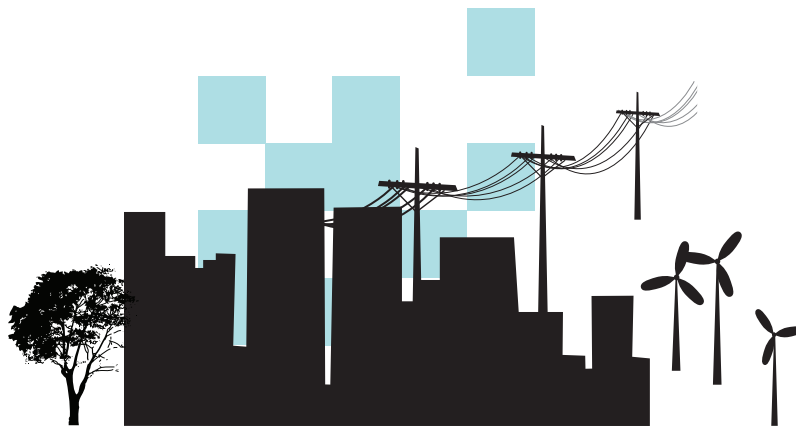


Enabling Deep and Scalable Energy Efficiency in Communities

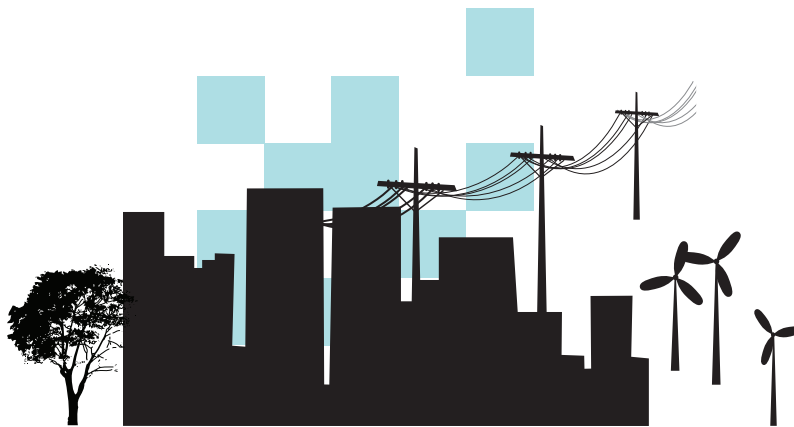


Massachusetts
Institute of
Technology

11.946

COMMUNITY ENERGY EFFICIENCY PRACTICUM

Enabling Deep and Scalable Energy Efficiency in Communities



11.946

COMMUNITY ENERGY EFFICIENCY PRACTICUM

ENABLING DEEP AND SCALABLE ENERGY EFFICIENCY IN COMMUNITIES
REPORT OF ENERGY EFFICIENCY PRACTICUM 11.946

PRINCIPAL INVESTIGATOR/INSTRUCTOR:

Harvey Michaels
Energy Efficiency Research Scientist and Lecturer
Department of Urban Studies and Planning and MITEI
(617) 253-2084
hgm@mit.edu 9-326

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Department of Urban Studies and Planning
School of Architecture + Planning
Massachusetts Institute of Technology
Cambridge, MA

PARTICIPATING STUDENTS

Community Systems for Energy Efficiency Service Innovation:

Derek Brine, Jacquelyn Dadakis, Ingrid Heilke, Eric Mackres, Adam Rein, Amit Sarin

Community-based Campaign and Energy Information Feedback Systems:

Rachel Henschel, Allison Lassiter, Patrick Lynch, Christina Santini, Adam Siegel

Community Enhancement of Energy Efficiency through Planning Processes;

Bjorn Jensen, Josh Sklarsky, Andre Ramirez, Gary Shu, Carolyn Hayek

TEACHING ASSISTANT: Veronica Metzner

FACULTY ADVISORS: Ellen Tohn, Tom Piper, Herman Karl

NSTAR ADVISOR: Susan Haselhorst

REPORT PRODUCTION: Sarah Madden

Special thanks to guest class contributors: Kenneth Mirvis and Brian Habeisen (and others), Watertown Energy Committee; Frank Gundal and David MacLellan, NSTAR; Phil Giudice and Meg Lusardi, MA Dept of Energy Resources; Josh Hassol and Lilah Glick, Cambridge Energy Alliance; Shubhada Kambli, US EPA Region 1; Stephen Cowell, Conservation Services Group; Beth Williams, MIT DUSP Alumna and National Grid; Alice Leung, Babson College.

CONTENTS

vii	EXECUTIVE SUMMARY
2	SECTION II: Energy Efficiency Partnerships: Innovations to Extend Program Reach and Depth
16	SECTION III: Utility Support to Community Energy-Saving and GHG reduction Campaigns
28	SECTION IV: Utilities Helping Towns Drive Efficiency in Public Buildings and New Buildings
38	APPENDIX 1: Extended Reach Group
40	APPENDIX 2: Campaign Group
43	APPENDIX 3: Municipal Group

For several decades, energy use has been trending towards irreconcilable energy supply and demand with significant economic and political consequences, as well as towards potentially irreversible and destructive climate change. Many studies conclude that energy efficiency is the largest, least expensive and cleanest of our energy options and show that we can possibly reduce the energy use of buildings by 50% from current trends by 2030. Doing so would produce at least 25% of the mitigation needed to meet our greenhouse gas goals (McKinsey, 2009).

However, successfully deploying deep efficiency across all homes, buildings, and communities is a challenging policy objective. While states and utilities have developed experience over several decades of programs targeting business and consumer energy efficiency, to date these programs lack both the scale and depth to achieve large scale reductions in energy consumption that we now understand are required to meet climate and supply concerns.

In the spring semester 2009, the MIT Department of Urban Studies and Planning (DUSP) conducted 11.946; the **Energy Efficiency Practicum** instructed by Harvey Michaels, which focused on study and design of policies and planning processes that have the potential to enable deep and scalable energy efficiency. Veronica Metzner, Sloan Master's candidate 2010, ably served as Teaching Assistant.

Seventeen graduate students, including many DUSP students, joined by students from Management and Engineering Systems, enrolled in this class to explore their interests in large-scale deployment of energy efficiency created by utility funding models, carbon cap-and-trade, energy saving building codes, appliance standards, and green community practices.

The Practicum's research focused on community-based energy efficiency strategy development, with community defined as a broader term than only city or town. The class examined neighborhood, affinity group, and Web 2.0 online communities for their relative dynamics, advantages, and pitfalls in their approach to the topic. The Practicum as well focused on skills and opportunities for students to develop and analyze new policy ideas generally, as well as effective consultation with community, industry, utility, federal, and state energy policy decision makers.

With appreciation for their generosity and insight, we acknowledge that NSTAR Electric and Gas, an energy utility serving Eastern Massachusetts, provided financial and substantial process support to the Practicum class and students. In particular, Susan Haselhorst attended several classes and provided ongoing access to information and feedback. NSTAR has also sponsored pilot community energy efficiency programs in Marshfield and Cambridge, MA.

We also acknowledge class participation critical to discovery of effective solutions from DUSP Research Scientists Tom Piper and Herman Karl, and DUSP alumna Ellen Tohn, an environmental consultant, as well as the City of Cambridge Energy Alliance, the Town of Watertown Energy Efficiency Committee, the Massachusetts Department of Energy Resources, the U.S. E.P.A. Community Energy Challenge Program, Conservation Services Group, and National Grid.

WHY COMMUNITY-BASED ENERGY EFFICIENCY?

Through interviews, research, and policy review, the class identified some of the most prominent barriers to efficiency. Noting that penetration rates on efficiency programs are 2% of the target population, the class considered strategies for effective innovation in program delivery.

Based on research and pilots, anecdotal evidence exists that community-based efficiency campaigns, such as the ones conducted in Marshfield, MA and Boulder, Colorado, might attract broader and deeper participation in efficiency than we have seen to date.

Collective action is key: While most existing programs encourage individual action, achieving deep efficiency deployment might be achievable with a collective action commitment by communities, aided by targeted services, information tools and financial resources. Underlying this hypothesis is evidence that municipalities and community groups may provide a critical platform of trust, social networks, innovative ideas and the expanded capacity required to achieve more effective efficiency campaigns.

Communities are enthusiastic about the role: Broadly, many communities have shown enthusiasm; in New England, a majority have formed energy efficiency committees targeting either reduction in town facility energy costs, or setting community goals for Greenhouse Gas reductions, or both. Communities bring trusted access to energy decision-makers regarding town buildings and as well can serve as conduits to reach residential and commercial energy consumers in their jurisdiction.

Utilities and communities can support each other's energy efficiency needs: During the semester, participating regulators, policymakers, and utilities alike saw promise in this community-based efficiency approach. However, utility and state leaders addressing the class both stressed that utilities hold the primary long-

term responsibility and funding for achieving efficiency. As a result, the class explored approaches that utilities and communities could take in partnership that may result in deeper, more comprehensive sets of efficiency improvements, leveraged by available state and federal funds.

The community energy efficiency hypothesis is gaining momentum: The 2009 ARRA stimulus package is funding Energy Efficiency Community Block Grants, state energy programs, and low income weatherization with \$3-6 billion each. In addition, some states, including Massachusetts, directly fund community efficiency, and have begun to assemble utility data streams to serve community energy programs. And as well, utilities have begun to reach out to cities and communities to help them meet their goals. Utilities can provide information, tools, and incentives, while community leaders have the ability to leverage local networks to reach a broader and more attentive audience.

To be successful , communities need a new and innovative energy efficiency support system: Especially for small communities with limited professional staff, the Practicum found that the support and enthusiasm of the citizens to encourage energy efficiency can be overwhelmed by the process difficulties. Finding ways to help communities, making the process easier and more manageable with appropriate tools, funding, professional and process support, may prove to be important keys to achieving dramatic success on the promise of energy efficiency.

NOTABLE QUOTES FROM CLASS GUESTS:

“Efficiency methods are the vegetables;
renewables are the dessert.”

EPA COMMUNITY ENERGY CHALLENGE COORDINATOR
SHUBUDA KAMBLI

“Utilities have the mandate to Think big, be
bold, identify obstacles.”

PHIL GIUDICE, MASSACHUSETTS ENERGY COMMISSIONER

“Communities may be the partners we
need, since they can tap trusted local networks
better than we can.”

NSTAR'S SUSAN HASELHORST

“We need easy; we want benchmarks;
we like rewards and need to understand
consequences.”

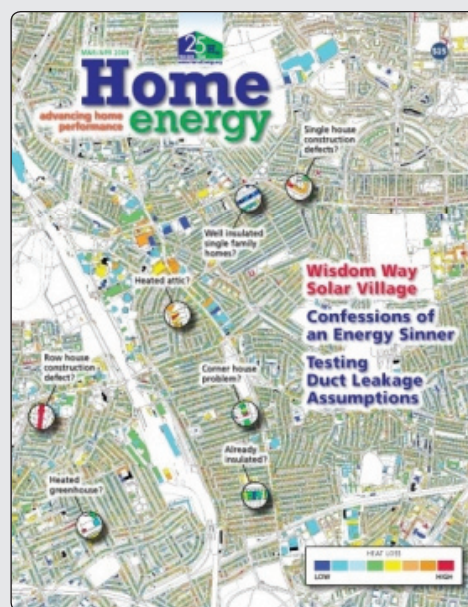
“How do we work with utilities?
What holes do they leave?”

WATERTOWN ENERGY EFFICIENCY COMMITTEE

“50 million homes can save 50% with \$5000
investment. Stimulus and utility funds alone
will pay the full cost for over 3 million homes.

That's 100 times our capacity and we're 40%
of the market.”

STEPHEN COWELL, CONSERVATION SERVICES GROUP



The cover of Home Energy magazine, March/April 2009, showing a neighborhood map of heat emitted from roofs.

The Concept of a Utility-Community Energy Efficiency Deal

The research focused on initial investigations of promising directions in utility-supported:

- Community-based program innovations to cost-effectively engage consumer segments that have under-participated in efficiency programs
- Campaign strategies and tools to help communities engage residents, businesses and others
- Activities to help and encourage communities to improve energy performance of public buildings and publicly permitted buildings

In structuring any partnership, the underlying interest of the key parties must be satisfied for the partnership to be robust and sustainable. In this case the key parties are the utilities and communities. The practicum sought to develop a deal that both parties would find compelling. What do each of the key partners need?

Utilities are under pressure in states such as Massachusetts to show significant energy cuts in a timely and cost-effective manner. Communities are ripe targets to help utilities meet these needs, because communities not only exist in all geographic regions of the Commonwealth, but also own buildings that could benefit substantially from energy retrofits, and are conduits to reach residential and commercial customers in their jurisdiction.

Communities, in turn, need an easy way to access, undertake, and finance energy efficiency (EE) efforts to reduce their own operating expenses and support community energy efficiency activities, particularly in these challenging economic times. Beyond municipal operations, communities are comprised of individuals, families and businesses who may be interested in undertaking energy efficiency measures to save money and address environmental goals.

Energy efficiency needs to be easy to undertake for both unsophisticated towns that do not have staff knowledgeable in energy management, as well as larger cities that may have energy expertise. EE activities must also produce results in a short run so that communities can see the benefits of their actions (e.g., reduced operating expenses, more comfortable buildings). Results should also

be visible to town members (e.g., reductions in operating expenses) in order to garner continued community support.

A clear win-win scenario exists that meets the overlapping needs of utilities and communities. To pursue this win-win scenario, the class proposed that utilities extend an open offer to all communities to participate in the utility-community program. This program would offer communities varying levels of utility support in exchange for varying levels of community commitment. Under this deal, the utilities would sign a Memorandum of Understanding (MOU) with participating communities committing each party to specific actions.

A sample of the commitments of both the utilities and the communities are shown below and discussed in more detail in this report.

SUMMARY OF FINDINGS

Over the semester, the students worked individually and collectively to explore the community efficiency concept, with each student developing a foundation expertise in some aspect of the concept, including various topics in funding, campaign strategy, municipal services, and hard-to-reach populations.

The report that follows describes their work. Below is a summary of the findings of the three group analysis and design projects:

- *Community Systems for Energy Efficiency Service Innovation*
- *Community-based Campaign and Energy Information Feedback Systems*
- *Community Enhancement of Energy Efficiency through Planning Processes*

UTILITY GIVES

1. Single point of contact for community EE efforts, preferably across utilities
2. A streamlined source of information for community EE managers by providing a Town Manual and Workshops
3. Funds building operator and stretch code training
4. Financing options
5. Access to:
 - community innovation funding to market energy efficiency services
 - community energy campaign tools
6. EE SWAT team to assist committee to:
 - review benchmarking, provide audits and draft specifications for EE
 - assist in arranging financing and overseeing work
 - technical and operational assistance

UTILITY GETS

1. Single point of contact for community EE
2. Reduced marketing expenses for menu of existing programs by leveraging community trusted networks.
3. Fulfillment of state and federal energy savings goals through increased participation in programs associated with:
 - building operator training*
 - innovation funding
 - community energy campaign
 - municipal building retrofits
 - adoption of stretch code
4. Better customer service and improved public image

COMMUNITY GIVES

1. Single point of contact for EE
2. Mandatory training for municipal building operators
3. Stretch code training for municipal staff
4. Municipal data needed for benchmarking
5. Community leadership commits to participate in workshop
6. Commitment to adopt the stretch code
7. Commit to undertake recommended EE actions in municipal buildings
8. One other item from pre-approved list (e.g., streamlined permitting for green buildings, promotion of advanced buildings, etc.)

COMMUNITY GETS

1. Single point of contact
2. Data on building energy usage/expenses & workshop to recommend priority actions
3. Training for building operators which will likely result in energy savings
4. Access to additional innovation funding for residential & commercial EE programs
5. Access and training to use community energy campaign tool
6. Energy savings in municipal buildings
7. Substantial technical assistance in selecting EE actions, drafting specifications, and overseeing work

GROUP ANALYSIS:

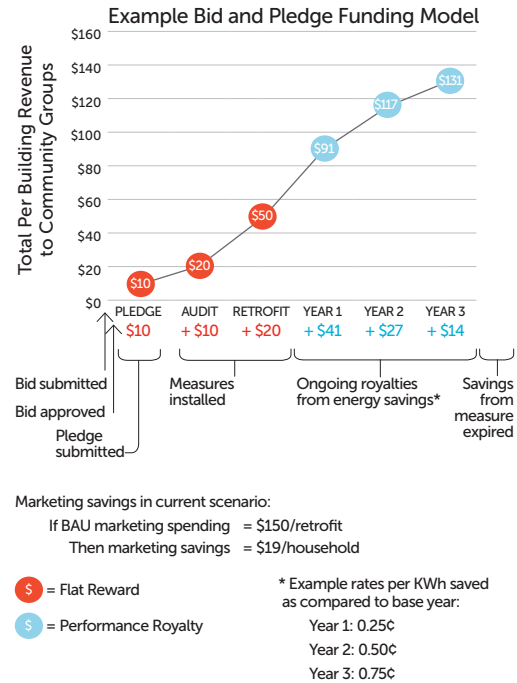
Community-based Efficiency Service Innovations to Extend Program Reach and Depth

The class explored new approaches to implementing energy efficiency that emphasized partnerships with local community groups. Community-based approaches may address many of the common barriers to energy efficiency (EE), including lack of trust, lack of transparency, and split incentives. At the same time, EE programs can increase both their cost effectiveness and equity by leveraging the resources of community groups -- such as nonprofits, faith-based organizations, or trade associations. This group worked on the design and likely outcome of programs such as:

Approaches to Leverage Community Resources for Efficiency Marketing – Community groups can act as outreach arms for state, federal, or utility efficiency programs, by recruiting their members and networks to undergo comprehensive energy efficiency audits and retrofits. In concept, community groups can be offered an incentive (form to be determined) for each member that takes a measurable EE action, reducing energy efficiency marketing costs while increasing participation among hard-to-reach groups.

Innovation Fund – Efficiency-implementing agencies allocate funding for pilots and evaluation of experimental approaches to EE with the goal of discovering new cost-effective methods of outreach and deployment. This would fund effective models that do not fit within the current utility planning framework, such as neighborhood aggregation, building- or industry-specific interventions, behavior change, or unproven new technologies.

Approaches to Create Sustained Capacity for Efficiency Retrofits – The current model of efficiency-as-economic-stimulus creates a concern by groups considering expanding their service capacity: that after the stimulus funding runs out, efficiency programs will be significantly reduced, potentially destroying NGO and industry investments in permanent systems for efficiency retrofit services.



The Practicum explored an alternative concept: government/utility partnerships with local firms and community groups as a key strategy for creating **sustainable long term efficiency provider systems**. A key issue here is the need for new methods to manage low income weatherization programs, to achieve more efficiency benefits as well as creating an ongoing trade and industry beyond the support of stimulus funding.

Other research topics examined to promote efficiency within the community include:

- EE-green lease clauses to address the split incentive between principal and agent in rental properties
- Revolving loans and on-bill financing to convert one-time funding sources into ongoing streams of capital for future EE investments
- Financing, workshops, and energy labeling regulations to target small business participation

GROUP ANALYSIS:

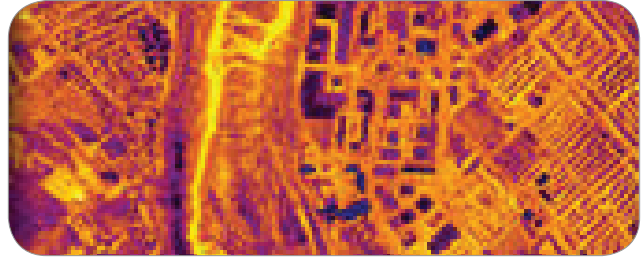
Community Energy-Saving and GHG Reduction Campaign Strategies and Tools

In order to resolve several of the barriers to energy efficiency, the class explored options for a community-based campaign for energy efficiency. The goal of a community-based campaign would be for a utility company to take advantage of trusted community networks in order to create excitement and commitment for adopting energy efficiency. This group identified five key aspects of a community campaign:

- Collect and standardize information about programs and processes for efficient access
- Disseminate data about individuals and communities to heighten awareness of and learning about their energy usage *and* encourage behavior change through competition
- Create a flexible campaign platform that is customizable based on community goals including adjustable incentives and a town specific look and feel
- Tap into local networks, word of mouth, and community action to build trust and enthusiasm for utility programs
- Utilize rewards, competition and incentives to generate enthusiasm for energy efficiency

These points lead the group to recommend two new products, which together, would reinforce each other to help communities create an effective town-wide program:

Community-based Energy Information Systems – It is posited based on anecdotal research that a collective performance measurement can be more motivating than individual information feedback. While individual information systems are under development and testing, much less has been done to conceptualize, examine, and test the performance of various approaches to collective information presentment. Geographic Information Systems (GIS) provide a promising structure to provide collective goal-setting, benchmarks, and scorekeeping, as well as support community leaders building efficiency campaigns. The research question is whether community feedback can help drive higher adoption rates and deeper efficiency.



Thermal mapping in England demonstrates which roofs lose the most heat to the atmosphere, an indicator of the insulation capacity of the roof. <http://www.bluesky-world.com/products/>

The practicum examined GIS-driven data systems, and determined that systems can be assembled to provide a community-level view of carbon footprint and benchmarked use, as well as support group comparisons (community, neighborhood, facility type). By layering Web 2.0 approaches on top of the system, groups within the community can share data and work jointly to meet individual and group goals. With the growing availability of Advanced Meter/Smart Grid short interval data, inferential analytics can make the data more useful and compelling. The Energy GIS could be part of a community online gathering (*Community Energy Café*) to learn more about energy efficiency, compare tips and tricks, and track their progress as they adopt energy efficiency upgrades. It could be designed to disseminate information and provide an online community support, and as well, direct people to participate in the local initiatives.

Town Manual – Town leaders (whether elected officials, well-connected individuals, or energy efficiency champions) are interested in implementing deeper retrofits in their towns. However, they are often unsure on the specifics of energy efficiency and how to best organize the process.

To address this problem, the class determined that town leaders would significantly benefit from an online “manual” explaining how best to work with all town constituents and all available energy efficiency implementation resources.

GROUP ANALYSIS:

Community Enhancement of Energy Efficiency through Planning Processes

Municipalities have a key role to play in working with utilities to deploy efficiency in their communities by retrofitting and managing public buildings to reduce energy usage, creating incentives to build advanced green buildings, and incorporating energy efficiency into their community planning and regulations. This class group proposed a framework that unites interests and resources to better equip municipalities in achieving energy efficiency on the local scale. Utilities can offer communities technical and financial assistance, in return for assurances of pursuing efficiency-promoting town activities and policies. This program relies upon a Memorandum of Understanding (MOU) signed by the utility and the municipality providing commitments to EE actions.

Town Building Management and EE Retrofits – Municipalities have the opportunity to lead by example in achieving energy efficiency, starting with their own buildings. Reducing energy usage in public buildings offers municipalities could the opportunity to significantly reduce town expenses at a time when many are facing budget difficulties. Two key strategies with municipal buildings are ripe for action: training facility managers to ensure energy is not wasted and retrofitting public buildings to reduce ongoing energy demand.

Promoting Advanced Buildings and Enhanced Energy Codes – With funds to leverage interest and provide technical support, municipalities can promote advanced buildings for new construction and permit-required retrofits, with strategies such as:

- Adopting Energy “Stretch Codes” and Train Municipal Building Department Staff
- Applying Aggressive Energy and Green Building Requirements to Public Buildings
- Creating Regulatory Incentives for Advanced Buildings (e.g., accelerated permitting, density bonus)

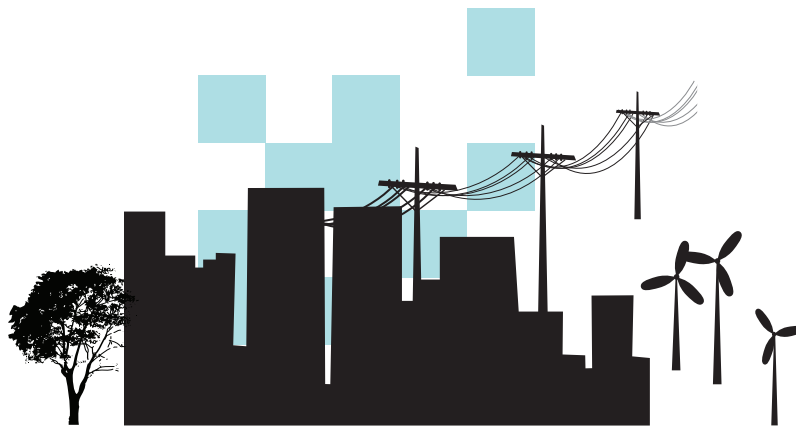
Encouraging Energy Efficiency Through Planning Ordinances and Bylaws – Municipal Planning and building departments have a unique opportunity to help achieve energy efficiency within their communities through the adoption of ordinances and bylaws. For example, the setting, design, and construction of a building can significantly affect the energy needed for cooling, heating, or lighting. More energy efficient designs can be encouraged through simple changes in zoning that enable floor-area ratio exclusions, changes to building setbacks and height restrictions, making buildings solar-ready, and compact growth.

Technical Assistance Workshops for Participating Communities – Recognizing disparity in current community involvement and expertise, the group proposed a technical assistance program that responds to communities’ needs at each level.

REMAINDER OF REPORT

The next three chapters provide more detail on the proposals of the three group proposals summarized above. Following the proposals is a chapter on tools, including some detail on the proposed town manual, website, and workshop, followed by appendices supporting the body of work.

Enabling Deep and Scalable Energy Efficiency in Communities



11.946

COMMUNITY ENERGY EFFICIENCY PRACTICUM

ENERGY EFFICIENCY PARTNERSHIPS: INNOVATIONS TO EXTEND PROGRAM REACH AND DEPTH

THE CHALLENGE AND OPPORTUNITY

Recent dramatic changes in legislation and funding sources for EE require that utilities, municipalities and states re-examine their respective strategies and roles in the implementation of EE programs. Common EE programs presently lack both the scale and depth required to achieve large scale reductions in energy consumption. Utilities currently offer a number of residential programs that target easy to address EE measures, including energy audits, distribution of compact fluorescent light (CFL) bulbs and promotion of ENERGY STAR appliances. However, these initiatives only enjoy modest consumer participation rates: based on NSTAR surveys, compact fluorescent light (CFL) adoption runs at only 20% (NSTAR, 2009).

EE programs often take decades to make a significant impact. In California's award winning Low-Income EE Program, only approximately one percent of homes receive deep retrofits each year (ACEEE 2008). Many EE programs tout high participation rates through awareness and audits that fail to translate into large scale retrofits – where the real energy savings lie. The Marshfield Community Energy Challenge in Massachusetts represented a noteworthy utility-community success in achieving greater energy savings. The program resulted in a ten percent participation rate in its first year with 94% of retrofits adopting CFLs and a considerable number (25%) adopting insulation and air-sealing measures. Nevertheless, the number of actual retrofits preformed was still well below the number required to pursue a significant percentage of the available cost effective energy efficiency measures (Haselhorst, 2009). Achieving over 50 percent penetration of EE programs would represent a major breakthrough in implementing cost-effective efficiency.

As with any campaign, limited reach and limited depth result in decreased cost effectiveness. Without high participation rates, the cost per participant of running EE programs and campaigns can become prohibitively high when compared with the benefits. For example, current NSTAR EE home audit program spends an estimated \$60 per audit for marketing representing an enrollment rate of only about 10 percent (Haselhorst, 2009). Utilities will be able to realize more EE at increased cost effectiveness by increasing the number of people that enroll and subsequently participate in their programs. Moreover, a greater depth of efficiency

through retrofits would increase the cost effectiveness of dollars spent per participant. Finding a way to make sure that those who enroll in an EE program stay in or ‘complete’ the program therefore also becomes critical to achieving greater EE.

Beyond cost effectiveness, why should utilities attempt to extend the reach of their EE programs? Tied heavily to the current limited reach of EE programs is a lack of equity amongst participants and non-participants. Hard-to-reach groups – renters, low income households, the elderly, non-English speakers, and small businesses – are typically the most expensive groups to service and the least likely to access energy-efficiency programs that are not specifically targeted to them. At the same time, these populations are also most often composed of the individuals that would benefit most from EE interventions. For example, according to the Department of Energy, low-income families spend 14 to 20 percent of their gross income on energy bills (Edison Energy Institute, 2007). Basic weatherization programs in Massachusetts and New York, similar to those offered by NSTAR in Massachusetts, typically save ten percent of a low-income family’s annual energy bill, while deeper retrofits have been proven to save up to 37 percent per year (ACEEE, 2008). The populations that typically do not participate in EE programs are most likely to see their energy bills go up in the case of a rate increase. By extending the reach of EE programs to these and other groups, utilities help to achieve more equitable distribution of the societal benefits of EE.

A community-based efficiency model provides benefits to both the utility and the partner community.

The matrix below lays out the details of this “deal.”



The path to achieving large energy reductions. In the current model, even an exceptional EE program would be lucky to have greater than 10 percent participation at the retrofit stage.

	Utility	Municipality	Community groups
GIVES	<ul style="list-style-type: none"> Funding for new cost-effective EE measures Staff dedicated to implementing an “extended reach” program Campaign materials 	<ul style="list-style-type: none"> Help identify community groups 	<ul style="list-style-type: none"> Access to members through pledge drive Higher stakes community buy-in Labor, organization, outreach Take on risk of achieving innovative EE goals
GETS	<ul style="list-style-type: none"> Lower customer acquisition costs Better image and community trust Meet regulatory requirements More cost-effective EE measures 	<ul style="list-style-type: none"> Infrastructure investment Leverage for other funding 	<ul style="list-style-type: none"> Overhead funds & performance bonus Capacity and training Lower energy costs

BARRIERS

What causes consumers to refrain from enrolling in EE programs? The limited reach of EE programs is caused principally by three factors.

- **Lack of Trust** – Many people are justifiably wary of programs that purport to provide aid at little or no cost to the consumer. In addition, having strangers, even contractors, in one's home is not an appealing prospect for anyone, especially if there is concern that the dwelling is not up to code and requires additional work beyond the scope of the utility program. Moreover contractors used for EE are selected from a pool known to the ESCO or utility that has hired them, rather than the consumer whose home is being retrofitted. For many consumers, not being able to select the retrofitter and not being familiar with their work and reputation is a red flag. If consumers do not trust the utility or their contractors then EE will continue to be confined to its present participation rate. A manifestation of poor trust is the fact that 30 to 50 percent of homeowner turn down EE home services even when they are offered for free (CSG, 2009).
- **Lack of Transparency** – Public education about EE has increased substantially in recent years. Still, there remains a lack of information about how to access utility programs, how contractors are selected, and how benefits are calculated and other details of the program. This lack of transparency reduces consumer interest in the undertaking EE measures. To increase the rate of participation substantially, it is necessary to improve the public understanding of the benefits of EE, the process of the audit and retrofit, and the qualifications of the EE service provider. By providing standardized training and using local sources of labor, a program can control for quality while also accessing local networks.
- **Split Incentive** – Rental units face the additional barrier of a split incentive or principal-agent problem. A split incentive occurs when the costs and benefits of an investment accrue to different parties. Often

energy bills are paid by the tenant but the cost of the retrofit falls on the landlord. In this case capital investments to improve a building or unit's EE performance are likely not to be made. Landlords are not motivated to make EE improvements because they will not reap the reward of lower monthly energy bills. Moreover, tenants are unlikely to make capital improvements to the property because they often will not inhabit the unit long enough for the investment to have a positive net value. This problem is widespread in the United States. As much as 25 percent of the U.S. population is affected by a split incentive for EE investments (Williams, 2008). Current attempts to extend the reach of EE programs have not overcome this obstacle. Detail on the split incentive, and approaches to overcome these with Green Leases and Financing tools are described in Appendix 1.

THE PROPOSALS:

EXTENDING THE REACH AND DEPTH OF ENERGY EFFICIENCY PROGRAMS

The political and regulatory atmosphere is extremely favorable for aggressively extending the reach of EE programs. With the American Recovery and Reinvestment Act of 2009 earmarking more than \$40 billion dollars towards energy initiatives and \$2.7 billion to EE Block Grants for localities, utilities should see communities and groups within those communities as partners in achieving EE (US Department of Energy, 2009). These Block Grants offer utilities an opportunity to extend their current reach and work with community groups to overcome the above barriers. This section puts forth a new way for utilities to engage communities in extending the reach of EE programs in a mutually beneficial manner.

To overcome the barriers to deep EE participation, it is important to utilize local networks. The proposal outlined below encourages partnership between the utility, municipality and local community groups to bring greater trust and transparency to the process. The proposal creates three new processes for EE programs: Community based outreach, innovation funding, and community access to training and retrofit contracts.

EXTENDED REACH PROPOSAL 1 OUTREACH BID & PLEDGE PROCESS

This process would effectively replace a portion of a utility's EE program marketing by funding community groups to promote programs from the bottom up. The utility would provide the funding, framework, and tools for community groups within the municipality to run pledge drives which would serve to both enroll individual households or businesses in EE programs, and to disseminate information about EE.

WHY THIS PROGRAM

The Bid and Pledge framework enables the utility to enhance trust and transparency by directing its campaign

materials through organizations, institutions, or business associations that can tap into their own local networks. It also encourages innovation – by receiving per-household rewards, community groups have incentive to go beyond their immediate constituencies and reach deeper into their community networks. Moreover because they receive funding based on the energy savings of their members, there is incentive to continue to advocate EE (and conservation) within their groups. In aggregate, this could create a powerful kind of advertising – if an individual hears of her utility's EE programs from various groups, she would be more likely to take notice. If groups begin competing for pledges, it fosters even more visibility and momentum for EE. An outreach partnership benefits all of the actors involved:

- The **utility** benefits by minimizing the labor and cost involved in customizing outreach programs to hard-to-reach groups.
- The **municipality** benefits by supporting community groups and citizens.
- **Community groups** benefit through fundraising and through presenting their constituencies with access to EE audits and retrofits.
- **Individuals** benefit by receiving information on EE programs from a trusted source, and by being able to simultaneously receive information and services while supporting an organization that they value (such as a school, church, cultural organization, etc.).

HOW IT WORKS

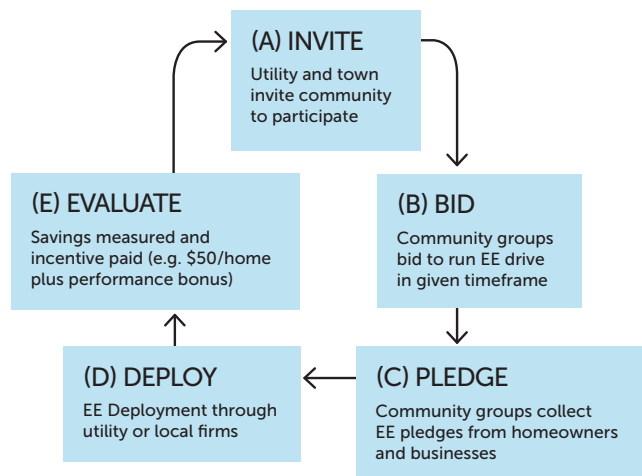
The five main mechanisms of the process are:

(A) **Invite** – The utility and municipality follow a predetermined process for contacting community groups. The municipality provides the utility with a list of all community organizations to be contacted within the utility's specified categories (e.g. those representing renters, homeowners, low-income, elderly, immigrants, community action, faith-based, etc.). The utility sends a press release to local media announcing the opening of the bid and pledge process. This increases awareness of the process and politically incentivizes the municipality to provide a thorough list of community contacts.

(B) Bid – Community groups commit to a pledge drive, set pledge drive goals and determine how funds raised through the drive will be spent. They are supplied with campaign materials from the utility and begin signing up their members, via pledges, for EE measures. At the end of the drive, the community groups submit the pledges and receive per-household compensation. The compensation is phased in with the stages of the audit and retrofit process. Each household that pledges is tagged to the community group through which they pledged; that community group receives an upfront reward for pledges and a ‘performance royalty’ based on the energy saved in a three year period following a retrofit as compared to base-year usage. The performance fee incentivizes the community group to motivate its constituency to follow through on pledges, and to reduce usage through behavior changes. Over time, incentivized behavioral change can transform into cultural norms, which has been evidenced in recycling and anti-smoking campaigns.

(C) Pledge – Individuals receive information through community groups, or through the municipality, on EE programs, the audit-retrofit process, and associated cost-benefit scenarios. Building owners pledge to undergo an energy audit, and to take measures to reduce their energy consumption. Renters can sign the pledge to undergo the audit and provide landlord contact information so that the utility can follow up with the building owner. Pledges can act not only as an outreach mechanism by which households are enrolled in EE programs, but also as a means for gathering data. In addition to supplying the household with EE information, the pledge would contain questions related to house type, family size, years in residence, attitude toward EE, or any other information that could inform EE deployment to that household in particular, as well as refinement of EE programs more generally.

(D) Deploy – At the end of the pledge drive, the utility then aggregate pledges and coordinates integration of the customers with their existing EE service providers to. The utility can use the building and household information supplied in the pledge to determine which EE service provider is most appropriate. For example, audits and



retrofits can be deployed based on either geographic or building-type considerations, or based on the month the household indicates is most convenient to undergo a retrofit.

(E) Evaluate – At the end of each Bid & Pledge cycle, the process should be evaluated so that it can be continuously improved. Aspects to be evaluated should include:

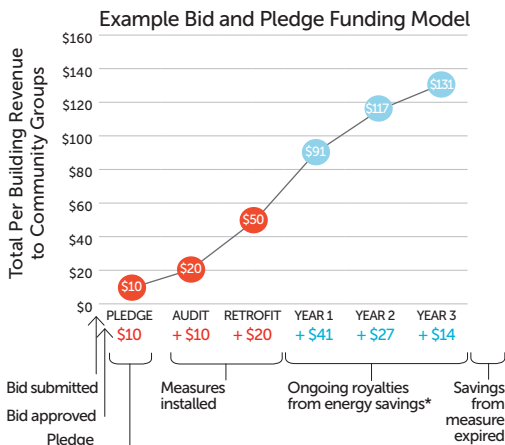
1. Communications between community groups and the utility
2. Success in reaching a comprehensive mix of community groups through the municipality
3. Usefulness of campaign materials supplied to community groups
4. The pledge form – how well is it understood?
5. Is the data that it generates relevant and useful?
6. The process of tagging households in order to provide the community group the right level of incentive
7. The appropriateness of the structure of the funding model

EXAMPLES

The Bid & Pledge process is best illustrated by way of example. Three scenarios below depict ways in which the remainder of the process could play out with various community groups. The examples throughout this report were written for illustrative purposes and are hypothetical. They have, however, been informed and refined through interviews conducted with representatives from various Massachusetts community organizations.

The Watertown Armenian Church

The **Watertown Armenian Church** makes a bid to reach out to its 300 member constituency using utility campaign materials. The church announces the drive and provides information on how its members can benefit from NSTAR's energy efficiency program, and how the church can benefit from the proceeds reaped by member participation (retrofit of its own drafty building, funding for its youth and cultural programs, and a new coat of paint). The church also decides to go beyond the limits of its own constituency and does an internal EE fundraising challenge whereby teams within the church compete to sign up the most non-members.



Marketing savings in current scenario:
 If BAU marketing spending = \$150/retrofit
 Then marketing savings = \$19/household

- Ⓢ = Flat Reward
- Ⓢ = Performance Royalty

* Example rates per KWh saved as compared to base year:
 Year 1: 0.25¢
 Year 2: 0.50¢
 Year 3: 0.75¢

Each team then decides to which church program their proceeds will be applied. A teenage team within the church sets up a table outside of the Armenian supermarket to raise money for their summer-camp program. An elderly team within the church decides to raise money for the church's Armenian folk dance program – they get pledges from their neighbors and family members. A parent team donates pledges to support the child-care program. The aggregated pledges submitted by the Armenian church to NSTAR total over 1000, winning a bonus prize for highest number of residential pledges. Forty percent of these pledges later result in deep residential retrofits, earning additional performance rewards. Outreach proceeds go to improving the church building and programs, and the church itself participates in the retrofit program. The church's energy bills are subsequently reduced by over \$500/month.

The Home Energy Efficiency Team

“**The Home Energy Efficiency Team (HEET)** is a Cambridge-based co-op bringing neighbors together to weatherize homes and take the energy future into their own hands.” HEET conducts Weatherization Barnraisings about once a month at which skilled volunteers head teams of unskilled neighbors to weatherize a building in the neighborhood. The process builds community cohesion and disseminates EE knowledge as volunteers take weatherization skills home with them. Since HEET does both the outreach and the weatherization work, it is able to skip the standard audit phase. Buildings improved through Barnraisings are tagged and HEET receives a per household royalty from the utility, which agrees to supply all of the materials for each barnraising.

Boston Climate Action Network

Boston Climate Action Network (BCAN) is an education and advocacy organization, primarily volunteered, dedicated to motivating residents of the City of Boston to take action in personal, neighborhood, and institutional contexts regarding climate change. It organizes events to inform the public and affect public policy about climate change initiatives, energy conservation, clean technology, and “green collar” jobs as pathways out of poverty.

Its proposal builds directly upon a proven model for successful residential energy use reduction, implemented nationally and internationally with over 100,000 participants, and which it has adapted and piloted in three Boston neighborhoods with more than 300 participants in multiple events over the past year.

HEAT is comprised of three elements:

- Training for leaders of faith and other community organizations (“training-for-trainers”)
 - A survey that organizations can use to introduce issues, measure interest, and identify key members needing or desiring further involvement (“HEAT survey”)
 - Peer education groups to deepen commitment to action (“LoCaL groups”)
- (Above text taken directly from BCAN grant proposal)*

The BCAN HEAT project introduces the pledge process into its trainings (as an option that trained leaders can bring back to their community organizations), pairs it with surveys that it intends to disseminate, and incorporates them into its peer education groups.

Interviews with faith-based leaders show the viability of this type of partnership:

“Church members are well-educated and interested in EE, but haven’t gone very far. They would be more than willing to sign up, especially when they see that their church will benefit. What better way to reach people than through the communities that they are dedicated to.”
(Goode, personal communication, 2009)

“The hook here for institutions is the fundraising component. Retired members are looking for something to do. When the church adopts a fundraiser, there is usually a large amount of motivation behind it.” *(Sit, personal communication, 2009)*

EXTENDED REACH PROPOSAL 2 INNOVATION FUND

An Innovation Fund would support pilots and scale-up of new community-based models that expand the cost-effective reach of efficiency. Innovative delivery funds have succeeded in other fields, such as Boston Community Capital’s affordable housing fund, by encouraging entrepreneurship and creativity. This fund would also help reach out to new sources of trained labor to deliver efficiency in a capacity-constrained environment. Funding could come from the government, utilities (through the systems benefit charge), or foundations.

WHY THIS PROGRAM

The current cost-effectiveness framework limits EE spending to programs with a proven track record of measurable costs and benefits. Programs are delivered by utilities to residential and business customers and by Community Action Program (CAP) agencies to low-income homes. There are three typical existing home programs offered by utilities: HVAC replacement, retrofits and weatherization, and appliance and lighting rebates (NSTAR). Using potentially circular logic, potentially cost effective programs that do not fit within these categories lack funding because they have not been proven to be cost effective.

HOW IT WORKS

The innovation fund would use a four-step process:

1. Solicit Applications – The innovation fund would be widely publicized through partnerships with municipalities and other organizations. Any private, nonprofit, or municipal group would be invited to submit proposals to coordinate or implement efficiency. Proposals would detail energy-saving activities, the expected cost, and a target decrease in energy usage, as well as information on organizational capacity, community-engagement, and access to skills and labor resources. Application assistance workshops on proposal-writing skills, efficiency accounting, and brainstorming of innovative delivery techniques should be offered through the municipality to aid non-traditional groups that have never applied for an energy-related grant.

2. Selection and Financing – Proposals should be mainly reviewed on the following criteria:

- Potential cost-effectiveness
- Capability of implementing organization
- Ability to scale
- Non-energy community benefits

It is critical for the Innovation Fund to create transparency in its evaluation process in order to foster trust among bidders, perhaps through a public posting of all submissions and reviews. Partner organizations whose proposals are selected would receive 10 to 20 percent of funds immediately to launch their program. First time partner organizations would undergo a series of milestone audits to ensure pilots proceed on track, with innovation funds being released after each milestone is reached whereas accredited partner organizations would have fewer obligatory milestones. Financing could take the form of grant funding or revolving loans with up to one quarter of the funds distributed as a success fee based on post-program measurement and verification of energy savings. This would place financial risk and incentive on partner organizations to achieve the benefits stated in the proposal.

3. Implementation – Community partners may have stronger relationships with local building-owners and tenants than do utilities, allowing them to market and coordinate efficiency programs for less cost than centralized organizations. Beyond coordination, many organizations also have capacity to deliver high-quality efficiency services. Proposals may involve a partnership between organizations, such as a door-to-door neighborhood insulation campaign run by a community development organization and insulation contractor association.

4. Measurement and Verification (M&V) – The Innovation Fund will dedicate 5 to 10 percent of funding for M&V, a typical amount for EE programs. The Fund will manage M&V audits and assistance as partner organizations have little familiarity with this specialized process, contracting with M&V specialists to conduct the work. Pilots will be evaluated using similar cost-effectiveness tools as traditional EE programs. Utilities are already familiar with evaluating the impact of pilots (e.g. demand response, in-home display). Evaluation techniques include appliance and lighting savings estimates, whole-building consumption versus a baseline, and calibrated

simulation (Efficiency Valuation Organization, 2007). In addition, the community nature of this fund opens the potential for randomized experiments that compare electricity and heating bills of the program group versus a control group of similar households. M&V data will be used to calculate a final cost-effectiveness of a pilot, including costs, NPV of benefits, timeline, and decrease in energy usage.

EXAMPLES

Many potentially cost-effective programs do not fit within current utility programs:

Neighborhood Aggregation

Community stakeholders have expressed interest in EE deployment simultaneously targeting dozens of homes or businesses within a concentrated geography. This model reduces the cost of deployment, as demonstrated by IBOG's (1 Block Off the Grid) successful rooftop solar initiative in San Francisco.

Potential community partner: Neighborhood CDCs

Industry-Specific

There is a large potential for efficient models tailored to certain industries, especially for small businesses. For example, an effort could be made to deploy efficient ovens to the restaurant sector.

Potential community partner: Industry and Trade Assns

Hypothetical example: The Massachusetts Restaurant Association (MRA) decides to reach out to its 1500 member restaurants in Massachusetts by adding the NSTAR pledge drive on to its existing energy management program. The MRA makes a bid within the Watertown deal to coordinate a mail and phone campaign to its member restaurants using small-business campaign materials provided by NSTAR, as well as restaurant-specific information that they have compiled.

The MRA also uses the pledge drive as an opportunity to expand their member base by advertising the Energy Efficiency program as well as its other services to new potential members. In addition to the typical energy efficiency menu offered by NSTAR, MRA expands the program by providing its members with financing for Energy Star appliances and partners with a contractor for

draft mitigation at restaurant entrances. The MRA also provides its members with campaign materials that they can use to enroll their customers in the pledge drive by offering, for example a free entrée for each pledge signed. The MRA receives a grant for its innovative program add-on.

Behavior Change

Community organizations rely on the close ties and trust of stakeholders. These relationships can prove more effective than traditional utility and government marketing efforts at achieving measurable reduction through conservation or behavior-induced efficiency (such as resetting thermostat and hot water heater temperatures). For example, the ENERGY STAR “Change a Light, Change the World” campaign resulted in 1.5 million pledges for families to install a CFL through the partnership of 1,100 local organizations (ENERGY STAR).

Potential community partner: Member-based nonprofits

Unproven Technologies

There are a number of innovations currently being tested to improve EE and including in-home monitors, dashboards, or energy management software. Many of these technologies are tested through multiple, lengthy utility pilots that can last for years. A 2006 meta study demonstrated that energy feedback resulted in savings of five to 15 percent, yet utilities continue to rollout additional pilots (Darby, 2006). An innovation fund would help spur faster deployment of new technologies to test their ability to reduce efficiency at low cost and move them quickly to scale.

Potential community partner: Local home audit and contract businesses

PROGRAM 3 LOCAL LABOR CAPACITY FOR EFFICIENCY RETROFITS

Utilities would benefit from actively recruiting and supporting the training of new retrofit contractors from existing building firms and community groups. These processes include specific outreach to industry and non-profit groups through workshops and direct marketing, training and scholarship programs that provide clear

pathways to careers and contracts. To overcome the issues of trust and transparency that currently block the completion of deep retrofits, there must be a culture shift in the perception of the value of local knowledge and actors in achieving efficiency adoption.

WHY THIS PROGRAM

Capacity – At a time when funding for EE on the state and federal levels¹ has increased dramatically, the labor required to meet goals and use funding wisely is in short supply. According to Steve Cowell at Conservation Services Group, “50 million homes can save 50 percent of their energy use with a \$5000 investment. Stimulus and utility funds alone will pay the full cost for over 3 million homes. That’s 100 times our capacity and we’re 40 percent of the market.” There is evidence, however, that this problem is beginning to be addressed from outside of the network of typical efficiency actors. According to Loie Hayes at Boston Climate Action Network, “a lot of organizing has been going on to create enterprises to provide [EE training and services]; in the past the only way to get the training was to get hired by CSG, or to go to a training institute in New York.”

The drastic increase in anticipated demand for efficiency retrofits is leading efficiency providers to rethink the industry labor model. On one end of the spectrum, community groups are organizing to create an EE training program that allows local access to stimulus and long-term efficiency jobs. On the other end, large corporations such as Sears are positioning themselves to enter the home retrofit market. The design of programs in this phase of expansion will determine if this program will meet the promise of local green jobs or if this industry will continue to be dominated by a small number of national providers.

This report emphasizes the need for local champions who understand efficiency programs and can provide trust and transparency to the local networks. While it might seem logical that a large energy services company would have efficiency benefits over small outfits statewide, local organizations have proven to be able to provide local knowledge and expertise that has thus far eluded the larger players. According to Mark Dyan at CSG, the most successful program, by an order of magnitude, is in Upstate New York, where a group of contractors

¹ MA DOER is expecting at least a 200 to 300 percent increase in efficiency spending under the least cost procurement standard. In addition, the federal stimulus package has resulted in a 20-fold increase in funding for WAP, a 50-fold increase for SEP, and funded EECBG for the first time.

approached the program like salesmen and did not wait for CSG to aggregate the clients.² By doing the legwork in their own community, these contractors have seen retrofit participation rates of upward of 30 percent.

Economic Stimulus – The strong downturn in the housing market and subsequent economic recession has affected building trades disproportionately. This resulted in mass underemployment in one of the largest industries in the country – construction. Where as a few years ago there was little interest in the residential retrofit industry due to the larger complications and smaller margins and returns, today the building trades are eager to enter the field. Mobilizing this workforce on EE projects would be a quick jumpstart to the economy. According to Greg Beeman, President of MA Association of Builders & Contractors, “The current market makes our 475 members especially excited to try opportunities in EE.”³

The American Reinvestment and Revitalization Act is requiring for the first time that weatherization programs pay prevailing wage, thus setting the stage for union contractors to enter this market. Complicating this further is the lack of clarity over which union will represent weatherization workers – a sign of how few weatherization jobs were completed by union shops before. Utilities should work to align their programs with programs that are funded through ARRA, while also designing programs to keep contractors interested after the recession has passed.

Quality – Engaging trained, experienced and credentialed builders and trades-people will ensure a high quality of work and therefore real-world performance that more closely matches predicted performance. Doing efficiency right the first time decreases both the risk of the investment and the payback time. It also lengthens the lifespan of the measure and reduces the need for additional future maintenance. A number of people we talked to in the course of our interviews commented on the uneven quality of current utility home auditors. A representative of the Boston Climate Action Network noted that auditors she has interacted with are often not well informed, not good communicators, are under pressure, blaze through their tasks, don't leave information on how to get to the next step and have little follow-through likely leading to lower penetration rates. Both Greg Beeman of MA ABC and

Eugene Autlinsky, a local HVAC contractor in Watertown, identified a training gap between the contractors who run the business and the journeymen who work the job. A standard training program for journeymen and contractors alike is necessary to create an understanding of the principles of EE at all levels of the building trades.

Trust and Access – As shown in the successful CSG program in Upstate New York, contracting work to members of a local community will likely result in higher penetration of efficiency measures. Their existing networks and relationships in the community access points of leverage. HVAC repair technicians are able to draw on their existing client lists to provide an additional retrofitting service. This process leverages local assets and encourages innovation in delivery methods. Trust and transparency are arguably the most important issues to be addressed to increase the penetration of efficiency programs and people are much more likely to trust someone they talk to at the supermarket, go to church with, or simply perceive as being a member of their community.

Equity – New avenues to enter efficiency work need to be open to community members and existing firms. One of the stated goals of the policy and public funding push for EE is to use the creation of a clean energy economy to provide opportunities for those who have been left out in the past. The need to quickly generate retrofitting capacity to meet the spending objectives of the economic stimulus is at odds with the longer-term goal of a more equitable economy that provides broader, long-term job opportunities. There is already growing tension between labor unions and low-income communities about who will get the new jobs. To this point it is important that partnerships between labor unions and communities be built to provide an all-win outcome to this rapid economic transition.

HOW IT WORKS

Standardization – The simplest way to integrate industry and community groups is through a statewide training program that provides a level of training in energy audits, energy efficient retrofits, and the EE job distribution system. In interviews with the Association of Builders and Contractors and YouthBuild, there was a common

² Mark Dyen, CSG, 5/8/2009

³ Greg Beeman, MA Association of Builders and Contractors, 4/15/2009.

criticism that the list of qualified retrofitting contractors is “shrouded in mystery.”⁴ Both groups were interested in how their members could be integrated into this system.

Even after the creation of a statewide standard program, there is a huge concern about access to the program for non-union workers. Though the issue of unionized versus non-unionized labor is beyond the scope of this report, it is recognized that the level of expansion these programs are demanding will require a greatly increased labor pool.

Standardizing the energy audit and retrofit training is also key to allowing innovative contractors to be hired and their work judged. By standardizing the training, there is less risk to expanding the labor pool by allowing the trained contractors to bid creative delivery methods into the Innovation Fund. It will also solve the education gap between the journeymen and the general contractors.

Access – An important element of creating a statewide standardized training is providing channels for local people to enter the industry. As part of a community based approach to EE, providing training to community members creates a local point of contact. To achieve this, we suggest that community groups entering the Bid and Pledge process be offered scholarships for their members to participate in the statewide EE training program. The number of scholarships should be proportional to the number of pledges the community group retains.

A community scholarship program would have two benefits: It would expand the local labor base available to complete energy audits and retrofits and it would allow the community groups to contract with someone they trust from their social network. This can reduce apprehension about inviting a stranger in to their home. Even if the local energy efficient expert does not complete all the work for the community, they are available to explain the process and bring transparency to the program. Participants can ask questions to someone they trust.

To achieve strong participation in EE programs, the current system must change its relationship with communities. An important part of this change is local access to training and employment. If the program has a community face, the barriers of trust and transparency are overcome using local knowledge and networks.

EXAMPLE: MASSACHUSETTS

The current utility efficiency retrofitting model is going to require a great expansion of its labor pool to allow for timely delivery of both audits and retrofits. In Massachusetts, and many other states, the current system has two distinct streams of labor. The weatherization program contracts with a select group of Insulation Contractors who specialize in the weatherization programs provided through the utility or through the CAP agencies that target low-income residents. These contractors bid into CSG for specific territory to cover. The typical firm has 30 employees that work on three non-union crews. CSG has never received a bid from a union construction firm in the State of Massachusetts. The rebate programs are available to any licensed HVAC contractor in the state, but because the rebate program does not allow the contractor to mark up the unit being installed, there is little incentive for the HVAC contractor to sell the rebate program to his clients (Autlinsky, 2009). It must be the clients who initiate using the program.

NSTAR bid processes as well as CSG contractor approval processes have not been widely publicized and are seen within the construction trades and community groups as a black box. This year, anticipating for the first time having a labor shortage, CSG is advertising for contractors to join the program. Previously CSG did not do outreach but instead used contractors referred by the CAP agencies program (Dyen, 2009). Still, the outreach has not been extensive and this barrier to entry for small local firms and community groups that lack sophistication in how to apply for this program has a number of negative implications for the efficiency industry.

Some efforts to address the current situation are underway. In the Spring of 2009, the State of Massachusetts Department of Energy Resources was soliciting applications for a statewide EE Training program. This is an important step in removing barriers to entering the field. To facilitate the quickest ramp up in labor capacity, the MA Statewide program should be open to both union and non-union students. A suggestion from YouthBuild would open the program to everyone, with completion of the program counting towards apprenticeship hours if the graduates enter union jobs.

⁴Greg Beeman, *ibid.*

OTHER APPROACHES TO EXTEND THE REACH OF EFFICIENCY: LEASING AND FINANCING MECHANISMS

Green leases – Resolving the Split Incentive and Energy Efficiency in Residential Rental Housing and Small Businesses

A split incentive occurs when the costs of an investment accrue to one party while the benefits accrue to another. Investments in EE in rental housing face this problem. Tenants are generally responsible for their own utility bills because landlords could easily increase the monthly rent to account for increases in utility costs. Thus, landlords are reluctant to make capital expenditures which lower the overall electricity costs since their investment cannot be recaptured in the form of lower energy bills.

Rental housing is one area which remains largely untapped by EE programs. At the same time, rental housing accounts for over 30 percent of the U.S. housing market and 35 percent of households in Massachusetts (U.S. Census Bureau, 2009). One way to overcome the split incentive and realign landlord and tenant goals is to add an EE clause to the lease. An EE clause stipulates that a landlord may increase the monthly rent of a unit by an amount not greater than the monthly savings reaped by making an investment in EE for that unit.

For instance if a landlord were to install new ENERGY STAR insulation in a unit that after some period of time decreased the average monthly energy bill by \$25, they would be able to raise the rent by up to \$25 or a percentage of that amount agreed to upon signing of the lease. By doing this the landlord is able to recapture their investment, while the tenant's rent remains the same or goes down, depending on the agreement. Utilities and communities should engage landlords associations in drafting common EE clause language for standard leases that incorporates the above mechanism. This type of intervention may, for example, fall under the unproven technologies clause of the innovation fund above.

Another way to tap the residential EE market for rental homes is to implement regulations that hold landlords to account for common areas in their rental properties. New York City, for example, has recently implemented a citywide law requiring landlords to conduct

an energy audit every ten years and make any and all EE upgrades that have a payback period of five years or less (Recchia, 2009). By implementing regulations that start to reflect the importance and significance of EE in rental housing, municipalities can be a driving force behind bringing deep EE in the rental sector.

Overcoming the split incentive is critical to realizing the 50 percent penetration rates needed to affect real change in energy consumption in the U.S. By working with landlord's associations to lobby for an EE clause in their standard form lease and by working with communities to draft regulations about EE retrofitting, utilities can help to overcome this barrier.

Small businesses remain one of the most under-enrolled energy-using groups, typically too small for ESCO programs and overlooked by most utility programs.

A targeted effort to extend the reach of efficiency programs to small businesses would have four main benefits. First, neighborhood aggregation and similarity of building type and use would lower the cost of deployment compared to similar-sized residences. Second, small businesses are typically connected through tight-knit associations to facilitate delivery. Third, many small businesses are very energy intensive, such as hotels and retail stores, and thus offer a larger potential for savings than other similar-sized buildings. Demand response and peak load reduction have been especially popular with business customers (e.g. New Mexico PNM Power Saver Program). Finally, small business efficiency programs have large spillover effects by educating and empowering employees.

How are small businesses different than large businesses? Main street businesses often lack access to financing and have deeper ties into the community. One award winning small business EE program (SBEA: Connecticut Light and Power and Western Massachusetts Electric) achieved a three-year, 35 percent penetration rate for lighting, refrigeration and HVAC measures by providing 100 percent, zero-interest financing for two years (ACEEE, 2008). Similarly, the Ontario Business Incentive Program for EE offers up to \$50,000 in reimbursements for efficiency capital investments. Beyond cost savings, many businesses also benefit from brand and image improvements from engaging in local efficiency programs.

One barrier is that many small business owners are renters, creating the same split-incentive common among multi-family buildings. In addition, many business owners are very busy and lack information on efficiency. In California, one solution was a PUC-funded San Joaquin Energy IQ Program that contracted a third party to give EE workshops for 15 to 30 small business owners at a time. An email campaign reached a ten percent view rate. (San Joaquin Energy Program, 2004) Community-based programs could help partner with small businesses.

One other innovative program is the development of a small business energy labeling regulation (similar to the Los Angeles health department rating system). Significant EE standards can be created after benchmarking businesses against other firms of similar size and sector, such as gas stations, supermarkets, and restaurants. The utility can aggregate the customer data and work with the municipality or state government to find an acceptable benchmark of energy use if all available incentives are being utilized. The small businesses will then be given a certain period to become compliant by taking advantage of all incentives that currently exist to make become as efficient as possible. Businesses would be required by the city or state to display their energy “grade” on their window.

FINANCING INNOVATIONS: TAKING ENERGY EFFICIENCY TO SCALE

Over the course of creating this report, the landscape for EE has drastically changed. Programs that used to receive millions of dollars in funding are now preparing for billions. While the public support for EE is heartening, the industry cannot expect this level of public subsidy to be permanent. The most efficient use of these funds would be to establish institutions that make available long term financing, like revolving loan funds, that lowers the cost of EE investments to the customer while assuring they are invested responsible for the work done by sharing costs. The current economic stimulus could do more than just make a two year splash, but rather fuel a sustained pool of EE investment for decades to come. In order to take EE to scale, it must be understood that an EE retrofit is not a onetime solution. A building will need investment in its maintenance and systems multiple times over its life. Does

it make sense to offer one-time zero-cost retrofits because there is currently strong political will to fund the program? Creating a sustainable source of financing for EE out of the current economic stimulus funds should be a priority for both municipalities and utilities.

The low level of retrofit completion in previous efficiency programs is disheartening. The fact that many customers refuse to participate in free retrofits could be interpreted as implying that it is impossible to recapture the cost of the installation from customers. There is also reason to rethink the hypothesis that the retrofit has to be nearly free to achieve decent penetration numbers. This report has found the problem is one of trust and transparency. As the public becomes better educated about efficiency, as the program creates local champions, and as the negative consequences of not participating in the program – higher energy bills – becomes apparent, the opposition to the program should lessen. This is not to suggest that there will not always be customers who refuse to participate in the program, but this number will shrink as local networks overcome the lack of trust.

A key tool to making the program more convenient to customers and recapturing the cost of the retrofit is on-bill financing. There a number of creative ways municipalities have come up with to get around a lack of on-bill financing. Berkeley, CA, offers financing through a property tax lien that is paid back over 20 years. Babylon, NY, declared carbon a solid waste and thus funded their efficiency through the garbage bill. Another novel concept is to allow employers to provide financing through their payroll system, deducting the payback from the employee’s paycheck. All of these programs involve complexity in customer understanding and the link between energy savings and payback. However, these mechanisms do not provide universal funding – some areas do not have a garbage bill. If the utility is to take the lead in scaling up EE programs, ultimately, on-bill financing is a necessity.

See Appendix 1:

1. Example Memorandum of Understanding
2. Extended Reach Bibliography

FOUNDATION SUMMARY: MASSACHUSETTS ENERGY PROGRAMS

Eric Mackres

Massachusetts has robust state-level energy efficiency programs that were boosted considerably by the Massachusetts Green Communities Act (GCA). The additional funds from the federal stimulus (American Recovery and Reinvestment Act of 2009, or ARRA) channeled through the State Energy Program (SEP) will also help to ramp up state programs. These and other energy programs are coordinated at the state-level by the Massachusetts Department of Energy Resources (DOER). The GCA channels millions of dollars of new revenue annually from Regional Greenhouse Gas Initiative (RGGI) auctions to DOER for its programs. From 2008 RGGI auctions alone, \$28 million was allocated to energy efficiency programs. This is in comparison to the approximately \$25 million per year generated through the \$0.0005 per kilowatt-hour (0.5 mill/kWh) by the Massachusetts Renewable Energy Trust (MRET) ratepayer surcharge, the traditional method of financing efficiency. The diagram below depicts DOER's revenue sources and programs. The two DOER-operated programs with the greatest funding are:

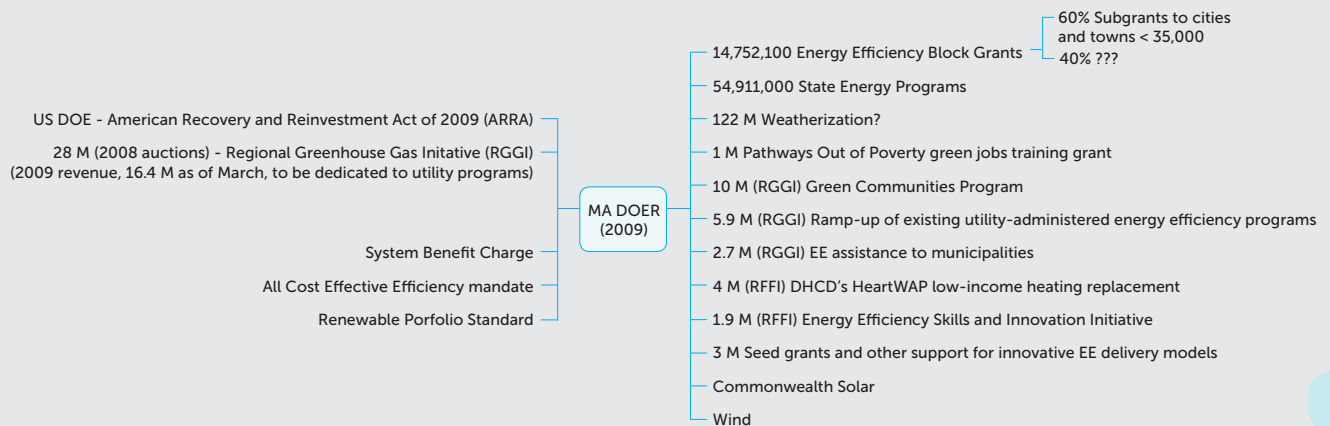
GREEN COMMUNITIES PROGRAM

Established by the Green Communities Act of 2008, this program has \$10 million in funds annually for municipalities that meet the criteria of a "green community," including establishing energy use baselines and adopting a more energy efficient "stretch" building code for new construction. For the first few years much of the funding will be used as technical assistance to help communities meet the criteria.

STATE ENERGY PROGRAM (SEP)

Federal SEP funding to Massachusetts from ARRA has greatly increased to nearly \$55 million dollars. This money will likely be used by Massachusetts on energy efficiency and renewable energy retrofits to state public buildings as well as a Competitive Solicitation for other clean energy programs.

MASSACHUSETTS DEPARTMENT OF ENERGY RESOURCES FUNDING & PROGRAMS:



UTILITY SUPPORT TO COMMUNITY ENERGY- SAVING AND GHG REDUCTION CAMPAIGNS

Utilities in Massachusetts are required under the Green Communities Act to initiate all cost effective measures for energy efficiency. Meeting this mandate requires a massive increase in the energy efficiency programs adoption rates. However, utility energy efficiency programs experience low adoption rates and high costs. In the past, existing energy efficiency programs sponsored by utilities have garnered 2% adoption rates.

In order to resolve several of the barriers to energy efficiency, we propose a **community-based campaign for energy efficiency**. The goal of a community-based campaign would be for a utility company to take advantage of trusted community networks in order to create excitement and commitment for adopting energy efficiency. By generating word-of-mouth testimonials using community networks, ideas about energy efficiency can spread in more resonant ways than traditional advertising. The word-of-mouth approach also helps energy efficiency overcome the hard-to-visualize barrier.

By creating a systematic approach for utilities to work with communities, higher adoption can be created at lower costs. The community-based campaign is a different approach that is easily implemented by the utility companies.

SITUATION

There are several barriers for customers to learn about energy efficiency. First, efficiency is a diffuse topic with no clear definition or solution, therefore people talk about in various ways and that creates confusion. Second, energy efficiency cannot be seen; it is made up of many components and moving parts and cannot be visualized like a windmill or solar panel. Energy efficiency suffers because it is not easily identifiable. Third, energy efficiency requires a customer's behavior change – be it learning to use smart systems, looking for energy efficient appliances, or understanding their current energy use.

There are many incentives for towns to become more energy efficient. For instance, the recent economic crisis has spurred interest in reducing municipal power costs through energy efficiency. Communities are also interested in using energy efficiency to decrease greenhouse gas (GHG) emissions. Additionally, recent legislative actions and funding from the federal stimulus package have created resources for towns to begin energy efficiency campaigns. Yet, towns do not know where to begin. In Lexington MA, for example, the town formed an energy

committee with the goal of saving money for schools and buildings. However, they do not know how a group of volunteers can take advantage of existing programs.

There is an opportunity for utilities and communities to develop stronger relationships. For a variety of reasons, certain communities and utilities have had tenuous relationships in the past and may not believe that they can partner to create energy efficiency programs. For example, at a town energy meeting held this year, citizens questioned their utility's motives and complained that the utility had passed off between three different project managers and all were unresponsive. Instead of bowing to this status-quo relationship, energy efficiency campaigns can be a vehicle for utilities and towns to work together and build trusting, effective relationships that will make future work easier to accomplish.

The media attention and incentives recently lavished on energy efficiency have created an opportune time to rethink efficiency programs to tear down these barriers.

KEY ACTIVATION POINTS

We started our analysis by conducting focused interviews with town leaders, campaign leaders, NSTAR's employees, and others to get a better feel community campaign needs.

- Marcia Cooper (Newton's Green Decade)
- Fran Cummings (Commonwealth Solar)
- Martie Fiske (from Weston)
- Sue Haselhorst (NStar)
- Brian Hebeisen (Watertown Energy Committee)
- Representative Jon Hecht (from Watertown)
- Professor Rebecca Henderson (MIT)
- Jason Jay (MIT PhD student)
- Meg Lusardi (Massachusetts DOER)
- Shubhada Kambli (EPA)
- Alice Leung (from Babson)
- Dave MacLellan (NSTAR)
- Beth Zwick & Roberta Miller (Community organizers from Watertown)

These interviews developed five common themes, which we focus on to support our recommendations:

1. Collect and standardize information about programs and processes in one database for quick and efficient access.

Consider a community leader who has recently become interested in energy efficiency. Perhaps she is increasingly concerned about global warming and its effect on her children and read an article about how energy efficiency can be a great way to make a difference locally. Perhaps high oil prices in recent years have driven home the need to find a way to help residents save money on their winter heating bills. Whatever the reason, what should she do next? The Utility has an opportunity here, a potential local champion to bring local connections and knowledge of the community. But people are busy, and without a clear path of what to do next, the opportunity may be lost.

Nearly every interview identified the fact that there is no central location, no "one stop shop" that lists and explains all of the resources available for a town's energy efficiency campaign. As Professor Henderson described to us, "Lexington does not know how to even start their community campaign" and would greatly benefit from a tool or manual that explains the steps they can take to begin their campaign. To further increase the benefits of such a manual, Meg Lusardi explains that there needs to be a place that "pulls together existing resources," so that new campaign leaders can quickly and easily understand all of the resources available to them.

There are a lot of great programs out there for energy efficiency. Creative people are designing new approaches every day. But we need better tools to organize and disseminate this information. Community leaders from across the state need a centralized clearinghouse which tells them what programs are available, gives them ideas on how to get started, and lets them share best practices and tips with each other.

This need is what led us to the Town Manual. Why not spend the time up front to establish and maintain a resource that can help anyone who is interested get their town started on energy efficiency? In addition to helping to develop interest, the Utility will surely save money in the long run by creating a standardized information tool, rather than having to devote more unique resources to getting each community leader going on energy efficiency.

2. Disseminate data about individuals and communities to heighten individuals' awareness of and learning about their energy usage and encourage behavior change through competition.

Data on energy efficiency can be a powerful tool for both town leaders and community members. For town leaders, data on energy efficiency may reveal the neighborhoods or sub-communities where the largest energy efficiency gains are likely to be had. For example, with energy efficiency data it is possible to answer question like the following: which neighborhoods are using the most energy? Within that neighborhood, are the largest energy users mostly families with children who we can target through the local school?

For community members, data on energy efficiency can inspire people who see that some of their neighbors are paying lower utility bills, motivate them by allowing them to check their own progress, and provide recognition to people that have achieved strong efficiency gains. Data on efficiency may also be used to spark healthy competition. With energy efficiency data, it is possible to answer the questions: how does my energy usage compare to the average for my block? Since the campaign started, I've cut my usage by 15%, is that good?

We need tools that connect the actions an individual can take with reductions in home energy usage, and through that, with community goals. What is the likely impact of replacing my refrigerator on my energy usage and bills? My neighborhood is close to our reduction goal, what do I need to do to help with the final push?

Our Community Energy Café proposes a website designed to answer these questions and many others. It can help both individuals and organizers learn about community energy usage, establish benchmarks and goals, and keep up to date on progress.

To most effectively run a campaign with a limited set of volunteers and other resources, it is important to have a deep understanding of the community's energy consumption and energy efficiency needs. Roberta Miller explained that having detailed sub-community data is of key importance to their campaign, but is unfortunately lacking today. She said that this information will help "so that you can...give people a sense of where they're at, as well as benchmarking against other communities." Being

able to have measurable "metrics so that people see that they're making visible progress," explains Rep Hecht, is key to ensuring that the campaign keeps its momentum and the constituents remain engaged and motivated.

3. Create a flexible campaign platform which is customizable based on community goals including adjustable incentives and a town specific look and feel.

As Martie Fiske described, "every town is distinct." Therefore, it is important to understand the unique needs, sub-communities, and resources in and available to each town. A successful campaign will be flexible enough to adjust to the needs and desires of each town. The challenge for a utility stems from a historical approach to service delivery, based on a single method of service applied to all towns and cities, and even states.

The campaign is structured to overcome this challenge allowing the utility to approach each town with a flexible platform, which facilitates the ability for the town and utility to work together. With a menu of options for campaign design, the utility and town can work together to identify the most appropriate campaign model for the specific city or town.

The campaign website will be a critical tool for the utility and town to work together. The utility can approach each town with a standard platform that allows for customization according to the town's needs and desires. As the utility and town get to know each other better, they can identify a structure and feel that works for the specific town.

Defining and maintaining unique goals and timelines is a crucial part of any successful campaign. "Being able to quantify is fabulous," says Roberta Miller about campaigns she has run in the past. Representative Hecht further elaborates on this point: "given that a lot of people feel unprepared to understand [energy efficiency because of its technological aspect], the campaign must translate goals into things that are easily understood, as well as examples of success that people can easily understand." He also considers strict timelines of utmost importance, saying that campaigns need to define a "clear duration - start and end dates so that people have a focus of their energy, and that people carve out time and energy for this campaign."

Martie Fiske suggested that we "consider offering

guidance on two levels: simple, without involving state or federal resources, and more complicated and demanding, as your manual now outlines.” That way community campaign leaders can determine for themselves the depth at which they run their campaign while maintaining the option to ramp up in the future.

4. Tap into local networks, word of mouth, and community action to build trust and enthusiasm for utility programs.

Utilities must overcome the challenge of linking into local networks. Due to the traditional model of utilities’ service delivery, they have not had to tap into local networks to conduct business. To achieve energy efficiency, the utility has to get to know towns, local groups, individuals, business leaders, and others.

The campaign enables the utility to identify local champions, who will bridge the gap between the utility and the community. These “Energy Efficiency Champions” can be formal, elected leaders, leaders of local organizations or groups, informal leaders, or simply active members of the local community.

To achieve deep energy efficiency, the utility must gain access to and then activate these local networks. Local leaders, already embedded and trusted within the community, will help to build trust between the utility and the community. Individuals and business owners in the town are not likely to know their utility well; they see the utility as a faceless company delivering a service. To build trust, utility customers in towns must begin to associate friendly faces with their utility.

As enthusiasm for the campaign builds in a town, word of mouth about energy efficiency will transmit from neighbor to neighbor or business owner to business owner, creating a sweeping effect through the town.

Many interviewees explained the importance of utilizing existing local networks to achieve significantly deeper penetration. Roberta Miller says that the “community organizing model is the best way to do this. [Since it is the] quickest and easiest way to quickly achieve high penetration.” Representative Hecht says of successful campaigns he has seen in the past: they “utilize existing networks and institutional resources in town: school system, business organizations, churches, NGO

institutions.” Marcia Cooper further illustrates this point with the Cool Massachusetts campaign she is running now, saying that she is “getting churches, synagogues, businesses, and schools to work on ecoteams.”

Roberta Miller explains that “if people aren’t knowledgeable about the community, it won’t work,” and that an effective campaign “needs good “on the ground” intelligence about the community, otherwise it will fall flat on its face.”

Rep Hecht explains that “clear leadership [of the campaign needs to] reflects the range of subgroups, as well as executive leadership to manage and organize the campaign” and that the campaign needs “visible and identifiable leaders at the forefront to give their blessing and visibility with the people that they interact with.” Roberta Miller seconds this: good campaigns “need some type of “convener” that is credible amongst all types of people.” Doing so will build trust and exposure in the community, raising involvement significantly.

Finally, both Rep Hecht and Roberta Miller explained the necessity of “mixing in the fun thing” to keep participants excited and to draw in new participants. Marshfield, as an excellent example, engaged the community through community-run activities like concerts and schools events.

5. Utilize rewards, competition and incentives to generate enthusiasm for energy efficiency.

As part of the traditional advertising and marketing campaign to motivate citizen and customer interest in an energy efficiency campaign, the utility should consider creating a community competition or reward system.

Goal-setting is an important motivator. If a utility wants to pursue a rewards or competition program, the first step would be working with towns to create a specific savings goal that is appropriate and achievable for a community. Then, as a reward the utility and town can agree on an appropriate reward. With the campaign underway, the goal will be tracked on the energy café and on billboards throughout town.

In Marshfield, NSTAR and Commonwealth Solar promised three small solar photovoltaic systems to an Elementary School and Police Station. The cost was approximately \$75,000. The systems were not part of a

FOUNDATION SUMMARY:

MASSACHUSETTS COMMUNITY ENERGY EFFICIENCY CAMPAIGNS

Christina Santini

MARSHFIELD, MA (2007)

SPONSOR	NSTAR community partnership with Marshfield
GOAL	Create community awareness and local commitment to making a greener, more energy efficient town
WHAT	Direct mail, civic events, school programs, ad campaign, local leader buy-in <ul style="list-style-type: none">• 75 percent off insulation and air sealing upgrades• Up to \$1,000 rebate for a high efficiency heating system• \$300 rebate for a high efficiency hot water heater• ENERGY STAR® replacement window & refrigerator rebates• Commonwealth Solar incentives for solar electric (PV) panels• Additional money saving offers for residences with central A/C• Specialized incentives and services for your business
RESULTS	Over 600 audits, 25 PV systems, well above average for other towns.
LESSONS LEARNED	Ratio of investment per quantity of energy efficiency achieved too high to be replicable broadly

SOMERVILLE CLIMATE ACTION

SPONSOR	Citizens' group
GOAL	Reduce their greenhouse gas emissions. We promote energy-conservation, energy-efficiency and the adoption of renewable sources of power through education, advocacy, and coalition building
WHAT	Educating citizens; providing information on financial incentives; generally facilitating citizen access to EE resources and procedures; Somerville Solar Challenge (150 households and businesses contributed \$100 to NE wind fund – solar for school as reward)
RESULTS	Solar challenge – city was awarded a 2kW solar photovoltaic; widely accessible array of energy efficiency materials
LESSONS LEARNED	Productive combination of grassroots group with city support

formal reward or competition program, but were used as an incentive for participating in the Energy Challenge. Still, solar systems are expensive and may not be a cost effective reward for generating energy efficiency participation.

Towns are interested in renewables because they are visual representations of action, whereas energy efficiency is largely unseen. At a meeting in Watertown, citizens were excited at the idea of converting an existing dam into a small hydropower project. Towns may have different desires or sites for renewable projects, so we do not recommend one type of renewable as a reward. Instead, we suggest working with towns to find unique rewards.

Despite the benefits of customized competitions, we recognize that there are also several drawbacks of a reward or competition program. Firstly, competitions create winners and losers. A community vs. community competition for a single reward could reinforce existing stereotypes and discourage the losing community. Secondly, competitions do not implicitly guarantee collective action.

A second type of reward/competition program that may prove effective in helping communities meet their energy efficiency goals is targeted not at the community, but utility program managers. This type of program was recently implemented by National Grid in the United Kingdom, who is now tying management bonuses to greenhouse gas (GHG) emission goals. If the goals are met, bonuses are received. This structure aligns incentives and allows flexibility and motivation for management to pursue creative goal-reaching programs. It is a novel idea, and could be applied to energy efficiency. Project managers receive their bonuses based on MW savings goals in their territories. This will encourage hard work, commitment to communities, and create an environment for

generating innovative ways in which communities can achieve MW savings. We recommend exploring a similar program that creates incentives for utility project managers to innovate and create effective energy efficiency programs.

THE DEAL

A community-based campaign is an opportunity for a win-win solution for utilities implementing cost-effective programs and towns struggling with energy planning. In this approach, the Utility provides systematic tools, initial investment and program managers. In return, the town provides local champions and assistance carrying out the campaign in a local area.

Using this approach, the Utility can achieve higher adoption rates at lower costs. The town is able to access assistance from utilities and government, tap local investment, and achieve positive results. Both the Utility and town build trust and stronger working relationships, leading to improved brand equity for the Utility and political capital for the town.

These points lead us to recommend two new products, which will address the challenges to a successful energy efficiency community campaign. These tools do not replace traditional marketing materials but can help to greatly increase awareness and adoption of energy efficiency programs and tools.

CAMPAIGN PROPOSAL 1: TOWN MANUAL

Town leaders (whether elected officials, well-connected individuals, or energy efficiency champions) are interested in implementing deeper retrofits in their towns. However, they are often unsure on the specifics of energy efficiency and how to best organize the process. They need help getting started to work with NSTAR, national & state programs, their own local community groups, and other constituencies to effectively achieve their goals.

To address this problem, we determined that town leaders would significantly benefit from an online “manual” explaining how best to work with all town constituents and all available energy efficiency implementation resources. This resource will include a step-by-step manual describing energy efficiency and the process by which any interested town-member can launch a town-wide energy efficiency campaign – by leveraging the local resources, organizations, and institutions to achieve deeper adoption of NSTAR’s, and National and Massachusetts’ energy efficiency programs.

This manual will be based on research from a variety of sources, including the Marshfield Energy Challenge, other energy efficiency campaigns across the nation, as well as other non-energy community campaigns. Additionally, the manual will include the resources available to cities from national and state programs.

DESCRIPTION OF THE MANUAL’S FUNCTIONALITY

The manual will be an online set of “click-through” steps that a user can navigate to walk through the creation and implementation of their town-wide energy efficiency campaign. Additionally, if feasible, the manual will incorporate utility and other data to provide quantitative projections of possible energy savings, as this will inspire action through self-interest.

Manual audience – The manual is intended for any person interested in leading an energy efficiency campaign in their town or city. The manual is not intended for individual citizens within the town, but instead for the town’s campaign leaders. We refer to these people as “energy efficiency campaign champions,” and the can

FOUNDATION SUMMARY: SMART GRID AND THE COMMUNITY

Patrick Lynch

BOULDER, COLORADO – As of the Spring of 2009, Xcel Energy and the city of Boulder are currently working to implement a comprehensive Smart City program, incorporating all of the elements listed above with the exception of dynamic pricing. They have allocated an estimated \$100 million to creating an upgrade distribution grid with two-way real-time communication, upgraded substations, and in-home control devices. They are also building distributed infrastructure to support plug-in hybrids, battery systems, wind turbines, and solar panels. They list potential benefits of “operational savings, customer-choice energy management, better grid reliability, greater energy efficiency and conservation options, increased use of renewable energy sources, and support for plug-in hybrid electric vehicles and intelligent-home appliances.”

Similar to an energy efficiency campaign, a Smart Grid trial must build the buy-in of a large percentage of the population. People must be willing to install new devices and adjust to a new way of using electricity. Xcel has included community events in their information campaign, including participation in farmers’ markets and local festivals. The Boulder program is perhaps the earliest large-scale attempt to implement a comprehensive overhaul to electricity usage within a city, and as details of the project emerge, they will be a huge help to other utilities or cities looking to begin similar projects. National Grid and the city of Worcester, Massachusetts have recently begun a Smart Grid pilot as well.

be elected officials, concerned individuals, influential individuals, or others. To perform the steps listed in the manual, a campaign leader would not need to be in a position of power within the town, though it will be helpful for him or her to know the town and its constituents well.

Medium of delivery – The manual will be housed online. Being an online resource will make it easy to update and expand and will ensure that every user will constantly have the most up-to-date version.

Example user experience – To illustrate the user experience, one can think of an online survey, where the user answers some multiple-choice questions about their town, including the energy consumption of various town sub-communities (small businesses, low income, residential, etc). It is possible that some of this information may be pre-populated from NSTAR or other data sources.

After completing the questionnaire, the site will suggest the town’s sub-communities to target, as well as an initial list of resources available to the particular campaign (i.e. foundation grants, national funding sources, community organizations, local contractors). The user can then determine which resources from that list they wish to pursue, and then dive deeper into each of those. The user experience thus far helps navigate the possible target sub-communities and potential resources, and corresponds to Steps 1-3 of the manual as defined below.

Creation of the manual & ongoing ownership – The manual will be created by NSTAR in conjunction with DOER, the EPA, and other related groups. NSTAR will be the project lead because they have access to the funding required, as well as the other necessary resources and contacts to flesh out a full version of the manual. However, once the manual is created, NSTAR will need to work with the other stakeholders to determine which entity is best to perform ongoing maintenance. Possible options include NSTAR, DOER, ICLEI, or a spun-off entity.

Maintenance – Maintenance will need to be performed on an ongoing basis to keep the manual and the resources included within it up-to-date. To ensure maintenance is constantly performed at a minimal cost, web 2.0 functionality must be incorporated.

Outline – We have included the first-pass outline for the manual in Appendix 2.

CAMPAIGN PROPOSAL 2

COMMUNITY ENERGY CAFÉ

The Community Energy Café is a website directed toward the residents of a participating town. It is designed to disseminate information and provide an online community support. The website will address the following major categories of information:

- What is energy efficiency?
- Who has energy efficiency?
- How do I compare?
- Sign me up!
- Community message boards
- Energy efficiency in the news
- Town-specific programs

The content of the website is customizable and will reflect the programmatic choices made by town leaders engaged with the Town Manual. Town energy efficiency initiatives will visibly display the Community Energy Café web address. Similarly, the website will direct people to participate in the local initiatives. The manual and the website should be self-reinforcing.

Many efficiency specialists, utilities and towns have recently begun to consider how GIS could be used to help implement energy efficiency. Examples of spatially explicit household or neighborhood level analyses of energy efficiency in active use in efficiency planning or campaigning are not readily available. Yet, understanding energy consumption and efficiency as a function of place has the potential to convey many advantages.

GIS is a particularly powerful tool when embedded in a community-based approach to energy efficiency because it allows for the people, buildings and space behind energy consumption to be analyzed. This may be performed by overlaying energy use data, census data and zoning data. Then it is possible to calculate statistics like energy intensity (kWh/ft²) by block group, by sector (e.g., commercial or residential), by household size, or by the resident's age. Relating energy efficiency to the demographics of the people behind utility bills and the location of the account is a departure from standard practice.

Spatially analyzing energy use alongside demographic and land use data will have two major impacts. Firstly, it will allow for the comparison of energy efficiency across community groups (neighborhood to neighborhood, town to town) and give community members a means of benchmarking their success as a whole and their success relative to other groups. Secondly, it can give community leaders a better sense of which groups are engaging in efficiency and which are not. This will help better customize a community's approach to energy efficiency.

Because of the ability of GIS to provide community feedback through benchmarking and help leaders build a targeted efficiency campaign, implementing a comprehensive GIS will help drive higher adoption rates and deeper efficiency. In addition, the data input at the community level could be aggregated at a state level to provide real time transparent data on who is doing what on EE at the community level.

The Community Energy Café is an online gathering place for people to learn more about energy efficiency, compare tips and tricks, and track their progress as they adopt energy efficiency upgrades.

Audience – The Community Energy Café is targeted at town or city residents and business owners. Each participating community will have their own version of this website, customized to meet the needs of their specific community.

An advertising campaign should accompany the launch of the website to help increase awareness in the community. This campaign may include strategically placed banners or billboard showing the web address and advertisements in the local newspaper.

Creation and ownership – The Community Energy Café could be created by NSTAR (or an NSTAR-contracted company). NSTAR will modify the content, as is appropriate for each town. The website will then be appended to the town's existing site. Ongoing monitoring and site management will be the responsibility of the town.

WEBSITE OUTLINE

The following describes the format and content of the Community Energy Café:

Welcome – This is the introduction to the website. It should be simple and clear. It will provide links to each of the six major website components that are described below. The welcome page will also provide a succinct indicator of how the town as a whole is progressing toward its energy efficiency goals. For example: 50 megawatt-hours saved this month! 30 more megawatt-hours to go!

The page may also show recent news headlines or a hotkey to a major initiative (Vote here for where to site solar!). The welcome page should demonstrate that the website is fresh and updated, while remaining as streamlined and clear as possible. Six website components are described below:

1. What is energy efficiency?

This page provides a simple definition of energy efficiency (e.g., Energy Efficiency: Use less energy without

changing your lifestyle) and shows general examples of energy efficiency in action (see Figure 1). Examples might include Energy Star appliances, double pane windows, efficient water heaters, or weatherization strips. Each example should also include the approximate annual savings on an energy bill.

2. Who has energy efficiency?

This page links to examples from community members within the town or city. This will be customized for each participating community. It will include people from several different sectors of the town, with the aim of identifying individuals that many community members will recognize as their friends and tapping trusted local networks.

Each community member that is featured on this page will share testimonials about their experience with energy efficiency and show pictures of items in their house that have changed. They will also compare their energy bills from before the efficiency upgrades to after the upgrades.

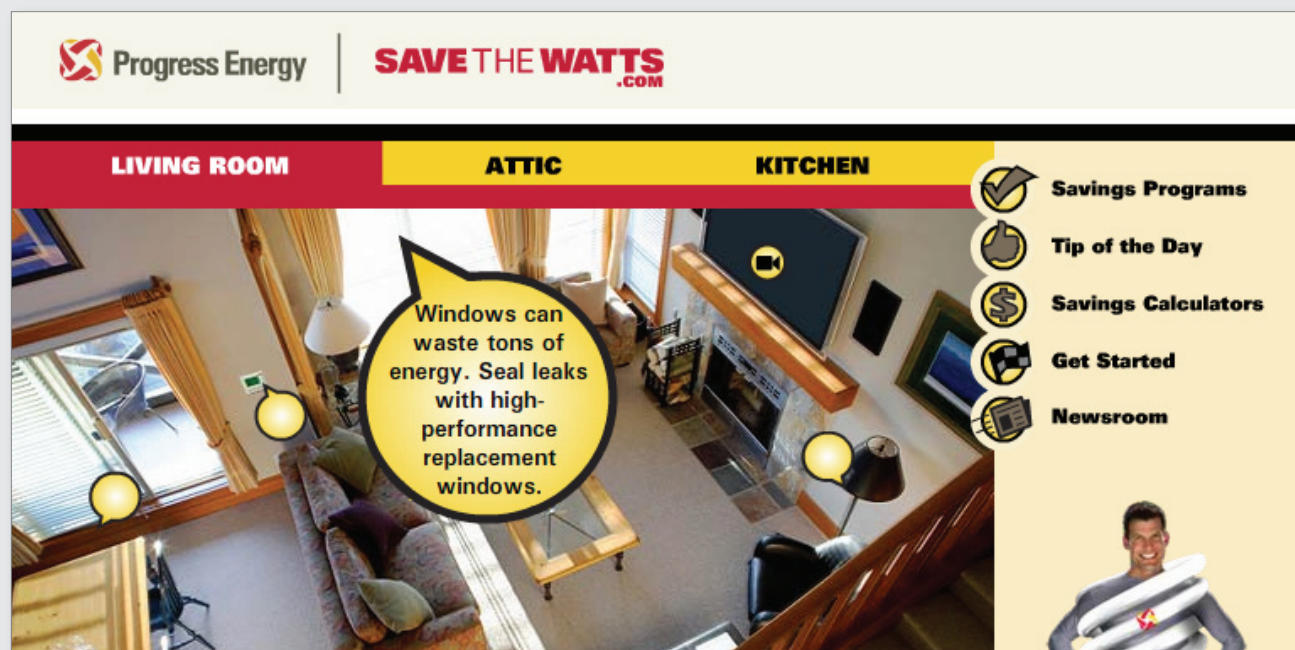


Figure 1. Examples of energy efficiency savings in the living room of a house. This website also showcases an attic and a kitchen. Source: Progress Energy Save the Watts campaign, <http://www.progress-energy.com/shared/stw/car/main.html>



Figure 2. A couple providing positive testimony about their experience with an energy efficiency program, including information on their energy savings.
 Source: Lifestyle Home Solutions, http://www.lifestylehomesolutions.ca/index.php?page=energy_audits

3. How do I compare?

This section will allow community members to compare their energy efficiency relative to their neighbors and track their collective progress over time. This page will feature a map of the community that shows two major datasets: a base display of aggregated energy efficiency data by block group overlaid with opt-in, household-level efficiency information (see Appendix 2 for more information).

There are not presently any examples of energy efficiency data being shared via community maps anywhere in the country. Such benchmarking is important in allowing community members to compare their energy efficiency to that of their neighbors and inspire action. People with poor efficiency will be encouraged that it is possible for them to lower their energy consumption (and, thus, their bills). People who already have good efficiency will be inspired to maintain or improve their efficiency as they are looked to as leaders within the community.

Maps of energy efficiency will have the secondary effect of making efficiency more tangible, as people are able to better visualize efficiency in action (see Figure 3).

4. Sign me up!

This page encourages community members to start on energy efficiency now. It offers tips on energy efficiency upgrades and shows how to perform a self-audit. It also allows community members to sign up for an audit with NSTAR.

Energy efficiency tips may include items such as installing CFLs or weatherization strips. The page may also include a tip of the day, as show in Figure ##.

In addition to do-it-yourself installations, recently Lawrence Berkeley National Laboratory unveiled a web-based program for performing self-audits. Some people may be interested in performing their own audit, in lieu of a professional coming to their home. This website is linked to by the US Department of Energy Energy Hog campaign.

For those who are not interested in do-it-yourself work, it will also be possible to sign up for a free energy audit. The website will coordinate with an NSTAR database so that NSTAR can synchronize their audit scheduling with each town website. It is possible that an online, community-based sign-up would allow NSTAR to specify particular dates that audits are available in a given town, streamlining the delivery of audits.

5. Community message boards

In the message boards, community members can questions of each other and compare tips and tricks. For example, a community member may write, "Air conditioning is making my energy bills sky rocket! Anyone have any tips on how to stay cool and pay less?" or "I've weatherized my windows and doors and I'd like to do more, but I don't have a big budget. Anyone have any suggestions of cheap, DIY efficiency upgrades?" or "Are tax write-offs available for any efficiency retrofits?"

Figure 3. Thermal mapping in England demonstrates which roofs loose the most heat to the atmosphere, an indicator of the insulation capacity of the roof.
<http://www.bluesky-world.com/products/>



Tip of the day!
Real-life, simple tips you can use to save cash.

[View more tips](#)

TIP #52
The next time you dust your house, dust your fridge. Check the coils behind the refrigerator — and use coil vacuums or dusters to clean it off and keep costs down.

Next

Print out all 100 tips!

- Savings Programs
- Tip of the Day
- Savings Calculators
- Get Started
- Newsroom

Figure 4. An energy efficiency tip of the day. Note that it is possible to print out all 100 tips.
Source: Progress Energy Save the Watts campaign, <http://www.progress-energy.com/shared/stw/car/main.html>

HOME ENERGY SAVER

The first web-based do-it-yourself energy audit tool

Click here
to give us your feedback and help us to improve this site.

Save \$\$\$
Find out more about the profitability of energy efficiency upgrades

CALCULATOR
Find the best ways to save energy in YOUR home!

Enter your zip code OR Enter previous session #

Go!

Don't know the zip code?

Investing in a home on your street could be more profitable than investing on Wall Street.

MAKING IT HAPPEN
Find resources to make your home more energy efficient.

- About this Site
- What's New?
- Testimonials
- Librarian
- Glossary
- FAQ
- Ask An Expert
- No/Low-Cost Tips
- Remodeling
- Local Resources
- Awards & Accolades
- Press Information
- Demo Movie
- Developers
- Students & Teachers
- Search
- Help

Money isn't all you save. Visit the ENERGY STAR website for information on energy-efficient products.

Developed by the Environmental Energy Technologies Division at Lawrence Berkeley National Laboratory
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Figure 5. Instructions on how to perform your own home energy audit.
Source: Home Energy Saver from Lawrence Berkeley National Laboratory. <http://hes.lbl.gov/>

Sign up for an energy audit

Free energy audits are available to all *Columbia Water & Light* customers. An Energy Management Specialist will review your account history and call to set up a time to visit your home.

Please enter the following information and press "Submit Request" when complete.

* Indicates a required field.

Energy Audit Request

Customer information: (Address where energy audit is to be performed.)

First Name: *

Middle Initial:

Last Name: *

Address: *

Apartment Number:

City: Columbia , MO. *

Zip: *

Daytime Phone Number: *

E-mail Address: *

Please verify your information before selecting submit.

If you have problems with this form, you can call 874-7325 during business hours or send an e-mail to wmail@GoColumbiaMo.com.

Figure 6. An online form to sign up for an audit.
Source: *Columbia Power and Light, Columbia, MO.*
<http://www.gocolumbiamo.com/WaterandLight/Forms/afom.php>

Efficiency Matters! Energy Efficiency Message Board Community Feedback

Post a Message

Welcome!

October 22, 2008
Posted by

Norwich Public Utilities is pleased to offer the newest edition to our website -- the NPU Message Board!

This forum is intended to give our customers an opportunity to post comments or share information about energy efficiency or NPU Energy Efficiency Program.

Please note: NPU reserves the right to remove any post that contains inappropriate or offensive language or suggestions.

If you have a question that requires a response, please submit it to efficiencymatters@npumail.com.

Figure 7. A community-based energy efficiency message board. Source: *Norwich Public Utilities,*
<http://norwichpublicutilities.com/messageboard.asp>

6. Town-specific programs

In addition to the categories listed above, the website will feature content that is specific to a community's program choices. For example, the Town of Marshfield has chosen to site a wind turbine in their town. The Marshfield Community Energy Café might include a program that allows members to vote on the location of the wind turbine and discuss the wind turbine. Other towns might choose to mount a campaign that is aimed at elementary-aged kids. If this were the case, the town could potentially add on some pages to their site that are specifically aimed at kids, as is available from the US Department of Energy's *Energy Hog* campaign.



Figure 8. A page within the Energy Hog website that is aimed for kids. The link to this page is marked "No Adults Allowed!"
Source: *Energy Hog, Department of Energy.*
<http://www.energyhog.org/childrens.htm>

UTILITIES HELPING TOWNS DRIVE EFFICIENCY IN PUBLIC BUILDINGS AND NEW BUILDINGS

Municipalities can play an important role in achieving local energy efficiency. As the case of Marshfield, Massachusetts demonstrates, combining local action with utility expertise and city government authority can achieve deep and lasting levels of energy efficiency in communities.

Critical to achieving deep energy efficiency is improving the energy use of existing public buildings such as firehouses, police precincts, sanitation garages, offices, public schools, libraries and courthouses. Efficiency can be improved through retrofits, the replacement of outdated inefficient equipment such as old boilers with new Energy Star models, and proper commissioning and building management. More than half of the greenhouse gas reduction potential identified for New York City's landmark sustainability plan (PlanNYC) is in the form of improvements to existing public buildings through retrofits and better facilities management including commissioning and retro-commissioning (pg M4, PlanNYC).

Described in this section are:

- The general process for energy-efficiency municipal building management, and an examination of the barriers faced by municipalities
- Municipal options for advanced building promotion
- The proposed *Deal*
- Proposals to implement the *Deal*

ENERGY-EFFICIENT MANAGEMENT OF MUNICIPAL BUILDINGS

Municipalities have within their direct control the many large, public buildings that are used for city government businesses. Beyond facilities such as the town hall, library, offices, police and fire departments, public works buildings, each town often has large energy and operating expenses devoted to the school system and its buildings. There are some key initial steps toward effective and efficiency management of energy use in municipal buildings:

Town governments should know where their municipal buildings stand in terms of energy usage. Often this means conducting a survey or audit of current energy usage. Such performance audits can be costly but worth the initial outlay if significant energy savings can be realized. Funds are also available through DOER to fund this kind of energy performance assessment and ESCOs will use such audits to determine where they can monetize energy savings. No matter the funding source, townships should view an energy survey as an investment.

After a performance assessment has been performed on municipal buildings, **town governments should look to benchmark their usage against similar buildings to determine the potential savings.** After upgrades and retrofits are implemented in order to capture efficiency savings, monitoring and verification of these savings need to be constantly and accurately completed. ESCOs will perform some of these measurement activities, but often the burden of measuring efficiency achievements will fall upon the municipality. DOER has announced plans to accelerate the rolling out of its Energy Information Reporting System. It will be made free to all municipalities in the state and will provide online tools to monitor and track energy use and measure the impacts of efficiency measures. For example, it will enable automated downloading of utility billing data directly into the energy accounting software.

Successful energy efficiency management of municipal buildings will require some training in current best practices. For administrators and town managers who are new to energy efficiency practices there can be significant learning curves. Examples would encompass training town administrators in monitoring their portfolio of building energy use, to ensuring that the everyday facilities managers understand and prevent common energy wasting habits. In this way, municipalities can achieve significant operating expenses through the realization of energy efficiency in their own town buildings.

BARRIERS TO ACHIEVING ENERGY EFFICIENCY IN MUNICIPAL BUILDINGS

Public Bidding Process – Anecdotal evidence from preliminary meetings with Watertown, MA city and school officials suggest that a significant barrier to undertaking major efficiency projects in Massachusetts is the public bidding regulation. Officials managing public construction projects are required to accept the lowest-cost bid and must solicit separate bids for general contracting and each type of subcontracting. The “lowest cost” requirement prevents officials from making decisions based on contractor reputation or other indicators of quality. Bidding the general contracting separate from subcontracting often

forces general contractors to work with subcontractors with whom they have no prior experience and have little leverage over.

The result, according to Watertown officials, is a construction process that is a headache for administrators and that produces unreliable results. Communities need another solution that gives them access to qualified technical help to identify cost effective energy retrofits and financing to undertake the most viable options. One solution currently available to communities is to contract with ESCOs, which are not subject to public bidding requirements due to the performance nature of their contract. ESCOs provide a full range of services from initial auditing through financing and implementation of energy and water saving measures. The ESCO secures a profit from taking the risk of the saving measures which is repaid through savings. This construct pushes ESCOs to pursue measures with relatively quick paybacks and reliable savings. Such companies typically have staff or preferred contractors with whom they work to ensure quality services. Another possible solution is for the state to reform the public bidding regulations to address the issues discussed above or for utilities to offer services to municipalities that mimic the services offered by ESCOs (e.g., benchmarking energy usage, energy audits, prioritization of energy efficiency actions and estimated paybacks, overseeing and financing selected energy improvements).

Inadequate Data on Energy Usage of Public Buildings – Another barrier to improving the efficiency of existing public buildings is a lack of data on existing buildings and how one town’s buildings compare with similar buildings elsewhere. It is not readily apparent to municipal official how much energy buildings use and which aspects are inefficient. Making data easily accessible to public officials is essential for achieving energy efficiency in public buildings. Detailed energy audits are needed to establish and prioritize an inventory of shovel-ready efficiency projects that can be funded with money from the federal stimulus package, which will begin flowing to municipalities in the coming months.

Not Enough People and Technical Expertise – The majority of communities in the Commonwealth do not currently have staff trained in energy management,

FOUNDATION SUMMARY: RECOMMENDATIONS FOR MUNICIPALITIES IN PARTNERING WITH ESCOS

Gary Shu

Municipal governments should bundle similar efficiency projects between various communities in order to maximize the value that can be offered in an RFP. By tying together, for example, school renovation projects across several townships, ESCOs can achieve higher economies of scale and will view the package more lucratively. This would invite more proposals and interests from various ESCOs and a greater response to large municipal RFPs. Municipalities should take the initiative and partner with one another to put together packages of similar and profitable buildings to put out to bid for ESCOs.

WORKING WITH COMMUNITY GROUPS

Municipalities and ESCOs should connect with local community groups who have a much deeper local knowledge of the various homes and diversity of residents. By affiliating with local leaders who bring in homeowners and buildings to be audited, ESCOs can achieve savings so that local energy efficiency projects become profitable. Utilities could support the initial auditing costs through a subsidy. Another way of utility outreach is local community action like training workers and educational programs, who could thereafter be hired and trained to precertify other homes for energy efficiency projects.

STREAMLINING THE PROCESS

While audits of buildings are highly individualized, the contracting and procedures in implementing energy efficiency projects need not be. ESCOs can offer more standardized contracting with a la carte or optional packages suited to municipal projects. State governments could create legislation for the standardization of such contracts between state and local governments. Local governments or associations can bundle and negotiate with larger ESCOs for an umbrella agreement that various agencies and municipalities could decide to opt into.

FINANCING AND IMPLEMENTATION OPTIONS

Local governments find themselves in highly differing financial situations. Depending on the availability of credit, a municipality may choose to finance an energy efficiency project themselves and only contract out the auditing, construction and verification portions. If a large local government builds up a store of extensive technical expertise, they may eventually develop their own energy efficiency agency to implement and oversee projects. On the other hand, small and resource-limited municipalities may choose to off-load the entire portion of the project to an ESCO. The unique circumstances of a local government or municipality will dictate the best course of action for an organization to partner with an ESCO.

and some may not have facility management expertise. For these communities one critical barrier is the lack of expertise and time to develop and implement a cogent EE plan, even if there are ripe energy savings. While ESCOs may be an appropriate choice for some municipalities, lack of experience working with performance contractors may make some communities hesitant to pursue such a course of action. Increasingly Energy Committees are forming to help fill in the gap in staff resource, provide technical support, and rally community interest in EE and renewable energy options.

Energy Audits May Trigger Costly Building Repairs – An additional barrier to improving energy efficiency in existing buildings and enforcing the building energy standards is the potential of discovering structural and other safety code violations during audits. Building owners may be reluctant to take advantage of free energy audits for fear that costly code violations will be discovered leading to the requirement that they engage in expensive repairs. Resolving and overcoming such a barrier is a difficult issue. On one hand, the building code health and safety requirements should be enforced notwithstanding the financial pain of property owners. However, what if widespread efforts to enforce the energy code lead to the condemnation of a significant portion of the building stock when property owners cannot afford to bring their buildings up to code? Public buildings have less of a problem because the cost of repairs is shared by taxpayers and because of a greater expectation that public buildings will be up to code. Citizens expect the government to play by the rules.

MUNICIPAL OPTIONS FOR ADVANCED BUILDINGS AND BUILDING ENERGY CODES

Municipalities have a key role to play in working with utilities to deploy efficiency in their communities by removing barriers to advanced buildings, retrofitting public buildings, and incorporating energy efficiency into their community planning. Utilities can support towns and cities in adopting and enforcing the new building energy “stretch” code by providing training to code enforcement officials and helping to educate the building and design communities. Cooperation between municipal building departments, utilities, architects and contractors is key to achieving the potential energy savings created by adopting the stretch code. A community-utility partnership involving an accelerated permit and utility connection program is one avenue for such cooperation.

High Performing Energy Efficient Design for New Buildings – There are several different rating and benchmarking systems for high performance building design. Probably the best known is the Leadership in Energy and Environmental Design (LEED) developed by the United States Green Building Council (USGBC). The New Buildings Institute has developed the Advanced Buildings package of technical resources and trainings to provide a prescriptive path for designing commercial buildings projects of up to 70,000 square feet that exceed ASHRAE 90.1-2004 efficiency requirements by 20 to 30 percent. The Advanced Buildings Core Performance requirements provide criteria for efficient envelope, lighting, HVAC, power systems and controls, and have been approved by the USGBC for achieving certain LEED Energy and Atmosphere credits. The effectiveness of LEED certification in predicting energy savings is under debate within a larger debate about predictive versus performance-based building rating systems. The Energy Star Homes and Home Energy Rating System (HERS) are effective models for achieving energy savings in residential buildings.

Stricter Building Energy Codes – The development and enforcement of stricter building energy codes is seen as one of the most cost effective means of achieving energy savings. Ensuring that new buildings are designed and constructed to be energy efficient produces energy savings for the life of the building, typically from 50 years to over

100. Massachusetts has linked its building energy code to the most recent version of the International Energy Conservation Code (IECC) model energy code developed by the International Code Council (ICC). Massachusetts building energy code will now automatically update when the IECC is revised every three years.

On May 12, 2009, the Massachusetts Board of Building Regulations and Standards (BBRS) adopted an informative index which will function as a “stretch” code, also called a “beyond code”. The stretch code for new construction and major renovations will be made available to any municipality that seeks a more stringent building code for projects within its jurisdiction. The informative index, entitled Appendix 120.AA, includes performance based codes in the form of Home Energy Rating System (HERS) index requirements for residential construction, and a performance standard for large commercial projects over 100,000 square feet. Building energy codes only produce benefits when they are complied with and achieving compliance takes a focused effort.

A recent roundtable discussion convened by the Building Code Assistance Project (BCAP) and Energy Foundation identified the following barriers to enforcement: “Code Enforcement Officials (CEOs) lack a solid understanding of energy efficiency, energy systems and how they work;” and CEOs have little quality assurance through inspections because “the energy inspection process often conflicts with the [Life Health Safety] processes. Lack of staff and lack of funds are also critical barriers. Among the recommendations of the roundtable was the use of HERS raters to enforce codes and to focus on training CEOs and building and design professionals together regarding building energy codes.

A 2008 survey of code enforcement officials by the BCAP found that CEOs overwhelmingly saw a lack of training as a significant barrier to effective energy code enforcement. The BCAP report notes, “there is a shortage of training within the codes industry on the value of energy efficiency, high performance, and integrated design.” Code officials reported that in-person workshops were the most effective training medium, while documents and resources from the International Code Council (ICC) are the second most preferred method. Increasing the uniformity of building energy codes across jurisdictions is

recommended to improve compliance because it “makes it easier and more cost effective for builders and contractors to construct residential buildings” by creating economies of scale. The study found that the building industry views code enforcement as a significant motivator for building energy code compliance. BCAP estimates that the average cost of an in-person workshop per employee is \$93 for a one-day six-hour training session, and that the total annual basic training cost per full time building code inspector to maintain ICC certification including state and local continuing education requirements is \$2,059.

The state is planning on investing \$1,000,000 for Energy code training in an effort to train all local building officials on both the base code and stretch code. Utilities can contribute to the effectiveness of building energy codes by partnering with states and localities during code adoption, providing analytic support, engaging stakeholders and educating the building and enforcement communities about new requirements. The Washington state Utility Code Group (UCG) of the 1990s is a model of such support. UCG “informed stakeholders about key code provisions, incentives, and compliance options... developed a training program and disseminated information to industry audiences through an initiative to advance innovative enforcement and evaluation mechanisms.” A recent survey found that 94 percent of homes in Washington met or exceeded building envelope code requirements. Much of this success is attributed to the efforts of UCG.

Expedited Permitting – Utilities and municipalities can work in coordination to expedite the permitting and utility connection processes for high performing buildings. Utilities can begin working with contractors and developers early in the process to streamline the design to facilitate timely connections. To address concerns about whether or not advanced buildings deliver on energy savings expectations, utilities and municipalities can jointly develop customized performance standards for expedited permitting and utility hook-up programs that more specifically target energy efficiency than a standard LEED rating. They can also require proper commissioning post construction from those who receive expedited permits.

Municipalities should adopt ordinances that require buildings receiving public funds to meet additional energy efficiency requirements such as a LEED or NBI Core Performance rating that exceeds the building energy code and that meets sustainable site and other environmental criteria. Pending promulgation of the stretch code, the Massachusetts Zero Net Energy Buildings Task Force recommends model zoning to encourage “stretch code” compliant projects through density, expedited permitting, and other incentives. Grants, tax breaks, and building fee waivers are direct financial incentives municipalities frequently offer developers to encourage green buildings. Density bonuses are an indirect financial incentive in that they increase the value of the development.

Mechanisms that municipalities use to enforce compliance with green building programs include: withholding certificates of occupancy until verification that projects have complied with green building requirements, requiring mitigation through the substitution of alternative green building measures if proposed green building features are not implemented during construction, the use of monetary penalties, and requiring a bond that is forfeited in cases of non-compliance.

Accelerated permitting offers a strong incentive to developers. Reduced wait-time can create significant savings by leading to earlier sales or leasing and reducing the interest paid on construction loans. Municipalities can create additional financial savings by waiving permitting fees for high performance projects. Chicago was the first large city to develop such an accelerated permitting program. Chicago’s Green Permit Program can issue permits for large or complex projects in as little as half the time of a typical project and waives up to \$25,000 in project review fees charged by the city. The waiving of fees is an important incentive for non-profit and smaller scale developers. Chicago’s program has encouraged growth in green building projects, growing from 19 permits issued in 2005 (the year the program was introduced) to 71 in 2006.

THE DEAL

The objective of our team is to propose a framework that unites interests and resources to better equip municipalities in achieving energy efficiency on the local scale. The deal would give communities energy savings and access to the technical and strategic assistance they need to move forward. Utilities would be able to document energy savings through municipal actions primarily related to public buildings operations and maintenance and regulatory changes affecting new construction or significant renovation. A community-based efficiency model provides benefits to both the utility and the partner community. The matrix below lays out the details of this “deal.”

The proposed deal would require municipalities to commit to a core set of actions to be eligible for technical and financial assistance in undertaking EE activities. These community commitments generally take the form of policy, regulatory or asset management actions affecting public buildings and municipal staff. The core policy and operational changes municipalities can undertake, which are listed above in “the deal” are discussed below.

	Utility	Municipality
GIVES	<ul style="list-style-type: none"> A single point of contact for EE Benchmarking of public buildings and workshop analyzing the results Funds building operator training & stretch code training Supports EE SWAT team to identify funding and oversee EE implementation (Level 2) Assist municipality in securing funding for new cost-effective EE measures to achieve 30% energy reduction in at least 2 public buildings < 1.5 years (Level 2) 	<ul style="list-style-type: none"> Single point of contact for EE Requires training for municipal building operators Requires stretch code training for municipal staff Municipal data needed for benchmarking Community leadership commits to participate in workshop Creates local policy/regulatory incentives for EE Municipal leadership agrees to undertake EE in at least 2 public buildings to achieve 30% energy reduction in < 1.5 years (Level 2) Adopt stretch code within 2 years or equivalent building standards (Level 2)
GETS	<ul style="list-style-type: none"> Single point of contact for community EE Energy savings associated with building operator training* Energy savings from retrofits to public buildings (at least 30% reduction in 2 buildings < 1.5 years) (Level 2) Local policy incentives for EE 	<ul style="list-style-type: none"> Utility single point of contact for EE Access to EE SWAT team expertise (Level 2) Energy savings associated with improved building management Energy savings from public building retrofits

FOUNDATION SUMMARY: EECBG IN MASSACHUSETTS

Josh Sklarsky

The Energy Efficiency and Conservation Block Grant Program provides an unprecedented opportunity for communities in Massachusetts to leverage additional funds and resources to make real gains in reducing greenhouse gas emissions and reducing their overall energy load. This program will also help communities achieve the goals of the Green Communities Act. The Massachusetts Department of Energy Resources has been holding webinars to provide towns assistance in applying for these funds, which can be found on the DOER webpage.

There are 42 city-equivalent governments in Massachusetts receiving direct DOE formula grants, ranging from just under \$150,000 to over \$6.5 Million. DOER will receive \$14,752,100 of which they are making available \$12,252,000 to the 309 towns that have populations less than 35,000 through a competitive grant process. This represents approximately 85% of the State's entitlement, which is larger than the 60% required by US Department of Energy to be used. A timeline for these grants has not yet been set, but will be announced after the plan has been approved by DOE.

Despite the implicit purpose of the Energy Efficiency and Conservation Block Grant by title, these competitive grants will not be eligible for traditional energy efficiency and conservation projects. Instead, the awards which are capped at \$150,000, can be used for Solar PV, Clean Energy Technologies such as Combined Heat and Power Facilities, and for performance contract buy-downs. Massachusetts has decided that energy efficiency programs are the responsibility of utility companies and funding for such projects should go through them.

DOER is also planning to use \$1.5 million to roll out its Energy Information Reporting System to all 351 municipalities in the Commonwealth. This system will allow cities and towns to benchmark consumption and identify targets for efficiency projects, measure results, and track emissions reductions that result from efficiency, conservation, and renewable energy projects. On top of this, there are plans to spend \$1 million in the EECBG money to provide training for buildings officials on the Massachusetts state energy code.

MUNICIPAL PROPOSAL 1: TOWN BUILDING MANAGEMENT AND RETROFITS FOR EE

Municipalities have the opportunity to lead by example in achieving energy efficiency by starting with their own buildings. Reducing energy usage in public buildings offers municipalities could significantly reduce town expenses at a time when many communities are facing budget difficulties. Two key strategies with municipal building are ripe for action: training facility managers to ensure energy is not wasted and retrofitting public buildings to reduce ongoing energy demand.

Building Manager Training – The EPA Community Energy Challenge program found that changes in building management could generate significant changes in energy use. Training facility managers to efficiently manage their buildings for energy and water usage is a relatively low cost, high payback action. Many utilities currently offer such training and hence ensuring all communities have trained staff (be they in house or contract staff) is a feasible by scaling up the programs. Energy performance expectations could be incorporated into building operator contracts and such contracts might also require third party commissioning and re-commissioning of public buildings.

Energy Retrofits for Public Buildings – A win-win scenario for municipalities and utilities is realized when the energy use in public buildings is cut. Towns and cities see their operating budgets plummet and utilities now charged with pursuing aggressive energy efficiency targets, can document substantial energy savings as many municipal buildings are not energy efficient. Most communities do not have the expertise to either benchmark their energy usage of their existing public buildings, analyze the data and then take action to fix buildings. Under a utility community partnership, the utilities could help provide this expertise and provide communities with two levels of service: benchmark and prioritize and a more comprehensive EE SWAT team that would help a community take the next step to undertake and finance EE activities through use of utility funds, private ESCOs, government incentives, Federal funds and other resources. Currently utilities offer some support to municipalities along these lines. For example, NSTAR's Town Green Program provides comprehensive energy audits and carbon footprint analysis, benchmarking, and usage reports.

MUNICIPAL PROPOSAL 2. PROMOTE ADVANCED BUILDINGS AND ENHANCED ENERGY CODES

As part of the “deal”, utilities could require municipalities to promote advanced buildings for new construction, and potentially for permit-required retrofits. There are several strategies communities can undertake to create more stringent energy requirements or incentives.

Adopt the Energy “Stretch Code” – In May 2009, a code change proposal relating to energy conservation was approved by the Massachusetts Board of Building Regulations and Standards (BBRS). The approved change will become an appendix to the MA State Building Code and it known as the ‘120 AA Stretch Code Final’. Municipalities can adopt the Stretch Code, which would ensure newly constructed commercial and residential buildings meet a code that is about 30% more stringent than existing code for energy. Training will be needed to bring local officials up to speed on the Stretch Code; the Commonwealth, utilities, and others are planning to support such training. The MA Net Zero Energy Task Force recommended municipal adoption of this code.

Apply Aggressive Energy and Green Building Requirements to Public Buildings – Municipalities could adopt ordinances that require buildings receiving public funds to meet additional energy efficiency requirements such as the Stretch Code, LEED certification or NBI Core Performance rating that exceeds the building energy code and that meets sustainable site and other environmental criteria.

MUNICIPAL PROPOSAL 3. ENCOURAGE ENERGY EFFICIENCY THROUGH PLANNING ORDINANCES AND BYLAWS

Planning boards have a unique opportunity to help achieve energy efficiency within their communities through the adoption of ordinances and bylaws. For example, the setting, design, and construction of a building can significantly affect the energy needed for cooling, heating, or lighting. More energy efficient designs can be encouraged through simple changes in zoning that enables floor-area ratio exclusions changes to building setbacks and height restrictions, making building solar-ready, and compact growth.

FOUNDATION SUMMARY: STRETCH CODES IN MASSACHUSETTS

Bjorn Jensen

Many states and municipalities are mandating that new construction meet increasingly stricter energy efficiency requirements. Massachusetts has linked its building energy code to the IECC so that it will automatically update when the IECC is revised every three years. The state has developed an informative index to function as a “stretch” code, also called a “beyond code.” This is a more stringent building energy code municipalities may adopt instead of the state’s basic building energy code. It applies to new construction and major renovations. The informative index, entitled Appendix 120.AA, includes performance based codes in the form of index requirements for residential construction, and performance standard for large commercial buildings. The index requires large commercial buildings over 100,000 square feet to meet a performance standard 20% below AHSRAE 90.1 2007, a Home Energy Rating System (HERS) index of 65 or less (35% better than the base code) for new residential over 3,000 square feet, and a HERS index of 70 or less for new residential construction under 3,000 square feet. For residential additions there is the option of meeting the above mentioned HERS ratings or prescriptive requirements. For residential rehab and repairs there is the option of meeting prescriptive requirements of a HERS index of 85 for additions of 2,000 square feet or less and 80 for additions greater than 2,000 square feet.

Survey results⁵ from the American Planning Association in 2007 have shown that the responsibilities of planners has been expanding to include energy plans and policies and that the most common tool being used to reduce energy demands is energy efficiency. The study also showed that many communities have yet to officially integrate energy efficiency into zoning and review. Furthermore, many communities do not offer incentives for energy efficiency and most of the planners that were surveyed were unaware of options for incentivizing green buildings.

Floor area ratio exclusions – Many energy efficient measures can take up additional space in buildings. If these additions were excluded from the floor-area ratio (FAR), it might encourage their installation in municipalities with constricting codes. Examples of things that could be excluded from the floor-area ratio calculations are heating and cooling equipment, the width of exterior walls, and ventilation shafts.

Changes to Building setbacks and Height Restrictions – Building setbacks and height restrictions can impose limitations on energy efficiency within a neighborhood. For example, building setbacks can discourage thicker exterior walls, which tend to be more energy efficient. Furthermore, having no setbacks would encourage buildings with shared walls, which are more energy efficient than exterior walls. Installation of solar energy panels can also be encouraged by allowing the projection of solar collectors into setback areas or excluding the equipment from building height measurements.

Compact Growth – Zoning ordinances and by-laws can be used to promote compact growth, which tends to be more energy efficient. Cluster development takes advantage of existing water and sewer infrastructure while mixed uses can help reduce travel requirements for work, services, shopping and recreation. Finally, smaller lot sizes and setback amendments that make an area more compact can prevent excessive heat loss through exchange with adjacent buildings.

Other Actions for Planning Boards – Energy efficiency can be promoted through other measures taken by planning boards such as the simple sharing of information. For example, some towns in Vermont encourage energy efficiency and conservation by providing educational materials with permit applications. In addition, the local planning board requires that applications for new building construction and additions and renovations include a plan and statement on how energy conservation principles (such as insulation, building orientation, landscaping, glazing type and location, earth sheltering, measures to reduce infiltration, and heating and ventilation) will be addressed within the proposed project. Permit approval may then be conditional on meeting the outlined measures.

Create Regulatory Incentives to Advanced Buildings – An alternative to full adoption of the Stretch Code or other green building requirements, is to create regulatory and permitting incentives (e.g., density bonuses, expediting permitting) for developers/owners who choose to meet this more aggressive code. The Massachusetts Net Zero Energy Task Force also recommended using the Stretch Code as an incentive for fast-track permitting or other bonuses. Accelerated permitting offers a strong incentive to developers. Reduced wait-time can create significant savings by leading to earlier sales or leasing and reducing the interest paid on construction loans. Municipalities can create additional financial savings by waiving permitting fees for high performance projects. Chicago was the first large city to develop such an accelerated permitting program. Chicago's Green Permit Program can issue permits for large or complex projects in as little as half the time of a typical project and waives up to \$25,000 in project review fees charged by the city. The waiving of fees is an important incentive for non-profit and smaller scale developers. Chicago's program has encouraged growth in green building projects, growing from 19 permits issued in 2005 (the year the program was introduced) to 71 in 2006.

⁵ <http://www.planning.org/research/energy/survey/2007/>

MUNICIPAL GROUP PROPOSAL 4: TECHNICAL ASSISTANCE WORKSHOPS FOR PARTICIPATING COMMUNITIES

Recognizing that communities across Massachusetts are currently at different levels of energy efficiency, we propose a technical assistance program that responds to communities at each level, and at least two target populations:

Communities that have signed a Memorandum of Understanding (MOU) with the utility, thereby committing to increasing energy efficiency in their area. The services offered through this program would be available to local public officials, decision-makers, and other community leaders. The following sections outline suggestions for style, content, and utility role.

Empowering communities to increase cost-effective EE through pledge aggregation and new technical capacity. In order to reach organizations that have not participated in previous utility programs, there needs to be an upfront investment in technical support and proposal writing guidance. Utilities should sponsor a series of seminars across the state to teach groups how to write a proposal for the application process.

SEE APPENDIX 3:

1. Workshop topics
2. Existing Municipal Options for Implementing Energy Efficiency

APPENDICES FOR EXTENDED REACH GROUP

1. Example Memorandum of Understanding
2. Bibliography

EXAMPLE MEMORANDUM OF UNDERSTANDING

1. **Purpose:** This Memorandum of Understanding (herein referred to as the agreement) between _____ (herein referred to as implementing organization) and _____ (herein referred to as community group) establishes a partnership to identify and implement energy efficiency opportunities in the city/town of _____ (herein referred to as the city).
2. **Understandings, agreements, support and resource needs.**
 - a. The city will/has provide(d):
 - i. Staff time to help identify and outreach to community groups
 - ii. Co-hosting of community partner outreach workshops with the implementing organization to recruit applicants
 - b. The community group will provide:
 - i. Organizational-level buy-in to meeting efficiency goals of bid
 1. A bid which includes the predicted number of households/businesses who will undergo efficiency measures and the predicted energy savings (if applicable)
 - ii. Access to community networks through pledge drive
 - iii. Labor, organization, and outreach capacity from its membership and staff
 - iv. A community face for efficiency programs
 - c. And in return will receive:
 - i. Upfront information about the structure of the program: the cost breakdown for different measures, and evaluation methods used to quantify efficiency
 - ii. Capacity and training in outreach and RFP process
 1. trainings on Bid & Pledge process and best practices, including upfront application assistance
 2. campaign guidance and outreach materials
 3. assigned efficiency liaison to the implementing organization
 - iii. Flat-rate, per-household funding for outreach
 - iv. Royalties based on energy savings in tagged households
 - v. Lower energy costs for organization and members because of program participation
 - d. The utility will provide:
 - i. Funding for and implementation of cost-effective EE measures
 - ii. campaign materials and staff support
 - e. And in return will receive:
 - i. credit for energy savings from investments which help to meet Green Communities Act requirements
 - ii. expanded community marketing network, leading to gained trust and better image
3. **Contracting period.** This agreement will cover the bid and pledge process from ___/___/___ to ___/___/___.
4. **Monetary and performance terms.**
 - a. All cost-effective measures pledged by the community group will be implemented by the implementing organization in a timely manner, (meaning no more than ___ months?).
 - b. Once the community groups bid is approved, they will receive a forgivable loan of \$___ per household upfront to undertake outreach activities.
 - c. The community group gets a total of \$___ (i.e. another \$___ in addition to the forgiven loan) per household which undergoes deep efficiency measures
 - d. Additionally the community group receives a royalty based on EE performance of pledged households for three years after the implementation of deep EE measures. Royalties will be equal to ___cents/KWh saved in the first year; ___cents/KWh saved in the second year; and ___cents/KWh saved in the third year.
 - e. Outreach loans to community groups that do not result in pledges will be returned to the utility.
 - f. If more than one community group in the area is participating in this program, only the organization that receives the pledge first gets credit for a home
5. **Monitoring and contract compliance.**
 - a. The utility has the right to site visits, access to program documents, and other monitoring activities.
 - b. Each party retains the right to terminate the agreement at any time if the opposite party fails to comply with the terms and/or conditions stated herein.
6. **Effective date.** This agreement will be effective as of ___/___/___

[implementing organization representative]

[Community group representative]

Date

Date

2: EXTENDED REACH BIBLIOGRAPHY

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APPENDIX 2

CAMPAIGN GROUP APPENDIX: VISION OF THE TOWN MANUAL

INTRO	<p>Introduction: This section will be a broad introduction to the town manual – an executive summary that explains the purpose and goals of the manual. It will also lay down the expectations for the community campaign leaders. This section should help excite potential community leaders and inspire them to act.</p>
WHAT IS ENERGY EFFICIENCY?	<p>What are the benefits of energy efficiency? How can it benefit the town (energy cost savings, jobs, infrastructure planning, etc)? How does it benefit the environment?</p> <p>What are the types of upgrades and technologies that constitute energy efficiency? Lighting, weatherization, appliance upgrades, etc. How does the home audit work?</p>
DETERMINE CAMPAIGN LEADERSHIP	<p>STEP 1: Identify campaign leaders and train on the benefits of energy efficiency if necessary. Two levels of leaders need to be identified: executive leadership and visible leadership</p> <ul style="list-style-type: none">• Executive leadership must be city champion(s), whether an executive director or “steering committee”, that can commit their time and energy to leading the city campaign• Be sure to involve leadership that reflects the range of subgroups you will be targeting. These leaders need to be extremely knowledgeable of the community they are representing• Solicit involvement and buy-in from elected officials, though they will not need to provide day-to-day support• If necessary, train the leaders in the benefits of energy efficiency. Leaders with a good grasp of conservation strategies to advocate for and inspire people to listen, learn and put into practice ways to improve energy consumption choices.
PRIORITIZE NEEDS AND TARGETS	<p>STEP 2: Determine the city’s true energy efficiency needs and key areas/sub-communities of focus (i.e. focus on small businesses, municipal buildings, restaurants, new construction, or specific neighborhoods). This will help prioritize the set of energy efficiency programs that the city will push to its energy consumers.</p> <p>STEP 3: Inventory available city resources – survey, document, and prioritize city organizations, groups, and institutions that can help administer and implement the energy efficiency campaign</p> <ul style="list-style-type: none">• Identify existing networks and institutional resources in town (i.e. school system, biz organizations, churches, NGOs). It is important to gain their buy-in, otherwise they will not feel ownership in the campaign and will not devote significant time or effort• Customize the campaign marketing materials available through NSTAR• Customize the campaign marketing materials available through the Energy Star Communities (http://www.energystar.gov/index.cfm?fuseaction=challenge_community.showSupport) and their Challenge Toolkit (http://www.energystar.gov/index.cfm?c=challenge.challenge_toolkit) <p>STEP 4: Determine which NSTAR, DOER, MA Technology Collaborative, DOE, and EPA programs match your city’s needs – informed by the needs assessment determined in Step 2, you will need to determine which energy efficiency programs will best meet your target sub-communities’ specific needs. (We would suggest the site maintain a database of programs run by DOER or another organization that catalogs the programs and funding sources, and rates which goals they address).</p>

DETERMINE GOALS

STEP 5: Determine energy efficiency goals by sub-community and program type. Identify metrics that can be measured to achieve these goals.

- The manual will include example goals and metrics, which can be used directly or tailored to your city's specific needs. The metrics will help focus on the most important aspects of the campaign, and will show participants that they are making clear progress throughout.
- Given that people feel unprepared to understand the technical aspects of efficiency technologies, goals must be translated so they are easily understood. Successful examples can help people grasp the goals more easily.
- Define a clear duration for the campaign so that leaders and participants can carve out their time and energy for the campaign.

DETERMINE TACTICS TO ACHIEVE THOSE GOALS

STEP 6: Pick specific programs/techniques to target at various sub-community groups in order to meet target metrics. Establish penetration goals for these programs which will meet overall goals.

- The campaign programs/techniques must be very user-friendly, incorporate elements of fun and community building through joint efforts (i.e. Home Energy Efficiency Team – HEET – heetma.com).
- Parents and children: Design appealing programs to attract students and their parents. Inspiring parents of school aged children is likely to increase participation, since parents always want to do what is best for their children and most parents recognize that climate change is not a good thing for their kids.
- Faith communities: Enlist to encourage their congregations to play a role in efforts to protect our environment for the well being of future generations.
- Business leaders: who support environmental programs and projects benefit when the community sees that their businesses care about the responsible use of our resources. Another incentive is to save money while saving energy.

BUILD RESOURCES AND CAPACITIES

STEP 7: Request resources from NSTAR, MA Technology Collaborative, and DOER – request the available resources from NSTAR, MA Technology Collaborative, DOER, and other organizations that help administer the energy efficiency programs you will be implementing (determined in Step 6).

- To help with this process, the manual will provide a “resource guide” that links all energy efficiency programs to their administrators and funding options.
- There also needs to be a lot of publicity to inform residents as to how they and their community can benefit from participation in a town wide campaign.

STEP 8: Identify supplemental funding sources if necessary – the manual will include a list of possible additional funding sources (both from state and national programs), as well as details on eligibility and application criteria.

STEP 9: Recruit city ambassadors – to effectively run a deep energy efficiency campaign throughout a city, “ambassadors” need to be identified throughout the target sub-communities to lead the campaign’s efforts in their particular areas. The manual will suggest ways to identify sub-community ambassadors.

- To help solicit leaders from a variety of sub-communities (i.e. existing city organizations), customize the Energy Star Community Challenge marketing materials found at http://www.energystar.gov/index.cfm?c=learn_more.work_with_groups. This provides information for working with architecture, real estate, health care, education, home improvement, hotels, manufacturing and other industry, retail, schools, small businesses, and supermarket organizations, as well as local congregations and government
- Getting individuals to be excited about participating in a community wide program may not happen as quickly as you would like it to happen, however, a well organized and determined team of leaders can make significant strides. They may draw people in by offering appealing programs, such as extracurricular school related activities.

EMPOWERMENT AND EXECUTION

STEP 10: Empower sub-community ambassadors to achieve energy efficiency goals – provide training and proper resources to the ambassadors, and organize events for ambassadors to share their thoughts, successes, and failures

MONITORING AND COURSE CORRECTIONS

ONGOING: constantly provide administrative support and organize events for ambassadors to share their thoughts, successes, and failures. If systemic issues are identified (i.e. insufficient funding), work with the ambassadors, NSTAR, MA Technology Collaborative, DOER, etc, to find solutions to the problems. Track progress against the goals determined in Step 5 and identify course-correcting actions if necessary.

MUNICIPAL GROUP APPENDICES:

1. Technical Assistance Workshops for Participating Communities
2. Existing Municipal Options for Implementing Energy Efficiency

TECHNICAL ASSISTANCE WORKSHOPS FOR PARTICIPATING COMMUNITIES

Recognizing that communities across Massachusetts are currently at different levels of energy efficiency, we propose a technical assistance program that responds to communities at each level, and at least two target populations:

Communities that have signed a Memorandum of Understanding (MOU) with the utility, thereby committing to increasing energy efficiency in their area. The services offered through this program would be available to local public officials, decision-makers, and other community leaders. The following sections outline suggestions for style, content, and utility role.

Empowering communities to increase cost-effective EE through pledge aggregation and new technical capacity. In order to reach organizations that have not participated in previous utility programs, there needs to be an upfront investment in technical support and proposal writing guidance. Utilities should sponsor a series of seminars across the state to teach groups how to write a proposal for the application process.

Workshop Topics

Brushing Up On The Basics – Communities that have yet to begin in-depth energy efficiency plans may need help in understanding what programs and resources are available to them. This service is meant to help these communities access all of this information through a single source. The types of information that can be shared under this service include, but are not limited to:

- The benefits of greening cities
- The requirements of the Green Communities Acts
- Existing stimulus programs and requirements
- Best practices for energy efficiency
- Options for integrating energy efficiency with other programs

- How to work with utility companies to accomplish these goals

The information listed here can be shared with participating communities in a number of ways. One example might involve one-day workshops held across the service area. These workshops could be on the larger side with presentations by representatives from the different parties involved in energy efficiency, including DOER and the utility. The Green Communities Group at DOER held a similarly designed workshop series in the recent past, but the content did not encompass all of the topics that we hope to include here. The role of the utility in this case may be to partner with and provide support to the Green Communities Group to run another series, which includes a wider range of topics and direct access to representatives of the different parties involved.

Another option, which is not necessarily exclusive from the workshop series suggested above, is to have a telephone or e-mail hotline that community members can contact with general questions about any of the topics listed above. The most effective time for an active telephone hotline would be during regular business hours, since those are the hours in which decision-makers will be working as well. The benefit of e-mail, on the other hand, is that questions can be more efficiently directed toward the right person, can be submitted at any time, and allow utility personnel to utilize their time better during down times.

Customizing Municipal Programs – Some towns have already gone through the first step of energy efficiency and are now trying to apply the general knowledge more specifically to their own community. Therefore, the second service offered through this assistance program is aimed at helping municipalities developed customized measures for achieving local energy efficiency.

Scheduled working sessions with town members and utility representatives can be directed at the setting of realistic goals, identifying cost-effective improvements, or instituting more advanced energy-related programs. For example, if towns could share information about their local building stock while the utility shares data on energy use, the workshop might be able to identify specific problem areas for certain towns. This allows towns to better direct their resources to those areas to achieve more cost-effective improvement.

In addition, towns may be able to identify other important goals that would drive the types of energy programs best suited for their particular neighborhood, such as green jobs programs, planning ordinances, or training for building code enforcement officials. Once the desire for a specific kind of program has been established, the community can work with the utility to build the necessary organizational capacity for program implementation.

Increasing Organizational Capacity – After identifying the types of energy measures that a town would like to pursue, towns will need help in designing and implementing various programs. The utility can play a role in the implementation by building organizational capacity within the community through in-depth training. Examples of training session topics include, but are not limited to:

- Managing buildings effectively
- Enforcing building codes
- Developing green jobs programs
- Establishing energy efficiency boards
- Designing local campaigns
- Extending reach within communities
- Functioning as an ESCO

The particular size of these training sessions and the utility's role may vary with the topic and level of interest. It may make more sense in some cases, such as extending the reach of local campaigns, to work with a single community at a time since the concerns and methods could potentially vary across towns. However, something like the enforcement of building codes, which is matter of standard practice regardless of location, could be done through a larger session with several towns at a time. In any case, the utility may wish to facilitate these sessions directly, or to provide fiscal or material resources for another party who may be more experienced in the specific topic.

Tools for Community-based Program Delivery

Seminars should cover the following topics:

Technical Training – Community groups often do not have a background in EE. They have networks that utilities can utilize to reach a greater penetration in communities, but utilities must educate the groups about the final goal of the Green Communities Act: All Cost-Effective Efficiency. These tools provide the vocabulary the groups need to complete the application. In order to achieve deep retrofits, construction professionals need to be trained in sustainable building methods. This may require the establishment of job training centers or coalition building with existing union training programs to expand the trainings to include weatherization and energy efficient retrofit techniques.

Valuation – As part of the training seminars, a standard valuation of retrofits is established. This provides an easy way to both create and evaluate proposals for the program. As opposed to having to individually audit every project, a standard value for the type of building and retrofit is created. Groups create their proposals around this value, including overhead costs.

Outreach – An explanation of the current process and evolution of EE programs needs to be accessible to multiple language groups. Foreign language manuals should be created that mimic existing tools and surveys. The attendees of the seminar should be walked through both the material and the goals of outreach, i.e. behavior change and participation in the retrofit program.

Green Lease – For groups dealing with the landlord-tenant split incentive, it is important to explain existing approaches to this situation and to provide standard EE clause terminology. This might include the utility and community engaging landlord's associations in drafting this language for their standard leases and/or agreeing upon local regulations for retrofitting.

EXISTING MUNICIPAL OPTIONS FOR IMPLEMENTING ENERGY EFFICIENCY

Programming energy efficiency and the implementation process for cities draws upon conditions that are required to initially realize energy efficiency. Large projects require large up-front capital and investment for equipment, servicing and contracting work. How energy efficiency can be effectively implemented may depend on the situation of a municipality and its residents. This section will briefly discuss how municipal governments can implement energy efficiency for both its residents and city buildings.

Energy Service Companies

Energy service companies (ESCOs), or energy service performance contractors (ESPC), are organizations that organize financing and contracting for energy efficiency projects. ESCOs provide “turn-key” efficiency solutions where the owner of a building will not have to find financing or builders. In so doing, they take on the risk that comes from anticipating the monetary savings from energy efficiency projects.

The business model that ESCOs typically work in provides several constraints. To begin with, ESCOs generally serve the largest customers such as institutions or large commercial buildings in order to protect their profitability. While this provides sufficient opportunity for municipalities to embark on energy efficiency projects for a town’s schools or government buildings, this generally leaves residents and small businesses in a different category from the township’s implementation.

In our discussions with town energy planners, we have discovered that one of the particular benefits in hiring ESCOs to implement energy efficiency projects in the state of Massachusetts is the ability for ESCOs to more closely hire and manage the contractors. State procurement laws for local governments are such that the lowest bid must be accepted, and subcontractors are bid out separately occasionally resulting in poor partnerships between building contractors.

Whether a municipality will decide to use ESCOs for its government projects will depend on the perceived benefits of using such organizations and the ability to

find convenient contracting and financing. What our group has found thus far is that ESCOs are convenient for Massachusetts’s municipalities. In order to use ESCOs for single family residential homes, however, other mechanisms such as pre-arranging contracts or bundling projects may be required in order for ESCOs to find such a market desirable.

Municipal Electric Utilities

In Massachusetts, there are 41 municipal electric utilities that administer and provide power to their districts, serving approximately 15% of the state population. Municipal electric utilities are overseen by the communities that they serve. The advantages of such organizations are that they are small and closer to their customers. The related disadvantage may be a lack of adequate size and economies of scale.

Regarding energy efficiency, municipal electric utilities may not have sufficient resources to finance large numbers of energy efficiency projects. In such a situation, municipal electric utilities would have to find financing from banks or float a bond.

Whether a municipal electric utility would run its own energy efficiency suite of services, similar to ESCO, depends on the ability of such municipal utilities to cheaply finance projects and their relationship with contractors of energy efficiency projects. Extensive home-by-home energy efficiency work has generally not fallen within the scope of municipal utilities, so some capacity and experience building will probably be necessary for most municipal utilities.

Third-Party Efficiency Organizations

Non-profit organizations can be used to help serve and provide residents with energy efficiency. These organizations can run the gamut from efficiency education and community building activities (e.g. Home Energy Efficiency Team, or HEET) to government-sponsored organizations like Cambridge Energy Alliance (CEA).

Organizations like CEA perform several quasi-government-like activities. They partner with the government to more effectively campaign for energy efficiency, but CEA also works with utilities to access data and their resources. To implement energy efficiency

projects, CEA also partners with ESCOs, describing themselves as a “one-stop shop” for energy efficiency. CEA will direct business and residents that are interested in energy efficiency to ESCOs. Other types of activities that CEA carries out are analyses and education on energy efficiency.

Cambridge Energy Alliance is relatively new and their success is far from assured. Cambridge also benefits from strong government and business support, something that not all cities would have in forming such an organization. In deciding on whether to promote energy efficiency through such an organization, a municipality must consider the resources it has at its disposal and the mix of projects in its residents. City governments should also consider the scope and mandate given to such programs.

Utilities

The larger Massachusetts utilities are required by the Massachusetts Green Communities Act to provide energy efficiency programs. NSTAR has several programs targeted toward residential consumers as well as municipal governments. A city government could partner with utilities to promote the utility program for its residents.

For municipal projects, NSTAR has a program such as the Town Green Program, which provides comprehensive energy audits and carbon footprint analysis, benchmarking, and usage reports. Financing options would also be available.

The decision for a municipality to use utility programs will center on the town’s own expertise on implementing energy efficiency as well as the municipality’s relationship with utilities. If a township does not have the initial capability, expertise or resources to implement energy efficiency, relying on a utility’s wherewithal may be recommended.

