

Demonstration of Energy & Efficiency Developments (DEED) Grant Agreement

Fort Collins Utilities, 700 Wood St, Fort Collins, CO 80522

Grant #1042- Integrated Utilities Services

Final Report - 19 January 2017

Overview:

Fort Collins Utilities and our partners, Platte River Power Authority (PRPA) and CLEAResult, have launched the innovative next phase of the Efficiency Works-Home program, the **Efficiency Works- Neighborhoods (EW-N) Pilot**. The Pilot is a new model of Utility Energy Efficiency (EE) conservation program that is designed for the scale and comprehensiveness of EE and renewables needed to meet the City of Fort Collins Climate Action Plan in the existing home sector. The pilot program tested a streamlined, turn-key EE program designed to eliminate the problems of a home performance contracting approach, and overcome customer barriers to project implementation that are inherent in a traditional energy audit program.

Purpose:

The Pilot tested how to increase customer program participation in order to increase energy and greenhouse gas savings. By offering an integrated service for the homeowner that overcomes the following barriers and limitations associated with traditional residential efficiency programs:

- Homeowner lack of time to select and meet with contractors
- Complex decision making for choosing the right scope of work
- Gaps in the comprehensiveness of efficiency upgrades
- Inconsistent quality of workmanship
- Homeowner distrust of contractors
- Access to affordable and convenient financing

Fort Collins Utilities

Fort Collins Utilities provides electricity, water, and waste water and storm water services over a 55 square mile area and sells over 1,500 gigawatt-hours of electricity annually to 70,500 residential and business customers. The utility operates a distribution grid (99% underground)

and substations. Power is purchased from the Platte River Power Authority of which Fort Collins is an equity owner, along with the cities of Loveland, Longmont and Estes Park.

There are approximately 36,000 attached (duplex, townhomes) and detached single family homes that qualify for the Efficiency Works Homes Program and this Pilot.

Key Personnel:

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Dates

The DEED Grant Proposal was originally submitted 2/14/2014 and amended by a supplemental scope letter dated 4/21/2015. American Public Power Association (APPA) and Fort Collins Utilities executed the DEED Grant Agreement, effective 5/28/2015.

The Pilot kicked off on 6/9/2015. Pilot development lasted from June 2015 until a soft launch 10/1/2015. The Pilot duration was for one year, and ended 10/1/2016.

Pilot Description:

The Efficiency Works Neighborhood Pilot tested a new hybrid model of comprehensive home performance (HP) contracting to increase participation and energy savings. It is a streamlined, turn-key service for the homeowner that overcomes the barriers to participation such as, lack of time to select and meet with contractors, too many complex technical scope of work decisions, homeowner distrust of contractor proposals, and an easy affordable way to pay for improvements.

To achieve the increased results, innovative targeted marketing was developed, using a propensity model to target the neighborhoods with the highest potential for saving, and then direct mail marketing to neighborhoods with the highest propensity to participate. Customers were sent a letter announcing their neighborhood has been selected to participate in this new program. Two weeks later a follow up reminder and scarcity call to action post card is sent. Various third points of contact were tried to see if they increased enrollment. Open houses showing work performed, yard signs, and geo-fenced digital ads were found effective and continue to be used.

This is a new integrated model of home performance (HP), where a free assessment is performed by an impartial 3rd party HP specialist from CLEAResult (CR), instead of a traditional HP contractor. The HP Specialist lists opportunities to improve the health and safety, comfort, value, and energy efficiency in the home. The opportunities are bundled into packages labeled as good, better, and best, with customizable options. The good package was at minimum a comprehensive improvement of the building envelope that will meet a customer's expectations of efficiency and comfort. The better and best packages offer additional measures such as HVAC equipment, windows, and solar PV options.

DIY customers or those that want to control the contractor selection and pricing process, are referred to the traditional path, when a single measure is all that the house needs, or is desired by the customer.

Once the customer selects a package, the Advisor (see Energy Advisor in the Process section) creates a scope of work and sends it to the next trade ally in rotation. Insulation contractors provide the customer with a proposal contract for services based on agreed to standardize pricing (except HVAC and windows. See below), and apply upfront rebates to reduce the amount of cash or financing required for a project.

The pilot also developed a new way to achieve 100% QA, without the time and expense of a site visit, using photo documentation in the "cloud". It proved very successful and reduced program expenses significantly.

Using the Utilities On-Bill-Financing HELP loan was an integral part of the success of the Pilot program. We wanted to know if having very attractive rates and terms for customers to finance the projects would increase conversation rates from presentation to project. This proved to be critical to achieving the level of success this pilot produced.

Alternatives

Several alternative approaches were considered when envisioning how to build upon the original EW-Homes a-la-cart model to increase participation and savings in this Pilot.

The original plan was proposed by Rocky Mountain Institute (RMI) in the IUS “white paper” , http://www.rmi.org/Knowledge-Center/Library/2014-36_eLabFortCollinsIUS+Report-FINAL-20141219), with the Utility being a “service provider” to replace lost revenue as a result of increasing energy efficiency and solar PV. EW-N utilized many of the program principles in the IUS white paper but not the financial ones.

Several alternatives (some discussed in the IUS paper) were considered to increase customer intake and meet our savings goals. These included:

1. All customers in a targeted neighborhood are auto-enrolled and receive an audit and a complete replacement of incandescent light bulbs with LED’s; with the cost of the audit and direct install added onto their utility bill.
 - a. In this alternative model, customer enrollment and savings would certainly have increased, but the Utilities Marketing Manager rejected any form of customer auto-enrollment. Our team concluded that this could create a negative image of Utilities, instead of offering a positive customer service.
2. A Home Performance General Contractor (HPGC) provides a turn-key service from audit to completion. The HPGC does the audit and creates the scope of work. The GC obtains subs, schedules all work, supervises all subs, and provides QC on the work.
 - a. The HPGC would offer each participating customer at least a basic package of EE improvements, which included comprehensive insulation and air sealing (I&AS), with a better and best package options that included HVAC + Solar + DSM thermostat
 - i. Using our Peak Partners demand response thermostat as an offering to the homeowner was removed from consideration as it conflicted with and did not have the communicating capability of the thermostats our HVAC contractor’s sold with their high efficiency furnaces and AC.
 - b. Developing a pool of Home Performance (HP) contractors to provide the turn-key services had been tried in Fort Collins twice in the past without lasting success. Plus the traditional HP contracting model doesn’t overcome the barriers of impartial EE recommendations, home owner mistrust of contractors, and the potential for poor quality. So we abandoned this approach altogether, and developed the model described in this report.
3. An alternative method of partially replacing lost Utility revenue from the conservation and renewable energy improvement projects (the premise of the IUS white paper), was to require that all packages in the Pilot be financed with a Utilities HELP loan. This idea was eliminated as it was felt we could offer our financing as an option, but not require that customers go into debt.

Illustration of the Pilot Streamlined Path vs Traditional Path



See Appendix D, E and F for detailed process Flow Charts

Marketing

Developing Target Marketing:

The first step in developing the test population for the pilot was targeting high energy use intensity (EUI) (kbtu/sq ft/yr) homes. Homes built in the 1970s and 1980s had large opportunities for improvement; we knew this from having done thousands of audits in our Home Efficiency Program (3500 since 2010.) The original idea was to identify the customers with the least efficient houses in the city and target those customers that had the greatest opportunity for savings.

In June 2015 we ranked the highest electrical energy users in gas and electric heated homes. The initial spreadsheet compiled the following data, and ranked highest those neighborhoods that had:

1. A high percentage of houses built in the 70's and 80's, with the most uniform building style.
2. The highest average monthly energy use, the highest Energy Use Intensity (EUI), and the highest monthly base loads.

The above data was gathered from multiple sources. The customer's monthly electricity consumption, monthly baseload and EUI were from ICF's SIMMS tool. As part of ICF's contract with Experian, we were also able to collect customer's FICO, income and Mosaic segmentation data. We added property information like house style (Tri-level, 2 story, etc.), and total area from the County Assessors records, in addition to what was in Simms.

Neighborhood Targeting:

The neighborhoods propensity to participate was determined by an analysis of those customers that had participated in our Home Efficiency program from 2010 to 2015. We plotted participation as a function of household income and education level. The charts determined that the greatest participation in the EW-Homes program was with customers having an average household income of \$75,000, which is slightly above the area household median income. It was also determined that customers with higher education levels (Bachelor degree and above) were found to participate more frequently than lower levels of education.

The scoring was weighted to those neighborhoods that had the greatest number of customers that met the following criteria:

1. Average household income of income nearest to \$75,000
2. Average household education level of at least a Bachelor's degree
3. Greatest previous participation in any other energy efficiency program that the City offered.

Neighborhoods were scored and ranked by the above criteria, and color coded dots that corresponded to the ranking were plotted on a Google map of the City (See map below).

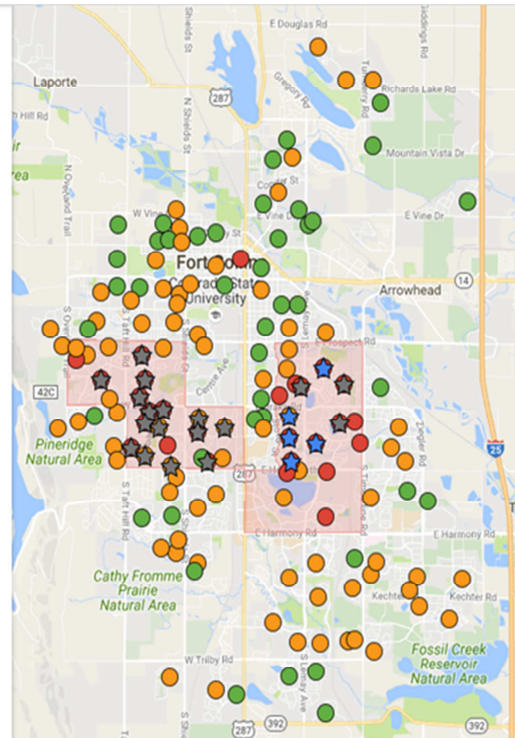
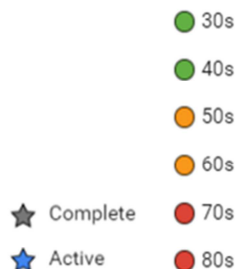
Red dots were the neighborhoods that scored with the greatest propensity to participate, then orange, and green having the lowest propensity. Once a neighborhood had been targeted the dots were changed to black.

This enabled the program to visually determine clusters of neighborhoods to target and to track those previously and currently targeted. Each dot representing a neighborhood can also be clicked on to see the average household income, building age, and education level used to rank that neighborhood.

Mapping

- Plotted neighborhood scores using Google Maps
- Identified high scoring areas
- Added past and currently targeted neighborhoods

[Link](#)



Outreach Plan:

The outreach plan was developed by the EW-Neighborhoods (EW-N) team with the help of our internal communications and marketing team, and a marketing consultant from Colorado State University, Caros Consulting. The purpose of the plan was:

- 1) Identify people with a high propensity to purchase energy efficiency
- 2) Provide them with the necessary information and impetus to make the call to participate
- 3) Create tools for social norming (yard signs, etc.) and events such as neighborhood events or open houses.

The targeted outreach consists of a two stage mailing campaign. Stage one is a letter accompanied with an EW-N program brochure. Stage two is a follow-up post card mailed two weeks from the first letter. This is the most expensive (per customer) mailing program that we tried, and at 2 times the cost of our alternative, which consisted of two post cards mailed two weeks apart, produced 4 times better results.

Messaging was adjusted (based on feedback from the marketing team) to reflect the demographics of each neighborhood. For example, higher income neighborhoods were sold comfort, health and safety, and savings, while lower income neighborhoods were sold comfort, health, safety, and savings, with an emphasis on affordability. (See appendix)

Various third point of contact methods were tried. These included the following, with the results:

- Finding neighborhood newsletters to advertise the Pilot. - Successful but not widely found.
- Having a Pilot participant post their experience on the “Next door app” to create a buzz. - Didn’t gain any traction in the targeted neighborhoods, and wasn’t consistent with City communications policies.
- Going door to door replacing incandescent porch lights with LED’s, advertising our Pilot and the Cities “Lose-a-Watt” campaign to win the Georgetown Energy Prize. - Good enthusiasm from those contacted, but not one followed through and enrolled. Very labor intensive for staff.
- Digital ads for our Pilot geo-fenced around targeted neighborhoods. - Effective but expensive.
- Recruiting neighborhood association leaders. - Was not successful. Too difficult to determine who the contact person was. Many HOA’s are run by property managers.
- Yard signs: We received permission from the City Public information office for homeowners that did a project to put up a yard sign telling neighbors, “My house is now more comfortable and efficient thanks to Efficiency Works. Join your neighbors, call... to sign up”. We also installed brochure boxes on the signs and the brochures had to be replaced weekly.- Very successful way to create neighborhood buzz about the program. Neighbors would ask neighbors about it.
- Open house showing off work that was done, with a presentation. – Another very successful way to get the buzz about the program into the neighborhood. Almost everyone who attended signed up afterwards.

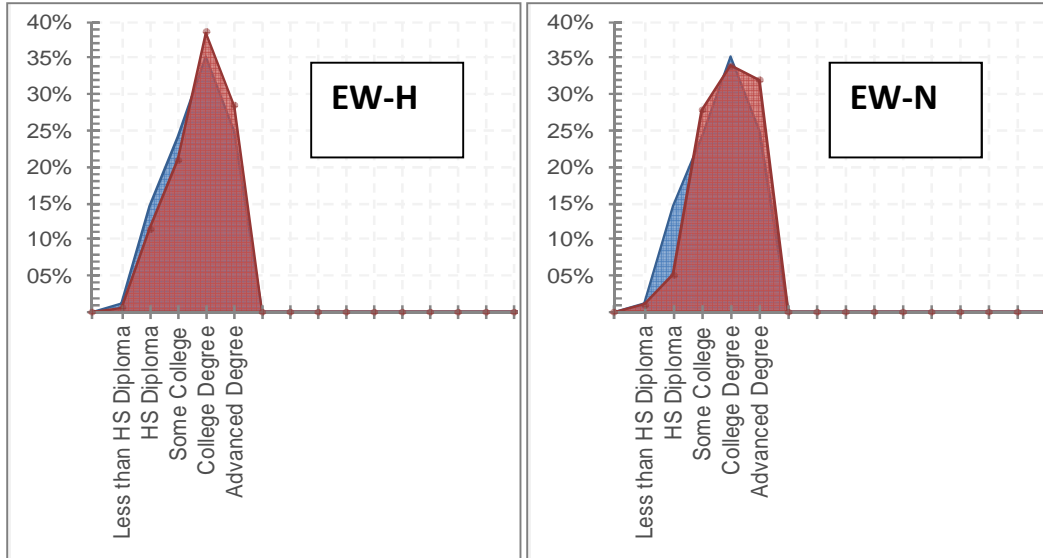
All outreach materials is Fort Collins Utilities branded in order to re-inforce the City’s ownership of the program. Our third party administrator (CLEAResult) is based in Boulder and we insisted that all phone numbers associated with EW-N have the local area code (970) to reinforce the locality of the program.

Marketing Summary:

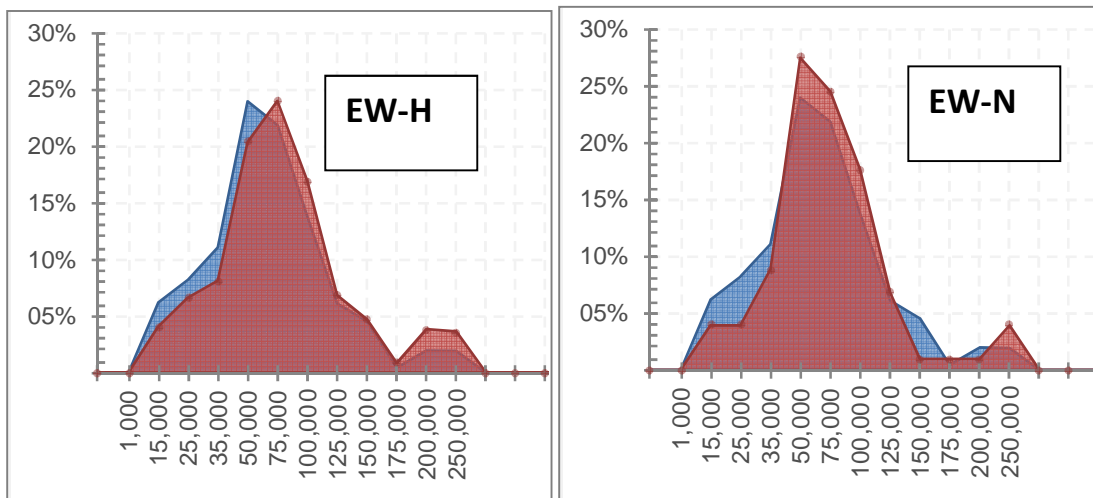
During the pilot, 5400 letters were mailed resulting in 293 phone inquiries which is a response rate of 5.4%. This is 1.5 – 2.0 percentage points above the national average for targeted mailings. Note that several mailings tactics were used over the period so a case could be made that had we used the current mailings strategy the results would be higher.

Marketing costs from direct mailings and geo-fenced digital ads were 35% higher in the Pilot than using conventional low cost marketing strategies like Utility bill stuffers used in our traditional Homes program and other program marketing. The direct mailing and other strategies used produced more than a 50% higher response rate than traditions methods. Of those that contacted the advisor after receiving a mailer, 70 % enrolled in the program. The conversation rate from assessment to a project was slightly less than 50%.

So while the cost per acquisition is higher than the traditional program, more contacts were made and more projects were done. This was the goal and it is much more successful than we anticipated.



The charts above show the distribution of the education of participants (red) vs. the targeted accounts (blue.) Note that EW-N is attracting a broader education range on both sides of the median.



The charts above show median income of participants (red) vs. the neighborhoods target accounts (blue.) Note that EW-H is attracting a higher income demographic whereas EW-N (while still skewed towards higher income) has captured a lower income level than we have previously achieved. This was not expected, as the EW-N projects are more expensive, with 5-6 measures per home vs. 1-2 with EW-H.

Process (audit to project):

The role of the **Energy Advisor** in this program is a critical function that maintains customer contact, and keeps the entire process moving forward. Their role is as follows:

- Customer first contact, program enrollment (including documenting customer interests and barriers) and assessment scheduling, final scope of work creation, contract routing, quality assurance scheduling, and rebate processing.

This specialized energy advisor role requires skills in: project management, contract management, customer education, and sales that is not normally available with an energy advisors traditional role.

The role of the **Home Performance Auditor (HPA)** is also specialized compared to a traditional energy auditor. They determine what the home needs via a traditional energy audit, and then presents to the homeowner three custom package options (Good, Better, Best) while in the home. The HPAs for the pilot project were specifically selected for having construction experience, to better understand everything needed to create the packages that the contractors would agree to. The contractors already had a great deal of confidence in our HPA's, having seen their audit recommendations for 6 years.

The HPA meets in the home with the owner and performs a three hour audit, followed by a package presentation that usually lasts another hour with questions and explanations. All packages start with comprehensive air sealing and insulation of the building envelope, and then progresses to include HVAC, windows, or a whole house fan, and then ultimately, roof top solar. The homeowner can decide immediately to proceed with a selected package option, at which point the package scope of work and pricing is forwarded to the advisor. Otherwise, the homeowner is left with the package presentation report which contains details with each measure being done per package, along with the pricing. Rarely did the homeowner decide on a final scope of work with the HPA in the home. Getting to the final scope of work is usually an iterative process between the customer and the energy advisor.

The homeowner will usually investigate pricing for HVAC or windows (if recommended) before they select a package. This is done separately with one, or up to three contractors, as there is no standardized pricing for HVAC and windows projects. Once the additional HVAC or windows work is added, and/or the scope of work is revised to the customer's satisfaction.

The final scope of work for each specialty contractor is sent to the next contractor in rotation. They have 48 hours to accept the job. Once accepted, the contractor creates a proposal that is then sent to the advisor. The advisor reviews the proposal for accuracy with the original scope of work.

The advisor sends each of the proposals to the customer via DocuSign for their signature. Each signed contract is returned to the specialty contractor, who then schedules the work directly with the customer.

See Appendixes D and E for Insulation and Air sealing and HVAC handoff Flow Charts.

Program	EW-N	EW-H (2015)
Average site visits	2	6
Time from audit to project completion (Days)	76 days (mean)	119 days (mean)
Time from project completion to rebate (Days)	43 days (mean)	88 days (mean)

The above table is an illustration of how the new streamlined turn-key processes created for this Pilot significantly reduces the time from audit to project, and project to rebate.

Trade Allies (start with the best):

Contractor selection for Pilot and Program participation is critical to quality assurance and customer service. The contractors for the Pilot were selected from the top performers participating in the EW-Home program. The selection criteria is based on customer ratings, number of projects completed in the EW-H program and the quality control results from EW-H.

In 2017 the program will be opened up to all EW-Homes contractors that have met the programs rigorous top tier qualifications, done through a QA and customer service scoring process.

Creating “Standardized” Pricing (and Contractor buy-in)

The most difficult piece to create and implement in this new model was standardized pricing. And it is also one of the most critical parts of streamlining the process and gaining trust with the customer. It eliminates customers having to meet with and then decipher proposals from multiple contractors to obtain a scope of work that is in their best interest. The following is a chronological account of how and where we achieved standardized pricing, and where we could not.

Initially, four neighborhoods were selected for the uniformity of the houses in order to create a package price by home type. The thought was that since each house type was fairly uniform, we could create a package price for each house type, since we knew more or less what each type needed. The first five test houses selected were representative of each house type in those neighborhoods: ranch, bi-level, tri-level, two-story, and four-level. Contractors were asked to determine what each house needed, then bid with the goal of creating a package price by each house type. This proved impractical as we discovered that even within fairly uniform house types there were too many assembly variables to create a single package price that our contractors would agree to do the job for.

We then shifted gears and asked the contractors to provide pricing on each assembly (by area), and measure (by components) for each house type. Assemblies included air sealing and insulating a flat attic; insulating and air sealing attic knee walls, foundation walls, and rim-joists; installing moisture soil gas barriers in crawl spaces, etc. Measures also included bath and whole house fans.

The pricing was compiled from the three insulation contractors. When the assembly or measure prices were close, we used a median as the standardized price. When a measure or assembly had a large variation in price, it became an iterative process with the contractors: identifying variables and different scenarios that needed clarification, and to better define the options that can occur with each measure. This added more line item pricing, and we were able to agree upon a standard price per assembly and measure. Some assemblies, like vaulted ceilings, which are complicated and expensive to properly insulate without creating a condensing surface inside the rafter space, were experimented with in sample homes. These were found to be too complicated to come up with a standardized price. So when a customer wants to reinsulate the vault, the contractor comes out and provides a customized proposal which is included in the package. **(See Appendix B for Measures List)**

After the initial iterations were completed for the assemblies and measures found in the most homes, a pricing /pilot program participation agreement was drawn up between the contractors and PRPA (because the original EW-Homes contractor agreements were with PRPA). One insulation contractor declined the pricing /Pilot participation agreement and we proceeded with the remaining two.

We were unable to negotiate standardized pricing with the three best HVAC contractors, as they were emphatic that they needed to be able to up sell or down sell as necessary, and there are too many variables to create standardized pricing. The requirements for HVAC efficiency, right sizing, installation standards and commissioning for HVAC and windows are maintained from the traditional program. In the end, the three top EW-Homes HVAC contractors agreed to participate as long as there was no standardized pricing.

The EW-Homes windows contractors were not initially approached to participate in the Pilot because all the insulation contractors also performed best practice windows installation as part of their business model, and we wanted to maintain as streamlined a process as possible. During the Pilot all the windows quotes and installations were done by the insulation contractors.

Towards the end of the Pilot, the insulation contractors expressed concern about spending excessive time bidding windows and not getting any work. And it became clear that window pricing provided by insulation contractors was starting to appear expensive compared to the pricing we were seeing in the original program. At this point we started referring Homes program window contractors to customers wanting windows in a package.

There were also concerns about fair pricing for HVAC measures without a standardized pricing agreement, because it was also a non-competitive bid scenario. An incident occurred where a customer questioned a bid. The price bid was determined to be almost twice that of our other participating contractor's prices. We corrected this with a new competitive bidding process starting in 2017.

In 2017 all Tier 1 contractors (those with the best QA and customer service scores) will be invited to participate in both paths. All packages where windows or HVAC pricing is being requested, will be referred to multiple Tier 1 contractors; as many as the customer wants bids from. The Advisor will review the bids with the customer, and if accepted will be added to a package. This new process will still be streamlined, and will provide a competitive bidding scenario to keep prices fair.

Adding Solar with Standardized Pricing

Solar was not initially included in the Pilot. Creating a standardized price for solar added another level of complexity to the Pilot that we didn't have the band width for, until the other innovative new processes were figured out. Once the process began to smooth out in early 2016, we started the solar contractor outreach to determine interest in this new model.

We wanted to bundle a comprehensive efficiency package with solar PV, in order to overcome the typically missed opportunity of making the home more efficient before adding solar. To make this approach appealing, we doubled the solar rebate when bundled with one of the Pilot envelope packages.

In February, we invited all solar contractors licensed in Fort Collins to a roundtable to announce the opportunity to participate in the Pilot and get their feedback. Those that were interested became part of a second roundtable to continue iteratively with us in a similar method as with the other contractors to develop the standardized pricing, define and price adders, and develop the intake and QA process into the Pilot. **See Appendix F for the solar process flow chart.**

We were able to secure \$3/ watt for a standard solar system, with a 10% increase allowed for price adders such as high slope roofs, clay tile roofing, etc. See **Appendix G for solar option details.** Two Solar PV contractors signed the participation contract and joined the Pilot in May.

There were dozens of homeowners that indicated an interest in solar during the intake interview with the Advisor. Many of these owners asked to obtain pricing, and if the roof looks like it had good solar access, the HP Specialist would include a simple system in the Best package sized by the next solar contractor up in rotation. The initial system size was based on their annual electrical use, but not to exceed 120% of average energy use. If the owner had further interest, the solar contractor was sent out to design and price the actual system.

Only two solar PV projects were installed as part of a package during the Pilot. The Advisors noted that the price was just too high when bundling solar with comprehensive envelope improvements, and kept homeowners from including solar in the package. See **Lessons Learned.**

Quality Assurance (using photo documentation):

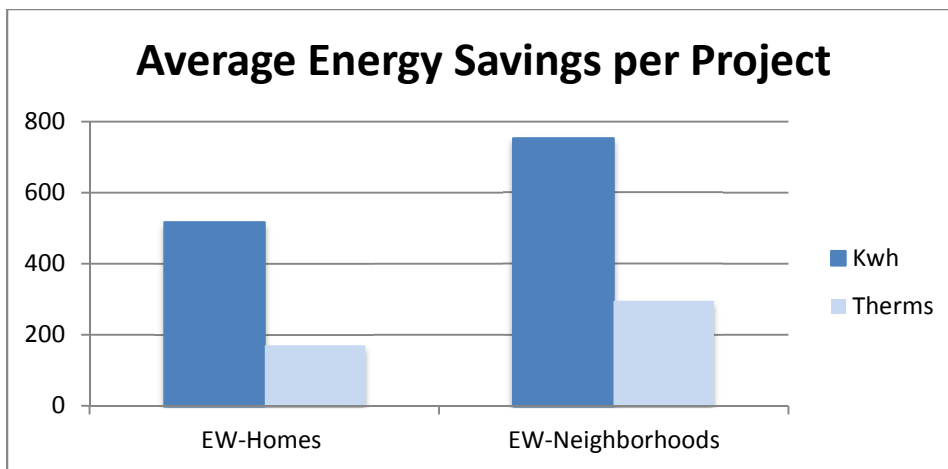
Maintaining good QA is imperative to customer trust and program sustainability. Along with the on-going installation standards training and mentoring we developed and utilized in the traditional homes path, we are using highest and best practices in the Pilot path. This required additional training and mentoring, which was time consuming and expensive.

We needed an innovative new QA process to streamline and reduce the time for our contractors and the administrator, and still maintain a rigorous level of QA. It was discovered that we could share and store photographs for each project between the program and the contractor on "One Note". Photos were taken of the major air sealing components during the assessment by the HPA. CR's QA manager

followed up by training the installers to take photographs of those same assemblies after the work is done, and upload to that project file on "One Note". The QA manager then does a comparison of the photographs for defects or Standards violations in the work. (See **Appendix C** for a sample)

This allows inspections to be done on 100% of the critical components of every project. On-site inspection by the administrator is only needed on 10% of the projects. This minimizes actual inspector time and allows the contractors to move onto the next job without having to wait for an inspector to perform an on-site inspection. This is a significant time and cost savings for both the program and the contractor. The contractors have embraced this as an improved model of internal company QA.

Results- Performance (per project):



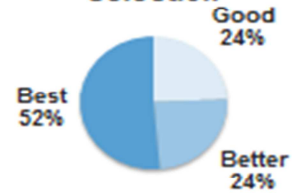
The new EW-N approach is producing 50% more electricity savings and 70% more gas savings compared to the EW-H program.

In the EW-H program, 50% of the measures completed are HVAC upgrades, compared to 23% in EW-N. This illustrates the savings that are possible when extensive air sealing and insulation are done to the highest best practice, and a quality focused approach is used.

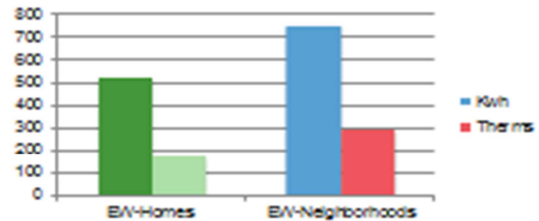
This new hybrid home performance model of DSM program yields savings that standard residential efficiency programs cannot match.

- **We reached more customers:**
 - 2x as many customers enrolled
 - 77% enrolled once contacted
 - 44% conversion rate to a package
 - 52% choose the Best package!
- **No additional program cost per home:**
 - 50% greater kWh savings per home
 - 70% greater Therm savings / home
 - 60% greater GHG savings / home
- 64% of projects used On Bill Financing.

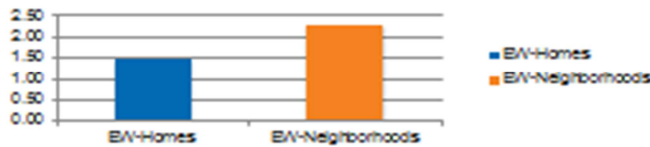
Neighborhoods Package Selection



Average Energy Savings per Project



Average GHG Savings per Project



The significant results from Pilot are best summed up with the above highlights on our Pilot. These extraordinary results stem from direct mail targeting the neighborhoods with the highest propensity to participate and the greatest opportunities to save. This doubled enrollment, and yielded a high conversation rate with dramatically increased savings per project.

- 52% choose the best package for their home, when we expected customers to predominantly choose the good or better package. This is a testament to the effectiveness of using the auditor as an impartial 3rd party salesman, versus the contractor trying to up sell in the traditional home performance model.
- It also appears that the high percentage of customers purchasing a package (44%) is due to the availability of the City's On-Bill financing (HELP loan). 64% of all Pilot customers used the HELP loan, which is significantly higher than in the traditional path.
- In addition to the tremendous energy savings this model yielded compared to our traditional audit path, the greenhouse gas savings were 60% higher, saving 2.25 mTons Co2 per project; slightly lower than the modeled reductions per home needed to meet our Climate Action Plan.
- It also is noteworthy that this new approach, while requiring a more complex role for the Advisor, and the extra time required doing a package presentation during the assessment, did not increase the program costs.
- 25% of the savings achieved in the traditional Homes audit program came from direct installs of energy and water conservation devices. This was not done in this Pilot to reduce time in the home, and because from experience we felt that these savings were overestimated: homeowners having already changed out incandescent to higher efficacy bulbs in most high use locations. It was still felt afterwards that we had missed a significant savings opportunity from performing direct installs in homes that did not do a project.

Sustainability of the Model

The program pilot exceeded expectations and reached contractor and administration capacity in April 2016, four months after a slow launch during the Thanksgiving, Christmas, and New Year's holidays. By June, additional funding was required for rebates in order to meet demand.

Looking forward, long term viability of this program will rely on the following:

- 1) **Low cost funding sources for participants:** This will be especially important as we move into lower income neighborhoods. This program utilized the same Fort Collins Utilities on-bill financing program (Home Efficiency Loan Program, HELP) that the original EW-H program used. It allows projects to be funded with no money down, financing up to 100% of project cost (\$25,000 maximum) and initially had an interest at 2.5% (until 6/2016 when it was adjusted to 4%) for up a 20 year maximum term. This allows very comprehensive and expensive EE improvement projects to be funded with a much lower monthly payment, with the savings offsetting more of the payment. From a cash flow perspective, this is very attractive to the customer, and would help explain the high conversation rate in the Pilot.
 - a. It needs to be noted that post Pilot the use of financing has dropped significantly. The HELP program ran out of funding in October, and a more traditional third party financing program was selected to replace it. We suspect, but will need more time to tell, that the new financing is not as attractive to the customer because the interest rates are higher, and the qualification process is more traditional and time consuming. There have only been two loans closed since the transition to the new loan product.
- 2) **Stability of incoming work:** in order to attract and maintain a stable of capable contractors, we must continue to have a consistent number of projects in the queue sufficient to keep companies busy, and justify adding staff to ramp up the program. If not, we risk losing the availability of our contractors seeking other work.
- 3) **Getting value for EE upgrades:** We are exploring how to have these improvements recognized and give value to the home in the real estate market place. We will be issuing an energy performance improvement certificate with a pre and post improvement Home Energy Score (HES) with estimated annual savings to each customer that does a comprehensive project. The EE improvement measures and HES will auto-populate the Green Fields in the MLS, and the Appraisal Institute's Green Addendum.
 - a. This should maintain and possibly increase participation by overcoming customer objections when measures or projects have a long payback period or there is a short time frame before the sale of the property.

Scalability of the Model

The following items are keys to scaling the program:

- 1) With a successful model and customer demand high, rebate funding available is beginning to limit the growth of our building efficiency programs and EW-N is no exception. Utilities seeks additional budget to ramp up participation to meet our 2020 Climate Action Goals.
- 2) Make our participating contractors more efficient and lowering costs are possibilities as follows: a) Treating adjacent houses at the same time such that contractors can be in multiple houses at once utilizing full crews in an assembly line manner. b) Encouraging contractors to adopt business systems to assure that all materials and people are deployed to the jobsite and eliminating call backs.
- 3) Ensuring adequate numbers of participating contractors in order to limit backlog, increase customer satisfaction and meet program and city goals.
- 4) Ensuring an adequate supply HPAs. These auditors have specialized knowledge and experience in the building trades which limit the growth of the program.

Challenges with the Model

- 1) Standardized pricing in custom housing and unique framing assemblies is problematic. For example vaulted ceiling have been a challenge from the beginning in that treatments of these assemblies require complex and expensive insulation installation processes and finishes. Also, standardized pricing per measure does not allow contractors to cost shift expensive items (such as bathroom fans) into bulk item pricing such as blown insulation.
- 2) Setting customer expectations about the role of the Program Administrator is important. The program is viewed as the general contractor by the customer, when in fact the administrator is only the “referring vendor”.
 - a. This was of great concern to CR. They did not want to be viewed as, and have the liability of a general contractor.
 - b. Great pains were taken by the advisor and QA manager to make sure the customers understood that the contract for all services was between the customer and contractor; there is no contractual relationship between the contractor and the administrator (CR).
 - c. All disputes over quality were investigated by the QA manager, but ultimately if there was an unresolved issue, it is up to the customer to go after the contractor, not the Administrator.
- 3) The City has moved to a third party finance vehicle and away from on-bill financing. The new loans lack many of the advantages of the on-bill financing model, such as:
 - a) Payments can no longer be added to the customer’s utility bill. The new loan is through a Credit Union, and as a more traditional loan product, is reported to the Repositories’ (Experian, TransUnion, Equifax) and is counted as consumer debt. On-bill it was simply a part of the Utility bill, not reported to repositories or visible as additional debt.

- b) Loan Terms have been reduced from a maximum of 20 years, to 15 years. Our previous product was designed for the long pay backs of efficiency projects, and with the 20 year loan term, the monthly payment was low enough to be attractive for lower income customers.
 - c) Interest rates have risen from 2.5% for up to 20 years, to 5.5% for up to 15 years for customer with a 740 FICO. Interest rates are now variable as a function of FICO and term length, which increases the monthly payments and makes the loan look less attractive, especially to the lower income customers with high debt to income ratios.
 - d) Traditional energy loan qualifying process is lengthier and more time consuming as opposed to the one day turnaround with the on-bill financing model. This really hurts the streamlined model, with the goal of keeping it simple to increase participation. New loan applications have plunged since going to the new loan, and enrollments are down post Pilot as well. A simple, easy to qualify for, low cost loan is critical for comprehensive EE projects.
- 4) Getting volume pricing from contractors: Our contractors have refused any sort of volume pricing even as the Pilot increased the referrals to them. This is explained by Contractors incurring an increased cost when utilizing best-practice installation standards and high-quality materials. There is also an increased cost for training employees up to higher quality installation standards, and an increased cost of labor to employ technicians who demonstrate superior workmanship.
- 5) Reducing or Eliminating Rebates: The original strategy was based on establishing a greater volume of work and then asking contractors for volume pricing to eliminate the need for rebates. With the contractor's reluctance to reduce prices, combined with a small stable of contractors for this program, we have been unable to eliminate rebates.
- a. Rebates continue to be a strong incentive for participation, with the upfront application of rebates by the contractor reducing the cost of the project and the amount of cash needed, or reducing the loan payment when financing.
- 6) Having enough qualified contractors and skilled technicians: Getting qualified as a contractor is not easy and involves some processes that many didn't initially like doing (such as taking pictures of their work, but they came to see the value of photo documentation which reduced call-backs). We see the only solution here is to make this work profitable for them. This allows them to pay a living wage to retain their trained technicians, and which will encourage our current contractors to grow their business with us.
- 7) Getting insulation contractors to do a complete turnkey job, including quality drywall repair and painting. The expectation of the customer is that this should be included, and should look professionally done. The insulation company employees did low quality drywall work and never included painted.
- a. We are considering adding drywall and painting specialty contractors to the program.

Lessons Learned

- 1) Target marketing (essentially that we are inviting people to participate) allows us to optimize the volume of customer intake for the advising staff and manage the volume of work to the contractors. The optimization is driven by advisor and contractor back log.
 - a. Best results with multiple customer contacts: Letter with brochure, then follow-up post card, then neighborhoods events like open houses.
 - b. Using a post card and a follow-up post card instead of the letter with brochure is 2 x cheaper, but 4 x less effective.
 - c. Door to door marketing was ineffective, staff time consuming, and expensive.
 - d. Yard signs with program brochures in a flyer holder were very effective.
 - e. Neighborhoods newsletter, while uncommon to find, were effective.
 - f. Neighborhood or HOA champions were hard to identify, and even when identified did not respond well to solicitation.
 - g. Digital targeted ads were effective but expensive.
- 2) Contractor quality has improved as a result of the QA processes developed by this program (100% photo documentation.) This has also increased the quality of the work in the traditional path program because the contractors are transferred what they learned from neighborhoods to homes. Also, some contractors are initiating their own internal quality programs to improve their business efficiency.
- 3) The pathway for the customer begins with the advisor and ends with the advisor. This creates a trusting relationship for the customer to help make decisions and take action. The big success of this pilot was eliminating the crux with standard efficiency programs of the customer working individually with every contractor and having no impartial party to consult on pricing or scope of work.
- 4) Solar bundling with EE was not taken advantage of, even doubling the solar system rebates. Only 3 projects bundled solar with a comprehensive envelope improvement package. The price point of both together appears to be a deterrent.
 - a. For customers focused on EE, solar tends to be a secondary consideration. Most customers are enrolling with different priorities than solar.
- 5) Homeowners were very concerned about whether enrolling in the program to have an assessment done obligated them to do a project. It is also very important to create accurate expectations of the process and outcomes, with clear explanations.
- 6) The contact and enrollment rate when offering a free assessment is higher than the regular program, which charges a \$60 co-pay at the time of service.
 - a. The problem going forward is that the program loses a significant rebate from Xcel Energy for every gas heated home audit done if the customer has no audit co-pay. So we had to add a \$60 co-pay.
 - b. Customer contacts and enrollments are down significantly, post pilot (although the weather has been very warm all fall, which is a factor also).
- 7) Participants in the Pilot compared to the traditional program, were:

- a. Younger and older (with a gap in the middle) . Not sure about this outcome, except that possibly
 - b. Had slightly lower household income (\$40k-90k bell curve, vs \$50k-120k). A very interesting result, which appears to indicate that overcoming the time, complexity and money barriers allows participation by busy, multiple job, lower wage households.
- 8) In order to have the program be simple and easy for the customer, a lot of effort and time is required behind the scenes. A third party implementer is necessary unless a Utility has a large internal staff to manage the program.
 - a. While there is a higher level of time commitment to customer service by the energy advisors on a daily/weekly basis, overall the time commitment is less than the traditional audit path, because the project time is 2-4 months, instead of 4-8 months.
- 9) We proved that more comprehensive projects could be sold by the HP Specialist, an impartial trusted expert, than a HP contractor.

Post Pilot Status/ Future Plans

- 1) Due to the success of this pilot, the streamlined path will be added in 2017 to the Efficiency Works Homes program in Loveland, Longmont, and Estes Park, administered by PRPA. It was recognized as a useful tool for their energy efficiency portfolio.
- 2) The City of Fort Collins will be doubling the number of streamline path audits in order to utilize the shorter project time and achieve more savings with our current resources.
- 3) The streamlined path in this Pilot is now a part of the City's new Home Wise program, in which employees of Fort Collins businesses are given worktime to attend a HomeWise presentation at their place of employment and sign up for the streamlined path audit. The business supports the effort by giving the employees work time to attend the audit and package presentation. Any project that qualifies for a HELP loan can be paid via payroll deduction through Elevations Credit Union.
- 4) The Colorado Energy Office (CEO) has a mandate to give value to energy efficiency improvements using the Home Energy Score (with a grant from the DOE.) Fort Collins Utilities in collaboration with the CEO is creating an Energy Performance Improvement Certificate (EPIC). This certificate will be given to customers completing a comprehensive project in this program. The EPIC certificate contains a pre and post improvement Home Energy Score, a list of measures completed and estimated annual energy savings. In an agreement with the MLS and appraisal institute the HES and energy improvement measures will auto populate the green fields in the MLS and the Green Addendum in an appraisal. This is on the forefront of adding real estate market value to efficiency. The EPIC makes efficiency a direct value added feature without a time based return on investment analysis. This also removes the barrier of participation when customers have a short time to sale horizon.
- 5) We will be gathering 12 month post improvement gas and electric use data for all projects performed in 2016 in order to measure actual savings. For example; Whole house fans are popular in this climate and there are no deemed savings available to apply to those. Our intent is to establish actual savings for this measure as well as all of the packages that we offer in the program.

Budget:

Funding

1. Efficiency Works Homes budget included the Pilot funding: **\$270,000**
2. APPA DEED Grant: **\$125,000**
3. Platte River Power Authority: **\$25,000**

Total Funding: \$420,000

Costs

1. Marketing and Outreach Development (Caros Consulting): **\$17,250**
2. Marketing Costs (program material mailings): **\$15,000**
3. Third Party Program Administration (CLEAResult): **\$142,000**
4. Rebates to Contractors: **\$222,000**

Total Cost: \$396,250

Summary/ Applicability

This new model tested and verified that overcoming homeowner distrust of contractors, the lack of time most busy homeowners have, removing the decision making complexity, and providing an affordable way to pay, yields significantly more program participation, and energy savings per home.

The marked increase in trust by the homeowner for a work scope that benefits them over the contractor, with a higher measure of installation quality compared to a traditional home performance program, makes this new model really stand out.

This is why this new method can be very useful to other Utilities. Increasing participation and being able to throttle the intake number so as not to overwhelm staff and contractors, while increasing energy savings through much more comprehensive projects, should be attractive to any Utility that needs to meet aggressive energy and greenhouse gas reduction goals.

It should be noted that the cost of this program was high. In order to make the process streamlined and turn-key for the customer there is a lot of behind the scenes time and expense required to make that happen.

A third party implementer is critical to make this happen, unless the Utility has enough staff to handle the time required for this kind of advising, contract and standardized pricing management, and quality assurance.

Appendix A - Marketing Materials

Customer Letter –



Utilities
electric · stormwater · wastewater · water
700 Wood Street
PO Box 580
Fort Collins, CO 80522
970.221.6700
970.221.6619 – fax
V/TDD: 711
utilities@fcgov.com
fcgov.com/utilities

July 14, 2016

Dear **NAME ON UTILITY BILL**,

Now is the time to increase your home's comfort and value – for a great price.

You are invited to participate in a pilot program with Fort Collins Utilities and Efficiency Works-Neighborhood™ that features home performance upgrades at a discounted price. These upgrades will increase your home's comfort, air quality and value by reducing draftiness, uneven temperatures and wasted energy.

Here's how it works:

1. Begin by scheduling your **free home performance assessment** (a \$300 value). Call 970-413-6020 or schedule online at fcgov.com/hpp.
During the assessment, a home performance expert will inspect your:
 - insulation and windows
 - furnace and ductwork
 - areas known for air leaks
2. Your home's specific needs will determine three package options: good, better and best.
 - You choose the package that best matches your lifestyle and budget.
 - Each package can be customized to address your needs and areas of concern.
3. Sit back and let Efficiency Works do the rest.
 - Efficiency Works will select a qualified contractor to complete your upgrades.
 - Efficiency Works will ensure the quality of all completed work.

The package pricing will save you money on upgrades. You can pay upfront or repay on your monthly utility bill and let your gas and electric savings help make the payment. *See insert for details.*

Important: Funds are limited. Schedule today to guarantee access to your free assessment and package discounts.

This pilot program is an effort to improve home performance and efficiency in neighborhoods historically known for higher energy use. Your neighborhood has been invited to participate in this innovative program.

Learn more or schedule your home performance assessment by calling 970-413-6020, email neighborhoods@efficiencyworks.co, or online at fcgov.com/hpp.

We look forward to assisting you.

Sincerely,

A handwritten signature in blue ink, appearing to read "Kim DeVoe".

Kim DeVoe
Fort Collins Utilities
Energy Services Engineer

Customer Letter – Low Income



Utilities
electric · stormwater · wastewater · water
700 Wood Street
PO Box 580
Fort Collins, CO 80522
970.221.6700
970.221.6619 – fax
V/TDD: 711
utilities@fcgov.com
fcgov.com/utilities

September 1, 2016

Dear **NAME ON UTILITY BILL**,

Now is the time to increase your home's comfort and value – for a great price.

You are invited to participate in a pilot program with Fort Collins Utilities and Efficiency Works-Neighborhood™ that can lower your utility bills by reducing energy waste. If you've noticed draftiness, uneven temperatures or uncomfortable rooms, you can take advantage of a FREE home performance inspection and access to *instant rebates* to lower the cost of any necessary upgrades.

Here's how it works:

1. Begin by scheduling your free home performance assessment (a \$300 value). Call 970-413-6020 or schedule online at fcgov.com/hpp.
During the assessment, a home performance expert will inspect your:
 - insulation and windows
 - furnace and ductwork
 - areas known for air leaks
2. Your home's specific needs will determine three package options: good, better and best.
 - You choose the package that best matches your lifestyle and budget.
 - Each package can be customized to address your needs and areas of concern.
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 - Efficiency Works will select a qualified contractor to complete your upgrades.
 - Efficiency Works will ensure the quality of all completed work.

The package pricing will save you money on upgrades. You can pay upfront or repay on your monthly utility bill and let your gas and electric savings help make the payment. *See insert for details.*

Important: Funds are limited. Schedule today to guarantee access to your free assessment and package discounts.

This pilot program is an effort to improve home performance and efficiency in neighborhoods historically known for higher energy use. Your neighborhood has been invited to participate in this innovative program.

Learn more or schedule your home performance assessment by calling 970-413-6020, email neighborhoods@efficiencyworks.co, or online at fcgov.com/hpp. Act now, this offer ends October 2016.

We look forward to assisting you.

Sincerely,

A handwritten signature in blue ink, appearing to read "Kim DeVoe".

Kim DeVoe
Fort Collins Utilities
Energy Services Engineer

Letter Insert – Front

It's SMART. Improving your home just got less expensive. As a participant, you get a FREE home efficiency assessment (\$300 value) and you can take advantage of the instant rebates only offered in this program. That's like cold, hard cash going right into your pocket.

It's EASY. Sit back and let us do the work for you. We'll create packages tailored to the needs of your home and budget, select a qualified contractor and make sure the work is done correctly. That means you get the benefit of a comfortable, healthy home, and the peace of mind of a job well done.

“ This program has, quite literally, changed our lives. We were at the point of feeling we might have to walk away from our home because of the HVAC problems. We are deeply, truly grateful for the Efficiency Works program. ”
– Cara N.

SCHEDULE TODAY

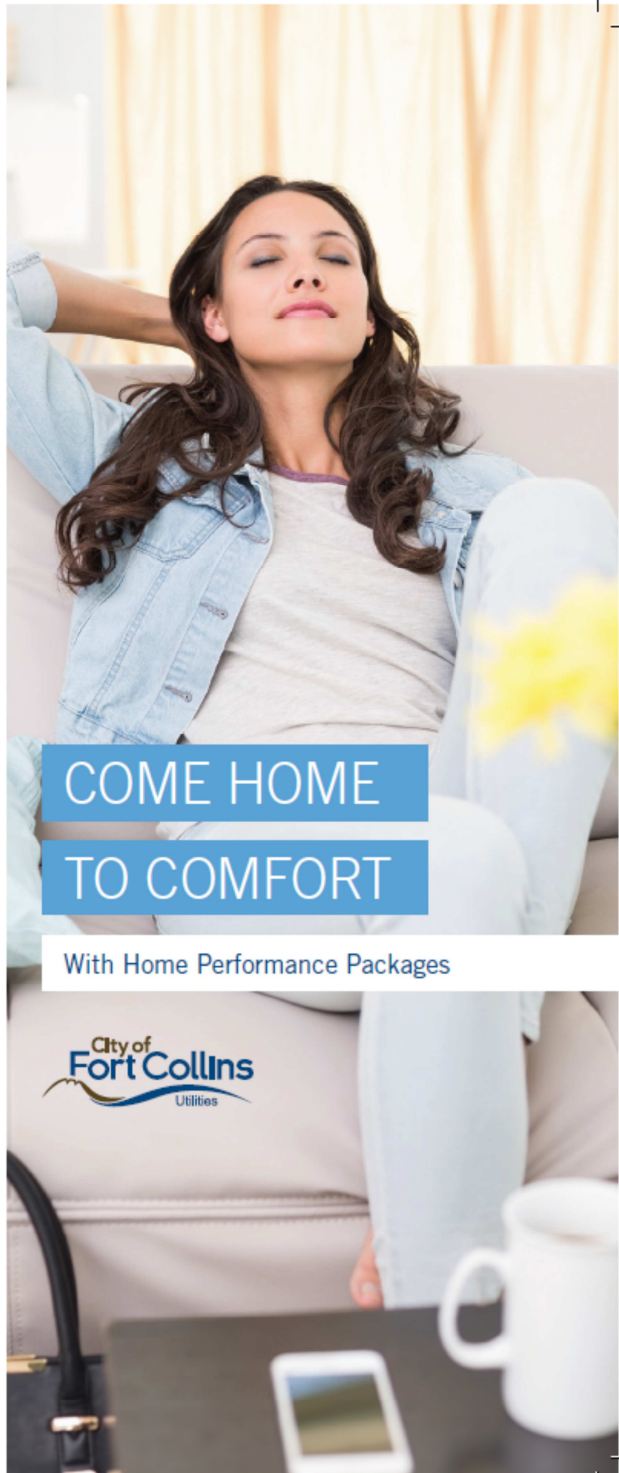
970-413-6020

fcgov.com/hpp

Auxiliary aids and services are available for persons with disabilities. VTDD: Dial 711


Esta información puede ser traducida, sin costo para usted.

 **Efficiency Works™**



COME HOME
TO COMFORT

With Home Performance Packages



Letter Insert – Reverse Side

A high performing home means more than lower utility bills – it's your escape. It's a place for cozy movie nights or warm holiday dinners. It's the peace of mind that comes from clean, healthy air. A high performing home is always the perfect temperature – no matter what Mother Nature dishes out.

Is your home underperforming? Do you notice drafty windows? Or maybe a room that always seems too hot or cold? For some people, an entire level of the home fails to reach the right temperature – no matter how often the furnace or air conditioning runs.

What are the risks? An underperforming home takes money out of your pocket through increased utility bills. But that's not all – a home with excessive air leakage may allow pollutants to enter your living space, contributing to health and safety risks.

Financing is available

Improving your home is easier than ever. Simply pay upfront or finance through Fort Collins Utilities. The payment is simply added to your monthly utility bill.

- No money down
- Covers 100 percent of costs
- Available for 5,7,10,15 and 20 years
- Loans from \$1,000–\$25,000
- The money you save on gas and electricity helps make the payment

Call 970-413-6020 or visit fcgov.com/hpp

GET STARTED TODAY

1

It all starts with your FREE Home Performance Assessment (\$300 value) Schedule today by calling 970-413-6020 or online at fcgov.com/hpp.

2

Choose one of three home performance packages that will increase your comfort and safety, while lowering your utility bills.

3

Let us do the rest. Efficiency Works will provide the contractor and ensure the quality of all completed upgrades.

[Schedule Your Free Assessment Today](#)
970-413-6020 or online
at fcgov.com/hpp



Follow Up Postcard – Front



Follow Up Postcard – Reverse



PO Box 1580
Fort Collins, CO 80521

This is a follow up reminder to the information you received two weeks ago.

Don't miss this FREE opportunity to have an expert inspect your:

- insulation and windows
- furnace and ductwork
- areas known for air leaks

For more information, visit fcgov.com/hpp

Schedule Today

970-413-6020 or online fcgov.com/hpp



Appendix B- Standardized Pricing Measures (Prices deleted)

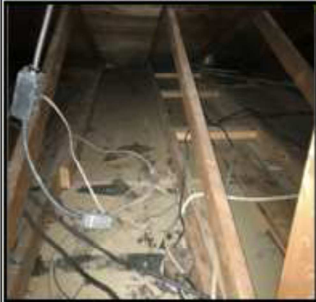
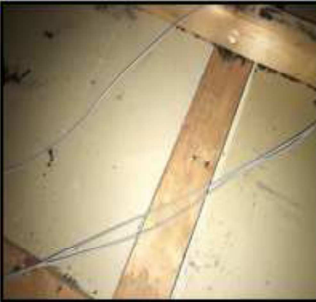
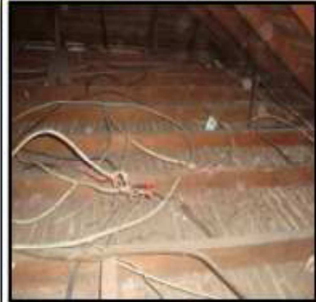






Appendix B- Standardized Pricing PPENDIX A				
Efficiency Works Streamlined Approach Installation Standards & Pricing as of 12-19-16				
General Notes:				
These installation standards are based on Efficiency Works - Homes (Final Installation Standards V3 Effective 7/15/15) That means that you will need to meet the Homes Final Installation Standards PLUS any additional requirements in the EW-Streamlined Approach Installation Standards.				
While the EW-Homes Standards often allow multiple pathways for compliance - this program will typically have a single pathway approach only.				
ENERGY EFFICIENCY MEASURE	INSTALLATION STANDARDS	REQUIRED TESTS	NOTES	STANDARDIZED PRICE
ATTIC				
Full Vacuuming of the Attic	This means that you shall vacuum the entire attic floor to reveal all of the areas that need to be sealed.	Photo-Documentation Required	In the spirit of sustainability vacuumed insulation should be repurposed as much as possible. This should only be done if the insulation is relatively clean and not full of organic pollutants.	
Attic Prep and Air Seal	See EW-Homes Installation Standards V3	Combustion Safety Test required record results on Appendix F	When the ACH50 is 8 or greater we expect a 50% reduction in infiltration.	
	ADD REQUIREMENT TO SEAL EXTERIOR TOP PLATES. ADD ATTIC HATCH MUST BE OPERABLE WITH DURABLE INSULATION DAM	Blower door test required prior to air sealing and after insulating in order to measure house tightness improvement. Photo-Documentation Required	When ACH50 is less than 4: identified bypasses must be sealed - insulation removal method prior to airsealing at the contractors discretion.	
Air Sealing and Insulating External Top Plates	The exterior top plate shall be sealed (when accessible) by creating an insulation dam with a fiberglass batt shoved just past the top plate. Closed-cell spray foam is then applied to not only coat the entire top plate but to also fill the space between the top plate and baffle or roof deck - 3-5 inches of foam.	Combustion Safety Test required record results on Appendix F	This is expected to be accomplished on most homes. Scissor trusses will be a possible exception.	
Bath Fan Ducting	If using flex must be careful to use long radiuses and pull flex tight. Insulated flex must be R-8 If using rigid ducting - must insulate to R-8 No 90 degree turns directly off housing Duct must be sealed to fan housing with HVAC mastic.	Contractors will need the ability to measure this flow Suggest Energy Conservatory Exhaust Fan Flow Meter Fan must be tested to prove 50 CFM or greater is achieved. Photo-Documentation Required Results & method must be reported to program.	This line item is intended to address existing fans that will not be replaced and ducting is not adequate. Typically ducting for these fans is not terminated to outside or is routed with excessive bends or elevation changes. Condition 1) Termination cap not installed. Price to install termination cap and ducting as necessary. Condition 2) Poorly installed ducting with adequate termination cap (excessive length or bends). Condition 3) Replace all ducting and install new termination cap. Leave existing fan.	

ENERGY EFFICIENCY MEASURE	INSTALLATION STANDARDS	REQUIRED TESTS	NOTES	
Accessible Knee Walls	<p>Must use spray foam - Can be low or medium density - Open or Closed cell - Two part only.</p> <p>Ignition barrier not required in attics unless storage is present or drop down stair access.</p>	<p>Combustion Safety Test required record results on Appendix F</p> <p>Blower door test required prior to air sealing and after insulating in order to measure house tightness improvement. Photo-Documentation Required</p>	<p>This price is for all knee walls.</p> <p>Access will be priced separately below.</p>	
Skylight Shafts	<p>Remove existing batt insulation if present and replace with spray foam to Phase I Installation standards - R-11 minimum over face of framing.</p> <p>Ignition barrier not required in attics unless storage is present or drop down stair access.</p>	<p>Combustion Safety Test required record results on Appendix F</p> <p>Blower door test required prior to air sealing and after insulating in order to measure house tightness improvement. Photo-Documentation Required</p>		
Batt Insulation Removal from Attics	<p>Removing old batts from attic with intent to dispose of at landfill.</p>	<p>Photo-Documentation Required</p>		
Whole House Fans	<p>See EW-Homes Installation Standards V3</p> <p>Additionally, use rigid adjustable elbow directly out of fan when flex duct cannot be installed without collapsing.</p>	<p>Photo-Documentation Required</p>	<p>AirScape is the only manufacturer we are aware of that meets these requirements. Non-ducted fans are acceptable where space is limited. Must have insulated, self-sealing, mechanical dampers.</p> <p>All whole house fan installs shall include electrical and drywall repair and adequate attic ventilation for the standardized price.</p>	
Whole House Fan Cover (for the older, existing Whole House Fans)	<p>A commercially available product must be used.</p>	<p>Photo-Documentation Required</p>	<p>Battic would be an example of the classic system with velcro. Please make sure to remind homeowners the importance of replacing this cover on hot days and leaving it on all winter.</p>	
ENERGY EFFICIENCY MEASURE	INSTALLATION STANDARDS	REQUIRED TESTS	NOTES	
Moving an Attic Access	<p>Seal over existing attic access with spray foam to bring area up to R-38. Create a new attic access with homeowner's direction. No paint.</p>	<p>Photo-Documentation Required</p>	<p>This would allow us to abandon a closet access that has bad location and find a better one for better accessibility with customer's approval.</p>	
Adding a Gable Vent for Access to Attic	<p>Gable vent can be permanently installed upon completion of attic improvement. Verify aesthetics with homeowner.</p>	<p>Photo-Documentation Required</p>	<p>This access option will be recommended only when the total truss span is 24' or more and the gable is less than 16' from the ground, typically the lower attic on a tri-level. The gable vent would be used to gain access to the knee wall at the least and, if conditions warrant, full insulation removal, air sealing and insulation. This pricing request is to add the gable vent only. All other work to be priced using standard pricing.</p>	
Knee Wall Access	<p>This could vary substantially from cutting through a bit of drywall or OSB to removing an entire porch ceiling or part of a garage ceiling. Assessor will price per job.</p>			
GARAGE				
Floor Over Garage Dense Pack	<p>At least 2 Feet of drywall shall be removed where ceiling touches house interior wall to allow for proper air sealing (Full depth blocking must be air sealed around perimeter & any holes though blocking for utilities - if full depth blocking is not present it needs to be backed and air sealed) - When water pipes are present: Tent pipes per Phase I Installation Standards and install rigid foam insulation to achieve R-19 minimum below the pipes.</p>	<p>Combustion Safety Test required record results on Appendix F</p> <p>Blower door test required prior to air sealing and after insulating in order to measure house tightness improvement.</p>	<p>Pricing covers dense packing only. Drywall removal and replace pricing is separate.</p>	

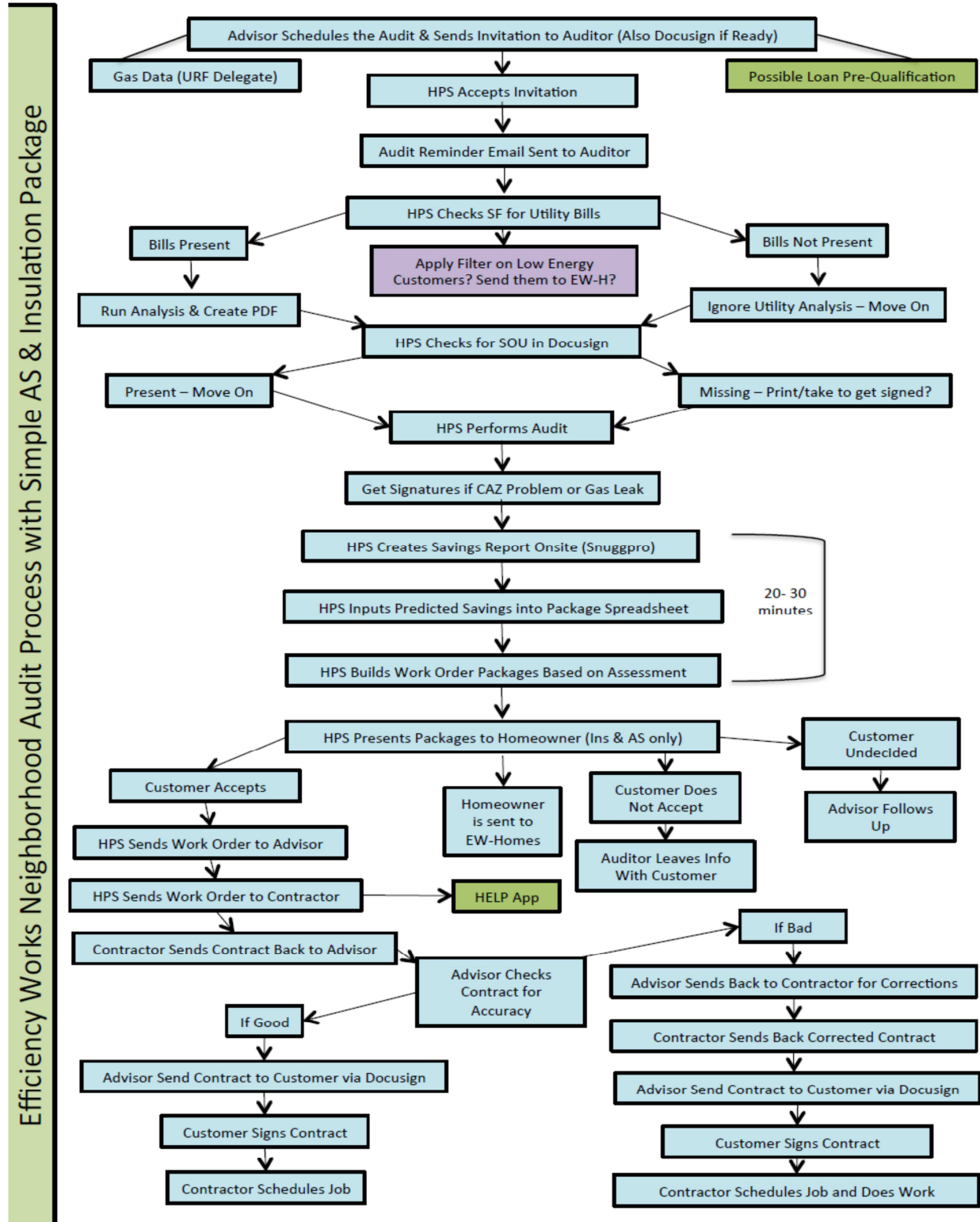
ENERGY EFFICIENCY MEASURE	INSTALLATION STANDARDS	REQUIRED TESTS	NOTES	STANDARDIZED PRICE
Pipe Freeze Protection Insulation in Garage (Walls & Ceilings)	When water pipes are present: Tent pipes per Phase I Installation Standards and install insulation to achieve R-19 minimum below the pipes. All rigid foam/insulation will be covered with drywall.	Photo-Documentation Required	Use any insulation to achieve R-19 on the unconditioned side of pipes. Install drywall to firetape stage or finished and textured per existing conditions. The intention is to prevent frozen pipes.	
Drywall Replacement and Firetape Finish	Must have a professional firetape finish.	Combustion Safety Test required record results on Appendix F Blower door test required prior to air sealing and after insulating in order to measure house tightness improvement. Photo-Documentation Required	No sanding should be needed when job is complete.	
Drywall Replace with Full Finish and Texture	Must have a professional full finish with texture.	Combustion Safety Test required record results on Appendix F Blower door test required prior to air sealing and after insulating in order to measure house tightness improvement. Photo-Documentation Required		
Seal Return Headers/Panning	Must expose the header and trunk to joist duct transition and seal with duct mastic.	Combustion Safety Test required record results on Appendix F Blower door test required prior to air sealing and after insulating in order to measure house tightness improvement. Photo-Documentation Required		
Install Attic Access Garage Ceiling	It we need an attic access in areas that have more than 30" of height then we will ask to leave a permanent access			
CANTILEVERS				
Cantilevered Floor Dense Pack	FOUR OPTIONS			
ENERGY EFFICIENCY MEASURE	INSTALLATION STANDARDS	REQUIRED TESTS	NOTES	STANDARDIZED PRICE
Cantilever Drill and Fill from Bottom	This is the option for drilling from the basement rim joists and from underneath the cantilever.	Combustion Safety Test required record results on Appendix F Blower door test required prior to air sealing and after insulating in order to measure house tightness improvement.	This applies to cantilevers that are 18" and higher from the ground	
Cantilever Drill & Fill (From Exterior Wall with Siding Removed)	Drill & Fill from outside - this includes removing the bottom row of lapsiding to gain access to the sheathing for drilling and replacing siding when done.	Combustion Safety Test required record results on Appendix F Blower door test required prior to air sealing and after insulating in order to measure house tightness improvement.	This will exclude aluminum siding and vertical wood siding as well as asbestos. This will include cantilevers that are lower than 18" to the ground.	
Cantilever Drill and Fill from Interior	Drilling and denspacking the cantilever from the basement or crawlspace rim joists.	Photo-Documentation Required	This will only be sought if there is an unfinished basement	
Cantilever Dense-Pack - Drop the Soffit	Drop the Soffit -Net and Densepack	Combustion Safety Test required record results on Appendix F Blower door test required prior to air sealing and after insulating in order to measure house tightness improvement.		
CRAWLSPACE/BASEMENTS				
Spray Foam Crawl Space Rim Joists	See EW-Homes Installation Standards V3	Combustion Safety Test required record results on Appendix F Blower door test required prior to air sealing and after insulating in order to measure house tightness improvement. Photo-Documentation Required		
Spray Foam Basement Rim Joists	See EW-Homes Installation Standards V3	Combustion Safety Test required record results on Appendix F Blower door test required prior to air sealing and after insulating in order to measure house tightness improvement. Photo-Documentation Required		

ENERGY EFFICIENCY MEASURE	INSTALLATION STANDARDS	REQUIRED TESTS	NOTES	STANDARDIZED PRICE
Insulate Crawl Space Walls	See EW-Homes Installation Standards V3 Additionally: Shall be a foam product (spray or board) - ignition barrier is required	Combustion Safety Test required record results on Appendix F Blower door test required prior to air sealing and after insulating in order to measure house tightness improvement. Photo-Documentation Required		
Insulate Basement Walls	We are going to call out a specific flash and batt. Hold framing 1" off the fdn wall and spray 1 inch closed cell behind stud and cavity and install R-13 unfaced batt	Combustion Safety Test required record results on Appendix F Blower door test required prior to air sealing and after insulating in order to measure house tightness improvement. Photo-Documentation Required	Only for homes going through basement remodel - follow Phase I Installation standards	
Install Moisture/Soil Gas Barrier in Crawl Space	See EW-Homes Installation Standards V3 Additionally, use polyurethane caulk sealant ie Permthane, not spray foam, to seal barrier to walls, footings, etc. Install perforated pipe under barrier.	Photo-Documentation Required	A radon mitigation contractor should be able to add piping and a fan if necessary to reduce radon levels but not have to improve the moisture/soil gas barrier.	
Crawlspace Exterior Entrance	The door needs to be insulated with foam to R-25, should be air tight, and should not need tools to open or close .	Photo-Documentation Required	Locking hooks or hasps are recommended to ensure an air tight seal.	
Batt Insulation Removal from Crawlspace	Removing old batts from crawlspace with intent to dispose of at landfill.	Photo-Documentation Required		
Repairing a Soil/Gas Barrier	Simply patching with a rectangular piece of barrier and urethane caulk.	Photo-Documentation Required	less than 5 square feet	
ENERGY EFFICIENCY MEASURE	INSTALLATION STANDARDS	REQUIRED TESTS	NOTES	STANDARDIZED PRICE
GENERAL				
Window Replacement	When windows are called out they will at a minimum meet Phase I Installation Specifications	Combustion Safety Test required record results on Appendix F Blower door test required prior to air sealing and after insulating in order to measure house tightness improvement. Photo-Documentation Required		
Duct Sealing (Outside Air or Thermal Boundary)	All duct sealing must be done with UL 181 approved tape or mastic. Mastic shall be used anywhere there isn't an access issue such as a door.	Leaky ducting in the attic must be sealed with mastic. Depressurize home with blower door and use smoke in attic to verify effective duct sealing. Photo-Documentation Required	When ducting is present outside of the thermal boundary sealing with mastic is required.	
Duct Sealing (Inside Air and Thermal Boundary)	All duct sealing must be done with UL 181 approved tape or mastic. Mastic shall be used anywhere there isn't an access issue such as a door.	Measure pressure in basement WRT the rest of the house. Training may be required. If pressure difference is negative assess return duct leakage and seal if accessible. If duct sealing is not possible advise homeowner to contact HVAC contractor to balance airflow. Photo-Documentation Required	This is focused on return leakage that can depressurize areas of the home. We are trying to minimize CAZ depressurization and possible IAQ problems. The assessor/energy expert will determine the need for this based on visual inspection as well as pressure diagnostics.	
Wall Insulation, Dense Pack Cavities, 2 x 4	We only want to densepack those walls that are empty - You can use either fiberglass or cellulose - if using fiberglass - make sure it's rated for dense-packing (short fiber).	Photo-Documentation Required		
Painting	1) price to paint areas around new whf when older one was removed. 2) price to paint exterior soffits under cantilevers. 3) price to paint new drywall after replacement for cathedral drywall tear out. 4) price to paint around interior drill and fill patches. 5) price to caulk and paint exterior siding after densepack.	Photo-Documentation Required		

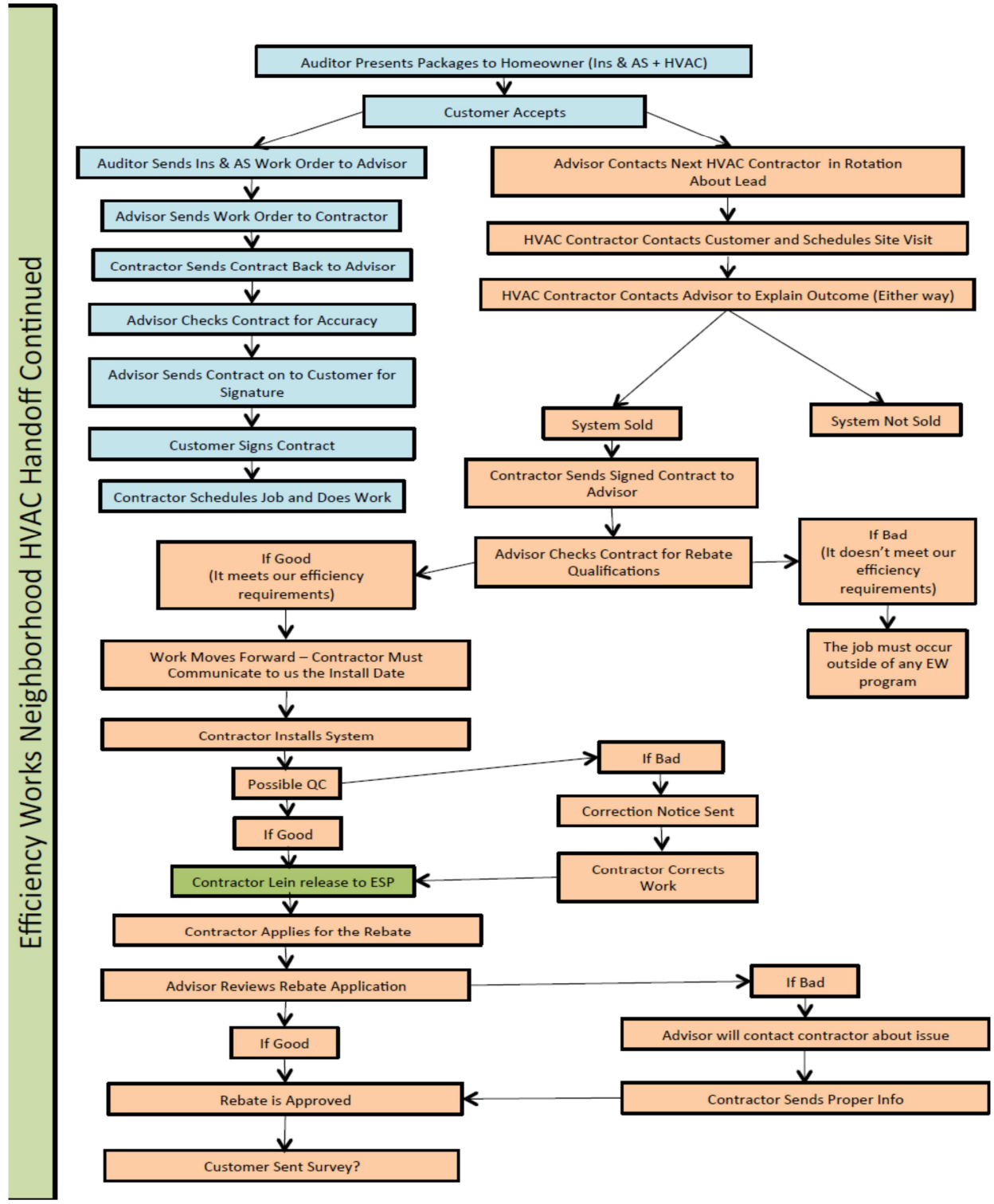
Appendix C- Photo Documentation of Quality Assurance (Sample)

Efficiency Works Neighborhoods Quality Assurance Photo Documentation Guide			
General Notes:			
<p>This photo documentation guide is to establish a great paper trail of the before and after on our more important details in the program. This is a piece of the EW-N program and are required on ALL jobs. While this may feel like a lot of extra work initially - we firmly believe that this will improve your internal quality control which will help the overall program.</p> <p>Please use as high a resolution setting that your camera will allow so we end up with good photos.</p>			
EXPECTED PHOTOS	EXAMPLE	EXAMPLE	EXAMPLE
Clean Attic Floor - Top Plates - Bypasses - Large Holes			
Sealed top plates- Exterior and Interior, electrical/plumbing/HV AC penetrations, chases, rulers, dams, etc.			
Unsealed Can light - Sealed Can Light			

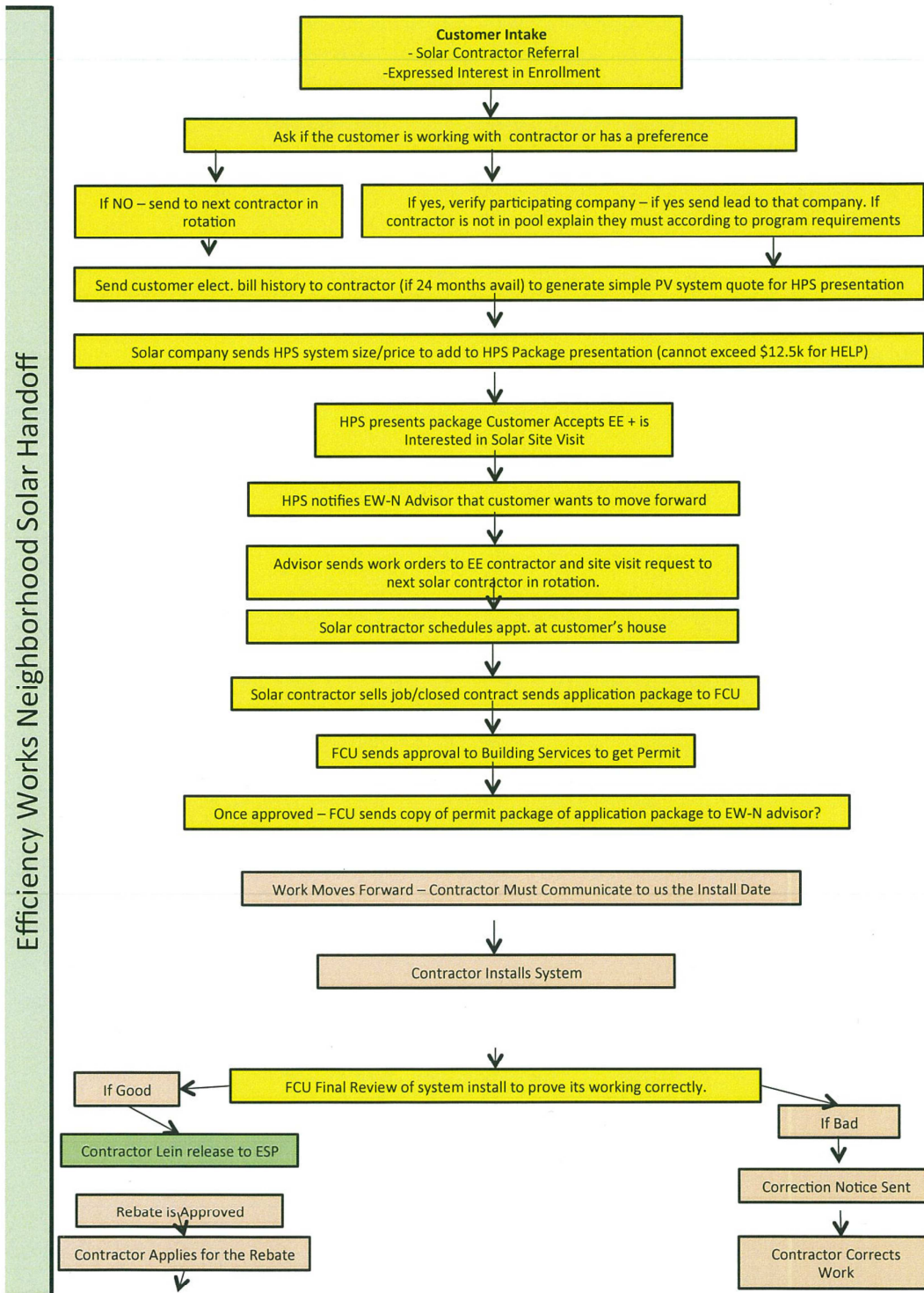
Appendix D- Flow chart for Insulation and Air Sealing Package



Appendix E- Flowchart for HVAC Handoff



Appendix F- Flowchart for Solar Handoff



Appendix G- EW-N Pilot Solar Option Details



Utilities
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Fort Collins, CO 80522
970.221.6700
970.221.6619 – fax
970.224.6003 – TDD
utilities@fcgov.com
fcgov.com/utilities

MEMORANDUM

DATE: March 17, 2016
TO: Team EWN
FROM: Norm Weaver, Senior Energy Services Engineer; Kim DeVoe, Energy Services Engineer
RE: Efficiency Works Neighborhoods Pilot Solar Option

SCOPE OF WORK

Background

Fort Collins Utilities is piloting a new program, Efficiency Works Neighborhoods (EWN); an innovative new approach to improve home energy performance where customers are offered packages of efficiency improvement measures from participating contractors with upfront rebates and standardized pricing.

The premise of the “Neighborhoods” program is to reach out to targeted neighborhoods of utility customers to offer a streamlined turnkey model to improve home energy performance that overcomes typical customer issues with mistrust, time, and other barriers to action.

EWN offers a free energy assessment by our third party home performance specialist, who presents the customer with a good, better, and best package, with options. Participating contractors, in rotation, are referred the customer’s selected package, who then provide the customer with a contract proposal using program agreed upon pricing. EWN program administration, home performance assessments / presentations, contractor referrals, and quality assurance are all performed by CLEARresult, in conjunction with Fort Collins Utilities.

Intent for the “Efficiency Works Neighborhood” solar option

Many households favor installing solar ahead of performing home efficiency improvements, which often misses the opportunity to install a more cost effective overall package, which truly comprehensive EE improvements can help assure; and the City misses out on more broad energy and carbon saving potential. The proposed approach seeks to structure a solar package option that leverages interest in solar with the broader benefit of a total package of **efficiency plus solar**. (The key idea is that one should not be separated from the other).

EWN Pilot Solar Offer Features:

- 1) Utilities will reserve twenty (\$1500) rebates initially in the 2016 solar rebate program.
- 2) 20 HELP loans of up to \$25k are currently available for comprehensive EE projects in EWN.
- 3) Designated EWN solar contractors will install PV systems at a price not to exceed \$3.00/Watt-dc (with a 10% allowance for adders as outlined below).
- 4) A double solar rebate (\$1.00/W) consisting of \$0.50/W current FCU solar rebate, and a \$0.50/W EWN program discount, will be available to households bundling solar with a package of efficiency measures. (The future EWN program may leverage a bulk solar purchase in lieu of incentives.)
- 5) The double “instant rebate” will be given to the customer as an upfront incentive by the contractor, and be reimbursed by the program.
- 6) The solar portion of EWN HELP loans will be capped at \$12,500.



EWN Standard PV System Description:

- System is customer owned
- Contractor provides project management and sales support
- Minimum transferrable component warranty of 25 years for solar modules, 10 years for inverters, and 10 year labor
- Critter barrier included where indicated by site conditions, visual skirting optional
- Module size up to 280 Watts-DC considered standard
- Mounting rail approach left to discretion of contractor
- No system expansion and storage contingencies are required
- System will be NEC 2015 compliant (eg. rapid shutdown)
- System level performance monitoring will be standard
- Roof pitch up to 28 degrees considered standard (< 7:12)

EWN PV System Cost Adders (up to 10% or \$0.30/Watt-dc):

(Possibly adders subject to Contractor's Discretion)

- Roof pitch above 28 degrees
- Height above 2 stories
- Wiring requiring service upgrade, subpanels or line side tap
- Roofing type of tile or wood shake shingles
- Configuration requires multiple arrays
- Detached buildings or other configurations requiring trench work
- Non-standard requests, such as transfer switching
- High performance modules requested (> 280W per module)