

The Cambridge Energy Alliance: Using Private Funds for Mass DSM Program Implementation

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ABSTRACT

The Cambridge Energy Alliance is a \$100 million, privately funded initiative to reduce the carbon footprint across the entire city of Cambridge, MA. The effort focuses on residential and commercial building energy efficiency, but also incorporates renewable energy and transportation improvements. The theory of addressing climate change on a municipal level has been bubbling over around the world, and the Henry P. Kendall Foundation has created a vision of doing so without relying on taxpayers. The idea involves a small non-profit administrative organization, a combination of grassroots and professional marketing, energy service companies to perform the necessary equipment upgrades, and financial services companies to provide the bulk of the funding in the form of low-interest loans. The plan is to also take advantage of existing utility, state, regional, and federal programs and funding sources as well, so as to not reinvent the wheel and to realize synergies to help meet the lofty goals that have been set of reducing the city's electric demand by 15% and carbon emissions by 150,000 tons in the next five years.

Introduction

To some people, the debate about climate change is ongoing. To others, the picture is clear and it's time for action to limit the effects. Many local leaders do not wish to wait for international, federal, or even state leadership on the issue, so they are moving at the municipal level and hoping to start the chain from the bottom up. The city of Cambridge, MA has always been on the vanguard of social and environmental activism, and when the Henry P. Kendall Foundation approached the city with its Energy Alliance proposal, it made the perfect match for a test case of a new, innovative approach to addressing climate concerns on a local level.

What is the Cambridge Energy Alliance?

Kendall Foundation Angle

The concept of attacking climate change one city at a time is the brainchild of Doug Foy, former Secretary of Commonwealth Development for Massachusetts and current Henry P. Kendall Foundation advisor, and Rob Pratt, former head of the Massachusetts Renewable Energy Trust and current Senior Vice President of the Kendall Foundation. Doug has been quoted as saying that cities are the "Saudi Arabia" of energy efficiency, since they are so dense in resources. Cities are a natural place to achieve the greatest benefits from energy efficiency because they have high concentrations of homes, businesses, government facilities, and institutions. The belief is that private funding sources will find this kind of concentrated opportunity more attractive than the typical statewide or utility-wide energy efficiency programs. A new arena of venture capital, investment banking, and commercial lending will ensue that will dwarf the current government-led investments in efficiency.

Once Kendall developed the program model, it needed to find a community willing to be the guinea pig. It had to look no further than across the Charles River from its Boston office.

City of Cambridge Angle

Cambridge has had the reputation as a revolutionary leader since the days of the American Revolution. It is the casual, intellectual counterpart to the business hub of Boston. Longtime home to Harvard University and the Massachusetts Institute of Technology, and recent host to one of the largest biotechnology clusters in the world, Cambridge has always been known for its role in education, social policy, and innovation.

Modern day Cambridge holds over 100,000 residents representing enormous diversity of culture, ethnicity, social status, and political leanings. A strong sense of community exists, and the City Council attempts to meld all these different constituencies into a cohesive municipal structure.

The issue of climate change seems to have a fairly unanimous verdict in Cambridge. The city joined the International Council for Local Environmental Initiatives (ICLEI) in 1999, which sponsors a Cities for Climate Protection program. Numerous studies have shown that Boston and Cambridge could suffer immense flooding under global warming scenarios, so people there want to take responsibility for its contributions to the problem and show how to be part of the solution. Furthermore, they realize the economic benefits in terms of job development and energy cost stabilization that result from addressing this challenge.

Cambridge has had a Climate Protection Plan since 2002. The goals are to reduce greenhouse gas emissions by 20 percent below 1990 levels by 2010 and to acquire 20% of municipal power from renewable sources by 2010. A Climate Protection Action Committee meets monthly to discuss ways to reduce energy consumption in the city. It is composed of city staff, utility representatives, business leaders, and concerned citizens. Every year, the group creates an Annual Report highlighting successes for the past year and new plans for the coming year. It tracks historical annual energy usage data for the city to measure results. Over 80% of the greenhouse gas (GHG) emissions in Cambridge are the result of energy use in buildings.¹

Although many Cambridge businesses and residents take advantage of the energy efficiency programs offered by the local electric and gas utility, NSTAR Electric and Gas, the goals have been slipping further away as the population and economy grow. The city was looking for radical ways to enhance its efforts, and when Kendall came knocking, the opportunity seemed ripe for the picking.

The Partnership

The decision was made to create a new entity, separate from either the city government or the Kendall Foundation, so that it could stand on its own and be replicated in other cities where such institutional support may not exist. In order to ease the incorporation of a non-profit entity, the existing Cambridge Health Alliance, a public health institution, spun off the new organization, appropriately called the Cambridge Energy Alliance (a public contest was held for the naming, and CEA won).

CEA consists of a small professional staff, while also relying on industry experts and trusted energy service firms and other contractors to implement the program. Members of both the city and Kendall, along with business, utility, and citizen leaders, serve on the board of the organization to provide a full perspective. Support from NSTAR has been unflagging from the start. This buy-in is critical to the CEA because of NSTAR's current energy efficiency programs and relationships with customers, service providers, and the city government.

¹ <http://www.cambridgeenergyalliance.org/faq.htm>

The Alliance will reach out to residents, businesses, institutions, and municipal government with a host of programs to reduce the use of electricity, natural gas, oil, gasoline, diesel fuel, and water in Cambridge. The Alliance will also promote efforts to install clean energy (such as solar panels) and dual use heat and power units at facilities throughout Cambridge. The Cambridge Energy Alliance will design, market, finance, document, and manage this massive effort to improve energy efficiency throughout the city.²

The official kick-off for the CEA took place in March 2007. Speakers included Massachusetts Governor Deval Patrick, Massachusetts Secretary of Energy and Environmental Affairs Ian Bowles, Cambridge Mayor Kenneth Reeves, Kendall Foundation representatives, and NSTAR CEO Tom May.

CEA Goals

Within five years, the Alliance expects to save 164 million kiloWatt hours of electricity (10%) annually and to cut the demand for electricity at peak use times by 50 MWs, or roughly 15% of the use today. The project will also cut demand for natural gas, oil, water, and transportation fuels. The program will reduce annual GHG emissions from the city by 150,000 tons (10%) by 2011.³

To achieve this, the Alliance will seek participation by the majority of customers in every category: residents, businesses, municipal government, and institutions. The ambitious goal is to reach a 50% penetration rate in all sectors, including ensuring the participation of all the major businesses and institutions in Cambridge.

How much money will the project save consumers and City Government?

Given estimates of the future price of energy, the value of the energy savings achieved is expected to be roughly \$160 million over the next 10 years. Some of the money from the energy savings will be used to pay back the costs of the energy saving investments, and the rest will be used to reinvest in the revolving fund. Once the costs of the installations are paid off, all of the energy bill savings will go to participating customers.⁴

What are the program's benefits?

The benefits of this city-wide aggregation of energy efficiency include:

- saving customers money through lower energy bills,
- improving living and working environments,
- creating new jobs and growing the city's economy
- achieving a substantial reduction in the "carbon footprint" of the entire city,
- reducing emissions of other pollutants,
- stabilizing energy costs at a time when energy demand is growing, and
- increasing energy security and reliability.⁵

Organizational Structure

² <http://www.cambridgeenergyalliance.org/faq.htm>

³ <http://www.cambridgeenergyalliance.org/faq.htm>

⁴ <http://www.cambridgeenergyalliance.org/faq.htm>

⁵ <http://www.cambridgeenergyalliance.org/faq.htm>

The goal of the organizational structure is to minimize administrative costs of the program and utilize existing resources through the city, utility, and community. The idea is to bring together the best of these initiatives and enhance them with new ideas. The financing and marketing will be performed in-house, but the implementation will primarily be left up to outsourced partners.

The Board is currently in the midst of a CEO search, to find the right person to be the figurehead for the CEA. That person will maintain the vision and create the relationships that will be required to make the effort succeed. Then a CFO will be hired to attend to all the financial dealings. Aside from that, very little administrative personnel should be required.

Financing

Start-up funding for the Cambridge Energy Alliance has been provided from private charitable foundations, including the Henry P. Kendall Foundation, the Barr Foundation, and The Chorus Foundation. The initial seed amount was \$500,000 for start-up costs.

The project incorporates innovative financing techniques that could be used to develop similar energy efficiency projects in other Massachusetts communities and across New England. Some participants will have the ability to finance investments in efficiency themselves. Others may qualify for savings through NSTAR's efficiency programs. But for many participants, efficiency investments will initially be paid for through simple, short-term loans. The Cambridge Energy Alliance will arrange for loans through a private investment company or local banks. A portion of the savings on energy bills will be used to repay the loans.⁶ Billing for the loans will be managed through a third-party operation.

Approximately 80% of the financing will come from private sources, without obligation to Cambridge or the state, an approach that should be highly attractive to cash-strapped cities and towns. Bostonia Partners, LLC is the partner that is arranging the private financing. Bostonia is a financial services company and investment bank specializing in developing new credit structures supporting public/private partnerships. The goal is to raise \$70 million for a revolving line of finance. \$50 million will come from pension and annuity providers and life insurance companies; \$5 million in private equity or subordinated debt; and \$15 million from public and utility-related sources. No municipal funds are directly involved. Because savings will be paid into a revolving fund, \$100 million in energy efficiency implementation will result over 5 years.⁷

The revolving fund will be set with funding from private investors and revenues from new public programs designed to stimulate energy conservation savings. As a result, energy savings and clean energy installations will in most cases be paid for by project financing and be repaid from energy savings resulting from conservation measures installed in homes, businesses, government facilities, and institutional buildings such as universities. The theory is that savings from energy efficiency measures with quick paybacks (such as lighting) will help pay for more comprehensive measures with longer paybacks (such as solar PV). These projects will be designed to complement and amplify the existing efficiency efforts of NSTAR. No upfront costs will be required for such installations, and there will be no cost to Cambridge or state taxpayers.⁸

Challenges of a Loan Program

⁶ <http://www.cambridgeenergyalliance.org/faq.htm>

⁷ Morgan, S. (2007). Slide 22.

⁸ <http://www.cambridgeenergyalliance.org/faq.htm>

Many utilities and state agencies around the country have offered loan programs to energy efficiency program participants, with mixed success⁹. For residential customers, while financing may make projects more affordable, such an investment may fall far down the list of debt they wish to carry. For commercial customers, many have their own banking relationships or internal capital structure, and adding another layer would not be worthwhile. Small businesses may be the sweet spot for loan-based programs, since they are interested in making money-saving investments and often do not hold lines-of-credit from banks¹⁰.

One of the major differences between the CEA and other such loan programs has to do with the source of funding, rather than the targeted end users. CEA's loans, as previously explained, are funded by private sources. This factor has at least two major consequences: private lenders perform greater due diligence than utilities or states in assuring that they will get a return on investment; and they are willing to take greater risk and offer more flexible terms in order to get deals done. The first point means that the lenders at hand must feel that the CEA has a promising outlook, otherwise they wouldn't agree to fund it. The second point means that regulatory oversight will not cramp the creativity of the lending potential, so that more special cases can be addressed.

For end users, the fact that the CEA is looking to fund a greater range of projects with longer payback periods may make the loan proposal more attractive than simply funding basic efficiency measures. The chance to finance solar panels or cogeneration could entice people or businesses to undertake more comprehensive projects and appreciate the magnitude of the investment more.

Public/Utility-Related Funding

The 20% of public and utility-related funding will generally come from a number of incentive programs that were established in part to promote energy efficiency. By aggregating energy demand reductions the Cambridge Energy Alliance will also earn revenues from these other sources, enabling the creation of the revolving fund that can continue to keep the costs of serving Cambridge residents and businesses low for the next five years.¹¹

Utility Incentives. The Alliance has worked closely with the local electric and gas utility, NSTAR Electric and Gas, from the outset of the effort. NSTAR already pours about \$4 million per year of electric Systems Benefit Charge funds and gas efficiency funds into Cambridge customers of all classes.

Three committees have been created between the CEA and NSTAR to assure adequate coordination between programs: an Operations Committee to clarify the basic structures of each program and the roles of each going forward; a Finance Committee to settle the details of how future NSTAR funds will be appropriated to Cambridge; and a Steering Committee to oversee high-level collaboration and address any issues that arise from the other two committees.

No specific funding limits have been set on Cambridge, but it is clear that NSTAR cannot divert all of its funding to Cambridge and away from the rest of its territory if demand rises exponentially. The CEA initially proposed to perform billing for loans through NSTAR on utility bills, but it was determined that that was not feasible, so NSTAR assisted CEA in finding a third-party billing operation.

⁹ <http://www.eebestpractices.com/index.asp>

¹⁰ This is the author's experience as a former Small Business Solutions loan program manager at NSTAR Electric.

¹¹ <http://www.cambridgeenergyalliance.org/faq.htm>

Forward Capacity Market. The Cambridge Energy Alliance is eligible to take advantage of several new sources of revenue, including a new regional electricity market demand reduction program. Communities across New England have been facing pressing issues such as energy cost increases and price spikes, as well as threats of regional energy supply shortages. To address these issues, the Independent System Operator of New England, the organization mandated to ensure adequate electricity supply in the region, is making funding available for programs to increase supply or reduce demand.¹² This Forward Capacity Market (FCM) is open to traditional supply as well as new demand-side resources. CEA is eligible to bid its expected future demand savings into the FCM, and an auction will be used to determine what resources qualify and what the price will be. If the CEA succeeds in the auction, it will be responsible for obtaining the capacity it has committed to and for measuring, verifying, and reporting its actually monthly production. NSTAR has agreed to assist CEA in its M&V duties as a part of its overall M&V efforts. The FCM has the potential to add approximately \$1 million per year to the CEA's coffers.

Regional Greenhouse Gas Initiative. Second, by aggregating city-wide energy savings, the Cambridge Energy Alliance will be able to bring in revenue by participating in new programs aimed at reducing greenhouse gases and increasing renewable energy use.¹³ The Regional Greenhouse Gas Initiative (RGGI) is an effort by ten northeast states to curb carbon-based emissions in the area. RGGI will be a cap and trade system, where credits will be distributed to participants and then can be bought and sold in a marketplace. Each state must enact its own version of the rules for disbursing credits, since proceeds can be used for different purposes. It appears that Massachusetts intends to use the proceeds from the credit sales to fund additional energy efficiency, which could include the CEA. It is too early to speculate on the financial implications this may hold.

Massachusetts state clean energy fund. Based on the excitement generated by the CEA kick-off, the state has developed a \$2 million fund to help start-up other similar municipal initiatives. Boston is believed to be next on the list.

Marketing

The CEA effort will be pushed from the top down and pulled from the bottom up. First, the City of Cambridge will use its "brand" within the community to aggregate interest and reach all sectors. The City has many contact points with residents and businesses, which would make good conduits to introducing the CEA. All the different stakeholders involved have trusted relationships with the City, and the City has the authority to deal with all targeted sectors.¹⁴

Second, grassroots promotions will be undertaken to get the depth of penetration that is desired. Existing community groups, such as Green Decade, are being engaged to enlist their membership's support and volunteerism. On the residential side, neighborhood-by-neighborhood, door-to-door campaigns are planned to inform every individual, make people comfortable with the initiative, raise a sense of a bigger purpose, and assert some level of peer pressure. On the commercial side, window stickers for small business storefronts may be utilized to display participation and let patrons know who is involved. Large businesses will be engaged from both sides, as they desire to stay on the good side of local politics and keep a positive reputation with their customers, employees, and neighbors.

¹² <http://www.cambridgeenergyalliance.org/faq.htm>

¹³ <http://www.cambridgeenergyalliance.org/faq.htm>

¹⁴ Morgan, S. (2007). Slide 11.

Coordination with NSTAR's energy efficiency marketing efforts will also occur. NSTAR sends out bill inserts, places advertising, attends community events, has vendors reaching out to mass markets, and has personal contacts with large businesses. Each of these avenues will include mention of the CEA when Cambridge-specific messaging is possible. Likewise, CEA marketing will cross-reference NSTAR programs to maximize the reach of the message.

Finally, the implementation vendors themselves, which are described in greater detail below, will conduct direct marketing to drum up business for themselves.

Implementation

The actual on-the-ground implementation of the CEA is based on the well-known and successful Energy Service Company (ESCO) model. ESCOs provide free upfront energy audits for customers. These audits will cover electric efficiency measures; other fuel types such as gas, oil, or steam; water efficiency, and distributed generation such as combined heat and power or solar photovoltaic. The ESCO will put forth a proposal to the customer, showing the costs, estimated savings, any incentives that would apply, and financial terms. The customer is free to choose any and all measures and can either use the CEA financing or self-finance by some other method. The ESCO will then perform all desired work and uphold any warranties that may apply. CEA will contract with independent inspectors to check on the ESCOs' work in order to bolster customer confidence in the process.

The Board has already hired an engineering firm to conduct energy audits for businesses that are ready to get on board. The major part of the start-up process has been the Request for Qualifications from ESCOs that are interested in serving each of the CEA's target markets: Small Residential, Large Multi-Family Residential, Small Commercial, and Large Commercial and Industrial. CEA held a public bidding process and received proposals from many of the industry's leaders. The winning bidders were just recently announced, so implementation should begin shortly. The Small Residential and Small Commercial sectors will have one ESCO each providing services, while the Large Residential and Large Commercial and Industrial groups will have two ESCOs each, giving customers a choice among proposals and companies.

Many of the chosen vendors have contracts with NSTAR to perform services as well (although this was not part of the selection criteria and NSTAR was not involved with the selection process). This synergy will greatly ease the coordination between programs for marketing and incentive payment purposes.

For municipal buildings, a separate Energy Performance Contract will be bid out to comply with state labor laws regarding prevailing wages and competitive bidding.

Measuring Success

As mentioned previously, independent inspectors will be utilized to assure project efficacy and persistence. In order to actually measure the savings that accrue and compare to the goals, the Cambridge Energy Alliance will track and aggregate the benefits to maximize the impacts of the program. CEA has worked very closely with NSTAR to obtain usage history for the entire city to build up a baseline and keep tabs on progress. NSTAR provided three years of aggregated historical electric and gas data for the city, by rate code to breakout residential and commercial sectors, which will be used, weather-adjusted, to create a baseline on which to base future savings. This data included energy and demand usage and cost information. Going forward, the same information will be provided on a monthly basis to log progress.

For individual customers, a confidentiality agreement had to be crafted before data could be shared. The utility has an understandable policy of not sharing customer-specific data without the customer's approval. Once customers sign up for the program and approve of utility information sharing, CEA will request 12 months of usage history from NSTAR to build that individual's baseline, against which its energy savings and loan repayment schedule will be measured. Again, monthly updates will be provided for tracking purposes.

Status and Timeline

After the kick-off event in March, the ideal was to have ESCOs selected by September and implementation begin in October. In reality, ESCO selection was not finalized until early November, and the first projects probably won't get underway until the beginning of 2008. Also, financing has taken longer than anticipated to get in place.

Production is scheduled to ramp up over the next four years and peak in 2011. After five years, the effort will be evaluated and determined if continued endeavors are warranted or changes are prudent.

The Big Picture

Citizens and business leaders have an opportunity to be part of a unique effort that will create significant economic benefits for the city while maximizing their efforts to address climate change. Beyond the boundaries of Cambridge, it is the intention of the Kendall Foundation to create a replicable model of collaboration between communities, utilities, and businesses to achieve energy efficiency and carbon reductions for other cities and towns in the state, region, and nation.¹⁵

References

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¹⁵ <http://www.cambridgeenergyalliance.org/faq.htm>