

The Massachusetts Green Affordable Housing Initiative Early Results and Indications of Market Transformation

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ABSTRACT

This paper summarizes early results from a demonstration grant program launched by the Massachusetts Renewable Energy Trust (MRET) to stimulate the use of renewable energy and green building practices in affordable housing. Since its inception in 2005 the Green Affordable Housing Initiative (GAHI) has provided \$24.5 million in grant funds to eight grantees (termed “Partners”). With just over half the developments completed, there are early results and impacts of the program, including indications of market transformation in the Commonwealth’s affordable housing market. This paper highlights some of these early housing, energy and environmental impacts of the program; presents some of the lessons learned; and showcases the preliminary indicators of market transformation.

Among early program results are state, city and individual organizational policy and funding changes to encourage renewable energy and green building practices; the creation of 2,195 green affordable housing units; the installation of 1,861 kW in renewable energy¹ capacity (39 developments), sufficient to support almost 80 percent the total square footage of all developments in the program; and early cost savings ranging from \$144 per multi-family unit to \$511 for single-family units, based on a small number of units reporting.

In presenting this report, the authors note that many of the GAHI Partners are still completing building projects and bringing them into operation. All GAHI developments will be completed by early 2011. Data reported in this paper are current as of November 2009 when GAHI monitoring and evaluation ended.

Background

The Massachusetts Renewable Energy Trust (now part of the Massachusetts Clean Energy Center) is funded through a public goods charge on all ratepayers for electricity consumption. Its mission is to help Massachusetts citizens better realize the environmental and economic benefits of clean energy through a number of initiatives, financial incentives and rebates, and outreach efforts that target individuals, businesses, nonprofit organizations, housing developers, and energy producers.

GAHI was based on the premise that incorporating renewable energy and green building features into residential housing can reduce long-term energy costs and improve building performance. Renewable energy installations can provide a reliable supply of energy at a stable cost, reducing vulnerability to fluctuating fossil fuel prices. In turn, these installations can contribute to increased economic activity resulting from services provided.

¹ Because all GAHI Partners are using or planning to use photovoltaic (PV) systems, PV may be used interchangeably with renewable energy in this paper.

In developing GAHI MRET was prompted by two main factors: (1) the limited adoption of green building features (including renewable energy) in the affordable housing sector in Massachusetts, and (2) high increases in energy costs that were contributing to a substantial rise in overall housing costs for lower income residents. The program began with two Partners (grantees) in late 2005 and was expanded in 2006 to a total of eight Partners to reflect a range of organizational types, geographic focus, and green building approaches. Partners include public and private organizations across the Commonwealth, including housing agencies, developers, funders, a utility consortium, and a regional energy services consortium.² Individual grants range from \$1.5 million to \$8.5 million.

Beyond establishing some “green” baseline definitions including a requirement that all GAHI-funded developments meet or exceed an ENERGY STAR[®] rating or its equivalent, MRET allowed flexibility and experimentation among the grantees to maximize the experimentation with a range of approaches. Ultimately, GAHI funding will be used for different types of affordable housing developments, renewable energy systems, green and energy-efficient features, and, for some, training and education.

Program Design and Goals of the Green Affordable Housing Initiative

In establishing GAHI as a demonstration program, MRET sought to encourage new approaches to the financing, design, construction, and operation of green affordable housing by funding a variety of organizations and approaches that reached across key stakeholders. MRET met with parties from the affordable housing industry, including developers, builders, financing entities, and public and private agencies, to solicit input on design and delivery of the demonstration program. Their feedback revealed many common, important obstacles to broad adoption of renewable energy and other green building practices in affordable housing, including:

- Lack of understanding and misperceptions about green building practices, including renewable energy
- Uncertainty about costs and fear that they outweigh benefits
- Developer concerns that green features could actually work against them when seeking financing from affordable housing programs and lenders
- Uncertainty about the actual performance of green features in affordable housing properties and the types of projects that will yield reliable benefits

In consideration of these challenges, MRET designed GAHI based on a Theory of Change approach, proposing that financial assistance (grants) and technical support provided to key organizations involved in development, preservation, and operation of affordable housing would increase knowledge within the affordable housing sector about renewable energy systems and other green building practices, including successful transferable models and tools. MRET

² Partners include Boston Community Capital, a nonprofit community development financial intermediary; Cape Light Compact, a regional energy services organization; the City of Boston Department of Neighborhood Development, the city’s housing and economic and community development agency; HAPHousing, a private nonprofit housing organization serving parts of Western Massachusetts; the Joint Management Committee, a consortium of various utility companies and energy efficiency services provider; Massachusetts Department of Housing and Community Development, the state’s affordable housing agency; MassHousing, a quasi-public affordable housing lender; and Winn Development, a private affordable housing developer.

expected that this knowledge and replicable models would, in turn, result in additional sustainable actions across Massachusetts's affordable housing sector to pursue green affordable housing projects.

Achievements and Results to Date

In making grant awards, MRET sought to develop a total of 1,621 green affordable housing units and to install 2,175 kilowatts (kW) in renewable energy systems to support these units and/or common areas in buildings. Ultimately, when all developments are completed, GAHI is expected to result in 3,121 housing units (more than double the original target) and 2,850 kW in capacity (19% above goal). These units in a total of 68 developments include single-family and multi-family units, rental and home-ownership units, and new construction, conversion and rehabilitation. Most of the GAHI-funded units are multi-family (95%) and most of the units are rental units (87%). Most of the units were created through the rehabilitation or conversion of existing structures (58%).

When completed, these developments are expected to generate more than 2.8 million kWh of electricity (estimates for some PV systems not yet available). This creation of energy through renewable sources has both cost savings and environmental benefits. Considering *only* the PV systems (n=27) already installed in single-family homeowner units, the systems are expected to save about \$27,623 annually based on an expected production of 183,126 kWh per year. This corresponds to an average savings of \$511 per unit. Among multi-family developments for which renewable energy is powering residential spaces (n=15), the installed systems are expected to save approximately \$167,508 annually based on expected production of 1,091,048 kWh per year, which corresponds to an average savings of \$144 per unit.³ Improved building energy efficiency also contributes to long-term savings. Among green features most commonly used across Partners were high-efficiency building envelopes, super insulation, interior water efficiency, water and pipe insulation, high-performing windows, and indoor air quality improvements. For a full list of green features employed see the final report.

While many of the energy benefits in terms of lower energy costs will be realized in future years as operation of the renewable systems continues, to date (with production data for a limited number of systems), the renewable energy systems installed through GAHI have helped to avoid 3,049 pounds of SO_x, 595 pounds of NO_x, and 1.3 million pounds of CO₂.⁴ Going forward, as more systems are installed and operating for longer periods of time, greater annual emissions savings will be realized.

Organizational Change and Market Transformation

An important aspect of the program design for GAHI is that it would serve as a catalyst for change by helping to overcome obstacles to greater use of green building practices and

³ These figures were derived based on installed production estimates for 27 single-family developments and 15 multi-family developments (total installed annual production estimate of 183,126 kWh and 1,091,048 kWh per year, respectively) and the electricity rates of the utility providers for these GAHI properties: CLC, NGRID, NSTAR, Unitil, and WMECO. The residential utility electricity rates for these providers vary from \$0.13/kWh to \$0.20/kWh).

⁴ These figures were derived using a calculator for CO₂ emissions available on the U.S. Environmental Protection Agency's Web site, (<http://www.epa.gov/cleanenergy/energy-resources/calculator.html>), which includes detail on the assumptions and methodology used.

consequently transform the affordable housing sector. When MRET established GAHI, one important expected benefit was improved knowledge among design and construction professionals about renewable energy in affordable housing and creation of green affordable housing standards. When GAHI was expanded with an additional \$15 million later that same year, MRET reiterated its desire that the program “lead a permanent transformation of the market for affordable housing.” This transformation would mean there would be regular and sustained use of green building practices in affordable housing without the need for a grant program such as GAHI.

The early results of the efforts of GAHI Partners reveal that important transformational changes have occurred and continue to occur. Thus far, Partners have implemented a range of changes that support continued use of green building practices and promote consideration and use of PV in affordable housing. On a broader scale, there also are early indicators of sustainable market changes, some directly attributable to GAHI and others influenced by GAHI activities. With that said, however, it is too early to draw a clear conclusion that market transformation has occurred, as the properties developed by GAHI Partners are still being completed. If the Partners and others in the affordable housing sector in Massachusetts continue to finance and develop green properties in the years after GAHI ends, that will provide strong evidence of sustained market transformation. The early indicators of market transformation and sustainable change fall into three main categories:

1. Changes in funding criteria among public funders to incorporate green practices
2. Green building knowledge transfer through training and outreach
3. Internal organizational shifts within individual Partners to incorporate green practices and build green capacity that may have lasting impacts on other stakeholders

Changes in Financing Criteria to Support Use of Green Building Practices

Among the GAHI Partners are four financing entities: the Massachusetts Department of Housing and Community Development (DHCD), the City of Boston’s Department of Neighborhood Development (DND), MassHousing, and a private lender, Boston Community Capital (BCC). These Partners use a variety of lending sources, including tax credits, low-interest loans, equity investments, and grants to finance construction or rehabilitation of affordable housing. As lenders, they also establish funding requirements, construction or rehabilitation standards, and underwriting criteria that developers must meet to qualify for financing of their affordable housing properties. Each Partner, by virtue of its ability to establish green building criteria and other requirements as a condition of financing, has the ability to achieve significant and long-term sustainable impacts on the greening of affordable housing in the Commonwealth. All four of these Partners made important, ongoing changes in their financing requirements that will increase the use of green building features in affordable housing. These changes are discussed below and include specific financing requirements or incentives to incorporate green features, requiring a green strategy and requiring property owners to collect and make available specific building performance data.

Financing requirements/incentives for green features. Leading the way among the Partners in terms of broader market impact through modification of funding criteria is the City of Boston’s DND, which began requiring LEED Silver certifiable elements (LEED Homes or LEED New

Construction depending on the size of the project) in all submissions for funding as of May 2007. DND's standards also call for all buildings to have solar-ready roofs. To support the changes in standards, DND modified its internal project review and oversight procedures to track green building practices and developed new tools such as a model Request for Proposals (RFP) for solar design/installation. While these changes were not due solely to participation in GAHI, DND reported that the Initiative played an important role in supporting this policy change, which was consistent with the Mayor's commitment to increase green building practices in affordable housing.

The state's affordable housing agency, DHCD, also has made changes to its funding guidelines which it relates directly to its participation in GAHI, specifically making modifications to its scoring of applications for financing, underwriting procedures, and Qualified Allocation Plan (QAP).⁵ While DHCD was already planning to change some elements of the QAP to include green building, the agency credits GAHI as the prompting factor to place greater emphasis on green building and renewable energy in the 2007 QAP. The QAP's Appendix G now includes a self-scoring process for developers applying for DHCD funding to identify the green (and accessible) features of their proposed projects. For example, Appendix G includes a matrix of 25 green features, including water conservation, air sealing, use of low VOC paints, and solar PV, which applicants are asked to address and describe for their proposed projects. While developers are not required to achieve a green designation beyond ENERGY STAR, applicants for DHCD funding have the opportunity to gain optional points in the very competitive evaluation of potential projects if their developments incorporate meaningful green features consistent with Appendix G. DHCD notes that if all other factors are equal, proposed projects with greater green features will receive the funding first.

Requiring a green strategy. Boston Community Capital also is requiring property developers to submit initial green screening summaries in terms of what green and energy efficiency strategies they plan to employ as a condition of applying for financing. This requirement builds developer experience with green features and indirectly leads them to make changes in their systems and processes for developing designs for upcoming residential projects. As developers gain experience and make changes in their systems, they are more likely to incorporate green features into future projects.

Requiring building performance data. MassHousing reports that, as a result of GAHI, it now plans to collect data on energy and water usage from the buildings it finances. This policy change will have a lasting impact as it will direct owners/developers to benchmark their buildings and begin to understand their buildings' performance. The importance of this requirement in transforming the market is that property developers and managers will now collect and use building performance data that they did not previously gather. The experiences of WinnDevelopment and other Partners is that using these types of data helps identify opportunities for achieving operational cost savings and improved building performance through energy conservation, renewable energy, and other green features.

⁵ Each year DHCD must update its QAP, which details the selection criteria, standards, and application requirements for awards to be made under the Federal Low Income Housing Tax Credit, the largest Federal subsidy source for new or rehabilitated affordable rental housing. The Massachusetts QAP also reflects the sustainable development priorities of the current administration, including expanding housing opportunities and promoting clean energy.

Green Building Knowledge Transfer

The feedback that MRET received from the affordable housing sector as it was designing GAHI strongly emphasized that the lack of understanding of green features and ways they can be effectively incorporated into residential property development and operations was a key obstacle to greening affordable housing properties. The Partners have achieved notable increases in the level of knowledge within the affordable housing sector. Across the three Partners that provided training (HAPHousing,

HAPHousing also has partnered with Greenfield Community College to create curricula and course content for a Green Building certificate in renewable energy and energy efficiency. The program is open to all students, and HAP employees can take courses at reduced or no cost. Internal Organizational and Operational Changes to Incorporate Green Practices

DND and WinnDevelopment), there have been nine external/public trainings and two outreach events since 2007, totaling 33 training hours and reaching 343 individuals. These trainings focused on a number of topics related to renewable energy, energy efficiency, and green building principles, and targeted developers, builders, funders, and other stakeholders. In addition, the Joint Management Committee (JMC) provided outreach and support directly to developers as part of its GAHI mandate. For example, JMC was able to work with four Habitat for Humanity affiliates to include PV in their low-income housing developments. The experience gained by the four chapters is expected to help increase the focus on energy efficiency and renewable energy among other Habitat chapters.

Internal Organizational and Operational Changes to Incorporate Green Practices

Several Partners have made internal changes in how they approach designing new projects, as well as building management and operations. These changes include altering (1) how they assess potential projects for renewable energy and energy upgrades, (2) how they monitor energy consumption and returns on investment related to building modifications, and (3) how they maximize and sustain energy benefits through outreach to occupants. For example, HAPHousing's newly created *Single-Family Homeownership Specifications*, which now guides project selection, is continually expanded to include more environmentally friendly and energy-efficient features, such as low VOC paints, high-efficiency boilers, the Carpet and Rug Institute's Green Label certified carpeting, and UV.31 windows. HAPHousing also has developed the Green Checklist for use by developers, a list of the top 25 green and low-cost features that have proven return on investment and performance success, the Solar Easement document, and the internal Solar Screening Assessment tool. HAPHousing's project monitoring and assessment practices have incorporated additional green diagnostics, such as blower door testing to assess air tightness. This internal expertise proved helpful in adjusting the installation of insulation and air sealing in several projects. HAP provides all single-family homeowners who purchase HAP properties with a homeowners guide and education on maximizing the energy performance of their homes. WinnDevelopment also implemented a series of internal changes, including a shift in organizational planning and operational priorities to place greater emphasis on implementing green building practices across its portfolio. These changes not only address GAHI-funded properties, but also properties owned and managed by Winn companies.

At the building operations and maintenance level, WinnDevelopment modified its traditional capital replacement plans for boilers to include building envelope work to improve

overall savings; developed new unit turnover procedures that specifically involve low VOC paints, green cleaning products, and air sealing activities; and has instituted portfolio-wide monitoring of utility costs (using an outside company) to identify properties that are large consumers of electricity and water to prioritize these properties for energy-saving upgrades. To support these efforts, WinnDevelopment has developed a template for use in the budgeting process that includes status and cost line items in 33 categories, including energy audit status, electricity, plumbing, landscaping, HVAC, weatherization, and monitoring. Properties also must complete the new Energy Conservation Measure (ECM) Progress Report and file it with the Winn Green committee. A focus on water usage in particular has allowed Winn to reduce water consumption in 17 properties, with a savings of roughly \$1 million per year from an initial investment of \$340,000.

WinnDevelopment also has expanded its training for staff, notably for property managers, to emphasize the importance and specific strategies involved in not only green building design, but green property management. With two staff dedicated to green building and its partner greenGoat, WinnDevelopment has developed the comprehensive Utility Diagnostic and Repair Kit. This data-driven tool measures utility consumption and optimizes utility performance. Still in its formative stages, the Kit will ultimately allow users, such as WinnDevelopment building managers and operations and maintenance staff, to track utility consumption and identify higher-than-normal usage levels, secure a utility audit to diagnose the cause of the problem(s), and ultimately to take appropriate corrective action. WinnDevelopment also created a separate entity, WinnSolar, to facilitate development of PV projects in a manner that takes advantage of the tax credit benefits and related financial benefits of third-party ownership. Finally, WinnDevelopment has made a commitment that all new developments will achieve a LEED certifiable standard.

Cape Light Compact (CLC) also has made organizational changes to incorporate energy efficiency practices and renewable energy systems. In fact, CLC is considering its next steps to continue its leadership in promotion of net-zero energy homes or passive homes. It also has grown into a new role as a technical assistance provider and broker on Cape Cod, fielding requests for developers and other affordable housing stakeholders, more information and lessons learned in green affordable housing, and how best to use renewable energy in the market. For example, leveraging lessons from its GAHI experience that focused mostly on small PV systems that are not financially feasible without a subsidy such as GAHI, CLC plans to investigate bulk buying options that could work in rural areas on Cape Cod. These internal changes not only offer positive indicators of market change, they also provide an opportunity for lessons learned and potential for replication among other developers seeking to incorporate green building techniques, improve operational efficiencies in their housing portfolios, and improve occupant health.

At the more immediate and quantifiable level, it is encouraging that most Partners have embraced green certification beyond the program's baseline requirement of ENERGY STAR or its equivalent. Partners have pursued LEED⁶ and other building designations, creating housing units that achieve improved energy efficiency and attain other goals, including improved indoor

⁶ LEED is the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ that provides a framework for building both residential and commercial buildings to meet specified green building, energy efficiency, and conservation metrics for construction and operation. LEED Homes and LEED New Construction have multiple certification tiers including certified, Silver, Gold, and Platinum scoring levels.

air quality and efficient use of materials and resources. Six of the eight GAHI Partners selected LEED certification or “certifiable” green designations within the tier structure of the U.S. Green Building Council’s program. LEED “certifiable” adheres to the same LEED rating system, requiring the same set of criteria and points to achieve a certification level (such as Silver), but without the final, independent certification step. LEED ratings are slated for 23 (of the total 68) developments containing 427 housing units (308 affordable units). Cape Light Compact’s Gulls Nest condominium development in Provincetown, MA was the first affordable housing development on Cape Cod and *in the United States* to achieve a LEED for Homes Platinum rating.

Other designations being adopted by GAHI Partners include the Green Communities Standard established by Enterprise Community Partners, meeting 20% above ASHRAE, NYSERDA Existing Multi-Family Energy Conservation Standards, Home Builders, and the NSTAR Construction Solutions program.

Lessons Learned

In designing and implementing GAHI, MRET sought to address several barriers that hindered the affordable housing sector’s sustained adoption of renewable energy and green building practices. A key goal for the program was to gain lessons from the experience of GAHI Partners that would help address these barriers. Collectively the experiences of Partners translated into several overall lessons that inform future affordable housing programs, policies, and funding given the questions and challenges identified when GAHI was first established. As part of these lessons learned, we explicitly asked Partners to identify green building practices they plan to continue once GAHI funds have expired, practices they would *like* to continue but face obstacles preventing adoption, and activities they will not continue. Partners’ input is captured in Table 1.

Table 1. Partner Feedback on Critical Green Building Practices

Practices Partners Will Continue	Practices Partners Want to Continue but Obstacles Exist	Practices Partners Will Cease
1. Screening sites for PV early in process.	1. Technical assistance to developers and builders new to green. <i>Need:</i> Funding/resources to support.	1. Solar systems on marginal sites. Partners learned the value of screening sites and owners for solar feasibility earlier in the process.
2. Green building design in public funding criteria.	2. Performance testing for energy and green measures (e.g., commissioning, measuring energy performance of innovative system, comparing modeled energy estimates with actual). <i>Need:</i> Funds and lead organization to take responsibility.	2. Small PV systems. Some Partners felt very small systems were not worth the investment of time (<3 kW) for single-family.
3. Gathering data on building energy and water performance to inform renovation decisions and evaluate system performance.	3. Installation of PV or other renewable energy technologies. <i>Need:</i> Additional financial support.	3. Separate solar feasibility, design, and installation services. Market has evolved to be a design- build industry.
4. Energy efficiency measures, particularly those related to building shell.	4. Use of monitoring system for solar production. <i>Need:</i> Administrative support for existing Performance Tracking System (MRET).	
5. Solar-ready roofs, even if PV is not part of the initial development.	5. Third-party ownership of PV. <i>Need:</i> Clarity of Federal tax credits or grants, more robust market for tax credits.	
	6. Forum to exchange learning on renewable technologies and green building. <i>Need:</i> Funding and lead organization.	
	7. Collecting and publishing data on GAHI building performance. <i>Need:</i> Funding and lead organization.	

The lessons learned below form the basis for recommended next steps in the subsequent section.

- **Lesson #1: There is clear value in applying green building features, including renewable energy, to development of affordable housing.** The Partners' participation in GAHI and their experience incorporating energy efficiency and other green features overcame their doubts about the feasibility and value of incorporating these features. All Partners reported that they would continue working to incorporate green features into properties to the greatest extent feasible because the features improve the quality and sustainability of the properties. Over time, as more performance data from GAHI properties become available, the data can help the affordable housing sector better understand the financial and operational benefits from the different types of green features, and inform decisions about upfront investments in these features.
- **Lesson #2: Incorporation of green building practices into public funding criteria and private housing development planning and operations supports continued development of green affordable housing (i.e. market transformation).** Partners universally endorsed efforts by public funders to adopt general green building program criteria (e.g., the City of Boston DND's adoption of LEED certifiable standards) as a strategy to ensure high-performing buildings are constructed. Private developers such as WinnDevelopment and those receiving funding from other organizations have committed to following green principles and designations in future projects.
- **Lesson #3: Energy efficiency measures offer the most cost-effective strategy to reduce energy costs and mitigate environmental impacts, warranting inclusion in all projects.** GAHI Partners agree on the value of energy efficiency measures such as air sealing, super insulation, energy-efficient lighting, and efficient heating and cooling systems. These features were among the most commonly pursued by all developers.
- **Lesson #4: Data on building performance (energy, water) are critical in designing renovations and evaluating new system performance, but such data are still challenging to collect and difficult to analyze.** Partners commented about the value of benchmarking existing buildings as part of any process to upgrade a building's green features and track changes. Numerous Partners expressed frustration over the difficulty in obtaining energy usage data from their respective utilities. Partners also were universally interested in tracking the performance of GAHI buildings for renewable production, energy usage, water usage, and relevant indoor air quality observations, but noted there was not an entity currently charged with this task for this program.
- **Lesson #5: Because occupant behavior directly effects energy consumption, education efforts about how to "best use" energy-efficient fixtures and appliances and how to "live green" in the new GAHI units are critical.** Nearly all Partners indicated they will provide such education to homeowners and/or tenants.
- **Lesson #6: PV becomes more financially attractive for energy-efficient buildings because a substantial amount of the energy needs can be met by solar production (particularly in single-family structures), driving toward net zero energy buildings.** GAHI developers and builders noted it is more cost-effective to aggressively pursue energy efficiency measures and size a smaller PV system that can provide the bulk, if not all, of a building's energy needs (electricity, heating using electric heat pumps) rather than constructing a traditional, less energy-efficient building with a larger PV on a less efficient structure. Several Partners noted that the costs of installing energy efficiency measures are generally less than those of creating the solar capacity to meet the energy needs that could have been avoided by efficiency.

- **Lesson #7: When considering PV, developers and funders should carefully evaluate the site and planned building to realistically assess their likely feasibility for solar production and return on investment.** Most Partners emphasized that it was important to undertake an initial site feasibility assessment for PV using a set of screening questions before pursuing time-consuming financial assessments and design studies. Partners universally endorsed, and plan to use, solar screening criteria in their development process; all believed this step was important and should be promoted in the affordable housing development community.
- **Lesson #8: At this time, PV systems continue to require subsidy to be financially viable in affordable housing projects.** Despite strong interest among developers and builders in PV as a renewable energy technology, it appears there is not a viable financial strategy to support installation of solar systems without significant subsidies, such as GAHI grant funding. All Partners indicated they would not continue to install PV systems without subsidies or grants like those provided by GAHI because of the high upfront costs and longer timeframe for return on investment. Partners did not feel that subsidy programs currently available in Massachusetts were sufficient to make PV systems financially viable for most affordable housing developments. A third-party ownership approach for PV systems, which was envisioned by some Partners as a strategy to achieve financial viability, has not yet achieved consistent success.
- **Lesson #9: Due to regulatory changes and market forces, continued application and use of third-party ownership of PV systems is needed to fully determine the viability of this approach in affordable housing.** GAHI funding enabled two Partners – Boston Community Capital and WinnDevelopment -- to pursue alternative ownership models to help finance and operate PV systems. Federal regulatory changes affecting a core element of the alternative ownership model (e.g., tax credits and grants) and a depressed market for tax credits and debt altered the fundamental elements that both Partners had relied on to structure their models, making the long-term viability of this approach uncertain. Both Partners are interested in adapting and continuing to experiment with third-party ownership in the future.
- **Lesson #10: Flexible funding offered by GAHI enabled Partners to experiment with a range of models and approaches.** This approach is producing results that far exceed the initial projects' goals and is leading to long-term sustainable change in the affordable housing sector. Although the variation in Partner models has made comparing grantees difficult, it has yielded a wealth of information and changes that might not have been possible in an alternate program design that was more focused on a single model that all Partners would be required to use. For example, the public funders have changed funding selection and construction standards to incorporate green design. Private and nonprofit developers have altered their design processes, pursued innovative green and renewable designs, incorporated green designations and approaches into asset management (where applicable), and are motivated to collect data and information to assess building performance. Other grantees have altered program designs to include renewables in ENERGY STAR evaluations, again securing long-term changes in core energy programs.

Next Steps

The experience of GAHI Partners provides valuable insights about ways that individuals and organizations working in the affordable housing sector can help “green” residential properties serving low- and moderate-income households with benefits accruing to residents and property owners. While the Partners have taken important first steps in greening affordable housing in Massachusetts, further actions are needed to extend the lessons from the GAHI program more broadly across this segment of the housing stock.

Greening the Nation’s buildings, both residential and commercial, and greater reliance on renewable energy sources continues to garner growing interest and commitment across the country, particularly at the Federal level. The next steps identified below are drawn from the results of the Partners’ work, and their feedback about ways members of the affordable housing sector can support the greening of this housing stock. These steps are organized by the major stakeholders in this sector.

Owners of Existing Properties

- Incorporate energy efficiency and water conservation in new and existing properties to the greatest extent feasible
- Monitor energy and water usage in your properties
- For properties achieving substantial load reductions, consider renewable energy generation, but carefully evaluate the building and the site to ensure this is technically feasible and financially viable,
- Look for opportunities to incorporate water conservation to the greatest extent feasible
- Pursue available funding for green improvements to your properties.

Affordable Housing Lenders/Funders

- Support a single, consistent set of application requirements and core green certifications
- Collect and analyze data on energy and water usage in properties you finance
- Offer monitoring and technical assistance regarding green building practices
- Assess the short and long-term costs and benefits of green features in the properties you finance.

Policymakers

- Facilitate electronic access to utility data for owners and lenders
- Link financial support for renewable energy to energy efficiency improvements in properties
- Continue financial support for renewable energy in affordable housing properties

A complete copy of the GAHI Early Results and Lessons Learned report is available on the Massachusetts Renewable Energy Trust’s website, http://www.masstech.org/renewableenergy/afford_housing.htm, or by contacting Cynthia Hansel Sherlock of ICF International (chansel@icfi.com; 781-676-4057).

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