

Partnerships in Efficiency to Benefit Regional Businesses: A Case Study in Federal Government, Chamber of Commerce, Clean Energy Provider, and Utility Collaboration

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ABSTRACT

This paper intends to demonstrate the opportunity and demand for actionable energy efficiency programs designed for the commercial and industrial sectors, and to show that comprehensive, collaborative partnerships allow for the efficient implementation of energy efficiency and clean energy solutions to businesses, eliminating many of the common challenges and pitfalls associated with such projects and programs. The paper will look at the innovative approach, design and initial results of one such program in Massachusetts - the Merrimack Valley Clean Energy Partnership. The program was established by the Merrimack Valley Chamber of Commerce and clean energy company, Nexamp, to benefit area businesses, with increased energy efficiency and clean energy adoption, job retention, and job creation as primary goals. The Chamber and Nexamp are providing complimentary clean energy advisory services through Nexamp's Clean Energy Road Map to identify energy cost saving opportunities for over 30 local businesses, supported by the federal and state governments through stimulus funding, combined with involvement and cost-sharing from the Merrimack Valley Chamber of Commerce, Nexamp, and two local utilities--National Grid and Columbia Gas. The program has enjoyed early success, has been well received by participants, and can serve as a model for similar initiatives across multiple sectors and geographic regions.

The Merrimack Valley Clean Energy Partnership: Opportunity and Framework

Energy efficiency improvements represent a vast opportunity for significant reductions in energy use and energy costs, with the commercial and industrial sectors accounting for 65% of end-use efficiency potential nationwide. Combined, these sectors represent a projected gross present-value energy savings potential of over \$730 billion by the end of the decade. (**Granade et al. 2009 55-75**) Moreover, industry experience has demonstrated that energy efficiency and renewable energy projects for businesses with high energy consumption have often proven to help retain and create jobs by reducing overhead costs through maximized energy productivity. These potential improvements are too often hamstrung by a variety of challenges, outlined below, that limit or prevent their implementation and effectiveness.

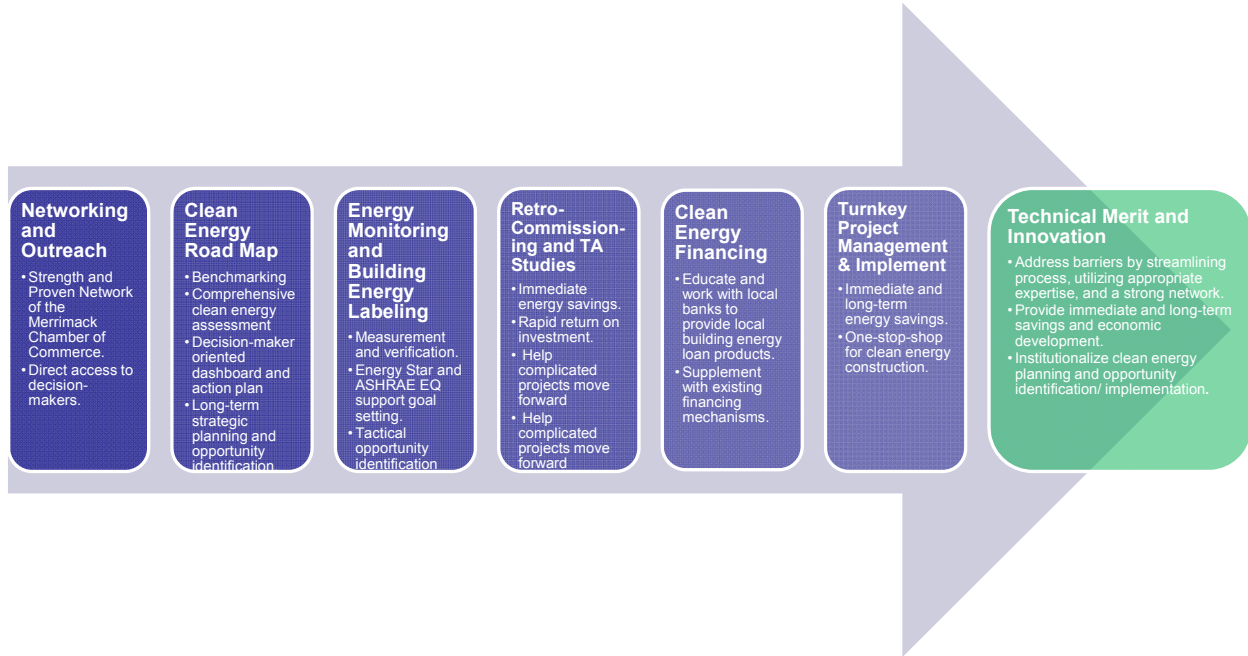
In order to overcome these hurdles, effective energy efficiency programs require collaboration between multiple parties in delivering meaningful, long-term solutions for businesses looking to reduce energy costs and carbon emissions. The Merrimack Valley Clean Energy Partnership - by combining the strengths and capabilities of the Merrimack Valley Chamber of Commerce, Nexamp, and two local utilities, National Grid and Columbia Gas - is designed to promote the immense environmental and economic benefits presented by efficiency and renewable improvements, and to address the systemic challenges that often prevent these

potential improvements by delivering immediate and actionable Clean Energy Road Maps to the state's strongest regional network of organizations. The Chamber has a proven and existing network dedicated to attracting and growing organizations in the Merrimack Valley and is a trusted partner for over 1,000 business and organizational leaders in the region. Nexamp, a leading provider of renewable power and clean energy solutions, has successfully helped dozens of organizational leaders to understand and implement cost-effective clean energy measures by providing a tried-and-true delivery model for clean energy planning, implementation, and monitoring. The Partnership leverages an existing network of business leaders and decision makers, providing them with a one-stop-shop for clean energy planning, turnkey project management and implementation, and long-term clean energy management. Collaborating directly with the utilities, the program addresses barriers and inefficiencies in current energy saving programs, provides immediate energy savings, and institutionalizes clean energy planning and constant improvement over the long-term.

Supported by the federal and state government through stimulus funding, administered by the Massachusetts Department of Energy Resources, combined with involvement and cost-sharing from the Chamber, Nexamp, National Grid and Columbia Gas, the partnership reaches organizational decision-makers to inform them about the potential for clean energy savings at their buildings. Nexamp will provide enrolled members with a customized Clean Energy Road Map based on a detailed whole-facility energy audit. The Clean Energy Road Map benchmarks energy use and presents clean energy options (energy efficiency, renewable energy, and energy management) required to achieve attainable energy reduction goals, such as Energy Star labeling or internal sustainability and cost reduction goals. The Clean Energy Road Map will translate energy and carbon opportunity into investment opportunity, communicated in the language of Chamber member decision-makers: return on investment, payback, risk, and cash flow. Members will be able to look at individual clean energy measures, portfolios of measures, and to screen out measures that do not meet their criteria. In addition, the Road Map is used to track and report progress as measures are implemented and identify future opportunities as they become viable.

In conjunction, the partnership utilizes its close relationship with the utilities to help inform the utility review process and anticipate any potential concerns as program participants move forward with improvements identified through the Road Map. Nexamp will supplement the Road Map with energy monitoring and building energy labeling to promote ongoing energy planning and identification of future energy savings opportunities. To ensure that immediate energy and savings benefits are realized, Nexamp will also provide retro-commissioning for buildings where appropriate. See below (**Figure 1**) for an overview of the program process:

Figure 1. The Merrimack Valley Clean Energy Partnership Program Approach



The Challenges

As indicated above, Nexamp has identified - through conversations and surveys of our partners, utilities, and customers - a common set of challenges faced by commercial and industrial businesses alike when considering energy efficiency and renewable energy improvements. These challenges are outlined below, along with an explanation of how the program will address each challenge.

Awareness and education. Over 70% of organizations surveyed by Nexamp highlighted awareness and education as among the three major challenges faced by their organizations in terms of energy usage and improvement. Simply put, businesses are often uninformed or misinformed of the potential for energy efficiency and renewable energy improvements to make large scale reductions in operating costs. Further, they are often unaware of incentive programs in place to reward energy efficiency and renewable energy upgrades. These incentives can come from the federal, state, and local utility level – often all three. Armed with organized, relevant knowledge of the opportunity presented by efficiency and capital improvements, organizations have enthusiastically demonstrated a willingness and desire to implement energy and cost-saving improvements as recommended by the program.

An increase in awareness and knowledge about energy use and energy saving opportunities and incentives are expected to account for a major portion of business enrollment in the program. Program campaigns and events have been designed with this purpose in mind as part of the *Networking and Outreach* portion of the Program.

As previously stated, the Merrimack Valley Chamber of Commerce is the largest, most effective business to business network in the Merrimack Valley and serves over 1,000 businesses and organizations. The Chamber has been recognized several times for the strength and effectiveness of its network. In addition, the Chamber has already institutionalized an annual

Merrimack Valley Green Energy Environmental Summit to build awareness and link members with the growing clean energy cluster in Merrimack Valley. The Chamber will leverage and build upon its award-winning network and clean energy outreach experience to support the MV Clean Energy Road Map Program with numerous networking and outreach activities, including clean energy conferences, clean energy forums and seminars, networking opportunities, Chamber mailings and publications, outreach and speaking opportunities to share business model with other Chambers and economic development agencies in the region. These activities will be used to enroll members into the program and as a means to facilitate active participation.

Access to busy decision makers and multiple gatekeepers. Access to decision makers is crucial to the adoption of efficiency and clean energy improvements at the commercial and industrial levels. For this reason, the Clean Energy Partnership targets its outreach directly at key decision makers throughout the process. In fact, it among the program requirements that a decision maker from each party and each business is present and accessible throughout the process, engaged in the Road Map process at all critical junctures. Once a client is engaged, Nexamp's project manager will serve as the single point of contact for the customer in order to easily facilitate the process and minimize potential for confusion among multiple parties. The Road Map is translated into straightforward investment terms and communicated in the language of Chamber member decision-makers: return on investment, payback, risk, and cash flow. Customer and partner surveys have indicated that this centralized and turnkey engagement approach has been vital in the successful implementation of the program goals.

Timing. Comprehensive energy efficiency and clean energy improvements are often time-intensive projects, requiring continuous coordination across multiple project timelines and involving multiple players. A comprehensive, holistic approach to efficiency and clean energy adoption can help to mitigate these challenges.

The Clean Energy Road Map utilizes a fully turnkey management and implementation process to mitigate the timing challenge for customers. All enrolled members that move forward with clean energy projects will be assigned an experienced energy project manager that will take responsibility for design, engineering, procurement, and integration of clean energy measures. The project manager serves as the single point of contact between the customer and the various partners that are involved in a successful project, regardless of scale.

Separation of audit and implementation, lack of actionable information. Traditional energy audits are often conducted without a plan of successive action upon completion. They can often leave businesses with lots of data about their energy use, but no suggestions or otherwise actionable information about how to best improve energy use and energy consumption patterns.

This is an issue that the Clean Energy Road Map solves directly. The Clean Energy Road Map benchmarks energy use and presents clean energy options (energy efficiency, renewable energy, and energy management) required to achieve attainable energy reduction goals, such as Energy Star labeling or internal sustainability and cost reduction goals. The Clean Energy Road Map will translate energy and carbon opportunity into investment opportunity, communicated in the language of Chamber member decision-makers: return on investment, payback, risk, and cash flow. Members will be able to look at individual clean energy measures, portfolios of

measures, and to screen out measures that do not meet their criteria. In addition, the Road Map is used to track and report progress as measures are implemented and identify future opportunities as they become viable.

Nexamp leverages its detailed understanding of energy project finance, incentives, and energy markets to ensure that each participating member’s customized portfolio of clean energy solutions is structured to optimize financial performance. The Road Map includes an interactive energy and carbon management dashboard (Figures 2, 3) and will be updated regularly to allow organizations to track the performance of energy solutions over time relative to their customized energy and carbon management plan.

Figure 2. Nexamp’s Clean Energy Road Map Interface

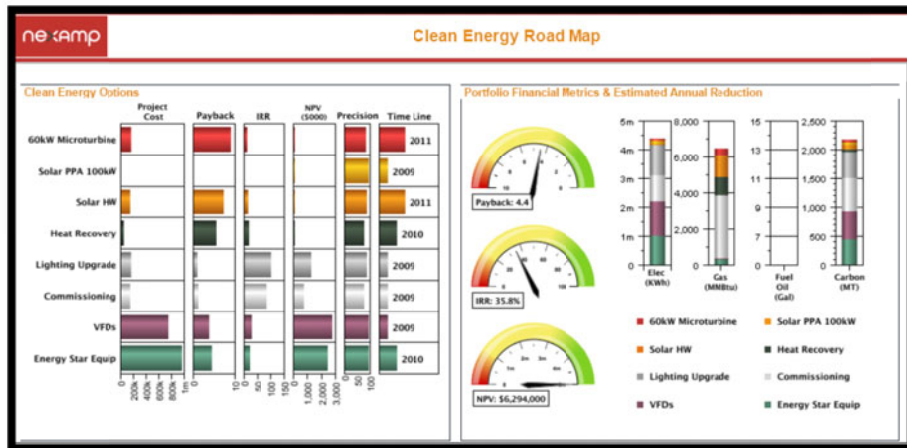
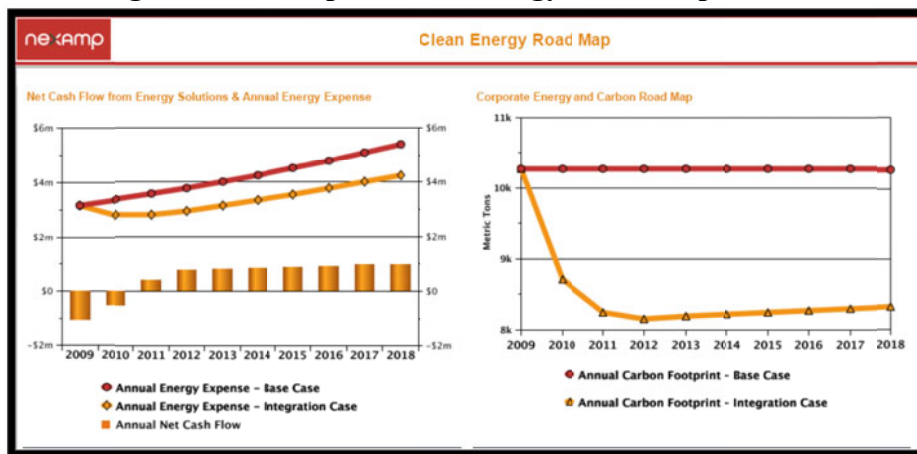


Figure 3. Nexamp’s Clean Energy Road Map Interface



Capital cost constraints. Potentially large upfront investments often delay or prevent efficiency improvements outright, highlighting the need for incentives as well as traditional and creative financing options. Not surprisingly, participants highlighted up-front cost considerations as one of the biggest challenges they faced in considering energy improvements.

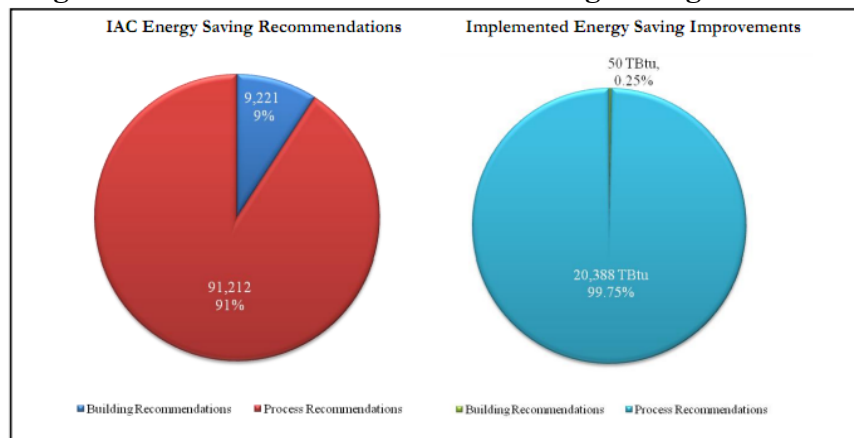
The Merrimack Valley Clean Energy Partnership takes a three-pronged approach in addressing this challenge. First, the program engages federal funds and cost sharing among program partners to deliver the initial Road Maps to accepted participants, as outlined above. Second, it leverages program partners' (the Chamber, Nexamp, and utilities) relationships with, and access to, financial institutions and lending agencies. Aside from identifying all available federal, state, and utility incentives, there are several banks on the Board of the Chamber and local lenders that are eager to better understand and explore opportunities for financing clean energy projects. The team will work with member banks and other regional banks (many of which have shown interest in this program), quasi-public agencies, and the U.S. Small Business Administration to involve them in the program and mutually explore opportunities for the development of financing products for Chamber member clean energy projects, as identified by the Road Maps. In parallel, the program will take full advantage of low-interest financing subsidies through its utility partners. National Grid and Columbia Gas, for instance, are both participating members of the Mass Save initiative, working closely with the Massachusetts Department of Energy Resources to provide a range of services, incentives and information promoting energy efficiency for businesses.¹

Finally, and perhaps most relevantly, the Road Map itself is designed with cost concerns and constraints in mind. As part of the Road Map process, Nexamp will work with Chamber members to understand financing options, such as loans for projects or off balance sheet financing in the form of power purchase or performance-based agreements. Because the program takes a *portfolio* approach to energy improvements, participants are able to access financing options and realize value that would not otherwise be available if pursuing one-off projects, and accurately predict a timeline for a potential *series* of improvements. Additionally, the Road Map is able to identify and highlight low-cost/no-cost improvements that can be met through *retro-commissioning* strategies. Retro-commissioning is used to evaluate how a building's energy-using systems are operating. With identifying the lowest cost and highest energy savings measures as the primary objective, the retro-commissioning process highlights measures that can be undertaken to optimize and improve energy use. Among these measures, the process involves focusing on the largest energy-using equipment and systems known to have problematic controls (typically HVAC and building controls), measuring baseline operating conditions, optimizing control systems through calibration and sensor testing, identifying and implementing operational and maintenance enhancements, and ongoing verification of energy savings and system operations. Retro-commissioning builds on the Road Map audit and monitoring of energy use, combining a detailed inspection to better understand energy systems operations. As cited in the Massachusetts Zero Net Energy Buildings Task Force Report, retro-commissioning can often result in energy bill reductions of 10% to 15% with minimal investment.

The retro-commissioning model can aptly be applied across both the commercial and industrial sectors, though process-related implementation is more often the focus in the industrial sector, as demonstrated by the U.S. Department of Energy Industrial Technologies Program Industrial Assessment Centers' database (**Figure 4**).

¹ For more information on the Mass Save initiative for Massachusetts businesses, please visit <http://www.masssave.com/business/>

Figure 4. Industrial Retro-Commissioning Savings Overview



Source: U.S. Department of Energy, Industrial Technologies Program, Industrial Assessment Centers' database

The Clean Energy Road Map: A Holistic Approach to Energy Improvements

Aside from its ability to address many of the common challenges faced by commercial and industrial clients in implementing energy improvements, the Merrimack Valley Clean Energy Partnership is unique in its holistic and long-term approach to energy improvements and energy management. The program is designed to help businesses shed extra “weight” through reduced energy costs across all building processes, and to *keep it off* through a long-term engagement and customer relationship.

Primary Objectives

The program is designed with a set of primary objectives in mind. These general objectives can and will be applied to each participating member of the program, as it reflects broad goals set forth when the Clean Energy Partnership was established:

- Identify near-term energy savings opportunities
- Identify incentives to buy-down the cost of project implementation
- Institutionalize long-term energy management
- Develop and implement a multi-year energy master plan
- Promote workforce retention/growth through energy cost reduction

These objectives are met through a multi-step process and outlined through the Clean Energy Road Map. Each building undergoes an intensive benchmarking and analysis process in order to identify the opportunities presented in the Road Map (**Figures 5-8**).

Figure 5. Sample Road Map Data: Utility Bill Analysis

Consumption & Cost	Energy (MMBtu)	Energy	Power (kW _p)	Cost
Electricity	992	290,720 kWh	205	\$46,417
Natural Gas	2,320	23,200 Therms	--	\$23,880
Oil	901	6,482 Gal	--	\$17,635
Total	4,213	--	--	\$87,932

Energy Use Intensity	EUI (kBtu/sqft)	EUI (/sqft)	EUI (kW _p /sqft)	EUI (\$/sqft)
Electricity	34.8	10.2 kWh	0.007	\$1.63
Natural Gas	81.4	0.81 Therms	--	\$0.84
Oil	31.6	0.23 Gal	--	\$0.62
Total	147.8	--	--	\$3.09

Calculations based on three year average of utility data from 2008-2010.

Figure 6. Sample Energy Benchmarking

Baseline Energy Consumption: EUI Comparison

EUI	George's Bakery Methuen, MA	Mixed-Use* Lynn, MA	CBECs 2003** New England
Electricity (Btu/sqft)	34,805	23,267	36,850
Electricity (\$/sqft)	\$1.63	\$1.18	\$1.06
Natural Gas (Btu/sqft)	81,413	46,930	50,490
Natural Gas (\$/sqft)	\$0.84	\$0.55	\$0.46
Oil (Btu/sqft)	31,616	--	44,480
Oil (\$/sqft)	\$0.62	--	\$0.35
Total (Btu/sqft)	147,834	70,197	131,820
Total (\$/sqft)	\$3.09	\$1.73	\$1.87

*Mixed-Use building in Lynn, MA used for benchmarking purposes because it is:

- Brick building built around 1900
- Mixed-use office building
- Approximately 100,000 square foot

** Commercial Buildings Energy Consumption Survey (CBECs) 2003 includes all commercial building types except "mall buildings"

Figure 7. Electric Use and Demand Previous Years 2008-2010

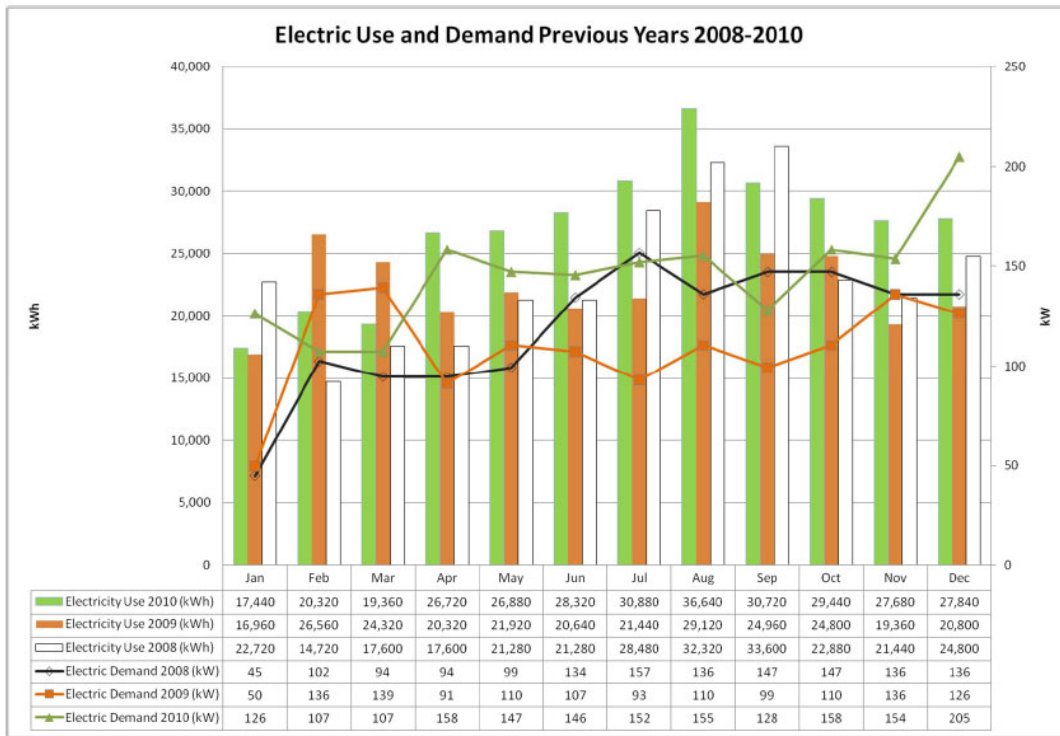


Figure 8. Sample Energy Conservation Recommendation Table

Energy Conservation Measure Table										
Client Project	ACME Corp				Potential energy conservation measures (ECMs) for consideration					
Utility Rates Elec Rate 0.137 \$/kWh Gas Rate 1.288 \$/Therm		Results Total Cost \$410,728 Total Savings \$151,911 Simple Payback 2.7 yrs			Climate Impact Table lbs of Pollutants Reduced Equiv trees planted Equiv gallons of gasoline					
					CO2 Reduction SO2 Reduction NOx Reduction					
Energy Conservation Measure	Savings Estimate (kWh)	Savings Estimate (Therm)	Savings Estimate (\$)	Cost Estimate (\$)	Potential Electric Incentive (\$)	Potential Gas Incentive (\$)	Net Cost (\$)	Simple Payback (yrs)	Status / Incentive	
1 Lighting Phase I	298,278	0	\$40,864	\$257,422	\$111,918	\$0	\$145,504	3.6	Completed / Prescriptive	
2 Lighting Phase II	150,259	0	\$20,585	\$84,651	\$13,020	\$0	\$71,631	3.5	Not started / Prescriptive	
3 Lighting Phase III	TBD	0	TBD	TBD	TBD	\$0	TBD	TBD	Not started / Prescriptive	
4 Chiller VSD	125,131	0	\$17,143	\$112,444	\$84,333	\$0	\$28,111	1.6	Completed / Custom	
5 RCx Phase II	48,557	0	\$6,652	\$17,480	\$5,000	\$0	\$12,480	1.9	Not started / Custom	
6 Boiler Upgrade	0	51,840	\$66,666	\$204,000	\$0	\$51,000	\$153,000	2.3	Not started / Custom	

Every enrolled member will receive an internet-based, real-time energy monitoring system to verify and monitor total energy use, performance of clean energy measures, and analyze the Road Map and future energy label updates. In combination with retro-commissioning this information will also be used to identify future energy saving measures. In addition, every enrolled member will be benchmarked and enrolled with Energy Star Portfolio Manager and

ASHRAE Building Energy Quotient. The team believes that Building Energy Labeling is important to long-term energy reduction, and is consistent with key recommendations outlined in the Federal Research and Development Agenda for Net-Zero Energy, High-Performance Green Buildings.

A number of key metrics will be utilized and presented in the monitoring and reports to assess pre- and post-implementation energy savings will include but not be limited to the following:

- MMBtu saved per square foot of building treated
- \$ saved per square foot of building treated
- Metric tons of carbon saved per square foot of building treated
- Quantity and type of measures implemented
- Comparison to other similar buildings per Energy Star and ASHRAE Building EQ

The monitoring system dashboard will be integrated into the same website as the Road Map for each member participating in the program.

Each Road Map is customized for each program participant and administered by a single project manager. Each potential improvement identified in the Road Map is presented to the customer in terms of initial investment, available incentive, rate of return, simple payback, and project lifespan. Project managers and customers can engage in a meaningful, practical conversation about energy conservation measures, renewable energy investments, and cost savings armed with all the relevant decision information at hand, and work together to create a long-term energy master plan, with continuous monitoring and performance measurements as the critical component in determining and acting on future upgrades and improvements. This model has proven to be extremely effective and customer response has been overwhelmingly positive.

Early Results

The Merrimack Valley Clean Energy Partnership and the Clean Energy Road Map program have both been extremely well received in the region. 26 of an eventual 31 total participants have officially been enrolled in the program to date, accounting for over 6 million square feet of mixed commercial space and over \$27 million in energy-related costs. Initial estimates suggest that, combined, these 26 participants will save up to \$3 million each year and over \$75 million over the next 20 years based on the investments and practices they adopt today. That is all money that these companies can put to productive use, like hiring and retaining employees, rather than wasting it on avoidable energy costs (**Apollo Alliance 2004**)².

Survey results of program participants and partners have revealed important lessons. It is clear that there is an incredible demand for this type of program, and equally clear that education and awareness outreach is a vital component of a successful efficiency and energy conservation program. Every participant agrees that the Merrimack Valley Clean Energy Partnership was instrumental in allowing their respective companies to meet their long-term energy goals. These goals vary depending on the client, and range from identifying and reducing wasted energy to help a facility “run smarter” for a building owner, to establishing data-intensive education

² A 2004 Apollo Jobs Report states that 21.5 jobs are created or retained for every \$1 million invested

protocols for a landlord's current and future tenants aimed at teaching tenants how the building is implementing energy efficiency projects that will lower their cost of operation and help in sustainability efforts, as evidenced by program milestones such as attaining Energy Star building status. No matter the ultimate goal, program participants agree that the collaboration between Nexamp, the Chamber, and the utilities has been vital in a successful education and project implementation. Perhaps most revealing of the success of the program, a majority survey respondents have enthusiastically demonstrated a readiness to implement the energy efficiency and renewable energy measures suggested through the Road Maps by indicating their companies will pursue most, and in some cases *all*, of the recommended improvements.

Summary

A tremendous opportunity for energy efficiency and energy conservation measures exists across the commercial and industrial sectors over the next decade. However, businesses face a number of challenges in successfully implementing efficiency and energy conservation measures, and are often unaware of the incentives and opportunities that exist. Programs like the Merrimack Valley Clean Energy Partnership can help businesses overcome these challenges and provide continuous support for long-term energy management and master planning, institutionalizing energy cost reduction and promoting workforce retention, growth and engagement along the way. Based on early success and enthusiasm, this program can and should serve as a model for similar initiatives across multiple sectors and geographic regions.

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