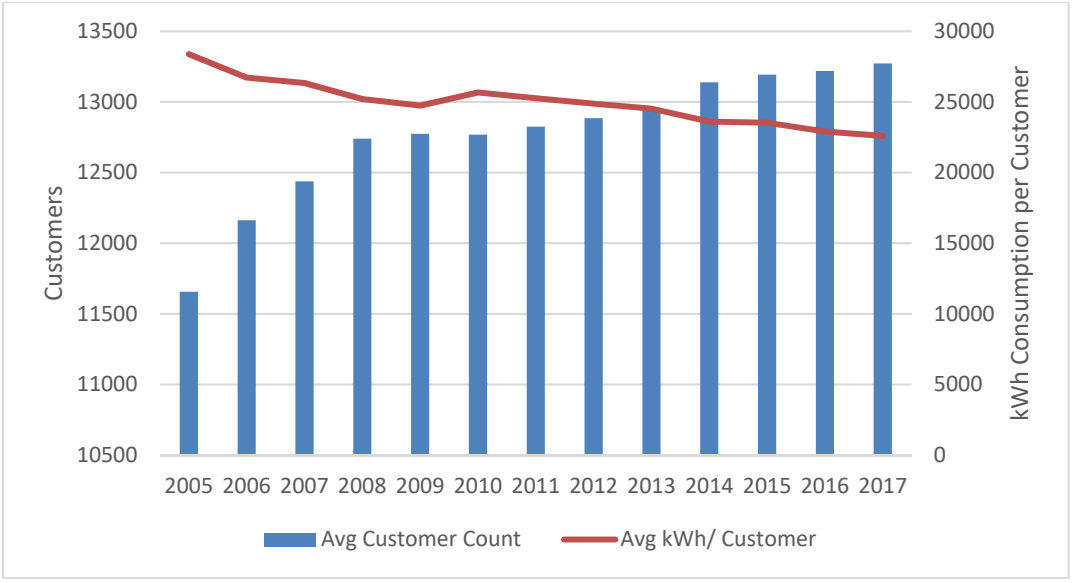
Since 2005, Danvers Electric's system has experienced both an overall decline in its annual system peak and also net energy delivered to customers. As can be seen in the following table, while they are certain years of increases in energy delivery or peak load, the overall trend has been declining.

Figure 4 – Danvers Electric's Historical System Energy Delivered and System Peak



These declines have been occurring while the average number of electric customers annually has been increasing, which means that the average energy consumption per customer has been declining.

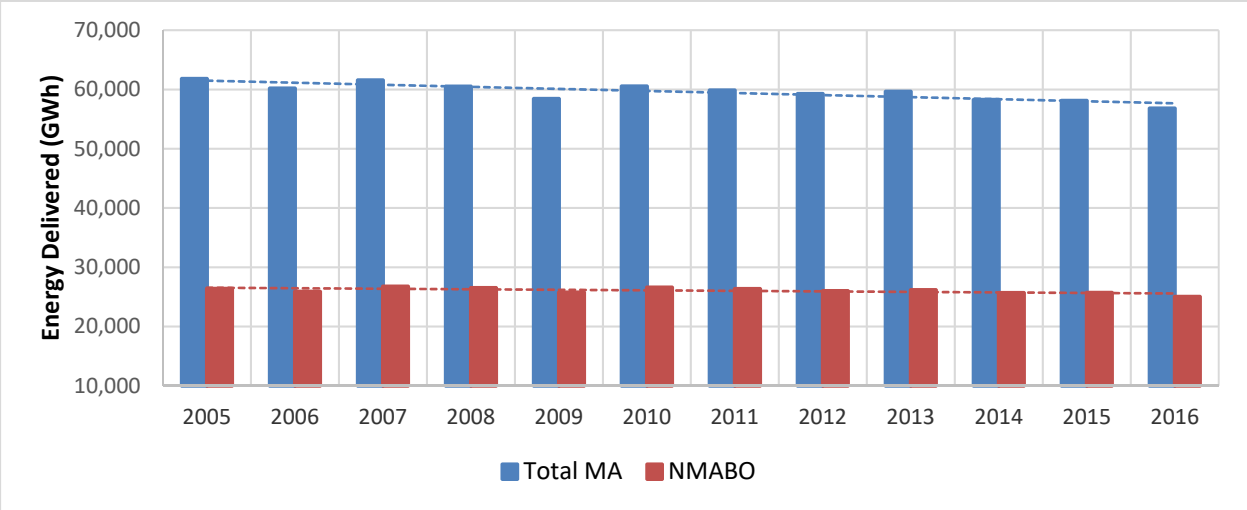
Figure 5 – Danvers' Historical Annual Average Customer Count and Average Customer Consumption



These declines have been attributable to some of the factors mentioned above, but also are not only unique to Danvers Electric.

Other municipal light plants (MLP) and investor-owned electric utilities in the state of Massachusetts have also faced stagnant or slightly declining electric load growth in the past several years. According to the ISO-NE's annual system peak/load data[2], the overall annual energy delivered across the state of Massachusetts has been generally declining within the last 10 or so years. This is evident not just across the state of Massachusetts, but also within the ISO-NE load zone for Northeastern Massachusetts & Boston (NMABO), which Danvers Electric is a part of.

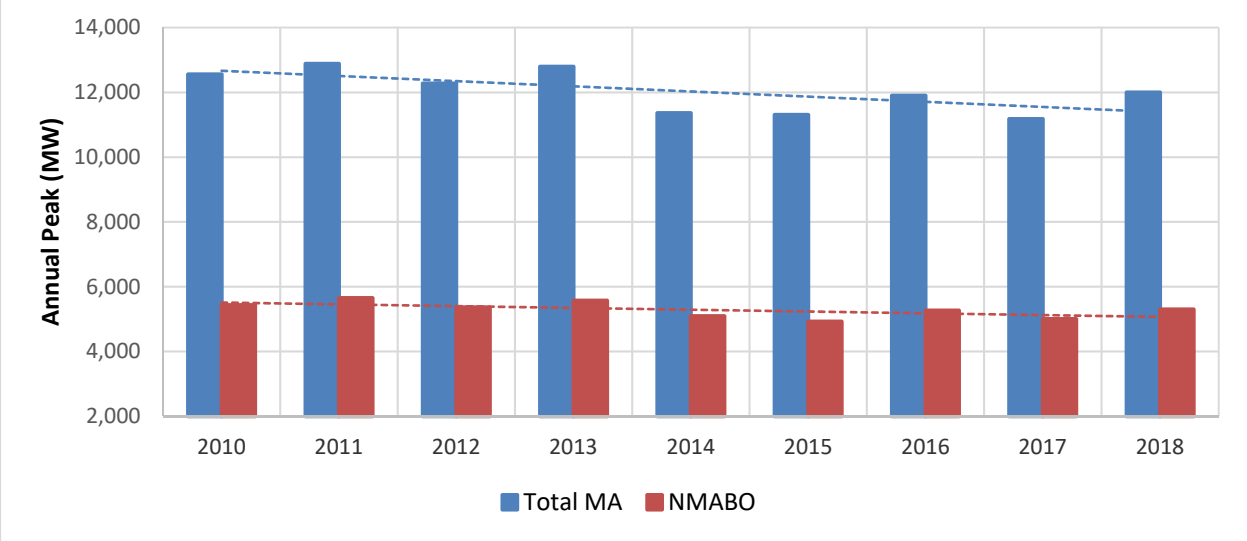
Figure 6 – Historical Net Energy Delivered - Massachusetts



Corollary to the general decline in energy delivery, the state of Massachusetts has also experienced a decline in the contribution to the ISO-NE's overall annual system peak within the last eight years. The caveat here is that the overall ISO-NE system peak is based on the aggregated hourly system peak across the six-state New England region and not just Massachusetts. As such, the overall ISO-NE annual system peak may occur on a July weekday between 2:00 PM – 3:00 PM, whereas Danvers or Massachusetts' annual system peak may have occurred on an August weekday between 4:00 PM – 5:00 PM. Nonetheless, the historical system peaks for ISO-NE typically have occurred on a non-holiday weekday between the hours of 2:00 PM – 5:00 PM, which coincides with when Danvers Electric's annual system peaks also took place.

[2] https://www.iso-ne.com/isoexpress/web/reports/load-and-demand/-/tree/ann-sys-peak-day-hr-load

Figure 7 – Historical Contribution to ISO-NE Annual System Peak - Massachusetts



Some of these declines may be due in large part because the state of Massachusetts has some of the most stringent energy efficiency savings targets in the entire nation per the American Council for an Energy-Efficiency Economy (ACEEE).[3] Per state legislation enacted in 2008, the Massachusetts Department of Public Utilities (DPU) has set certain annual energy efficiency savings mandates for the states' investor-owned electric utilities, including:

- National Grid
- NSTAR Electric
- UNITIL
- WMECO

These savings targets range anywhere from 1.88% to 2.95% incremental annual electric savings as a percentage of electric retail sales.[4] While the actual results of the electric savings from the IOUs' energy efficiency programs are difficult to measure to within 100% accuracy, it can be presumed that these programs and the DPU's mandated savings targets since 2009 have had an impact on reducing overall energy consumption across the state, even if customer count has steadily increased or remained the same.

While the historical results do not always dictate future load/energy requirements, they can provide a strong indication of expected trends.

[3] https://database.aceee.org/state/massachusetts
[4] http://ma-eeac.org/wordpress/wp-content/uploads/2016-2018-Energy-Efficiency-Three-Year-Plan-Order.pdf

Rate categories:

Current Rate Structure:

Danvers Electric has been interested in reviewing the state of its electric rate structure, in particular its rate cost categories. Currently, Danvers Electric's rates are set on the following rate categories:

- Minimum Charge: Basic Monthly Charge ($/month)
- Base Rate: Energy Charge ($/kWh)
- Base Rate: Demand Charge ($/monthly billing demand)
- Adjuster: Purchased Power & Fuel Adjuster (PP&FA) ($/kWh)

These various rate categories apply to the customer rate classes across Danvers Electric. A summary of these customer rate classes and the current rates[5] are provided in the following table.

Table 8 – Danvers Electric's Current Rate Class Summary

Customer Rate Class	Minimum Charge: Basic Monthly Charge	Base Rate: Energy Charge	Base Rate: Demand Charge	Adjuster: PP&FA	Other
Residential R-1	$5.00 per mo.	$0.0940 per kWh	N/A	Varies based on budgeted vs. actual cost of power and total electric sales.	Farm Discount; Early Payment Discount
Small General Service G-1	$5.00 per mo.	$0.0860 per kWh	N/A		Farm Discount; Early Payment Discount
Demand General Service G-2	$10.00 per mo.	$0.430 per kWh	$9.00 per highest kW		Farm Discount; Early Payment Discount; Primary Metering Discount (PMD) of 2.5%; High Voltage Discount (HVD) of 4.0%; Transmission Ownership Discount (TOD) of $0.12 per highest kW
Large General Service G-3	$210.00 per mo.	$0.0430 per kWh	$8.75 per highest kW		
Municipal General Service MG-1	$5.00 per mo.	$0.08176 per kWh	N/A		None.
Municipal General Service MG-2	$10.00 per mo.	$0.04276 per kWh	$9.00 per highest kW		None.

[5] Current rates as of November 2018: https://www.danversma.gov/electricity-rates/

Customer Rate Class	Minimum Charge: Basic Monthly Charge	Base Rate: Energy Charge	Base Rate: Demand Charge	Adjuster: PP&FA	Other
Private Area Lighting	Monthly rates vary based on the lamp/fixture type and wattage of the lamp installed at the customer's premise; also called Security Lights.				

As identified in the prior table, there are certain bill payment discounts that may apply to certain customers:

- **Farm Discount**: In addition, all customers who meet the eligibility requirements being engaged in the business of "farming" or "agriculture" as defined in M.G.L. Chapter 128 Section 1A at their service location are eligible for an additional 10% discount from their distribution service rates.
- **Residential Early Payment Discount**: An early payment discount of ten percent will also be applied to the Customer's bill if full payment is received at the Electric Division's billing office within 15 days from the billing date; the discount does not apply to the PP&FA charge.
- **Non-residential Early Payment Discount**: An early payment discount of five percent will also be applied to the Customer's bill if full payment is received at the Electric Division's billing office within 15 days from the billing date; the discount does not apply to the PP&FA charge.

Regarding the PP&FA charge, Danvers Electric determines an annual PP&FA charge ($/kWh) for residential and non-residential customer classes based on the division's total annual purchased power budget (set by Energy New England) and its annual budgeted electric sales. On a monthly basis, Danvers Electric tracks actual power costs and actual retail sales for that month. In cases where actual purchased power costs might actually be higher than budgeted for a particular month, this might warrant an incremental adjustment to the calculated PP&FA charge. On the contrary, in cases where actual retail kWh sales might actually be higher than budgeted for a particular month, this might warrant an incremental negative adjustment to the calculated PP&FA charge. Due to these potential occurrences, Danvers Electric also tracks the surplus or deficit on a cumulative rolling 12 month basis of actual purchased power costs compared to the electric revenues from the PP&FA charge to assess whether an actual adjustment to the PP&FA charge is actually needed. As communicated by Danvers Electric, actual changes to the PP&FA charge typically only occurs when there is a significant cumulative gain/loss of the actual purchased power costs and PP&FA revenues over the rolling 12 month time-frame.

Danvers Electric Cost of Service:

To tackle the question/concern of whether or not rates are adequate to recover enough revenue to meet the utility's expected cost of operations, utilities may pursue cost of service (COS) analyses or studies. These studies are not only important for the purpose of ensuring the utility's revenue stability and adequate cash flow, but also for additional reasons:

- To attribute costs to different categories of customers based on how those customers cause costs to be incurred ("principle of cost-causation).
- To provide cost-causation support for recovering the utility's revenue requirement through rates that are fair, just, and reasonable.
- To reduce inter-class and intra-class rate subsidies.

- To look out into the future- based on forecasted revenue requirement for fiscal year(s), quantify what future electric rates could become.

While Danvers Electric has not updated its based rates in several years, it has performed internal COS analyses through a COS model. Danvers' COS model has functionalized Danvers Electric's annual operating costs and capital costs (through annual depreciation of its electric plant balance) into several distinct categories as shown in the following table. The functionalization of costs is an important step towards classifying and allocating the costs of Danvers Electric system to different customer rate classes.

Table 9 – Danvers Electric COS Model Function Cost Assignment Summary

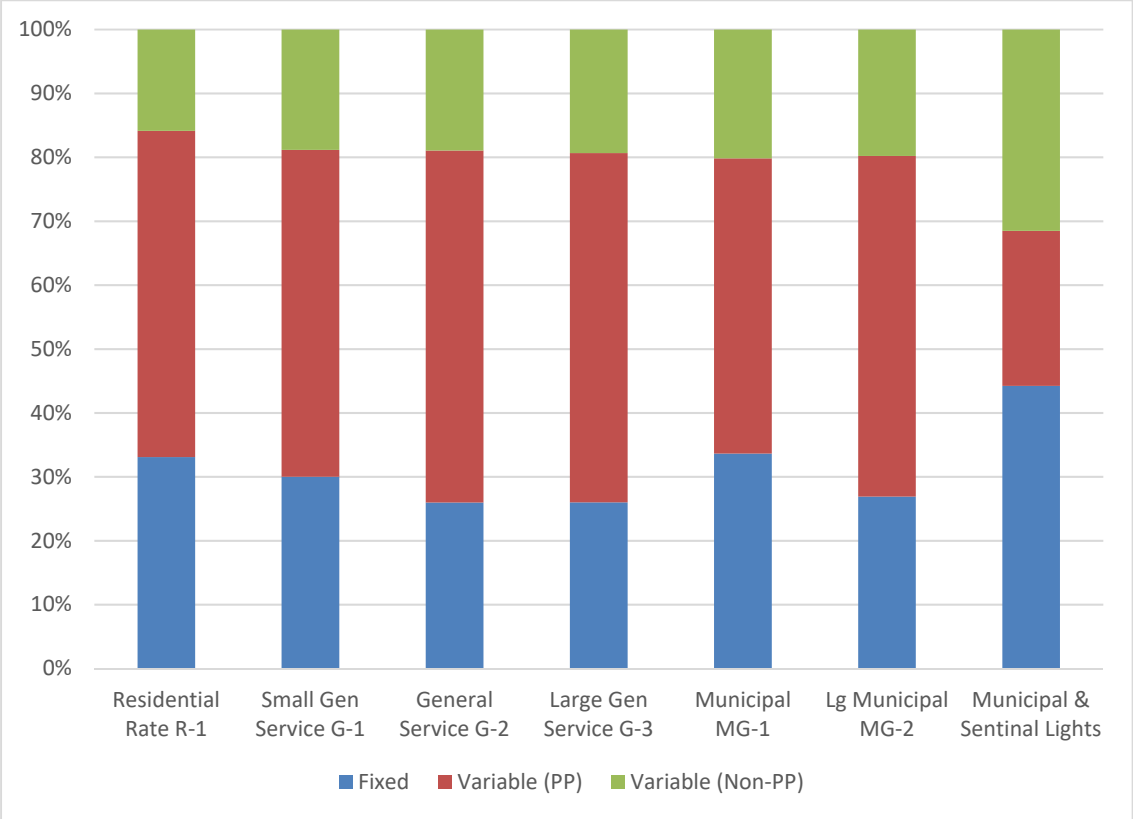
Functional cost assignment (per Danvers COS Model)	Description	Cost Component(s)
Capacity	Purchased Power Expenses: Capacity Payment (FERC Account 555)	Variable (Purchased Power)[6]
Capacity – NYPA	Purchased Power Expenses: Capacity Payment for hydropower purchased, through MMWEC, from NYPA (FERC 555)	Variable (Purchased Power)
Transmission	ISO Open Access Transmission and Transmission of Electricity by Others (FERC 565)	Fixed and Variable (Non-Purchased Power)
Transmission - NYPA	Purchased Power Expenses: Transmission Payment for hydropower purchased, through MMWEC, from NYPA (FERC 555)	Variable (Purchased Power)
Energy	Purchased Power Expenses, Energy Payment (FERC Account 555)	Variable (Purchased Power)
Energy - NYPA	Purchased Power Expenses: Energy Payment for hydropower purchased, through MMWEC, from NYPA (FERC 555)	Variable (Purchased Power)
Distribution	Distribution Operation & Maintenance Expenses (FERC Account 580 – 598)	Fixed and Variable (Non-Purchased Power)
Accounting/ Meter Reading (MR)	Operating costs associated with meter reading and billing, including: Meter Reading Expenses (FERC 902), Customer Records and Collection Expenses (FERC 903), Portion of Office Supplies and Expenses (FERC 921)	Fixed
Demand-Side Management (DSM)	DSM Program Expenses[7]	Fixed
Joint Allocation	All other operating expenses, including depreciation on general plant, green contributions, office supplies, Admin & General (A&G), PILOT, Employee Pensions and Benefits, etc.	Fixed

[6] Capacity payments may be considered fixed contractually based on a fixed capacity commitment and capacity price (i.e., $/kW-mo.), but they are considered variable in terms of cost of service.

[7] Danvers has functionalized Energy Efficiency/Conservation rebate costs under the Joint Allocation cost assignment category.

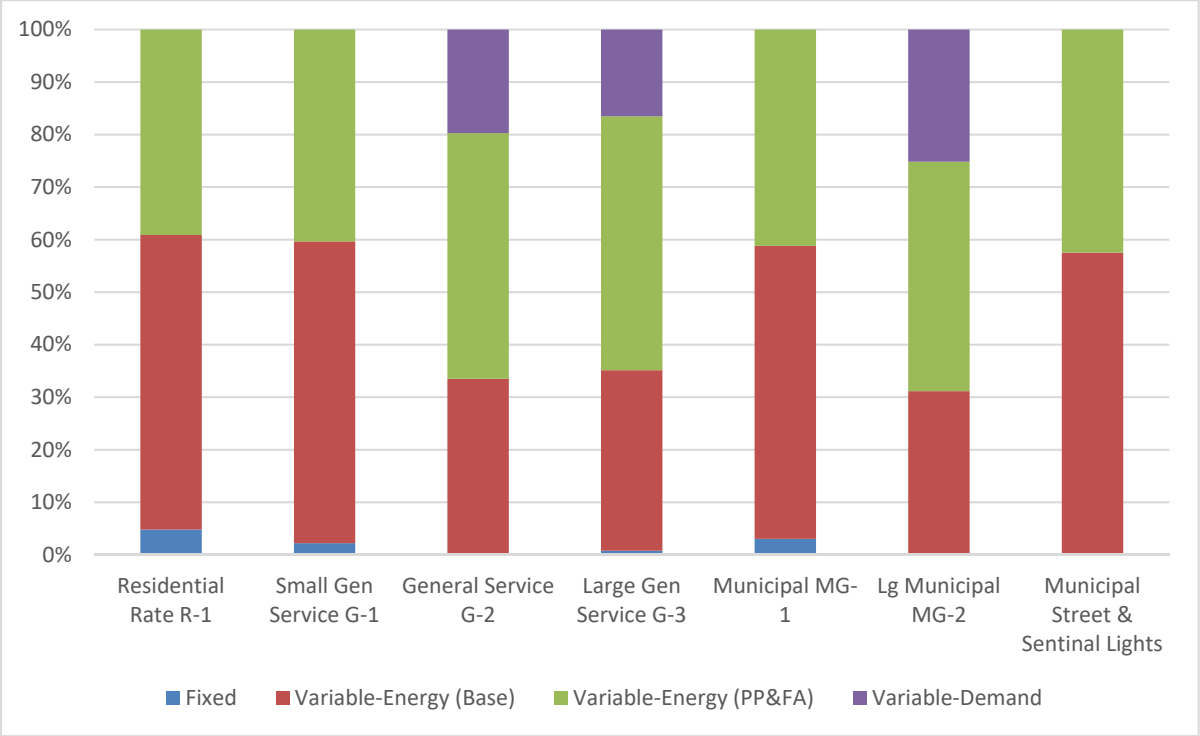
The functionalized cost categories provide a basis for determining the cost classification, whether they are deemed to be fixed or variable. As such, we have summarized the cost of service breakdown results of one of the year's contained within Danvers Electric's COS model for each customer rate class.

Figure 8 – Cost of Service Breakdown by Cost Component for Each Major Rate Class



The cost of service study is often developed to help inform the breakdown of functionalized utility costs by both the rate class and the individual cost components. By doing so, a utility is able to determine whether the revenues received from customers reflect the utility's true cost of operations. We have summarized the breakdown of revenues by various rate charge component for each customer rate class in the following figure. This figure can be compared to the previous one for purposes of discerning the relationship between the cost of service analysis and that of actual retail rates.

Figure 9 – Breakdown by Retail Rate Charge Component for Each Major Rate Class



The results overall for each rate class reflect a general imbalance between fixed costs of utility operation to the fixed charge component in the customer retail rate structure. Another way to look at this is to examine Danvers Electric's overall cost of service by cost component versus the revenues by different rate component. The following two figures provide this discrepancy for Danvers Electric's system as a whole.

Figure 10 – Cost of Service Breakdown by Cost Component for Danvers Electric

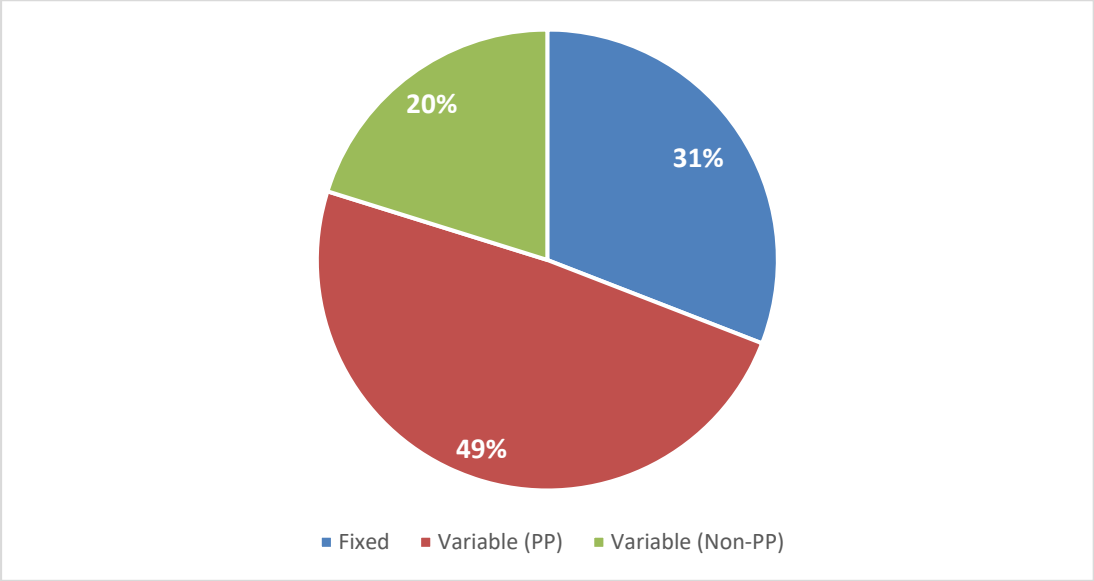
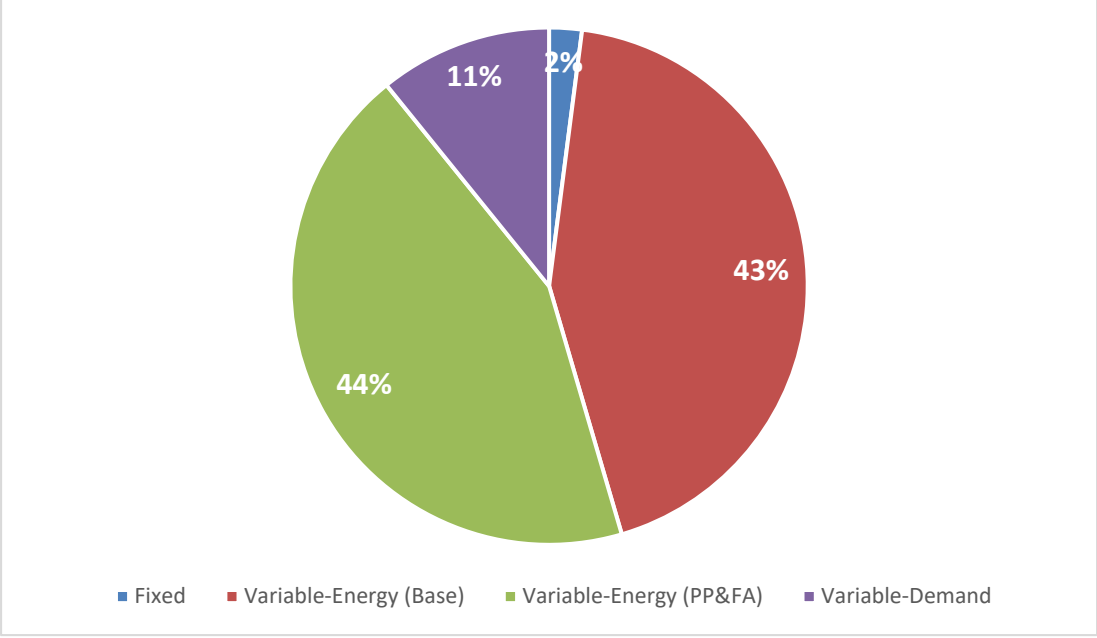


Figure 11 – Retail Revenue Breakdown by Rate Charge Component for Danvers Electric



Special Rate Programs:

Over the last decade, Danvers Electric has introduced a number of unique rate structures or customer programs that reflect the changing electric utility landscape. One of the major programs of significant interest is the Solar PV Program.

Solar PV Program

In 2008, Danvers Electric introduced a solar net metering program for solar PV installations on the customer-end of the electric meter. In the early years of this program, some customers experienced drastic utility bill reductions, since they were compensated for each unit of solar energy produced by their prevailing retail rate (e.g., $/kWh) regardless of whether the energy produced was in excess of the customer's monthly energy consumption or if the wholesale cost of power was low at a particular hour. As a result of this occurrence, Danvers Electric implemented an overall customer enrollment cap of 2,000 kW of solar PV installations and other structural changes:

- **Residential Net Metered**: Grandfathered to receive compensation for excess solar production at retail rate (up to 10 years since installation date)
- **Residential Non-Net Metered**: As of May 1, 2018, customers receive compensation at the prevailing ISO-NE market spot energy price for each hour of solar production.
- **Commercial Net Metered**: Grandfathered to receive compensation for excess solar production at retail rate (up to 10 years since installation date)
- **Commercial Non-Net Metered**: As of May 1, 2018, customers receive compensation at the prevailing ISO-NE market spot energy price for each hour of solar production.

According to the Solar Energy Industries Association (SEIA), Massachusetts ranked 6th nationwide of all states in 2017 in terms of solar capacity installed at 1,898.3 MW[8]. A large reason for this is that the Massachusetts DPU has set net metering regulations through 220 Code of Massachusetts Regulations (CMR) 18.00. Under the state law, investor-owned electric utilities have statutory requirements to allow for public and private net metering up to 15% for each utilities' historical peak load.

At the moment, only a small number of municipal light plants (MLP) in the state of Massachusetts provide solar net metering or other solar rebate programs[9]. Three MLPs in particular include:

- **Chicopee Electric Light**: Up-front incentive of $0.50/watt (AC) or $500/kW (AC) capped at $2,500.
- **Concord Municipal Light Plant**: Up-front incentive of $625/kW (AC) capped at $3,125.
- **Taunton Municipal Light Plant**: Up-front incentive of $1.50/watt (AC) capped at $4,500.

[8] https://www.seia.org/sites/default/files/2018-01/Federal_2017Q3_Massachusetts1.pdf
[9] http://programs.dsireusa.org/system/program?fromSir=0&state=MA

Similar to Danvers Electric, Concord MLP provides customers a credit for excess solar production at the prior that it pays the ISO-NE for energy on the spot market. Additionally, Concord has a residential net metering rider[10], which charges a monthly charge to customers, who install solar PV systems, to help cover the utility's distribution operating costs. These charges start at $3.60 per month for a system size between 2 and 4 kW AC and go up to $198.60 per month for a system size between 130 and 167 kW AC.

While there is no one-size-fits approach, being able to balance simplicity and also accurately align costs to prices are important factors with tackling rate design for distributed generation.

Electrical Vehicle Program:

Currently Danvers Electric does not provide a formal electric vehicle plug-in program.

A few other MLPs currently provide rebates for electric vehicles, including:

- **Braintree Electric Light Department**: A $250 rebate for the purchase of a Level 2 home charging system. Also, a bill credit of $8 per month for customers that charge their PEVs between 9PM and 12PM on weekdays or at any time during the weekend.
- **Concord Municipal Light Plant**: A rebate for the purchase of a Level 2 home charging system of $250. Additionally, electric bill credit to EV owners, who charge at home during off-peak hours (10 PM to 12 noon, Monday through Friday and all weekend).
- **Reading Municipal Light Department**: A pilot program providing a rebate for the purchase or lease of a batter electric vehicle ($1,500) or for the purchase of a plug-in hybrid vehicle ($1,000). Also, rebate for purchase of a networked AC level 2 charging station at 100% of equipment costs up to $500.
- **MMWEC**: Through the Home Energy Loss Prevention Services (HELPS) program, 8 MLPs participate in a program that provides customers with free or discounted Level 2 electric vehicle supply equipment.

Additionally, the state of Massachusetts Executive Office of Energy and Environmental Affairs' Department of Energy Resources (DOER) Massachusetts Offers Rebates for Electric Vehicle (MOR-EV) program provides rebates of up to $2,500 for the purchase or lease of zero-emission and plug-in hybrid light-duty vehicles.

Peak Savings Program:

Danvers Electric's Peak Savings Program is a voluntary program in which customers, based on notification from Danvers Electric, can reduce their power consumption at designated peak times for approximately 4 hour periods. The program rewards participants as a result of the reduced peak supply costs. The program consists of four primary components:

- **Large non-residential customers (usually largest 19 accounts)**: customers are called to participate in events to reduce power; customers can receive up to 50% of credits based on the amount of total energy and transmission savings that Danvers Electric realizes.

[10] http://www.concordnet.org/DocumentCenter/View/1205/Net-Metering-with-Banking-Rate-PDF

- **Small non-residential customers**: voluntary program in which they can receive a small $50 incentive off their electric bill
- **Residential**: voluntary program in which customers are entered in for a grand prize at the end of the year;
- **ISO-NE load aggregation**: approximately 200 customers are pooled to meet the minimum ISO-NE threshold for load aggregations.

In 2017, this program had 1,354 participating customers and had approximately 2.1 MW peak demand savings.

Energy Efficiency/ Conservation Rebates:

Danvers currently provides rebates to residential customers for the following energy efficiency products/appliances that meet certain ENERGY STAR criteria:

- Refrigerator
- Room/Window Air Conditioner
- Central Air Conditioner
- Heat Pump

Additionally, Danvers Electric provides residential energy assistance and energy audits free of charge for qualifying customers.

Compared to 11 other municipal light plants in the state of Massachusetts, Danvers Electric's offering of energy efficiency rebates to residential customers is similar in coverage. A total of 6 MLPs and 8 additional MLPs through MMWEC also provide energy efficiency rebate opportunities to the non-residential sector. These programs also provide rebates for certain energy efficient end-use technologies for lighting, HVAC, and refrigeration.

Time-of-Use Rates

Danvers Electric currently does not provide time-of-use (TOU) rate options to its customers. However, in the past decade, Danvers had previous analyzed TOU and other time-based rate based options (e.g., critical peak pricing). In the late 2000s, Danvers took advantage of the Department of Energy's (DOE) American Recovery and Reinvestment Act of 2009 (ARRA) Smart Grid Investment Grant Program (SGIG) to make various smart grid-related investments. One of these SGIG investments was deployment of over 13,000 smart meters to all its electric customers along with customer end-user upgrades, such as a web portal on daily and hourly consumption history.

Because of these upgrades, Danvers is able to gather and obtain 15-minute interval load data from the smart meters. Not only can Danvers utilize the interval load data for determining on-site generation for its net metering program, but it is in a unique position to provide time-varied rates that better match the varying price of providing power to customers, whether seasonally (i.e., summer or winter) or diurnally (e.g., morning, afternoon, evening hours).

A few different time-varying rates have been employed in the electric utility industry:

- **Time-of-use (TOU)**: which are predetermined rates for energy ($/kWh) defined by seasonality (summer months vs. winter months) an on-peak and an off-peak period for the 24-hour day (e.g., on-peak period might be 8 AM – 5 PM weekdays; off-peak period would be all others during weekday and all hours during weekend and holidays).
- **Real-time pricing (RTP)**: rates for energy ($/kWh) that vary on an hourly basis based on the price of providing power.
- **Variable Peak Pricing (VPP)**: hybrid between TOU and RTP in which different periods for pricing are defined (i.e., on-peak versus off-peak), but the actual price varies based on wholesale market conditions.
- **Critical Peak Pricing (CPP)**: a form of pricing in which a utility (or the ISO) may anticipate wholesale market prices or power system emergency conditions and may need to call critical events during a specified time period (e.g., 2 – 5 PM on a hot summer peak day). During this time period, electricity rates ($/kWh) may be substantially raised to reflect the increase in wholesale market prices.

In each of the last three time-varying rate options, the actual $/kWh rate is not preset and known ahead of time. As such, these rates are referred to sometimes as “dynamic pricing.” These rates also require the usage of smart meters and interval data as the ability to correlate demand or energy usage to the corresponding rate for that time-frame is essential.

In the case of the TOU rates, they typically are determined during the course of a cost of service rate study. During the COS analysis, the variable (purchased power) cost is bifurcated between defined summer months (e.g., June – September) and winter months (e.g., October – May) and an on-peak period versus an off-peak 24-hour period. The billing determinant for energy usage is also bifurcated to each of monthly period and on-peak/off-peak periods to determine unique rates. A simple illustration of this process is shown in the following table:

Table 10 – COS Analysis Illustration

Rate Type	Fixed and variable (non-PP) costs allocated to rate class	Variable (purchased power) cost allocated to rate class	Billing Determinant (Annual energy usage for rate class)	Calculated Rate ($/kWh)
	[a]	[b]	[c]	{ [a] + [b] } / [c]
Base Rate: Energy Charge for G-1 rate class	$180,000 *(Non-time varying energy charge: $0.0600/kWh)*	$120,000	3,000,000 kWh	$300,000 / 3,000,000 kWh = **$0.1000/kWh**
TOU Rate: Energy charge for G-1 rate class (Summer, On-Peak)	$27,000 *(Non-time varying energy charge: $0.0600/kWh)*	$30,000	450,000 kWh	$57,000 / 450,000 kWh = **$0.1267/kWh**

Rate Type	Fixed and variable (non-PP) costs allocated to rate class	Variable (purchased power) cost allocated to rate class	Billing Determinant (Annual energy usage for rate class)	Calculated Rate ($/kWh)
TOU Rate: Energy charge for G-1 rate class (Summer, Off-Peak)	$36,000 *(Non-time varying energy charge: $0.0600/kWh)*	$18,000	600,000 kWh	$54,000 / 600,000 kWh = **$0.0900/kWh**
TOU Rate: Energy charge for G-1 rate class (Winter, On-Peak)	$45,000 *(Non-time varying energy charge: $0.0600/kWh)*	$42,000	750,000 kWh	$87,000 / 750,000 kWh = **$0.1160/kWh**
TOU Rate: Energy charge for G-1 rate class (Winter, Off-Peak)	$72,000 *(Non-time varying energy charge: $0.0600/kWh)*	$30,000	1,200,000 kWh	$102,000 / 1,200,000 kWh = **$0.0850/kWh**

In this simple illustration of creating a TOU rate from an existing base rate, the non-time varying costs (i.e., fixed and variable, non-purchased power costs) can be aggregated and divided by the billing determinant (annual energy usage for the class) to derive a non-time-varying energy charge. As such, the energy charge that differs between the four TOU time blocks are the variable purchased power costs, which can be aggregated and divided by the billing determinant to derive a time-varying energy charge. The sum of all cost components divided by the annual billing determinant results in the four different TOU charges.

Benefits of employing a TOU rate include:

- Sending more accurate price signals to customers with respect to time-varying nature of purchased power costs
- Being able to complement these TOU rate blocks with an electrical vehicle program for charging EV cars during off-peak hours of the day

There are also some arguments made that reflect potential disadvantages to TOU rates. One of these arguments is that low-income households or senior citizen are the most negatively affected as they may not have the flexibility in their schedules to take advantage of off-peak rates. To help mitigate the impact to these customer groups, a TOU rate program can be complemented with more energy efficiency assistance to these customer groups. This could be achieved through more targeted outreach and/or a direct-install energy program at no cost to the customers that provides installation of lower wattage light bulbs (i.e., CFLs and LED bulbs), installation of outdoor lighting occupancy sensors, HVAC tune-ups, air sealing, etc.

2.2 – Observations and Recommendations

Baker Tilly makes the following observations and recommendations regarding Danvers Electric rate structures:

Table 11 – Observations and Recommendations Regarding Danvers Electric Rate Structures

Observation #	Observation	Recommendation
2.2.1	At the moment, Danvers Electric does not have approved TOU rates as base rates have not been updated for many years, and they do not reflect the time-varying nature of electricity supply costs. In Danvers' current resource planning, power costs are summarized by $/MWh according to the ISO-NE weekday peak (5x16) time-frame. Thus, Danvers is able to determine time-varying energy costs by this ISO-NE peak time-frame.	At the minimum, we recommend the development of optional TOU rates based on seasonality (summer vs. winter months) and peak period (on-peak vs. off peak) based on the ISO-NE peak hours definition: > On-peak hours: 7 AM – 11 PM on all non-holiday weekdays > Off-peak hours: Weekday hours between 11 PM – 7 AM and all weekends and holidays
2.2.2	Danvers Electric's PP&FA charge revenues appears to be tracked appropriately on a rolling 12-months basis of actual versus forecasted purchased power and fuel costs and actual versus forecasted retail kWh sales. Further, Danvers calculates a new PP&FA $/kWh charge based on the cumulative over- or under-collection of revenues and examines the charge's impact to average customers' bills. While the PP&FA-related costs and potential $/kWh charges are examined monthly, the PP&FA charge does not actually change on customer bills on a defined time-frame (i.e., whether monthly, semi-annually, annually, etc.). While this may be prudent given certain key factors, such as the seasonality of purchased power/fuel costs, ISO-NE market conditions, extreme weather affecting retail sales, and/or availability of cash reserves, the utility's decision to update (or to not update) the resulting PP&FA charge for a given month is normally outlined in a form of a policy or tariff document.	We recommend that Danvers formalize a policy on the administration and update of the PP&FA charge. Best practices for such a policy include mention of the historical tracking of actual versus forecasted costs and revenues and when the utility may make updates to the PP&FA charge, which may be a result of the aforementioned factors. Having a defined framework of when the utility may be evaluating the update of the PP&FA provides more transparency to customers on how these costs are recovered outside of base rates.

Observation #	Observation	Recommendation
2.2.3	Danvers Electric utilizes an internal cost of service model that analyzes customer class cost of service based on historical costs and functionalization of these cost categories for purposes of allocating costs to customer classes. It seems that historically Danvers has chosen not to update base rates to align cost recovery to current fixed cost/variable cost breakdown. As a result, fixed cost recovery is an issue as only a small portion (approximately 2%) of utility's revenues comes from the fixed charge, while approximately 31% of the utility's costs are fixed.	We recommend that Danvers Electric present the results of the COS analysis, so that the Board can make determination of whether it seeks to update base rates.
2.2.4	Regarding the electric vehicle rate program, Danvers Electric currently does not offer any rebates, which is actually quite typical for utilities across the state.	In anticipation of growth of the electric vehicle industry, we recommend that Danvers Electric explore options for providing customers with rebates or bill credits to perform charging during night off-peak hours that correlate with appropriate price-signals.

2.3 – Procedures Performed

Baker Tilly performed the following procedures in its review of Danvers Electric Division rate structures:

Table 12 – Procedures Performed during the Review of Danvers Electric Division Rate Structures

Procedures
1. Requested documentation from the Division on current policies and procedures and information systems used related to rate structures.
2. Interviewed key personnel that are responsible for rate structures to understand the current policies and processes in place.
3. Evaluated future rate demands through review of Danvers Electric's load forecasts and historical system loads. Compared Danvers historical system loads and load forecasts to ISO-NE's and state of Massachusetts' loads for determining appropriateness of projections.
4. Reviewed current rate categories (i.e., fixed costs, operations, power supply) through examination of Danvers Electric's cost of service model and past revenues by customer rate class. Compared cost of service results to revenue breakdown to determine whether costs are appropriately recovered in rates in accordance with industry best practice.

5. Reviewed special rate programs for appropriateness to Danvers Electric's current system capabilities and whether the Division is pursuing different programs that reflect industry trends.
6. Documented and summarized observations and recommendations related to areas where Danvers Electric can enhance its current rate structure.

3.0 – FINANCIAL SOFTWARE

3.1 – Background and Current Process

Baker Tilly was engaged to review Danvers Electric's financial software and to identify areas that could be improved through new technologies and process changes.

Danvers Electric currently utilizes Harris Financial Management System to support general ledger, accounts payable, and inventory functions. This system was implemented in 1995, over twenty years ago, and is the oldest version which is still supported by the vendor, Northstar Utilities Solutions. Due to the age of the system there is minimal flexibility and functionality compared to typical ERP and financial systems that exist today. This appears to create significant challenges for Danvers Electric because of inefficient processes related to system rigidity and manual workarounds that are required in areas where the system does not meet the business needs.

There is no work management system currently at Danvers Electric to support the construction and maintenance efforts. This leads to informal manual processes and less standardization around the engineering/design, work orders, materials, and capitalization processes.

The Town of Danvers' IT department currently provides back end and technical support (e.g. email, servers, project management) for the Electric Division, but most application service or support for the Harris system is presently handled directly through vendor support. The Town is currently in the process of developing IT policies and establishing an IT strategic vision, which should benefit the Electric Division significantly as they are included and considered in detail as part of that process.

3.2 – Observations and Recommendations

Baker Tilly makes the following observations and recommendations regarding Danvers Electric Division's financial software:

Table 13 – Observations and Recommendations Regarding Danvers Electric Financial Software

Observation #	Observation	Recommendation
3.2.1	Danvers Electric uses a financial system implemented in 1995 with minimal functionality and lack of flexibility, requiring manual paper processes and time consuming data manipulation. In addition, no work management system is being utilized, which results in less standardization and formality around the engineering/design, work order, materials, and capitalization processes. These technology impediments and lack of reporting capabilities impairs the Division's ability to perform meaningful analysis of	Baker Tilly recommends that Danvers Electric begin the process of developing business requirements for each functional area, with the goal of evaluating new software platforms to gain efficiencies in operations, optimize its use of data and enhance its financial reporting capabilities.

Observation #	Observation	Recommendation
	financial data and leads to inefficiencies in general.	
3.2.2	Division employees interviewed as part of this project state that materials being pulled from the warehouse are not consistently documented or "checked out" which leads to discrepancies in inventory and project cost and capitalization/fixed asset records.	Training should be given to employees on the importance of properly checking out materials and the role this plays in accurately costing projects and the related impact on customer rates. Additionally, implementing technology such as a work management system and integrated barcode scanning solutions will improve and expedite the materials process and potentially encourage employees to check out materials properly.
3.2.3	Prior to the creation of the IT Director position in 2016 and Information Systems Project Manager in 2017, most systems specific to the Electric Division, including the financial system, were supported independently by vendor partnerships with the Electric Division, with the former MIS department providing back-end and technical support, as requested. These new hires allowed for IT staff to dedicate portions of their time to the Electric Division for town-wide initiatives (e.g. fiber optic). Presently, the Town is transitioning to an organization-wide IT department to support Schools, Library, and Town operations, including the Electric Division. This new department will likely consist of three teams: Infrastructure, Customer Service, and Business Solutions.	Baker Tilly recommends that IT and Electric Division staff prioritize implementation of the Electric related aspects of the Town's IT strategic plan to ensure proper staffing is in place to address the needs of the Electric Division. Specifically, staff support is needed for operational technology, corporate IT systems/applications, coordination with other divisions on town-wide projects and initiatives impacting the Electric Division, and support required for utility applications and the financial/ERP system to be implemented. Although there is currently an IT steering committee which includes individuals from each division, including the Electric Division, Baker Tilly recommends that more formalization be developed around committee meetings and members of the committee. Currently, members of the committee are those individuals most directly involved in IT related functions from each Division. In addition, there should be executive level representation on the committee. If not already established, a charter should be developed to identify the purpose and authority of the IT steering committee as well as the frequency of meetings. The IT steering committee should provide strategic direction and oversight of technology initiatives, including prioritization of IT projects. With executive level personnel on the committee, this will allow for an adequate level of authority to ensure IT resources and projects are fairly allocated and prioritized.

Observation #	Observation	Recommendation
3.2.4	The Electric Division is heavily reliant on software vendors for IT support, whereas there may be opportunities to utilize the IT department for more cost-effective and timely services.	Baker Tilly recommends that the Town's IT Department continue to work with staff in the Electric Division to determine the extent to which IT staff can provide support services around Danvers Electric's systems/applications, for potential costs savings and response time versus using vendor support.

3.3 – Procedures Performed

Baker Tilly performed the following procedures in its review of Danvers Electric Division's financial software:

Table 14 – Procedures Performed in the Review of Danvers Electric Division's Financial Software

Procedures
1. Reviewed organizational charts, list of systems/applications, software vendor and implementation contracts, IT policies, and the Town's 5-year organizational vision for technology.
2. Interviewed key management and personnel at Danvers Electric to gain an understanding of the business systems and applications and how well those meet the business needs.
3. Conducted a walkthrough of various modules within the Harris Financial System and sample reports generated from the system
4. Interviewed the Town of Danvers' IT Director to gain an understanding of the relationship between and IT support and services provided to the Electric Division.
5. Assessed the current systems/applications, technology utilization, and IT organizational structure and support for gaps and areas for improvement.
6. Documented and summarized observations and recommendations related to areas where Danvers Electric can enhance its technology and technology oversight.

APPENDIX: EFFICIENCY REVIEW PRESENTATION TO DANVERS MUNICIPAL LIGHT BOARD

Baker Tilly presented the results of the efficiency review at the Danvers Municipal Light Board meeting on February 26, 2019. The presentation slides presented at this meeting are shown starting on the following page.

Danvers Electric

Efficiency Review

February 2019

bakertilly

now, for tomorrow.

Introductions

Russ Hissom, CPA, CIA, CISA, CRMA
Partner
russ.hissom@bakertilly.com

Amanda Lasinski, CIA
Consulting Manager
amanda.lasinski@bakertilly.com

Brian Kim, CRRA
Consulting Manager
brian.kim@bakertilly.com

Stacey Gill, CISA
Consulting Manager
stacey.gill@bakertilly.com

Baker Tilly's ("BT") Scope of Work

To perform an evaluation of Danvers Electric Division ("Danvers") in the following areas:

Financial policies:

- Review current financial policies and reserve accounts
- Compare current financial policies and reserve accounts with best practices
- Provide recommendations regarding Danvers' financial policies and reserve accounts

Rate structures:

- Review future rate demands
- Review future rate categories (fixed costs, operations, power supply)
- Review special rate programs

Financial software:

- Review existing financial software functionality
- Identify areas that could be improved through new technologies and process changes

Financial Policies – Background and Current Process

Existing Financial Reserves	> Danvers Electric has three restricted cash accounts/reserves: (1) Customer deposits and escrow funds; (2) Depreciation fund; and (3) Rate Stabilization
Other considerations for reserve funds	> Operating Reserves: allow utilities to manage potential risks (e.g., fluctuations in revenues, meet working capital needs, natural disasters) > Capital Reserves: provide funds for unplanned or accelerated infrastructure replacements, smooth out budgetary/rate impacts of fluctuating capital expenses > Rehabilitation and Replacement Reserves > Equipment Replacement Fund > Emergency Capital Reserves

Financial Policies – Considerations for municipal bond ratings

EXHIBIT 1

Municipal Utility Scorecard Factors

Broad Scorecard Factors	Factor Weighting	Scorecard Subfactor	Subfactor Weighting
System Characteristics	30%	Asset Condition (Remaining Useful Life)	10%
		Service Area Wealth (Median Family Income)	12.5%
		System Size (O&M)	7.5%
Financial Strength	40%	Annual Debt Service Coverage	15%
		Days Cash on Hand	15%
		Debt to Operating Revenues	10%
Management	20%	Rate Management	10%
		Regulatory Compliance and Capital Planning	10%
Legal Provisions	10%	Rate Covenant	5%
		Debt Service Reserve Requirement	5%
Total	100%	Total	100%

Factor 2: Financial Strength (40%)

EXHIBIT 3

Financial Strength (40%)	Aaa	Aa	A	Baa	Ba	B and Below
Annual Debt Service Coverage (15%)	> 2.00x	2.00x ≥ n > 1.70x	1.70x ≥ n > 1.25x	1.25x ≥ n > 1.00x	1.00x ≥ n > 0.70x	≤ 0.70x
Days Cash on Hand (15%)	> 250 Days	250 Days ≥ n > 150 Days	150 Days ≥ n > 35 Days	35 Days ≥ n > 15 Days	15 Days ≥ n > 7 Days	≤ 7 Days
Debt to Operating Revenues (10%)	< 2.00x	2.00x < n ≤ 4.00x	4.00x < n ≤ 7.00x	7.00x < n ≤ 8.00x	8.00x < n ≤ 9.00x	≥ 9.00x

Financial Policies – Moody's bond rating for Danvers and peers

MLP	Moody's Bond Rating	Last Update
Danvers Electric	Aa1	Sep 2017
Middleton *	Aa2	Mar 2017
Peabody	Aa2	Jul 2018
Reading *	Aa2	Sep 2017

* These MLPs have not issued revenue bonds recently, and thus the shown rating reflects that of the town or city's general obligation bonds.

Financial Policies – Observations/ Recommendations

Observation	Recommendation
1.2.6 - An investment policy has not been established by Danvers Electric.	BT recommends Management follow the Town of Danvers' investment policy or establish its own investment policy. The Town's investment policy allows funds to be invested in U.S. Treasury Obligations, Certifications of Deposits, Repurchase Agreements, and Money Market Funds.
1.2.1 - There is currently no reserve or restricted cash policy.	BT recommends establishing a reserve policy that designates how much should be reserved.
1.2.3 - Danvers currently has over $14.6 million in the rate stabilization fund. These funds have not been designated for a specific purpose except to provide cash flow in the event that revenues are unexpectedly low or rates suddenly change.	Baker Tilly recommends Management regularly review the amount currently reserved in the rate stabilization fund and create a formal policy that establishes caps and other targets for use of the funds. Deciding on a cap amount depends upon numerous factors.

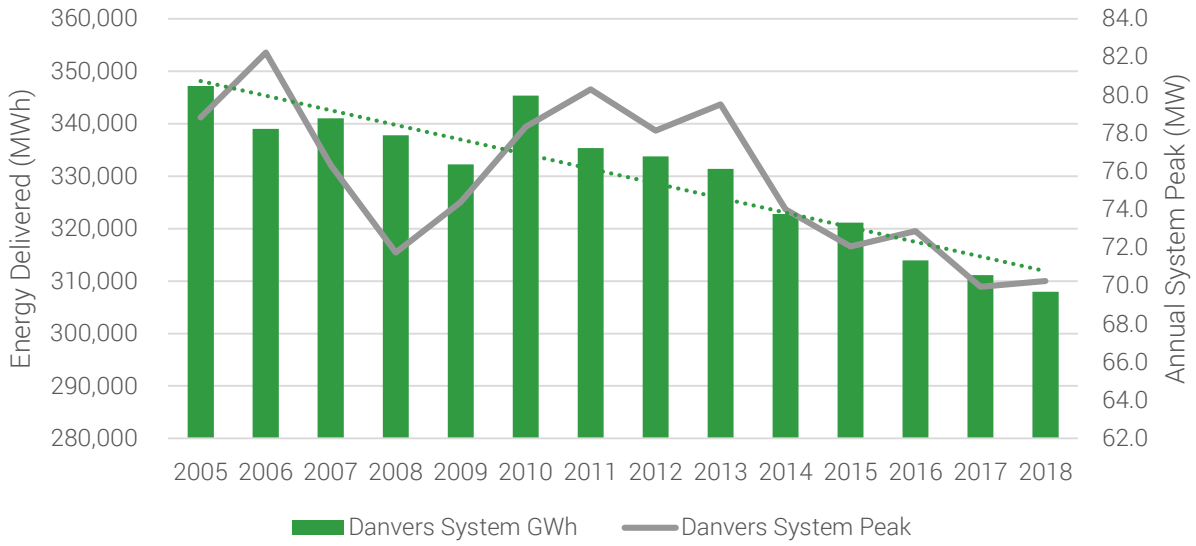
* This table shows a partial list of key observations/recommendations; please refer to draft report for full list.

Financial Policies – Prioritized Action Steps

Observation/ Recommendation	Recommendation Action Steps
1.2.6 – Regarding Investment Policy	Danvers Management should meet and discuss how they would like to invest their cash. The amount of risk Danvers is willing to accept will help determine how cash should be invested.
1.2.1 – Regarding Reserve Policy	Management should determine how best to establish and set uses for reserves, whether that be to pay down debt, decrease the pension liability, decrease the Other Post-Employment Benefits ("OPEB") liability, save for rate volatility, MMWEC payments, etc. Reserves should be based on historical costs, as well as future needs (e.g., the $17.5 MM five year capital projects plan).
1.2.3 – Regarding Rate Stabilization Fund	Danvers Management should regularly review the amount in the rate stabilization fund and consider setting up a formal policy that establishes caps and other targets for use of the funds. Deciding on a cap amount depends upon a number of factors, including the purpose of the rate stabilization account, size of utility, and if there are other established reserves.

* This table shows a partial list of recommendation action steps; please refer to draft report for full list.

Rate Structures – Future rate demands



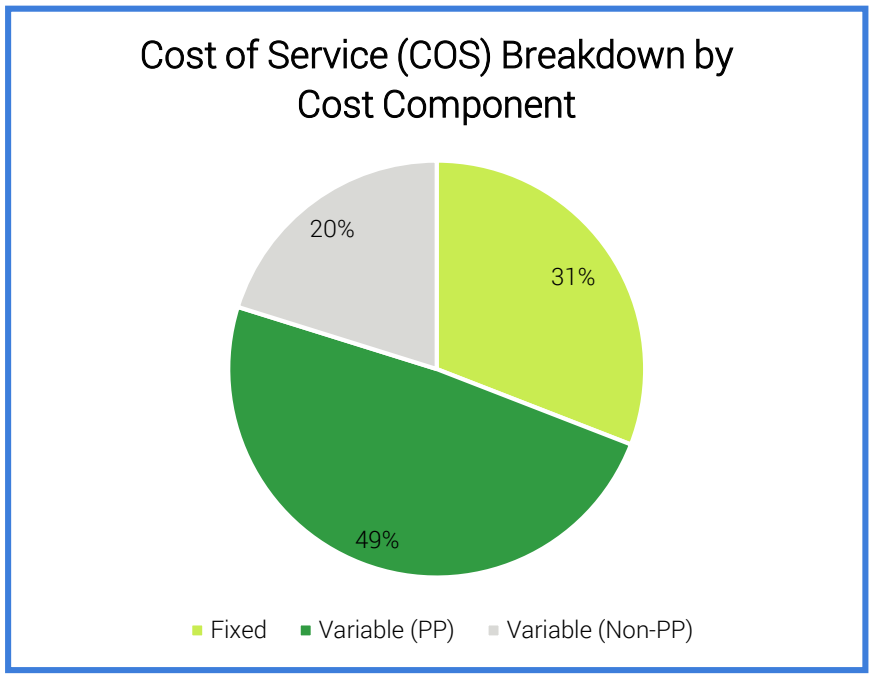
Danvers Electric's Historical System Energy Delivered and System Peak

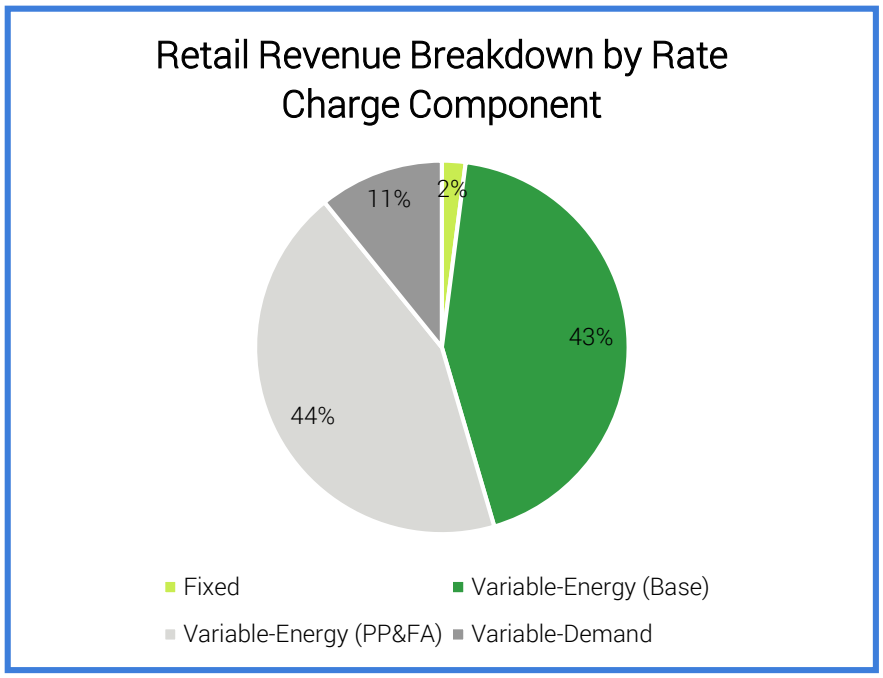
- Danvers' system has been experiencing an overall decline in its annual system peak and also net energy delivered to customers.
- These trends are consistent with other MLPs and IOUs in the state of MA.

Rate Structures – Rate Categories

Customer Rate Class	Minimum Charge: Basic Monthly Charge	Base Rate: Energy Charge	Base Rate: Demand Charge	Adjuster: PP&FA	Other
Residential R-1	$5.00 per mo.	$0.0940 per kWh	N/A	Varies based on budgeted vs. actual cost of power and total electric sales.	Farm Discount; Early Payment Discount
Small General Service G-1	$5.00 per mo.	$0.0860 per kWh	N/A		Farm Discount; Early Payment Discount
Demand General Service G-2	$10.00 per mo.	$0.430 per kWh	$9.00 per highest kW		Farm Discount; Early Payment Discount; Primary Metering Discount (PMD) of 2.5%; High Voltage Discount (HVD) of 4.0%; Transmission Ownership Discount (TOD) of $0.12 per highest kW
Large General Service G-3	$210.00 per mo.	$0.0430 per kWh	$8.75 per highest kW		
Municipal General Service MG-1	$5.00 per mo.	$0.08176 per kWh	N/A		None.
Municipal General Service MG-2	$10.00 per mo.	$0.04276 per kWh	$9.00 per highest kW		None.
Private Area Lighting	Monthly rates vary based on the lamp/fixture type and wattage of the lamp installed at the customer's premise; also called Security Lights.				

Rate Structures – Rate Categories





> Internal Danvers COS analysis reflects a generic imbalance between fixed costs of utility operation to the fixed charge component in the customer retail rate structure.

Rate Structures – Special Rate Programs

- Danvers has several special rate programs, including:
  - Solar Metering PV Program
  - Peak Savings Program
  - Energy Efficiency/ Conservation Rebates Program
- Danvers currently does not have the following programs:
  - Electrical Vehicle Program – However, the State of Massachusetts Office of Energy Resources (DOER) provides rebates of up to $2,500 for purchase or lease of qualifying vehicles.
  - Time-of-Use (TOU) Rates – Danvers has the ability to gather and obtain 15-minute interval load data from its smart meters.

Rate Structures – Special Rate Programs

Rate Type	Fixed and variable (non-PP) costs allocated to rate class	Variable (purchased power) cost allocated to rate class	Billing Determinant (Annual energy usage for rate class)	Calculated Rate ($/kWh)
	[a]	[b]	[c]	{ [a] + [b] } / [c]
Base Rate: Energy Charge for G-1 rate class	$180,000 (Non-time varying energy charge: $0.0600/kWh)	$120,000	3,000,000 kWh	$300,000 / 3,000,000 kWh = **$0.1000/kWh**
TOU Rate: Energy charge for G-1 rate class (Summer, On-Peak)	$27,000 (Non-time varying energy charge: $0.0600/kWh)	$30,000	450,000 kWh	$57,000 / 450,000 kWh = **$0.1267/kWh**
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* NOTE: Values shown strictly for illustrative purposes.

Rate Structures – Observations/ Recommendations

Observation	Recommendation
2.2.1 - At the moment, Danvers does not have approved TOU rates. Its current electric rates have not been updated for many years, and current rates do not reflect the time-varying nature of electricity supply costs. In Danvers' current resource planning, power costs are summarized by $/MWh according to the ISO-NE weekday peak (5x16) time-frame. Thus, Danvers is able to determine time-varying energy costs by this ISO-NE peak time-frame.	At a minimum, we recommend the development of optional TOU rates based on seasonality (summer vs. winter months) and peak period (on-peak vs. off peak) based on the ISO-NE peak hours definition: > On-peak hours: 7 AM – 11 PM on all non-holiday weekdays > Off-peak hours: Weekday hours between 11 PM – 7 AM and all weekends and holidays
2.2.3 – Danvers' internal COS model shows that approximately 31% of the utility's costs are fixed while only 2% of the utility's revenues are actually recovered in a customer's monthly fixed charge.	We recommend that Danvers move to include more fixed costs in the customer monthly fixed charge and update its base rates to be more in line with its cost of service.

* This table shows a partial list of key observations/recommendations; please refer to draft report for full list.

Rate Structures – Prioritized Action Steps

Observation/ Recommendation	Recommendation Action Steps
2.2.1 – Regarding TOU rates	To implement this recommendation, Danvers would need to determine which rate classes should have TOU rates, the non-time varying energy charge ($/kWh) for each rate class, and then the time varying energy charge. For the TOU energy charge component, Danvers would need to aggregate the variable purchased power costs for each TOU block to come up with the TOU energy charge. These changes would also require an update to Danvers Electric's tariff schedule through a formal rate proceeding.
2.2.3 – Regarding Fixed Cost recovery	In order to enact this recommendation, Danvers would need to update its cost of service model and make changes to the fixed monthly charges in its tariff schedule through a formal rate proceeding before its oversight body.

* This table shows a partial list of recommendation action steps; please refer to draft report for full list.

Financial Software – Background and Current Process

Current Financial System	> Danvers currently utilizes Harris Financial Management System to support key financial functions. However, this system was implemented in 1995 and is the oldest version supported by vendor, Northstar Utilities Solutions. Thus, there is minimal flexibility and functionality compared to typical ERP and financial systems that exist today. > This appears to create significant challenges for Danvers Electric because of inefficient processes related to system rigidity and manual workarounds that are required in areas where the system does not meet the business needs.
Other business system needs	> There is no work management system currently at Danvers to support the construction and maintenance efforts leading to informal manual processes and less standardization around engineering/design, work orders, materials, and capitalization processes.

Financial Software – Background and Current Process (cont'd)

IT Department

- The Town of Danvers' IT department currently provides back end and technical support (e.g. email, networks, servers) for the Electric Division, but any application services or support for the Harris system are handled directly through vendor support.
- The Town is currently in the process of developing IT policies and establishing an IT strategic vision, which should benefit the Electric Division significantly as it is considered in detail as part of that process.

Financial Software – Observations/ Recommendations

Observation	Recommendation
3.2.1 – Danvers uses a financial system implemented in 1995 with minimal functionality and lack of flexibility, requiring manual paper processes and time consuming data manipulation. In addition, no work management system is being utilized. These technology impediments and lack of reporting capabilities impairs the Division's ability to perform meaningful analysis of financial data and leads to inefficiencies in general.	BT recommends that Danvers Electric begin the process of developing business requirements for each functional area, with the goal of evaluating new software platforms to gain efficiencies in operations, optimize its use of data and enhance its financial reporting capabilities.
3.2.3 – Prior to the creation of key IT positions in 2016-2017, most Electric Division systems were supported independently by vendor partnerships. Presently, the Town is transitioning to an organization-wide IT department to support Schools, Library, and Town operations, including the Electric Division. This new department will likely consist of three teams: Infrastructure, Customer Service, and Business Solutions.	BT recommends that the IT Dept. and Danvers Electric Division staff prioritize implementation of the electric-related aspects of the Town's IT strategic plan to ensure proper staffing is in place for the Electric Division. Further, BT recommends that more formalization be developed around the IT steering committee meetings and members of the committee.

* This table shows a partial list of key observations/recommendations; please refer to draft report for full list.

Financial Software – Prioritized Action Steps

Observation/ Recommendation	Recommendation Action Steps
3.2.1 – Regarding existing financial system and technology	Baker Tilly recommends that Danvers Electric begin the process of developing business requirements for each functional area, with the goal of evaluating new software platforms to gain efficiencies in operations, optimize its use of data and enhance its financial reporting capabilities. This may require soliciting for these services and/or focusing on departments/functional areas with greatest needs.
3.2.3 – Regarding IT staffing/ organization	BT recommends that the IT Dept. and Electric Division staff prioritize implementation of the electric-related aspects of the Town's IT strategic plan to ensure proper staffing is in place for the Electric Division. Further, BT recommends that more formalization be developed around the IT steering committee meetings and members of the committee. This would involve establishing a standard charter and defining the frequency of these meetings (i.e., bi-monthly, monthly, etc.).

* This table shows a partial list of recommendation action steps; please refer to draft report for full list.

Questions?

Russ Hissom, CPA, CIA, CISA, CRMA
Partner
russ.hissom@bakertilly.com

Amanda Lasinski, CIA
Consulting Manager
amanda.lasinski@bakertilly.com

Brian Kim, CRRA
Consulting Manager
brian.kim@bakertilly.com

Stacey Gill, CISA
Consulting Manager
stacey.gill@bakertilly.com


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