

# **Ensuring Quality Work When the Work is Hard to See: The Importance of Quality Assurance/ Quality Control Protocols in Energy Efficiency Programs**

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## **ABSTRACT**

The Better Buildings Neighborhood Program, funded by the Department of Energy, created 25 community based energy efficiency programs to save energy and spur the economy through increased jobs. The benchmark used to indicate program success is the conversion rate - moving from energy assessment to energy efficiency improvement implementation. It was quickly realized that the creation of energy programs from the ground up is fraught with challenges as they continue to fall well short of initial retrofit goals.

The Chapel Hill WISE program, located in Chapel Hill, North Carolina launched in March 2011. After a little over a year in operation, with 4 prequalified contractors, the WISE program has maintained a 55% conversion rate, well above the 20% average of other programs across the country. Based on homeowner feedback, comprehensive quality assurance/ quality control (QA/QC) is a significant factor. From the initial design of the program, 3<sup>rd</sup> party QA/ QC has been implemented to ensure the program provides competent qualified contractors.

This paper, based on experience from Chapel Hill WISE, posits that the following elements form a comprehensive QA/ QC process:

1. Contractor training, qualifications, certification and mentoring;
2. Contractor agreement;
3. Test-out;
4. Site visit or desk review of every job;
5. Probation/ debarment policy;
6. Exit survey;
7. Annual contractor review;
8. Intermittent contractor training as the program evolves;
9. Certificate of completion.

A comprehensive QA/ QC process provides benefits to every stakeholder in an energy efficiency program – program administration, contractors, homeowners and even the local municipality.

## **Introduction**

The \$40 million Better Buildings Neighborhood Program (BBNP) created by the Department of Energy (DOE) is over half way complete (DOE, 2012a). During the first two years, the 25 BBNPs have utilized numerous models for the energy efficiency programs from financing to subsidies; nonprofit managed to municipal driven; single measure to vertically integrated contractors. The goal is the same for all programs – to reduce energy consumption and create jobs while pushing home performance energy contracting into the mainstream as a

standard practice. To measure the success of these fledgling programs, the conversion rate, the percentage of homeowners moving from energy assessment to energy efficiency improvement implementation, becomes one of the single most important factors.

From the start, programs predicted the completion of thousands of deep energy retrofits (15% estimated savings or better) along with the creation of thousands of jobs. Los Angeles County asserted a goal of 18,000 retrofits; SEEA a goal of 10,000; Portland, Oregon 6,000; and Boulder County 6,600 only to find unexpected challenges impeding the progress (DOE, 2012b). With a little over a year remaining in the grant, programs have reported retrofit numbers in the hundreds rather than the thousands, well below the predicted levels. Similarly, conversion rates for most programs remain on average around 20% (DOE, 2012c). There are stand-outs, such as Portland, Oregon and Bedford, New York to name a few, which have maintained conversion rates above 40% in addition to Chapel Hill WISE (Worthwhile Investments Save Energy) achieving a 55% conversion rate to date (DOE, 2012d).

While there are multiple factors that explain the shortfall in completed projects, an important factor is contractor competence. The lack of energy efficiency improvement standards and effective contractor training has resulted in a contractor base that struggles to meet the programs' minimum requirements. Expert quality assurance (QA) and quality control (QC) helps create and maintain a competent contractor pool for energy efficiency programs. Based on homeowner feedback from the Chapel Hill WISE program QA/QC is an element that has increased the conversion rate and ultimately saved more energy for homeowners.

## **Quality Assurance and Quality Control (QA/QC) Defined**

Quality Assurance (QA) should pervade all aspects of energy efficiency programs: program design, implementation and evaluation. QA provides a framework to ensure program standards are met and closes the feedback loop in order to assess and improve program processes. Quality control (QC), on the other hand, ensures that work meets required standards and is consistent across projects. For example, from the contractors' perspective, project test-out is a QC mechanism to maintain a certain standard of work and achieve performance goals. QA then ensures that quality control processes are in place and effective.

Therefore, QA is the process used to develop standards and deliverables a contractor must adhere to when working in an energy efficiency program. While comprehensive QA is prevalent throughout the development of an energy efficiency program, it is most recognized and appreciated for the after installation desk reviews and/or site visits. The review of completed work catches problems due to lack of sufficient training or lack of adequate QC. QC focuses on specific deliverables such as properly sealed ducts or installed insulation while QA determines the necessary deliverables and guides overall contractor improvement. Both QA and QC are important aspects of successful energy efficiency programs.

## **Benefits of Third Party QA/QC Provider**

QA/QC is generally considered a training mechanism to ensure work maintains a certain desired standard and meets the expected deliverables – in this case energy savings through proper energy efficiency measure installation. Comprehensive QA/QC for burgeoning

community-based energy efficiency programs is a key element for the success of the program and ultimately the success of contractors in the market. The benefits to each stakeholder are:

### **Homeowners**

A rigorous QA/QC protocol adds value to any energy efficiency program. It gives peace of mind with regards to the quality of the work, which aids in earning and maintaining customer trust. The Chapel Hill WISE program specifically has seen success maintaining a 55% conversation rate driven mainly by a strong contractor pool created through a comprehensive QA/QC process. The strong QA/QC contributes significantly to the program's homeowner satisfaction rating. To date, the Chapel Hill WISE program maintains a 90% satisfaction rating by the homeowners who completed retrofits with over 67% claiming to be "very satisfied" with their experience (Barger, 2011). Even more compelling, a survey of the homeowners who completed projects were asked about the program QA/QC and of the 50% of homeowners that responded, 58% stated that the presence of comprehensive 3<sup>rd</sup> party QA/QC motivated them to move forward with a project (Barger, 2012)

### **Contractor**

A good QA provider will pinpoint where a contractor should improve their QC protocols and fill gaps in their education and understanding of building science to increase future success. Work force development trainings and certifications are only a portion of training for quality home performance contractors. On the job mentoring helps new contractors move from the theory of the classroom to supervised application, which is invaluable in the contracting world. Because of the significant federal funding committed to residential energy efficiency through the Weatherization Assistance Program (WAP) and the Better Buildings Neighborhood Program (BBNP), small start-up home performance contracting companies have been created. These contractors come from varying backgrounds and may have little previous contracting and weatherization experience. As grant funding is exhausted and incentives disappear, many of these companies will be unable to sustain their business unless they provide quality work at a competitive price. Even with the subsidies and program support, Chapel Hill WISE has seen several small contractors close their doors and search for opportunities with bigger, more established firms. These contractors have been hired by the larger firms who are confident in their standard of work which may be attributed to the comprehensive QA/QC oversight of the program (Smith, 2012).

### **Program Management and Administration**

A third party QA/QC provider brings technical expertise in building science and can fill gaps in the program management knowledge. This allows program management to focus on process, rather than technical project oversight. For program management, the amount of time working with each individual job and bringing contractors up to program standards is reduced and allows for more time focused on program marketing and outreach. For example, The Chapel Hill WISE program ensures that the program administrator manages the contractors in terms of

adherence to program process and monitors their homeowner interactions. The 3<sup>rd</sup> party QA/QC provider works with contractors on the quality of their work and implementation of quality control mechanisms to improve future work. The clear delineation of management oversight means the contractor can easily navigate the system or quickly be removed from the program to reduce the negative impact on homeowners and program reputation.

Additionally, comprehensive QA/QC can become a source of revenue for energy efficiency programs and help off-set the QA/QC and administrative costs. WISE contractors are charged a fee for the Home Performance with Energy Star (HPwES) training and mentorship as well as a fee per project reviewed. Currently the majority of these costs are covered through the grant funds. However, as the program progresses and WISE becomes a trusted brand for energy efficiency resources and home performance contracting, the fees could be increased and expanded. Furthermore, homeowner fees for access to 3<sup>rd</sup> party QA/QC could be enacted along with the contractor fees as the value becomes more evident. The LEAP program in Charlottesville, VA and the NOLA WISE program in New Orleans, LA have both begun to charge a fee to homeowners in preparation for the reduction in grant funds.

## **Municipal Government**

Because the QA provider initially works with contractors to ensure their work meets the program standards and increases their understanding of building science this reduces the inspection costs and public health hazards for the municipal government. The Chapel Hill WISE program requires that participating contractors are BPI certified which means they understand combustion safety testing. This becomes very important with installation of energy efficiency measures such as air sealing, which reduces fresh air infiltration into the home. Rigorous QA and mentoring provides oversight to ensure contractors understand health and safety hazards and have sufficient quality control procedures in place to provide a consistent level of work. Over time building inspectors and public officials will be able to reduce their number of inspections to homes that participate in energy efficiency programs. They can trust that the quality of work meets the program requirements as well as the local building code standards.

## **Aspects of a Comprehensive Quality Assurance Program**

A comprehensive QA/ QC program adds value to any program. It helps market the program to homeowners while the local contractor pool is strengthened. It is a unique aspect of energy efficiency programs that customers do not generally have access to when undergoing home performance projects on their own. Contractor quality is unknown, there are few standards beyond the building code and objective assessment of the work from a technical expert is nonexistent or costly if available. Therefore, QA/QC should be touted by the program and used to attract customers and contractors.

Without good installers, energy savings goals cannot be met, which is the goal of every energy efficiency program. Good installers are created through solid quality assurance and quality control protocols. In addition, all aspects of a QA/QC process must be implemented concurrently to ensure program success from contractor selection to customer feedback. The

following should be included in a QA/QC process to increase program success and elevate the local contractors:

### **Required Certifications, Qualifications and Training**

The required contractor qualifications and certifications should be well defined. This ensures the program attracts contractors that work to a certain standard such as the Building Performance Institute (BPI) Building Analyst standards and creates a baseline expectation for the quality of work. Additionally the requirement will narrow the potential pool of contractors. Little value is brought to the program with contractors that are not vested and struggle to follow program processes and requirements. They take time to manage and may jeopardize the program brand through sub-standard work. Contractors that meet the qualifications and take the time to apply will understand the importance of the requirements, be successful in the program and ultimately reduce program administrative work.

To improve the contractor base in an area, training and mentoring should be incorporated into the QA/QC program. Not all training is considered part of QA, such as BPI certification training. However, training around the program process, standards and expectations from the QA/ QC provider is an important piece to a comprehensive QA/QC process. The QA/QC provider must ensure that the work is installed to program standards and that contractor work demonstrates an understanding of building science. Home performance contracting is a relatively new field with contractors coming from single measure installation, general contracting, or an entirely separate profession. The need for mentoring and training is inherent with a new industry where requirements and standards are still in development. In order to advance the industry and expand the market, the QA/QC process associated with energy efficiency programs needs to not only provide inspection and verification, but also provide mentoring and training to assist contractors as they adapt and grow in the field. The QA/QC provider is a resource for the contractor to improve his or her business and promote the benefits of home performance contracting and deep energy retrofits.

### **Contractor Agreement**

In conjunction with the required certifications and qualifications, a written agreement will help to clarify and solidify what is expected of the contractors who participate. The agreement should at the very least include: the required qualification criteria, health and safety, nondiscrimination, outline the liability, dispute resolution protocol, and administrative processes. The program administrator and the contractor should sign this agreement after an initial review of the terms. A written agreement will help the contractors successfully operate within the program guidelines because they will understand the exact expectations and work towards achievement.

### **Test-out**

The test-out is conducted once the measures are installed. The test-out verifies information gathered during a comprehensive energy assessment and performance goals are met.

It is completed on every home by the contractor. This is especially important where combustion appliances are present to ensure that CO levels are in the desired ranges and the health of the homeowner is not at risk. The test-out document should be standard across contractors to contain the same information and be easily interpreted by the QA/QC provider.

### **Site Visit/ Desk Review of Each job**

The field manager or the desk reviewer (if they are different people) will collect the test-out documentation and review to verify that project performance goals were met and no known issues remain in the home. Field inspectors conduct site visits to verify that the scope of work was executed as written and the measures installed to program standards. The field inspectors should have the same training, certifications and be able to use the same diagnostic tools as the contractors in order to adequately inspect the work and make informed judgments about the quality. Finally, the field inspectors should be good communicators. They need to be able to speak with the homeowner to explain their role as well as communicate with the contractors about the project and any identified issues (Lutz, 2012).

### **Probation Policy**

Once the program expectations are presented in the contractor agreement and through orientations and trainings, a mechanism should be in place to address problems if and when they arise. Although the contractors have been prequalified and on paper meet the program requirements, their performance in the field may not meet expectations. If a problem arises either from continual substandard work or even from unsatisfactory customer perception, the probation policy provides a framework on how to address it. The probation policy should be part of the Contractor Agreement so contractors are aware of the parameters. Additionally, homeowners feel more secure about working with contractors when they know that there is recourse for poor/ substandard work. This translates into a higher conversion rate with more homeowners choosing to move forward with energy efficiency work through the program because of the QA oversight.

### **Exit Survey**

A customer survey provides an outlet for homeowners to give feedback about their experience with the program, their contractor and make suggestions for program improvement. A comprehensive QA/QC process and protocol, while seen as productive on paper, can be experienced as cumbersome by homeowners. Soliciting feedback from homeowners helps to ensure that they are aware of the services provided through the program (if they did not receive a site visit). It also ensures that program management understands the impacts, both positive and negative, that the process has on the homeowner in order to continually improve as the program matures.

## **Annual Contractor Review**

An annual contractor review should be established to highlight both successes and areas that need to be improved. At the review customer rating information, survey results, customer complaints, as well as program process changes should be addressed. This will help the contractors understand where they need to improve in terms of program perception as well as technical ability. The review will also give the contractors a one-on-one opportunity to provide the program with feedback from their perspective. Again, assumptions that are made when designing the process are not always accurate when applied to ensure program standards are met and homeowners are satisfied.

## **Intermittent Training of Participating Contractors**

As new contractors join the program or as the program process evolves, intermittent training is imperative. Again this training is part of the QA/ QC process because it involves program processes and expectations. The contractors must deal with their own business operations as well as understand the energy efficiency program process and standards. Any changes need to be clearly communicated and explained to make sure that they are aware of program expectations and will be able to meet the QA/QC requirements.

## **Certificate of Completion**

Once the job is complete and QA, either desk review or site visit, has been performed provide a certificate of completion to the homeowner. The certificate should document the measures installed, the homeowner and address, the contractor and the date completed. The certificate provides a permanent record of the improvements that were made and verification that the job was reviewed by a 3<sup>rd</sup> party technical expert. Homeowners may keep the certificate with their house documents for future reference. The certificate is verification that the work has been done and potentially increases the resale value of the home.

## **The Chapel Hill WISE QA/QC Protocol and Procedure**

Although the 55% conversion rate of the Chapel Hill WISE program can be attributed to many different elements, incorporation of a comprehensive QA/QC process implemented by a 3<sup>rd</sup> party technical advisor is vital to the success and the sustainability. To date the process has aided in the identification and maintenance of a competent contractor pool to ensure quality work and homeowner satisfaction.

Chapel Hill set up a rigorous QA/ QC process with hopes to provide a high quality, one-stop shop for homeowners from program inception. The process was designed to review all three phases of a home energy efficiency improvement job: energy assessment, installation work and test-out in addition to contractor prequalification and mentoring and customer satisfaction review.

## **Prequalification of Contractors and Blanket Agreement**

To begin, contractor prequalification criteria were created to prequalify for program participation only contractors that could provide BPI energy assessments and act as general contractor for improvement projects. If a contractor meets all the qualifications, including BPI Building Analyst certification, adequate insurance levels, verifiable trade and customer references and provides a valid bank reference, a blanket agreement with the Town of Chapel Hill is created. The blanket agreement outlines the program expectations for the contractor and includes the ARRA requirements to meet the demands of the grantor as well.

## **Third Party QA/QC from Advanced Energy**

After the initial program design, Chapel Hill quickly engaged Advanced Energy to provide third party technical assistance through a contract to provide quality assurance and quality control. Advanced Energy is a Raleigh, North Carolina based non-profit created in the 1980's by the utilities commission. They are technical experts in building science and the sole Home Performance with Energy Star (HPwES) sponsor in the state of North Carolina. Therefore WISE is an HPwES program, which provides an additional perceived benefit to homeowners participating in the WISE program.

## **Contractor Mentoring During Probationary Period**

Advanced Energy has created a QA/ QC process that is frontloaded to mentor newly trained HPwES contractors on their first jobs and provide random spot checks after they reach a certain level of work. Initially a probationary period was created which consists of mentoring the first 5 jobs of each contractor. Mentoring a job means Advanced Energy is available to answer contractor questions during the job if desired and conduct a site visit. The job is scored from 1 ("poor") to 5 ("excellent"). During this period the contractor must receive 4's and 5's to be moved from the probationary period to a recognized HPwES contractor.

If during the first 5 jobs the contractor is unable to reach passing scores to complete the probationary period, they work with Advanced Energy to improve their quality of work on future jobs. Dependent on their ability to show improvement and willingness to incorporate quality control protocols into their process, they may or may not have to pay Advanced Energy for the additional mentoring activities. This is set up to incentivize contractors to work closely with Advanced Energy from the beginning. If they complete the probationary period within the first 5 jobs, the WISE program covers the resources provided in terms of mentoring and training on each job. If additional attention is needed to work through identified gaps in knowledge or skill, the contractor will have to pay for time and resources.

## **Desk Review of All Jobs and Assessment Reports**

During the probationary period the contractors' assessment reports are reviewed to ensure that they are following program protocol. The assessment reports must include: improvements



to reduce energy; improvements for safety issues, including combustion safety issues; improvements for comfort issues; improvements for other building failure issues; and include an estimate of energy savings from the proposed improvements.

At this point, the review of the assessment report is conducted regardless of a homeowner moving forward with the improvement work. The initial additional oversight is to ensure that the contractor recommends appropriate measures based on the factors listed above prior to installation. Once it is evident that the contractors can conduct comprehensive audits that meet the BPI protocol, review of assessment reports are limited to assessments connected to completed jobs.

A review of the proposed scope of work is also conducted. The QA/QC provider ensures that the scope of work is as detailed as possible to understand exactly what the contractor intends to address in the home. For example, if a scope of work simply states air sealing and does not state the location air sealing is to be performed, it is impossible to understand the extent of the measure. It could mean sealing only the plumbing penetrations in the attic or it could mean addressing all air leakage points found during the blower door test with a goal of reducing the air infiltration by 30% or more. Without detailed explanation of exact action and location, quality control procedures are hard to follow and quality assurance will not be effective because of lack of information to appropriately address potential problems. If the QA/ QC provider knows precisely what is being addressed in the scope of work, they will have the necessary information to verify proper installations that meet the program standards.

### **Quality Plan and House Characterization Tool**

Once the probationary period is complete, QA commences at a rate of site visits for 5 of the next 20 and then 4% of each contractors' remaining jobs. In order for Advanced Energy to decide which homes to provide site visits, the House Characterization tool was created. The House Characterization tool is an online tool that categorizes each home based on the complexity of the structure. The contractor enters basic characteristics: square footage, the foundation type, number of stories, type of ceiling, pitch of roof, exterior features such as garage, heating equipment, and duct location and type. Based on the information entered the house receives a house level and complexity score from 1 (basic) to 5 (complex). From the standpoint of building science, the more complex a house such as split-level with basement and cathedral ceilings as opposed to a one story house, built on slab, without an attic, the higher the number. Therefore homes that receive higher numbers are better candidates for a site visit because the job will most likely be more complex and will benefit more from increased oversight.

The contractors were initially opposed to the added step of data entry into the tool. It is web based so most contractors must collect the data and then enter it at a later time. However, program management worked to portray the tool as another benefit to program participation. The score allows the contractors to see the complexity of the homes, looking at them as a system, as opposed to individual components to tackle. The more houses the contractor assesses, patterns emerge in terms of structural/ design complexity. Potentially, through the patterns, the contractors can improve on price estimation based on complexity of the home and know that Advanced Energy will provide greater oversight for the more complex homes through QA.

Additionally, Advanced Energy can use the growing database to improve and streamline their QA process to better serve the program and the contractors.

### **Exit Survey**

Survey response from the homeowners closes the feedback loop for the Chapel Hill WISE program to ensure that the QA/QC process provides reassurance to homeowners that the prequalified contractors' work meets the program standards. Both Advanced Energy and the program provide surveys to the homeowners about their experience. In general the feedback has been positive. Advanced Energy has received a 34% response rate for the initial survey and a 21% response rate for the 6 month follow-up (Lutz, 2012). Additionally the WISE program provides a more general survey on the total program experience. Of the homeowners that responded and were aware that QA/QC was provided through the program, 58% stated that the presence of 3<sup>rd</sup> party QA/QC was a deciding factor to move forward with work through the program (Barger, 2012).

### **Contractor Probation/ Debarment Policy**

In addition to the probationary period and mentoring, the WISE Program has an explicit probation policy which outlines the process used if a contractor needs to be removed from the program. A contractor could be removed from the prequalified contractor list due to failure to meet program standards and/ or due to poor homeowner perception and homeowner complaints. The probationary policy was created to protect homeowners from underperforming contractors. Additionally, it delineates the need for additional contractor training to help increase their capacity and their quality control protocol (or lack thereof) to ultimately be able to provide better services to homeowners and improve their business.

The policy contains a written warning triggered by inability to meet the program standards based on the QA review of their jobs, inability to follow the program procedures due to missed deadlines or failure to submit paperwork, and/ or customer complaints. The contractor will receive a letter outlining the complaint that will serve as a warning and be noted in their file. If the infractions continue the contractor will be temporarily removed from the program and given additional training to ensure that they will be able to improve and meet the program requirements. Finally, upon return to the program, if more complaints arise or the contractor is still unable to meet the standards, they will be debarred from the program. They will have a chance to reapply after a certain time period with several customer and trade references from outside of the program. Additionally, they may be removed from the program immediately if there is any evidence of negligent or dangerous activities.

### **Lessons Learned from the Chapel Hill WISE Program**

Over the course of the past year the Chapel Hill WISE program has completed a pilot phase. Based on performance, the program received additional funding and made modifications to improve program benefits for both the contractors and the homeowners. During this time the following lessons have been learned and incorporated into the QA/QC process: delineate

between program performance and QA/QC technical performance requirements; implement a probationary/ mentoring period; promote QA/QC as a value-add to the program; and provide a certificate of completion as part of the QA/QC process.

### **Delineate Between Program Performance and QA/QC Technical Performance**

The Chapel Hill WISE program has found success through utilizing Advanced Energy, a 3rd party technical advisor to conduct the QA/ QC of the contractors' work in the program. They provide an objective review of the contractors work; they have the technical expertise and reputation to effectively mentor and train the contractors as well as reassure homeowners of the quality of work they are receiving; and they provide "fresh eyes" on each project. Additionally having a separate entity from program staff conduct the QA/ QC means the program staff may focus entirely on possible perception issues such as homeowner complaints and concerns about contractor conduct. The QA provider may focus solely on technical issues. This division is particularly helpful when addressing problematic contractors. By keeping the technical aspects separate from the perception issues, contractors remain open to QA. They feel mentored as opposed to 'policed'. Furthermore, customer complaints that stem from their interaction with the contractor are very different from a contractor failing to complete combustion safety tests on homes and jeopardizing the safety of homeowners. Customer complaints and customer perception problems need to be addressed from a programmatic standpoint and the building science problems need to be addressed by QA/QC processes.

### **Implement a Probationary/Mentoring Period**

When the WISE program first launched all contractors were considered HPwES contractors once they went through a ½ day training that mainly consisted of program procedural instruction and a signed contract. It was quickly realized that some contractors needed more support and training than expected to meet the program standards. The cost of additional training/ mentoring was not factored into the original contract and therefore there was no mechanism to recoup the cost from the contractor. By implementing a probationary period, Advanced Energy has a way of initially mentoring all of the contractors. For the companies that need additional attention, they may charge a fee for their added time and support. This creates leverage for the program administration to extend this period at the cost of the contractor or remove from the program for failing to meet the initial necessary requirements. However, it should be noted that contractors are resistant to calling this a probationary period and it should be labeled something more positive like the "mentoring period".

### **Promote QA as a Value-add to the Program**

The 3rd technical QA/QC provider, Advanced Energy, provides homeowners in the Chapel Hill WISE program reassurance that they are investing their money wisely and participation in the program is worthwhile. After reviewing the homeowner surveys it was found that several homeowners chose to move forward with energy efficiency work in part because of the QA/QC provided by Advanced Energy. However, through the responses it was also found

that not every homeowner realized that QA/QC provided by Advanced Energy was part of the program. Since this discovery we have advertised the QA/QC more prominently and hope to increase our current conversion rate and complete additional projects. To date, with a 50% response rate, of the homeowners that have participated and were aware of QA being offered through the program, 58% said it contributed to their decision to move forward with the work through the program. Knowing that building science experts would at least provide a desk review of the project is a value add to the program and ultimately has improved the conversion rate from assessment through completion of a retrofit, which currently stands above 55%.

### **Provide a Certificate of Completion**

Homeowners in Chapel Hill see the value of promoting the energy efficiency work conducted through the WISE program as increasing the value of their home. They actively seek out the HPwES certificate, provided by Advanced Energy, upon completion of the QA/ QC review, even though it does not currently increase the assessed value of their home. As energy efficiency and the home performance market expand, documented, certified work will potentially lead to increased sales price of homes. Additionally, in terms of branding and program impact, some sort of certification can operate as a badge of honor, to persuade others to take action because they feel it is the norm. The certificate becomes the blue recycling bin of energy efficiency and the prevalence encourages others to participate whether from understanding the benefits or from obligation to keep up with the neighbors.

### **Conclusion**

QA/QC is the workhorse behind any good energy efficiency program. The energy conservation measures installed such as air sealing and insulation are not readily visible. Since even the homeowners cannot see the work without crawling through their attic or crawl space, improper installation could go unnoticed which could lead to health hazards such as carbon monoxide build-up or moisture problems. Through comprehensive QA/QC protocols, administered through 3<sup>rd</sup> party providers, programs can improve the contractor competence and provide reassurance for homeowners in the value of their energy efficiency investment. Without it, energy savings goals are jeopardized and contractors receive little if any feedback about their work. Comprehensive QA/QC helps strengthen programs from the most basic element, the contractors, and should be a standard element for all programs.

As the grant period enters the final year, Chapel Hill WISE will work to maintain the exceptional 55% conversion rate while additional contractors are added and the incentive amount is reduced. The program is poised to expand the boundaries of service through transformation into a regional energy alliance while it continues to work with Advanced Energy to provide exceptional QA/QC to help the contractors grow with the program. With funding running out, programs are fighting for sustainability and searching for revenue streams that can support the continued operation. Fee collection from both contractors for the mentoring and the homeowners for program participation and utilization of program services can help generate revenue. Finally, if programs do not continue, due to lack of interest or funding, the legacy will live on through a

contractor pool with the skills and knowledge to operate efficiently and effectively in the home performance contracting market.

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