Massachusetts New Homes with ENERGY STAR® Process Evaluation of the Four to Eight Story Multi-Family New Construction Pilot
Interim Findings

January 28, 2011

Submitted to:

Joint Management Committee

Submitted by:

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Summary

The Four to Eight Story Multi-Family New Construction Pilot has signed[1] sixteen projects to date representing 1,011 units and 1.2 million square feet. Three of these projects representing 111 units and approximately 135 thousand square feet completed in 2010. The Pilot has been in contact with an additional thirteen projects representing 808 units and 0.9 million square feet, some of which are expected to sign up for the Pilot in the next few months. The Pilot is actively recruiting additional projects focusing on maximizing the amount of incentive budget dollars committed to projects and signing up projects that will complete before the end of the Pilot in 2012.

NMR Group has interviewed the two Sponsors of the Pilot, NSTAR and National Grid, the Pilot's chief project manager, and two individuals representing the three projects that completed in 2010. These interviews provide preliminary findings regarding several process evaluation issues such as the Pilot's goals and objectives, the process of signing up and completing verification, outreach and the types of projects served, the measures covered, the measures installed, barriers to energy efficient multi-family new construction, and satisfaction. We also note where the limited number of completed projects do not allow us to address particular issues such as free-ridership and providing technical assistance for participants to consider the addition of all applicable measures in their projects.

Goals and Objectives

The Pilot's project manager at ICF notes that the objective of the Pilot has been defined as addressing the energy efficiency potential of smaller, four to eight story buildings that do not qualify for ENERGY STAR certification but are too small for commercial programs. But a larger goal is to have the Sponsors acquire a comprehensive understanding of multifamily buildings. It is important to see the Pilot as a learning experience. To that end, ICF is developing a database documenting a number of data points—close to two hundred—on multifamily buildings, such as size, and applicable technologies using the Access database system. NSTAR and National Grid are thus collecting as much information as possible about the four to eight story market in order to develop an understanding similar to that which exists for the low rise multifamily market. There is, however, much less data available for this market than for the low rise multifamily market.

The Sponsors also see the Pilot as a learning experience noting that its goals are to determine if there are cost-effective techniques and opportunities that can be put forth for multifamily new construction and become part of the regular programs with more funding. The Sponsors also note a goal of providing one-stop shopping for multi-family projects with the incentives being coordinated between the commercial and residential sectors and across service territories.

[1] These are projects that have had their plans reviewed and been issued award letters specifying the incentives they will receive subject to installation and verification of a set of agreed-upon measures.

Participation Process

The Pilot's participation process appears to be running fairly smoothly based on the limited data from two interviews with participants who have completed their projects. Participants noted that, initially, they had to provide plans, drawings, specifications, and respond to questions the Pilot had on the specifications provided. Both said it was all very straightforward and both estimated it took about an hour of their time.

From ICF's perspective, the initial participation process could be improved by providing an interactive project tool that would allow the customer user to enter the measure inputs and see the savings and incentives right away. The account managers would still do the QA and verify the savings when the projects enroll in the Pilot, but having the customers interact with such a tool on their own time where they could, for example, see the thermal benefit of different types of walls for themselves would help educate them on what works to capture energy savings potential. This tool would be especially useful as the Pilot brings in more projects that are in earlier planning stages than the three projects that have been completed to date.

ICF notes that completion of the process involves verification that is done through different avenues for different measures. The High Performance Adder (HPA) contractor verifies measures in residential units, such as lights and appliances, as well as the ventilation and infiltration rates. The HPA contractor, also referred to as the Third Party Verifier, is hired and paid by the participant; ICF provides a list of nine firms that are qualified to act as HPA contractors, though participants may hire a different firm if it submits appropriate HERS or Building Performance Institute qualifications. To date, all participants have chosen to use HPA contractors as the buildings that meet the HPA infiltration and performance standards qualify for a $75 per unit incentive in addition to the prescriptive rebates they are already receiving. If a building chooses not to participate in the HPA, ICF would do verification of the unit measures.

ICF collects digital copies of all construction submittal documents directly from the participants for each of the common system measures, such as common area lighting, that are not verified by the HPA contractor and then a project manager visually verifies each measure.[2] The design team could spend several hours or several days providing all the information necessary at the completion of the project.

From the participants' perspective, completing the process in order to receive the incentives drew a more mixed response. One participant noted that the information needed at the end was pretty straightforward; some coordination was necessary, but that is par for the course whenever a building is finished and control is transferred to the owners. The other participant interviewed found completing the process to involve a lot of time and effort stretching over six weeks. The mechanical engineer, general contractor, and equipment manufacturer had to be contacted to calculate required ratings and resolve a host of issues. It should be noted that most of the

[2] In mixed use buildings, any commercial measures would be handled by the appropriate program.

difficulties arose due to the use of a Mitsubishi air source heat pump, which is further discussed under Measures Covered.

Both of the participants interviewed gave high marks to the account managers who worked with them on their projects. Many of the calls and research noted in the preceding paragraph were actually made by ICF, in order to have the equipment qualify for the Pilot. The interviewee believes his account manager went beyond the call of duty; he notes that "she really believes in this stuff." Though he has been building energy-efficient multi-family homes for a long time, he appreciates the education he got through this process.

Outreach and Types of Projects Served

Initially, the Pilot enrolled projects by making a few calls to developers and consultants in the field and through word of mouth. There were a number of projects that had been held up waiting for funding from the American Recovery and Reinvestment Act (ARRA) and other sources; once that funding came through, these projects enrolled in the Pilot. Both of the participants interviewed said they heard of the Pilot from ICF. As a result of the initial outreach and general economic conditions that did not favor construction of market rate units in 2010, most of the projects enrolled in the Pilot are for affordable housing and required to meet ENERGY STAR-equivalent standards as shown in Table 1.

Table 1: Projects Enrolled in the Multi-Family New Construction Pilot

	Number of Projects	Number of Units*	Square Footage*
Affordable	12	676	787,748
Percent of Total	75%	67%	64%
Market Rate	3	265	366,403
Percent of Total	19%	26%	30%
Unknown	1	70	70,000
Percent of Total	6%	7%	6%
Total	16	1,011	1,224,151

*Includes 20% of units and square footage that are by law reserved for affordable housing in market rate buildings

ICF is now using its more comprehensive database described under Goals and Objectives for outreach. The database tracks other projects that the design firms and architects working with ICF may have in the pipeline. ICF is doing outreach about the Pilot to the design firms as well as talking with them about trends in design and specifying equipment in order to get a handle on the energy savings potential for this sector as well as some of the issues that arise in trying to capture potential savings from emerging technologies. Still, the ICF project manager notes that market rate projects are less likely to be reached. ICF's contacts with design companies working with low income and affordable housing are not likely to yield many market rate projects, even as economic conditions improve, since the latter often have different developers. Furthermore, the Pilot has a limited budget and the low income and affordable housing developers are the most aggressive in going after these monies.

ICF and the Sponsors also note that mill buildings form another group of projects that are less likely to be served. There are a number of mill buildings being converted to multi-family housing. Mill buildings get something less than a gut rehab which would qualify them for a new construction program. But they do require major renovation work to address energy savings potential opportunities.

Measures Covered by the Pilot

The Pilot was designed as a prescriptive program addressing 154 energy conservation measures over seven categories. The aim was to include the most common measures installed at the outset and approve other measures on a case-by-case basis if they made sense. However, the Pilot's implementer believes there should be more focus on emerging technologies such as air source and ground source heat pumps, chillers, and super-high-efficient envelopes; these are high efficiency technologies that are difficult to do in a prescriptive program which does not deal with the interaction among measures. The way to deal with evolving codes and technologies is through modeling and the Pilot's implementer believes the Sponsors should work on a protocol for accepting energy modeling data for multifamily buildings. Until now, where there has been modeling, the Sponsors have needed engineers to review the inputs and the model, which makes modeling expensive for both the Sponsors and the participants for relatively small multifamily buildings. However, many buildings already have third party verification—they may have applied for LEED certification, for example—and the Sponsors can try to achieve economies of scale by taking advantage of modeling and verification already done.

The Pilot's implementer and one of the participants interviewed talked at length about the participant's experience trying to get an incentive for an air source heat pump, the City Multi, manufactured by Mitsubishi. This equipment, according to the interviewees, is far more efficient than the measures covered by the Pilot, but, since it does not have a fixed SEER rating, was not eligible for an incentive. ICF spent considerable time contacting the manufacturer to obtain the data necessary to qualify this equipment; in the end, the inverter based compressor mechanism of this emerging technology fell below the standards used by the Pilot.

The other participant tried to make the case for better covering ground source heat pumps (GSHPs). The Pilot provides incentives for energy efficient GSHPs, but he believes that does not take into account that all GSHPs improve the building's carbon footprint and make it greener. The Pilot does not provide support for the work that goes into digging wells for GSHPs, just for the units themselves, if they are rated at a certain level. Another suggestion was to consider indoor air quality and incentivizing air exchangers.

Measures Installed

Both of the participants interviewed said they installed all the measures in their award letters in the three projects completed to date, with the exception of one building that did not install lighting occupancy sensors everywhere they were recommended. Both participants also said they had intended to install all these measures before they learned of the Pilot with the exception of screw-in compact fluorescents in the units of one of the buildings (they were only going to install fluorescents where there were pin-based sockets). One participant with two market rate projects said they would have installed everything in the absence of any incentives because they have always "built green." The other participant, with an affordable housing project, could not really answer the question since he had always assumed there would be some incentives available and did not consider what he would do without incentives.

It is important to note that the two interviewees whose projects completed relatively early in the Pilot had these projects in the design stage when they learned of the Pilot and later projects may well be different with regard to free-ridership. Indeed, one of the participants noted that his was the first project to sign up for the Pilot so the design was already done based on the knowledge they had at the time; if the Pilot aims to provide technical assistance in considering all applicable energy efficiency measures, it needs to get to a project before the design phase.

The Pilot's project manager noted that variable frequency drives (VFDs), premium pumps, low-flow showerheads, and lighting controls are measures that can be added rather late in the design process. The building envelope in a multifamily building cannot be changed after the design, so the extra savings potential is limited in shovel-ready projects.

Barriers to Energy Efficient Multi-Family Construction

The split incentive, that is, the fact that the developer pays for energy efficiency improvements but the unit owners or tenants who pay for their own heat and utilities benefit from lower energy bills, is commonly considered a barrier to building energy efficient multifamily homes. The Pilot's implementer believes the split incentive is more of a barrier for market rate projects and the Pilot has had mostly affordable projects; cost is the main barrier to energy efficiency for the latter. Still, it is important to deal with developers who just want to move onto their next project and feel the owners will deal with the bills. The unit owners have to know and care about energy consumption; the units have to be marketed based on the energy that they consume rather than the measures installed.

The participants interviewed did not consider the split incentive a barrier for them, but the interviewee with market rate units noted that it affects most of the developers in the market. Those developers will adopt energy efficiency if they can charge a higher price for it or they can get incentives to cover their incremental costs.

The interviewee with market rate units believes an important barrier to energy efficient multi-family construction is that it is seen as transitional housing. Even when people pay a lot of

money to buy a condo, they do not think that they will live there for a long time because they will either start a family and move to a single family home or are empty nesters and think they will move on and are used to paying larger utility bills anyway.[3] Therefore, it is hard to sell them on paying more for measures that will pay for themselves with lower bills over time. One way to deal with this barrier is to incentivize developers so that the condo owners do not have to pay for energy efficiency.

Satisfaction

Both of the participants interviewed said they were very satisfied (five on a one to five scale) with the account manager and other staff they worked with in the Pilot. One participant rated the process itself a five; the other rated it a four. Satisfaction with the incentives received was rated a three and a four. One participant said the incentives did not fully cover incremental costs for energy efficient measures above code. The other participant noted that the incentives were only about one-half of what he had received through the Massachusetts New Homes with ENERGY STAR Program. (He also believed his project should have qualified for ENERGY STAR, except for what he considered a minor technicality.)

While acknowledging that the incentives could always be higher, the participants were happy to have a mechanism to specifically address this type of building. One interviewee expressed satisfaction that the Pilot encompassed the whole building, including the common areas and central HVAC system, not just the residential units. He was also happy he did not have to go through the commercial programs, as he had thought he needed to do for buildings over three stories.

Conclusion

As this interim memo is based on five interviews along with a review of the Pilot's database, it cannot offer conclusive findings or recommendations. The Pilot appears to be progressing in signing up projects that will complete by the end of 2012 and developing knowledge about four to eight story multi-family buildings. Offering the Pilot has also focused the Sponsors' and implementers' attention on emerging technologies and timing applicable to this market which will need to be addressed by a more permanent program.

Looking ahead, the project manager emphasized the need for the Sponsors and regulators to take a longer term view. Year to year efforts with no longer term commitment struggle to address the multifamily market which takes a far longer view. Doing outreach with design teams uncovers projects that may be in the pipeline and coming out in a few years dependent on ARRA and other federal and state funding. It is frustrating to tell people that programs are renewed each year and there is no guarantee that they will be around in two or three years; that is not how this market operates.

[3] This may be something to test out in the homebuyer survey.