Mass Save Home Energy Services Program
Home Performance Contractor Participation Agreement

between

CONSERVATION SERVICES GROUP, INC. (CSG)

AND

_____

This "Agreement" is made on this ____ day of _____, 2011 between Conservation Services Group, Inc., hereinafter called CSG, with offices located at: 50 Washington Street in Westborough, Massachusetts 01581 and _____, hereinafter called CONTRACTOR, with offices located at: _____, _____,____ _____.

Recitals:

a. Mass Save is a public/private partnership that was created to help electric and gas utility customers in Massachusetts ("Customers") save money through energy conservation.

b. CSG's Residential Conservation Services Division is a Lead Vendor under contract to both National Grid and NSTAR (each a "Utility" and together the "Utilities"), which are member utilities of the Mass Save Home Energy Services Program (www.masssave.com). The Program Description is attached as Attachment 1 *"Mass Save Home Energy Services Program Summary"*.

c. CSG is the Mass Save Home Energy Services Program Lead Implementation Vendor for the Utilities' territories. As such, CSG assigns to or accepts from participating contractors, such as CONTRACTOR, contracts to perform Home Energy Assessments ("Assessment Work") for Customers as provided herein, and, if a Customer elects to install savings measures ("Installation Work" and, together with Assessment Work, "Work"), CSG administers the Utilities' reimbursement program with respect to such Installation Work.

d. CONTRACTOR is willing and able to perform Assessment Work for CSG and, to the extent selected by a Customer to do so, to perform Installation Work for Customers under the terms and conditions set forth herein.

TERMS AND CONDITIONS

1. Term of Agreement

   a. This Agreement shall govern (i) all Assessment Work assigned by CSG to CONTRACTOR; (ii) all Assessment Work for Customers CONTRACTOR proposes to CSG and CSG verifies in writing to CONTRACTOR as eligible; and (iii) all Installation Work contracted

by CONTRACTOR with Customers for whom CONTRACTOR has performed such Assessment Work, from the date of the full execution of this Agreement through December 31, 2011, unless terminated at an earlier date, in the manner specified in Section 12 of this agreement.

2. Utility Programs
    a. CSG is administering the Mass Save Home Energy Services Program on behalf of and under contracts with the Utilities. As required of CSG under those contracts, CONTRACTOR shall be required to comply with the Contractor Background Check Policy attached as Attachment 2 hereto, and as such Policy may be revised by CSG and/or the Utilities from time to time.
    b. In compliance with CSG's contracts with the Utilities, CONTRACTOR shall not use the name of any Utility or the Mass Save Home Energy Services Program, or any abbreviation thereof for any advertising, promotions, trade display or other commercial purposes, nor use their logos or any adaptation thereof, without the prior written consent of CSG or the Utilities.

3. Relationships of the Parties under the Mass Save Home Energy Services Program
    a. The status of CONTRACTOR under this Agreement shall be that of an independent contractor and not that of an agent or employee of CSG or of a Utility. CONTRACTOR and its officers, agents, employees, representatives and servants at all times during the term of this Agreement shall neither hold themselves out as, nor claim to be acting in the capacity of, officers, employees, agents, trustees or servants of CSG or any Utility nor make any claim, demand or application for any right or privilege applicable to a Utility.
    b. This Agreement is between CSG and CONTRACTOR only. This Agreement does not constitute a contract between CONTRACTOR and any Utility. CONTRACTOR agrees that it will seek payment or other recourse under this Agreement only from CSG but only to the extent of amounts CSG receives from the applicable Utility(ies) under the Mass Save Home Energy Services Program, or, with respect to the Customer Share (as defined herein) of any Installation Work, only from the Customer.
    c. All Work orders and Customer Contracts prepared by CONTRACTOR shall be in the forms and on terms provided by CSG. CONTRACTOR shall not vary, modify or amend such forms or terms without the express, advance written consent of CSG.
    d. CSG reserves the right to perform quality control on any or all Work performed, with or without notice to CONTRACTOR, by any means CSG may select, including but not limited to accompanying CONTRACTOR to a Customer's location. CONTRACTOR shall use

its best efforts to obtain a Customer's cooperation in allowing CSG access to the Customer's location for this purpose and shall do nothing to encourage or cause a Customer to impede or refuse such access.

4. Location of Work
    a. CONTRACTOR agrees to provide services, in accordance with the terms hereof, in the homes of Customers CSG identifies as eligible and as confirmed by CSG.

5. Use of CSG Software

    a. CSG will provide software, for the express purpose of data capture, tracking and reporting for Assessment Work performed pursuant to this Agreement. CONTRACTOR will execute a software licensing agreement with CSG in the form attached hereto as Attachment 3 *"Software License Agreement"* to govern the use of the supplied software. Unauthorized use of the supplied software is expressly prohibited.
    b. CSG will report activities to the Utilities based on input uploaded by CONTRACTOR. CONTRACTOR will not report directly to the Utilities.
    c. CONTRACTOR shall supply any and all computers, printers and other peripheral devices required to perform its services hereunder.
    d. CONTRACTOR shall install the CSG-supplied software on CONTRACTOR-supplied hardware. CSG will supply the software installer.

6. CONTRACTOR'S Standard of Care
    a. CONTRACTOR agrees to perform all Work hereunder in conformity with the standards of the Mass Save Home Energy Services Program as implemented by CSG.
    b. CONTRACTOR shall comply with the standards set forth in Attachment 4, *"Mass Save Home Energy Assessment Standards"* and with any and all specifications, manuals, training and product literature supplied from time to time by CSG. The *Mass Save Home Energy Assessment Standards* are subject to periodic revision by the Utilities; CSG shall inform CONTRACTOR in writing of any changes to these specifications with which the CONTRACTOR must be in compliance during performance of the WORK.
    c. CONTRACTOR shall comply with the standards set forth in Attachment 5, *"Mass Save Program Standard for Materials, Installation and Conduct for Energy Efficiency Measure Installation Contractors"* and with any and all specifications,

manuals, training and product literature supplied from time to time by CSG. The *Mass Save Program Standard for Materials, Installation and Conduct for Energy Efficiency Measure Installation Contractors* is subject to periodic revision by the Utilities; CSG shall inform CONTRACTOR in writing of any changes to these specifications with which the CONTRACTOR must be in compliance during performance of the WORK.

d. Before performing any Work, CONTRACTOR shall attend up to ten (10) days of training to be provided by CSG ("Initial Training"), which Initial Training shall be attended by a limited number of representatives of the CONTRACTOR who are expected to perform any of CONTRACTOR's obligations under this Agreement and/or who are responsible for the training and supervision of other employees of the CONTRCTOR. CSG will determine the number of HPC representatives to whom CSG will provide direct training. CONTRACTOR shall not receive compensation for required Initial Training.

e. CONTRACTOR shall be responsible for providing comparable training to all of its employees directly involved in performing services under this Agreement and is solely responsible for assuring its staff meets all terms of this Agreement in performance of the WORK. CONTRACTOR shall complete such training of its employees without additional compensation.

f. CONTRACTOR shall attend such further training as CSG may schedule with respect to new offerings or programs of the Utilities, without additional compensation.

g. CONTRACTOR will follow manufacturers' instructions where applicable. If CONTRACTOR becomes aware of any inconsistency between any such manufacturers' instructions and any specifications, manuals, training and product literature supplied by CSG, then CONTRACTOR shall promptly notify CSG thereof and shall await further instructions from CSG before proceeding with Work affected by the inconsistency.

h. CONTRACTOR will maintain high quality standards for the services provided under this Agreement. CONTRACTOR will promptly remedy any substandard Work reported by a Customer or identified by CSG. All Work performed for Customers under this Agreement shall be of good quality and shall be carried out in a Workmanlike manner, in complete conformity with any applicable requirements of any state, local or national code governing the Work or systems affected by the Work.

i. CONTRACTOR will keep a Customer's home as free as possible from waste materials while performing Work under this Agreement.

j. After completing any Work under this Agreement, CONTRACTOR will clean the Work area, removing all waste materials, tools and supplies.

k. CONTRACTOR will be careful not to cause damage to a Customer's premises.

l. CONTRACTOR agrees that CSG may, and CSG reserves the right to, perform quality control to confirm adherence to these standards. Failure of CONTRACTOR to meet quality standards will be grounds for termination.

7. Assignment, Scheduling and Completion of Work

a. CONTRACTOR will market the availability of Assessment Work in accordance with the Mass Save Home Energy Services Program and will forward to CSG such information as CSG may require in order to determine whether the Customer is eligible to receive Assessment Work. In this capacity, CONTRACTOR acts an independent source of referrals to CSG.

b. If CSG determines that a Customer referred by CONTRACTOR is eligible for Assessment Work, CSG will so inform CONTRACTOR and will assign a Site ID to the Customer.

c. CSG reserves the right, but has no obligation, to request CONTRACTOR to perform Assessment Work for Customers not referred by CONTRACTOR.

d. To the extent that CONTRACTOR undertakes to or does perform Assessment Work or Installation Work, whether as a result of CONTRACTOR referral or otherwise, CONTRACTOR shall comply with all administrative duties in connection therewith established by CSG, as the same may be modified by CSG from time to time.

e. CSG will transmit confirmed Customer eligibility electronically to CONTRACTOR.

f. A general description of the Home Energy Assessment (HEA) is set forth in Attachment 4. Further details of programmatic procedures will be provided during training. The Assessment description is subject to ongoing revision as dictated by the Utilities.

g. After completing the Assessment Work for a Customer, uploading the data collection, and identifying appropriate Immediate Saving Measures (each an "ISM") for that Customer, CONTRACTOR shall inform the Customer of his/her right to choose the contractor to perform installation of any ensuing Installation Work or other energy efficiency improvements recommended by the Mass Save Home Energy Services Program and eligible for Utility incentives.

h. A Customer Contract for Installation Work may not include, and until completion of any Installation Work for a Customer CONTRACTOR shall not solicit or enter into an agreement with a Customer or otherwise undertake or perform services or supply materials or equipment to a Customer that are outside the scope of the Mass Save Home Energy Services Program or for which CSG has not provided Unit Prices. After completion of Installation under a Customer Contract, any other goods or services for the Customer must be the subject of a separate agreement.

i. When CONTRACTOR believes all Installation Work under a Customer Contract is complete, CONTRACTOR shall submit to CSG a Certificate of Completion with all information supplied and signed by the Customer.

8. Pricing

a. CSG will pay CONTRACTOR one hundred fifty dollars ($150.00) for each satisfactorily and fully performed Assessment Work engagement performed under this Agreement.

b. Immediate Saving Measures that are installed piece rate by CONTRACTOR according to Program guidelines during an Assessment Work engagement shall be priced in accordance with Part 1 (*Immediate Saving Measures)* of Attachment 6, *"Schedule of Unit Prices"*

c. Installation Work under a Customer Contract shall be priced in accordance with the Unit Prices stated in Part 2 (*Schedule of NSTAR Unit Prices for Weatherization Measures & Schedule of National Grid Unit Prices for Weatherization Measures)* of Attachment 6, "*Schedule of Unit Prices"*.

d. CSG may modify the Schedule of Unit Prices, both as to the specific measures included thereon and the unit pricing thereon at any time, upon reasonable notice to CONTRACTOR. No products other than items on this list, or a replacement list issued by CSG, may be used without prior written approval by CSG.

e. CONTRACTOR will not knowingly use any defective, second quality or previously used materials.

f. No changes in the prices set forth in Attachment 6 may be made at any time while this Agreement is in force without the prior written consent of CSG.

g. The Unit Prices in Attachment 6 include all costs, labor, benefits, materials, equipment, transportation, storage, procurement, overhead, applicable federal, state and local sales, service and excise taxes, other expenses and profit associated with the Installation Work.

h. CONTRACTOR may obtain the materials from any source; provided, however, that CONTRACTOR shall not use, for Installation Work under this Agreement or any Customer Contract, materials for which CONTRACTOR's supplier has received or expects to receive a subsidy of any kind from a Utility. CONTRACTOR shall make such inquiry of its suppliers as may be necessary to determine whether the supplier has received or expects to receive such a subsidy.

9. Compensation

a. Each Customer Contract for Installation Work will identify as the "Utility Incentive Share" the amount or portion of the total price of the Customer Contract to be paid by CSG, and as the "Customer Share" the amount or portion of the total price of the Customer Contract to be paid by the Customer.

b. CONTRACTOR may require that Customer pay a deposit of no more than one-third (1/3) of the Customer Share of the total price at the time the Customer Contract is signed.

c. CONTRACTOR agrees to submit invoices to CSG on a monthly basis. CONTRACTOR may not invoice for a given ISM or Weatherization Measure unless and until the Installation Work associated with that ISM or Weatherization Measure is complete. All quantities for services rendered must match the uploaded data for services performed during the period covered by the invoice. The invoices must comply with all requirements of CSG with respect to the content, form, detail and supporting documentation, which shall include, at a minimum, each customer's name, address, site ID as assigned by CSG, date of the HEA and the type and quantity of all ISMs and/or Weatherization Measures installed.

d. CSG agrees to make payment of the approved Utility Incentive Share of the price of Customer Contracts under the terms of this Agreement within thirty (30) days of receipt of CONTRACTOR's complete and accurate invoice.

e. In the event that, after payment by CSG of any part of the Utility Incentive Share, CSG, the Utility, a court or an arbitrator (or panel of arbitrators) determines that any part of the Customer Contract price was not earned or must be rebated for any reason, CONTRACTOR shall rebate the unearned or rebated amount to CSG within ten (10) business days of receiving notice of the determination.

f. Interest shall accrue on amounts owed by either party more than sixty days past due at a rate equal to the prime rate then published by the Wall Street Journal.

g. CONTRACTOR shall invoice the Customer for the balance of the Customer Share of the contract price, less any deposit, only after CONTRACTOR has received a Certificate of Completion signed by the Customer.

h. Neither CSG nor any Utility shall have any liability for failure of a Customer to pay any invoice for the Customer Share. CONTRACTOR acknowledges that it alone bears the risk of non-payment by a Customer for the Customer Share.

10. Representations, Warranties and Covenants of CONTRACTOR

CONTRACTOR represents, warrants and agrees as follows:

a. It possesses the technical and professional expertise and the fiscal capability necessary to carry out any Work authorized under this Agreement in a prompt, fair and workmanlike manner.

b. CONTRACTOR has the capacity to conduct no less than 40 engagements for Assessment Work on average per each calendar month.

c. CONTRACTOR has made a good faith estimate that it will generate a sufficient number of eligible referrals needed to complete an average of _____ Assessment Work engagements per month during the term of this Agreement. CONTRACTOR shall not perform Assessments in excess of 120% of this estimated number, over the course of a 3-month period, without expressed approval of CSG.

d. It currently has in effect, and will keep in effect throughout the term of this Agreement, insurance in the forms and amounts and with insurance companies acceptable to CSG in no event less than the minimum insurance limits set forth below. CONTRACTOR shall not commence Work until a certificate evidencing such coverage has been furnished to CSG. The minimum insurance limits (where higher limits are not specified in the Contract) are: (a) Worker's Compensation insurance as required by the law of the state where the employment takes place; (b) Comprehensive General Liability for bodily injury, personal injury, property damage and contractual liability, $1,000,000 per occurrence/$2,000,000 in the aggregate; (c) Comprehensive Automobile Liability on all cars/trucks used by Subcontractor in connection with the Work in the amount of $1,000,000 combined single limit; (d) Professional Liability Insurance in the amount of $2,000,000 in the aggregate, if the Work requires any professional services by the CONTRACTOR.

e. Before commencing any Work CONTRACTOR shall provide CSG with an original Certificate of Insurance and a copy of an

endorsement for each policy other than workers compensation and professional liability, listing CSG and any appropriate Utility contracting with CSG as additional insureds on a primary, non-contributory basis. CONTRACTOR shall waive all rights of recovery against CSG, the Utility and any of their affiliates for any loss or damage covered by the policies. Evidence of this requirement shall be noted on all Certificates of Insurance provided to CSG and a Utility.

f. CONTRACTOR will, at CSG's discretion, maintain tail coverage for five years on all policies written on a 'claims made' basis.

g. Any contract of insurance providing the coverage required in this provision shall contain the following or equivalent clause: "No reduction, cancellation or expiration of the policy shall be effective until thirty (30) days from the date written notice thereof is actually received by the insured's named hereunder." Upon receipt of any notice of reduction, cancellation or expiration, CONTRACTOR shall immediately notify CSG.

h. CONTRACTOR and its employees performing supervisory services hold the licenses required of them as in Attachment 7, *"Credentials Requirements"* as the same may be revised by CSG from time to time.

i. CONTRACTOR has complied, at its own expense, with all licensing and other requirements imposed by federal, state, or local statue, ordinance, regulation, or code to provide the services it is required to provide under this Agreement.

j. CONTRACTOR shall pay required federal, state and local property, license, privilege, sales, use, excise, gross receipts, and other like taxes which may, now or thereafter, be applicable to the installation Work under this Agreement.

k. CONTRACTOR is entering into this Agreement in good faith, without fraud, and that it is supplying the materials and performing the Work provided for in this Agreement solely on its own behalf, without connection with, or obligation to, any undisclosed person or firm.

l. CONTRACTOR shall maintain written paper records of all Work performed and products installed under this Agreement for a minimum of (3) years from the time Work was performed, including, but not limited to records of data collected, visits made, materials furnished or installed, individual staff providing the services, costs incurred, invoices and agreements. Copies of these records shall be made available to CSG within five (5) business days, upon request.

m. Work at Customers' premises under this contract shall be in conformance with the requirements of all applicable laws,

ordinances, codes, regulations and provisions of this Agreement, and that all warranties from CSG to Customers, whether express or implied by law, shall be satisfied. CONTRACTOR shall obtain and pay for all necessary permits and licenses required by law, and shall abide by all applicable federal, state, and local laws, regulations, ordinances and codes. CONTRACTOR acknowledges that any inspection of its Work performed by or on behalf of CSG shall not relive CONTRACTOR of responsibility for its own Work and is not a substitute for inspection by a state or local government inspector.

n. CONTRACTOR shall guarantee any materials provided by the CONTRACTOR and installed pursuant to this Agreement against any defect in materials, manufacture, design or installation for a period of one year from the date the materials are provided and/or installed, whichever is later.

o. CONTRACTOR shall remedy any defects of a non-emergency nature promptly, and within fourteen (14) days, upon notice by the Customer or CSG, without charge to CSG or the Customer. CSG shall notify CONTRACTOR upon receipt of any complaints by a Customer for Work performed by CONTRACTOR and CONTRACTOR shall notify CSG whenever it receives from a Customer any request for correction of defective Work or materials.

p. CONTRACTOR shall remedy any defects of an emergency nature immediately. Examples of defects considered to be emergencies are those that include, but are not limited to: conditions that might impact occupant health or safety, those that would impact proper operation of any existing mechanical systems, etc.

q. CONTRACTOR shall staff each Customer Contract for Installation Work with a crew chief holding <u>one</u> of the certification pathways as described in Attachment 7. The crew chief must be at the job-site for the duration of the job. .

r. CONTRACTOR shall properly classify its workers as employees or independent contractors consistent with federal and state laws, including but not limited to Mass. General Laws ch. 149, Section 148B.

s. CONTRACTOR shall obtain and have its employees obtain, as applicable, all other training, certificates, authorizations and other credentials required by Attachment 7, as revised by CSG from time to time.

t. CONTRACTOR is, at the date of execution of this Agreement, in compliance with all applicable federal and state wage and benefit laws and regulations, and has not been cited by any governmental authority for violation of any such law or

regulation within five (5) years prior to such date. CONTRACTOR shall notify CSG in writing of any such citation received by CONTRACTOR during the term of this Agreement.

u. CONTRACTOR is, at the date of execution of this Agreement, in compliance with all applicable federal and state workplace safety laws and regulations and has not been cited by any governmental authority for violation of any such law or regulation within five (5) years prior to such date. CONTRACTOR shall notify CSG in writing of any such citation received by CONTRACTOR during the term of this Agreement.

v. CONTRACTOR shall be fully responsible for its own employees and subcontractors, including but not limited to direction, supervision, training, compensation, tax withholdings, benefits, insurance, classification and verification of work status.

w. CONTRACTOR shall give reasonable consideration to employing individuals who have received training in weatherization and other energy conservation skills in Massachusetts training programs.

11. Prohibited Conduct by CONTRACTOR

a. For "Work" completed by CONTRACTOR for customers that CONTRACTOR accepted as assigned to CONTRACTOR by CSG

i. CONTRACTOR shall not distribute homeowners' names and/or addresses to any other contractor, vendor, or any other organization or agency. Customer names and/or addresses may not be used for any advertising or other promotional purpose.

ii. CONTRACTOR shall not, while performing Work hereunder, perform or offer to perform for such Customer any Work or services not included within the scope of the Installation Work authorized hereunder, or furnish, directly or indirectly, to such Customer materials, literature or information not authorized by CSG (including but not limited to vendor-branded handouts and promotional materials).

b. For all "Work" completed

i. CONTRACTOR shall not charge a Customer directly for any services compensated for under this Agreement other than the Customer Share identified by CSG in the Customer Contract.

12. Termination

a. CSG may terminate this Agreement for any of the following reasons:

I. A breach of any provision of this Agreement by CONTRACTOR;

II. CSG's reasonable dissatisfaction with the quality of the materials and services provided by CONTRACTOR pursuant to this Agreement;

III. Failure of CONTRACTOR to complete over each rolling three-month period, a minimum of 80% of the average number of Assessment Work engagements projected in paragraph 10c;

IV. The receipt by CSG of Customer complaints which CSG believes to be warranted, regarding the failure of CONTRACTOR to keep appointments or lack of promptness in performing services

V. The discovery by CSG that any of the representations made by CONTRACTOR in this Agreement or in its proposal or Statement of Qualifications are false.

VI. Conduct of CONTRACTOR or its staff, which in CSG's sole reasonable judgment, is improper, offensive to Customers, discriminatory, dishonest or unlawful in any respect, including but not limited to any acts or omissions for which CONTRACTOR receives a citation, charge, assessment or other complaint by any governmental authority.

VII. Termination or substantial amendment of CSG's contract with a Utility which affects CSG's ability to perform under this Agreement

b. CONTRACTOR may terminate this Agreement by providing thirty (30) days written notice to CSG. All Work assigned or in progress shall be completed according to the terms of this Agreement, unless CSG elects to relieve CONTRACTOR of responsibility for incomplete Work.

c. In the event either party terminates this Agreement, payment for any partially completed Work authorized under this Agreement at the effective date of termination will be pro-rata. CSG reserves the right in such cases to assign to another contractor the responsibility for completion of any Work not completed by CONTRACTOR prior to the effective date of termination. CSG also reserves the right to make any termination notice effective only upon the completion by CONTRACTOR of Work begun prior to the termination notice. CSG shall be entitled to deduct the amount of any claims, damages and liabilities CSG may have against CONTRACTOR under this Agreement or

otherwise from unpaid amounts earned by CONTRACTOR at the time of termination. If the amount of CSG's claims, damages and liabilities against CONTRACTOR exceeds the unpaid amount earned, CONTRACTOR shall pay CSG the difference within thirty (30) days after the Agreement termination date.

d. Termination of this Agreement shall not relieve CONTRACTOR of any warranties or other obligations expressed herein which by their terms are intended to extend beyond termination.

13. Indemnification

a. To the fullest extent permitted by law, CONTRACTOR agrees to defend, indemnify and hold harmless CSG, any Utility or other agents, servants, employees and others acting in concert with them from and against any and all claims, damages, loss or expense (including attorney's fees) arising out of or resulting from the performance or non-performance, in whole or in part, of CONTRACTOR's Work, including, but not limited to, claims for injury (including death) to persons (including employees, agents or subcontractors of CONTRACTOR), and damage or loss to property, whether in contract or in tort, or based on strict liability, caused in whole or in part by any act or omission of CONTRACTOR or those employed by it, or working under those employed it at any level (regardless of whether or not caused in part by a party indemnified hereunder) which relates to or arises from: the CONTRACTOR's Work; the failure of CONTRACTOR to satisfy any term, condition or obligation under this Agreement, CONTRACTOR's failure to pay any and all federal or state payroll taxes or contributions for unemployment insurance, worker's compensation, pensions and retirement benefits; the negligence or willful or reckless misconduct of persons performing CONTRACTOR's Work; or the misuse or prohibited disclosure of information of CSG, the Utilities or Customers, including the economic loss suffered by any of them as a result of such disclosure.

b. With respect to claims against any person or entity indemnified under this paragraph by any employee of the CONTRACTOR, the CONTRACTOR's subcontractors, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this paragraph shall not be subject to any limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR, or the CONTRACTOR's subcontractors under workers' compensation acts, disabilities benefit acts or other employee benefits acts.

14. Compliance with Laws

a. This Agreement is subject to federal and state laws and regulations regarding nondiscrimination. As a material term of this contract, CONTRACTOR agrees to comply with all such applicable laws and regulations. The terms and provisions of the Equal Opportunity Clause, Sections 60-1.4, 250.4 and 741.4 of Chapter 60 of Title 41 of the Code of Federal Regulations, regarding "Nondiscrimination in Employment by Government Contractors and Subcontractors", are incorporated by reference and made a part of this Agreement. In addition, CONTRACTOR agrees to comply with the provisions of 29 C.P.R. Part 470. Upon request, the CONTRACTOR shall supply CSG with a certificate demonstrating compliance with the foregoing.

b. CONTRACTOR shall comply with all applicable provisions of and regulations under the Occupational Safety and Health Act of 1970, as amended, and all laws, rules and regulations applicable to the hiring of disabled veterans, veterans of the Vietnam era, Uniformed Services member and individuals with physical or mental disabilities.

15. Mechanics' Liens

a. CONTRACTOR shall keep each Customer's property free of liens and claims and shall defend, indemnify and hold CSG and any Customer harmless from all expenses and losses incurred as a result of liens or claims filed by subcontractors and vendors of subcontractors and others claiming by or through CONTRACTOR. If a lien or claim is filed by a vendor or subcontractor, CONTRACTOR shall cause such lien to be discharged or bonded off within forty-eight (48) hours of notice by CSG. If CONTRACTOR fails to do so, CSG may, without prejudice to any other remedies available at law, pay all sums necessary to obtain a release or discharge of such lien and deduct those sums, including costs, expenses, including reasonable attorney's fees, from amounts due or to become due CONTRACTOR.

16. Miscellaneous

a. This Agreement is made pursuant to and shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts without regard to rules governing conflicts of law. This Agreement is further subject to, and is intended to be in conformity with and governed by, all applicable federal, state, and local statues, regulations, ordinances, directives, orders and codes governing the provision of weatherization and other home energy performance materials.

b. This Agreement consist of a main document of (16) Pages and the following Attachments:

Attachment 1.	**Mass Save Home Energy Services Program Summary**
Attachment 2.	**Contractor Background Check Policies**
Attachment 3.	**Software License Agreement**
Attachment 4.	**Mass Save Home Energy Assessment Standards**
Attachment 5.	**Mass Save Program Standard for Materials, Installation, and Conduct for Energy Efficiency Measure Installation Contractors**
Attachment 6.	**Schedule of Unit Prices**
Attachment 7.	**Credentials Requirements**

c. These attachments are hereby incorporated into and made an integral part of this Agreement.

d. CONTRACTOR may not assign this Agreement or further subcontract its obligations under this Agreement without the express written consent of CSG; with the exception of use of eligible subcontractors to complete Installation Work as described in Section 16e.

e. CONTRACTOR shall be permitted to utilize subcontractors to complete Installation Work under the following conditions:
   i. Only Independent Installation Contractors (IICs) currently engaged with CSG and in good standing under an IIC Participation Agreement may be used by CONTRACTOR as a subcontractor to perform Installation Work.
   ii. CONTRACTOR must submit to CSG a list of IIC(s) that CONTRACTOR intends to utilize as a subcontractor(s). CSG will confirm in writing to CONTRACTOR those IIC(s) submitted that are eligible to be used as subcontractors to complete Installation Work. No Installation Work is to be completed by subcontractors until such eligibility has been confirmed.
   iii. CONTRACTOR must enter into a separate agreement with CONTRACTOR's eligible subcontractors. CONTRACTOR is solely and fully responsible for all Installation Work completed under this Agreement that is completed by CONTRACTOR's eligible subcontractors.

f. This Agreement supersedes any prior Agreement between parties and sets forth the entire agreement of the parties with respect to the subject matter hereof and may not be altered, changed, abridged or amended other than in writing signed by both parties hereto.

g. Failure of CSG to complain of any action or non-action on the part of CONTRACTOR, no matter how long the same may continue, shall never be considered a waiver of any of its rights hereunder. No waiver at any time or any of the provisions hereof by CSG shall be construed as a waiver of any of the other provisions hereof, or as a waiver at any subsequent time of the same provisions.

h. Should one of more phrases, clauses, sentences, or paragraphs of this Agreement be invalid, the remaining portions of this Agreement or any part thereof shall not be thereby affected, and this Agreement shall be construed as if such invalid portion or portions had not been inserted into this Agreement.

i. The individual parties signing this Agreement warrant and represent that they have the proper corporate or other authority to execute this Agreement.

j. The headings of this Agreement are used solely for convenience and are not to be used in construing or interpreting this Agreement.

IN WITNESS WHEREOF, the parties have executed this contract as of the date written below.

CONSERVATION SERVICES GROUP

BY:_____

DATE:_____

CONTRACTOR

BY:_____

DATE:_____

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Attachment 1

MASS SAVE HOME ENERGY SERVICES PROGRAM SUMMARY

The focus of the Mass Save® Home Energy Assessment is to deliver on-site services to residential customers and motivate the customers to implement recommended energy efficiency measures. A customer can receive the Home Energy Assessment (HEA) through a variety of mechanisms, including a direct referral by calling the general Mass Save Home Energy Services Program statewide toll free phone number, from a Program Administrator, Program Vendor, trade ally, and/or as a result of marketing.

The HEA includes an evaluation of relevant energy efficiency measures and renewable energy measures in the home. The service is fuel-neutral, meaning that end-uses are examined regardless of the fuel used. Specifically, during the HEA, a whole house approach is used to evaluate the residence. This includes a review of the building's HVAC and DHW systems, lighting, thermal building envelope and appliances. The HEA includes the elements of both the Screening and the Diagnostic Assessments as described in the Mass Save Home Energy Assessment Standards, Version 1.0, dated July 15, 2010 (Attachment 4) with the exception of blower door testing.

The objective of the Home Energy Assessment is that the customer has an opportunity to understand the impact of relevant energy efficiency measures and improvements that can be implemented in the home and is motivated to implement major measures. The Energy Specialist will offer Immediate Saving Measures ("ISM"s) and, Energy Efficiency Incentives to customers in conjunction with the Home Energy Assessment.

The program is designed for the resident to accompany the Energy Specialist in the examination of the building as appropriate so that explanations and education occur during the course of the visit. The customer is provided with a written report that includes a list of measures and available incentives. If needed, the Energy Specialist will provide the necessary paperwork to *process the incentives.*

The HPC will perform Home Energy Assessments according to the terms of the "*Mass Save Home Energy Services Program Home Performance Contractor Participation Agreement"* and the *"Mass Save Home Energy Assessment Standards."*

The resulting "Customer Agreement" is based on the weatherization measures the customer has chosen for implementation. It details the measures, quantities, Utility incentive share and customer share of the cost to perform the work. The Home Performance Contractor (HPC) collects 1/3 of the customer share as down payment upon execution of this agreement between the HPC and Customer. The HPC will perform Installation Work according to the terms of the "*Mass Save Home Energy Services Program Home Performance Contractor Participation Agreement"* and the "*Mass Save Program Standard for Materials, Installation, and Conduct for Energy Efficiency Measure Installation Contractors* (to be supplied by CSG).

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Attachment 2

CONTRACTOR BACKGROUND CHECK POLICIES

[in this Attachment "Contractor" refers to CSG; "subcontractor" refers to CONTRACTOR]

Addendum to CSG Subcontractor Contracts

Employee Background Checks

Subcontractors are required to ensure that their employees who are providing services to CSG successfully pass a Contractor Employee background check. These background checks are to be done by the Subcontractor, at the Subcontractor's expense, prior to that employee performing or continuing work for CSG, and a background check program should be administered on a continuous basis throughout the period of performance of services for CSG.

The Subcontractor is responsible for maintaining documentation regarding these background checks through the term of the agreement and for three years following the expiration or other termination of the agreement. The Subcontractor must certify in writing to CSG that these requirements for all employees performing Work under this agreement have been fulfilled prior to commencement of Work. Non-compliance of these requirements by the Subcontractor will result in the immediate termination of this agreement between CSG and the Subcontractor.

The Subcontractor shall be responsible for administering the background check program, such that the program satisfies the minimum requirements outlined below and are made in accordance with CSG's obligation to **National Grid and NSTAR Electric & Gas.** Additional information has been provided as to this Addendum providing National Grid and NSTAR's background check policy requirements. It is the Subcontractor's responsibility to maintain compliance with all applicable laws and regulations in conducting background checks and maintaining information relating thereto, including without limitation the Fair Credit Reporting Act and the Consumer Credit Reporting Reform Act of 1996.

Minimum Requirements

- **Identification Verification/Eligibility to Work in the Country**
- **Criminal History Background Checks**
- **Sex Offender Registry Search**
- **Residential Address Verification**
- **Employment History Verification**
- **Motor Vehicle Driving Record Check**
- **Employees Previously Terminated or Removal from CSG Work for Cause**
- **Drug Screening as outlined in the National Grid policy below, whether or not the Work of a particular assignment is being done for a National Grid Customer**

NSTAR Policy

Minimum Background Screening Requirements

1. Identification Verification/Eligibility to Work in the Country

Contractors performing services for NSTAR must be able to provide evidence to NSTAR or its agent that they have verified Contractor Employees' identities and that all Contractor Employees are legally eligible to work in the country where the work is to be performed. NSTAR requires that U.S. Contractors complete a Social Security trace and or a Consent Based Social Security Number Verification – CBSV on their Contractor Employees and match results of this check with other identification documents provided by their employees. This search reveals all names and addresses historically associated with the Contractor Employees provided number, along with the date and state of issue, and verifies if the number is currently valid and logical. This search may also reveal the use of multiple social security numbers, AKAs/aliases, and additional employment information that can then be used to determine the parameters of other aspects of the background investigation. Adverse action should not be taken based solely on this information and may require further verification with the Social Security Administration (SSA) or the Department of Homeland Security (DHS).

2. Criminal History Background Checks

Contractors shall ensure that all their employees performing work or providing services to NSTAR are subjected to a criminal history background check. Such checks shall be conducted on all names, including alias names that are provided or developed, and include County, State, and Federal checks based on jurisdictions of work and residence for the past 7 years, as well as international jurisdictions, if available. Checks must be performed on all current Contractor Employees and any new Contractor Employees hired or assigned to support the NSTAR contract. If the Contractor has had a pre-employment criminal history check process in place and can provide documented evidence that employees assigned to the NSTAR contract have been subjected to the criminal history check within the last 3 years, then additional checks are not necessary. Contractor Employees who work in certain sensitive areas that fall under regulatory requirements, i.e., NERC, are subject to additional criminal history checks. If required, this information is contained in the supplemental background check information above.

The following criteria will be used as guidance by NSTAR in making the determination of whether the Contractor Employee will be allowed to perform work specified in the contract between your company and NSTAR. These criteria should also be evaluated by the contractor prior to making a request to NSTAR for the Contractor Employee to be approved for assignment to the NSTAR contract:

☐Number of convictions
☐Nature, seriousness and date(s) of occurrence of the offense
☐Rehabilitation
☐Relevance of the crime committed in relationship to the work to be performed
☐Unreasonable risk posed to NSTAR property or to the safety of employees, other Contractors and/or customers

During the term of the contract if the Contractor becomes aware of information concerning a criminal conviction of a Contractor Employee that would fit the above

criteria for reporting to NSTAR, this information shall be forwarded to NSTAR's Security Department for determination whether the Contractor Employee should be allowed to continue working or providing services for NSTAR.

3. Sex Offender Registry Search

Most states maintain a sex offender database that is available as a source of public record. Individuals convicted of such crimes as sexual assault, aggravated criminal sexual conduct, luring or enticing, and kidnapping, or who have been found to be repetitive and compulsive by experts and the courts are required to register with their state authorities. Specific registration requirements are dictated by state laws and are based on dates of offense, sentence and/or release from custody. Consistent with the scope of the Criminal History Search, a search will be conducted in the applicant's provided and developed names, in the state(s) of the applicant's residence and place of work, if a statewide repository is maintained and accessible as public record.

4. Residential Address Verification

Contractors must perform a seven-year address verification on all **new** Contractor Employees hired to support the NSTAR contract. The purpose of this check is to confirm that the address exists and relates to a real property, and to establish that the individual permanently resides or previously resided at the address. Verifying the address given by a prospective employee is important because it confirms that other information provided is correct. An individual may wish to omit their current or former address to conceal adverse information, such as criminal convictions.

5. Employment History Verification

Contractors must perform a three-year prior employment history verification on all **new** Contractor Employees hired to support the NSTAR contract. The purpose of this check is important as it serves to check the accuracy of information provided by the applicant. This check may also reveal prior employment with NSTAR that should be further explored. An individual may wish to omit prior employment history to conceal adverse information, such as criminal convictions.

6. Motor Vehicle Driving Record Check

All Contractor Employees who are required to operate a motor vehicle in conjunction with their contract with NSTAR must be legally licensed and hold a valid driver's license appropriate to the vehicle being driven. This requirement applies to both Contractor-owned or leased vehicles and NSTAR-owned/leased vehicles. A motor vehicle driving record check to include a commercial driver license search, when applicable, must be conducted by the Contractor annually in order to validate this requirement.

7. Employees Previously Terminated or Removal from NSTAR Work for Cause

NSTAR will not permit Contractor Employees who were previously employed by NSTAR and were terminated by NSTAR for cause, or Contractor Employees who were previously removed form working on any contract for NSTAR to work for NSTAR.

8. NSTAR's Right to Revise Requirements for Contractor Background Checks

NSTAR reserves the right to revise its requirements for Contractor Employee background checks during the contract term, which the Contractor must comply with. Any such revisions will be provided in writing.

NATIONAL GRID POLICY

National Grid Requirements for Contractor Employee Background Checks (For National Grid Level 2 Baseline & Supplemental Requirements)

1. Definition of "Contractor" and "Contractor Employees"

The entity or entities engaged or to be engaged under this contract to perform services for National Grid are alluded to throughout this document as "Contractor." The individuals who will perform work for National Grid under this contract, including employees, principals, sole proprietors, or contingent staff provided by the Contractor, are referred to as "Contractor Employees."

2. Minimum Requirements

National Grid's requirements for Contractor Employee background checks as defined below represent minimum requirements. Additional requirements may be deemed appropriate by National Grid or the Contractor or may be required by law, regulation, or other bodies having jurisdiction over the work or the Contractor. The Contractor must comply with any such additional requirements as are known or should reasonably be known by it.

To the extent the Contractor finds that the background check requirements are in conflict with State or Federal statutes, collective bargaining agreements, or other issues that would prohibit compliance, the Contractor should notify their Procurement Department representative for guidance and resolution.

3. Contractor Submittals

Contractor must complete and submit the attached "Contractor Information Sheet and Compliance Statement for Employee Background Check Requirements" to National Grid.

4. Requirements for Background Checks to be Completed Prior to Performing Work

Background checks as defined below must be completed before any Contractor Employee begins work under the contract, whether brought on at the outset of a contract or at any other point in the contract term. Only with the written approval of a National Grid Manager may a Contractor Employee begin work in advance of background checks being completed, and any such allowance shall not extend beyond 14 calendar days.

5. Identification Verification/Eligibility to Work in the Country:

Contractors performing services for National Grid must be able to evidence to National Grid or its agent that they have verified Contractor Employees' identities and that all Contractor Employees are legally eligible to work in the country where the work is to be performed. National Grid requires that U.S. Contractors

complete a Social Security trace on their Contractor Employees and match results of this check with other identification documents provided by their employees. This search reveals all names and addresses historically associated with the Contractor Employees' provided number, along with the date and state of issue, and verifies if the number is currently valid and logical. This search may also reveal the use of multiple social security numbers, AKAs/aliases, and additional employment information that can then be used to determine the parameters of other aspects of the background investigation. Adverse action should not be taken based solely on this information. The applicant's social security number can be verified through the Social Security Administration at 1-800-772-1213 after the applicant has been hired. Please note, you will be required to provide your company's Federal Tax Identification Number to access this information.

6. Criminal History Background Checks

Contractors shall ensure that all of their employees performing work or providing services to National Grid are subjected to a criminal history background check. Such checks shall be conducted on all names, including alias names that are provided or developed, and include County, State, and Federal checks based on jurisdictions of work and residence for the past 7 years, as well as international jurisdictions, if available. All checks must include both misdemeanors and felonies. Checks must be performed on all new Contractor Employees hired to support the National Grid contract. If the Contractor has had a pre-employment criminal history check process in place and can provide documented evidence that employees assigned to the National Grid contract have been subjected to the criminal history check, then additional checks are not necessary. Contractor Employees who work in certain sensitive areas that fall under regulatory requirements, i.e., NERC, are subject to additional criminal history checks. If required, this information will be contained in the supplemental background check information contained in Section 9 of this document.

If the results of criminal history background checks or any other source of information in the Contractor's possession reveal a Contractor Employee to have a misdemeanor conviction within the previous five years or a felony conviction, and the Contractor desires to have the employee perform work for National Grid, the Contractor must submit this information in writing to National Grid's Security Department. National Grid's Security Department, in collaboration with the User Department, Legal and Human Resources, will determine if the Contractor Employee will be allowed to perform work for National Grid and will notify the Contractor in writing of its determination.

The following criteria will be considered and used as guidance during the evaluation process:

- Number of convictions
- Nature, seriousness and date(s) of occurrence of the offense
- Rehabilitation
- Relevance of the crime committed in relationship to the work to be performed
- Unreasonable risk posed to National Grid property or to the safety of employees, other Contractors, and/or customers

During the term of the contract if the Contractor becomes aware of information concerning a criminal conviction of a Contractor Employee that would fit the above criteria for reporting to National Grid, this information shall be forwarded to National Grid's Security Department for determination whether the Contractor Employee should be allowed to continue working or providing services for National Grid.

7. Drug Screening

Contractor must be able to evidence that all new Contractor Employees hired to support this contract have been subjected to five-panel drug screening for the drugs listed below. Any Contractor Employee with positive indication for the presence of any of these drugs that cannot be substantiated to be related to prescribed medical treatment shall not be allowed to perform work for National Grid.

1) Amphetamines
2) Cocaine Metabolites
3) Marijuana Metabolites (THC)
4) Opiates / Metabolites
5) Phencyclidine (PCP)

With regard to Contract Employees in place prior to this contract, pre-employment drug screen checks will suffice for compliance with this drug screening requirement, as long as Contractor can provide documented evidence upon request that all employees assigned to the National Grid contract were subjected to this drug screening. In the event pre-employment drug screening was not in place at the time the employee was hired, and cannot now be legally imposed due to state statutes, union contracts, etc., National Grid may consider an exception for Contractor Employees based on work references provided by the Contractor.

8. Residential Address Verification

Contractors must perform a five-year address verification on all new Contractor Employees hired to support the National Grid contract. The purpose of this check is to confirm that the address exists and relates to a real property, and to establish that the individual permanently resides or previously resided at the address. Verifying the address given by a prospective employee is important because it confirms that other information provided is correct. An individual may wish to omit their current or former address to conceal adverse information, such as criminal convictions.

9. Employment History Verification

Contractors must perform a three-year prior employment history verification on all new Contractor Employees hired to support the National Grid contract. The purpose of this check is important as it serves to check the accuracy of

information provided by the applicant. This check may also reveal prior employment with National Grid that should be further explored (see section 11 below). An individual may wish to omit prior employment history to conceal adverse information, such as criminal convictions.

10.Motor Vehicle Operation

All Contractor Employees who are required to operate a motor vehicle in conjunction with their contract with National Grid must be legally licensed and hold a valid driver's license appropriate to the vehicle being driven. This requirement applies to both Contractor-owned or leased vehicles and National Grid-owned/leased vehicles. A motor vehicle driving record check to include a commercial driver license search, when applicable, must be conducted by the Contractor annually in order to validate this requirement.

11.Employees Previously Terminated or Removed from National Grid Work for Cause

National Grid will not permit Contractor Employees who were previously employed by National Grid and were terminated by National Grid for cause, or Contractor Employees who were previously removed from working on any contract for National Grid to work for National Grid.

12.Supplemental Background Check Information

Due to the nature of the work to be performed by the Contractor, National Grid requires that the background check include the following information, if checked. Contractor Employees with adverse findings will not be allowed to perform work for National Grid.

- Education/verification of degrees
- Validation of required licenses (professional and/or legally required)
- Credit history
- Employment history
- Global screening of offshore international/foreign national Contractors
- Homeland Security checks
- Criminal History updates every 7 years

13.Subcontracted Service Providers

Consistent with National Grid contract terms and conditions, Contractor will impose these background check requirements on any of its subcontracted service providers whose engagements will extend beyond 14 days and will provide evidence of this upon request by National Grid or its agent. Service providers include, but are not limited to:

- Contractors
- Consultants

• Staffing Agencies (employees and contingent workers assigned to National Grid Work)
• Professional Services Firms

Excluded from applicability are firms that provide solely delivery or removal services such as:
• Equipment, materials, or office supply manufacturers and distributors
• Delivery companies
• Waste or recyclables haulers

14. Removal of Contractor Employees from Work

If it is determined at any time that a Contractor Employee does not meet the background qualifications or has falsified a document that is or was part of the background check, Contractor shall notify National Grid Security immediately. National Grid Security will determine if the Contractor Employee must be removed from the work and will notify Contractor in writing of its determination. Contractor Appeals Process in Support of a Failed Contractor Employee. Should a Contractor desire to utilize an employee for work in support of National Grid despite adverse findings with any of the background checks performed, Contractor must submit a request in writing to National Grid's Security Department. Following receipt of such information, representatives from National Grid's Security, User, Legal and Human Resources Departments will evaluate the background check information and make a determination whether the Contractor Employee should be allowed to perform work for National Grid. National Grid will issue its determination in writing, which the Contractor should retain for the duration of the contract.

15. Retention and Access to Contractor Records

Contractor must maintain a record of all background checks and correspondence with National Grid regarding background checks performed during the term of the contract and shall make all records and correspondence available to National Grid or its agent upon reasonable notice. National Grid will perform audits of Contractor's background check records, background check program and all supporting documents concerning the background of any Contractor Employee performing work for National Grid. National Grid's direct costs and the cost for any contracted audit services will be at the expense of National Grid.

16. National Grid's Right to Revise Requirements for Contractor Background Checks

National Grid reserves the right to revise its requirements for Contractor Employee background checks during the contract term, which the Contractor must comply with. Any such revisions will be provided in writing.

17.National Grid Security Department Contact Information:

All inquiries and submittals to National Grid's Security Department or IT Security Department as required in this document should be directed as appropriate to:

All mail inquiries and submittals		Emails or Phone calls should be directed to:
Security	National Grid Director of Security 300 Erie Blvd Syracuse, NY 13202	Mr. Howard Allen Email: Howard.Allen@us.ngrid.com Telephone: 315-428-5129
IT Security	National Grid Manager IT Enterprise Security 25 Research Drive Westborough, MA 01582	Mr. Brian Betterton Email: Brian.Betterton@us.ngrid.com Telephone: 508-389-3190

Attachment 3
SOFTWARE LICENSE AGREEMENT

Software Licensing Agreement

This Software Licensing Agreement (the "**Software Licensing Agreement**") is made as of June___, 2011 (the "**Effective Date**"), by and between Conservation Services Group, a not-for-profit corporation with offices at 40 Washington Street, Westborough, MA 01581 ("**CSG**") and Contractor ("**Contractor**"), a corporation with offices at _____.

Recitals

WHEREAS, CSG has developed the EnergyMeasure Home Software (as defined below) to assist in the analysis of the energy efficiency of various structures and various backend operations surrounding energy efficiency including, but not limited to, recording utility data, marketing information, call center management, scheduling services, work order processing and efficiency savings calculations;

WHEREAS, Contractor provides professional services including, but not limited to, in-home energy assessments;

WHEREAS, CSG wishes to engage Contractor to provide in-home assessments and, in connection with such engagement, is willing to provide Contractor with a license to the RHA Software, all on the terms and conditions set out below; and

WHEREAS, CONTRACTOR wishes to license the EM Home Software from CSG, and CSG is willing to grant said license, all on the terms and conditions set out below; and

NOW, THEREFORE, for good and sufficient consideration, the Parties agree as follows:

Software Licensing Agreement

1. Definitions. For purposes of this Software Licensing Agreement, the following capitalized terms shall have the meanings set forth below. Other capitalized terms are defined in context. All other capitalized terms not defined in the Software Licensing Agreement will have the same meaning set forth in the Master Service Agreement.

1.1. Collected Data. The term "**Collected Data**" means the data or information collected by CONTRACTOR or CSG for purposes of this Software Licensing Agreement and subsequently provided to CSG via the EM Home Software including, but not limited to, Personally Identifiable Customer Information.

1.2. Confidential Information. The term "**Confidential Information**" has the meaning set out in the Subcontractor Agreement.

1.3. CSG Materials. The term "**CSG Materials**" means, collectively, the: (i) EM Home Software; (ii) Documentation; (iii) EM Home Reports—Intangible Rights; and (iv) Updates.

1.4. Customer. The term "**Customer"** means a customer of CONTRACTOR.

1.5. Deliverable. The term "**Deliverable**" means any software, code or other materials or services that CSG makes, or causes to be made, for CONTRACTOR pursuant to a Scope of Work, including the EM Home Reports, related specifications; and as based, in part or in whole, on input provided by CONTRACTOR. The term "Deliverable" expressly excludes CSG Materials.

1.6. Documentation. The term "**Documentation**" means: (i) all user manuals and training materials; (ii) product descriptions and specifications (including performance standards);

and (iii) white papers, technical manuals and supporting materials, whether provided in print or via electronic media, and which relate to the EM Home Software.

1.7. **Effective Date**. The term "**Effective Date**" has the meaning set out in the introduction to the Recitals.

1.8. **EM Home Reports—Intangible Rights**. The term "**EM Home Reports—Intangible Rights**" means all Intellectual Property Rights associated with the EM Home Reports including, but not limited to, all copyright interests.

1.9. **EM Home Reports**. The term "**EM Home Reports**" means those tangible reports generated by the EM Home Software based on the provided Collected Data. The term EM Home Reports expressly excludes CSG Materials and all Intellectual Property Rights behind the EM Home Reports.

1.10. **EM Home User Account**. The term "**EM Home User Account**" has the meaning set out in Section 2 (Delivery).

1.11. **EnergyMeasure Home Software**. The term "**EnergyMeasure Home Software**" or "**EM Home Software**" means the home analyzer software application owned by CSG, in Object Code, including any Updates, and as described in the Documentation.

1.12. **Fees**. The term "**Fees**" means, collectively, the: (i) EM Home License Fee; and (ii) Home Inspection Fee. No fees will be assessed for any Updates or maintenance provided hereunder.

1.13. **Intellectual Property Rights**. The term "**Intellectual Property Rights**" means any rights (whether owned by or licensed to a Party) under patent law, copyright law, data and database protection law, trade secret law, and any and all similar proprietary rights.

1.14. **Object Code**. The term "**Object Code**" means the machine readable code produced by a compiler. By way of clarification, and not limitation, the term "Object Code" means the source code transformed by compiler into a low-level language so that a machine can properly read and execute the code's underlying instructions.

1.15. **Party** or **Parties**. The term "**Party**" or "**Parties**" means: (i) CSG; (ii) CONTRACTOR; or (iii) CSG and CONTRACTOR, as the context permits.

1.16. **Personally Identifiable Customer Information**. The term "**Personally Identifiable Customer Information**" has the meaning set out inthe section entitled "Confidentiality" of the Subcontractor Agreement.

1.17. **Source Code**. The term "**Source Code**" means the computer programs, instructions and related material written in a human-readable source language in a form capable of serving as the input to a compiler or assembler program, and in a form capable of being modified, supported and enhanced by programmers familiar with the source language. By way of clarification, and not limitation, the term "Source Code" means the preferred form of the code for making modifications to it, including all modules it contains, plus any associated interface definition files, and scripts used to control compilation and installation of an executable. Unless otherwise agreed in writing, Source Code shall contain reasonable programmers' comments.

1.18. **Term**. The term "**Term**" has the meaning provided in Section 9 (Term).

1.19. **Updates**. The term "**Updates**" means bug fixes, patches, improvements, new versions, new releases, or other revisions to or modifications of the EM Home Software that CSG makes generally available to other users of the EM Home Software. CSG hereby agrees that such Updates will be provided without cost to CONTRACTOR.

2. **Delivery**. Throughout the Term, CSG shall make the EM Home Software available as set forth in Schedule 2 (the "**CSG Requirements**"), and shall make available a specific number of user accounts, each with a unique password, and as the same may be requested by CONTRACTOR from time to time (each, an "**EM Home User Account**"). CSG shall provide each requested EM Home User Account within a reasonable time of its receipt of a request by CONTRACTOR. CONTRACTOR may request additional EM Home User Accounts throughout the Term. CONTRACTOR acknowledges and agrees that delivery and acceptance of the EM Home Software has occurred once the EM Home Software has been made available to CONTRACTOR.

3. **Ownership**.

3.1. **CSG Ownership of CSG Materials**. The CSG Materials are licensed, not sold, to CONTRACTOR. CONTRACTOR acknowledges and agrees that, as between the Parties and subject to the grant of rights to CONTRACTOR set out in Section 4 (Non-Exclusive Grant of Rights to CONTRACTOR), CSG is the sole and exclusive owner of all of the right, title and interest in and to the CSG Materials, and in and to all Intellectual Property Rights associated with the CSG Materials. The Parties acknowledge and agree that: (i) in no event will any Deliverables be considered CSG Materials or will any CSG Materials be considered Deliverables; and (ii) the inclusion of Collected Data in an EM Home Report shall not be construed as giving any ownership interest to CSG in the Collected Data. By way of clarification, and not limitation, CONTRACTOR owns all Collected Data to the extent it is incorporated into an EM Home Report.

3.2. **CONTRACTOR Ownership of Tangible Copies of EM Home Reports; Rights**. The Parties acknowledge and agree that CONTRACTOR owns the tangible copies of each EM Home Report and that CONTRACTOR has the full right to copy, distribute, and display the tangible copies of the EM Home Reports; provided that CSG retains all Intellectual Property Rights in the EM Home Reports—Intangible Rights including, but not limited to, copyright interests.

4. **Non-Exclusive Grant of Rights to CONTRACTOR**.

4.1. **Non-Exclusive Grant of Rights to CONTRACTOR in EM Home Software**. CSG, during the Term and under its Intellectual Property Rights, hereby grants to CONTRACTOR a limited, non-exclusive, royalty bearing, non-sublicensable license to access one (1) copy of the EM Home Software per EM Home User Account in Object Code on a computer owned, leased or otherwise controlled by CONTRACTOR and to permit its employees with a unique EM Home User Account to: (i) access and use the EM Home Software for its internal business purposes only, including creating EM Home Reports; and (ii) as otherwise allowed in accordance with the Documentation or the EM Home Software's functionality.

4.2. **Non-Exclusive Grant of Rights to CONTRACTOR in Documentation**. CSG, during the Term and under its Intellectual Property Rights, hereby grants to CONTRACTOR a limited, non-exclusive, non-sublicensable license to use, copy, modify, perform, display, distribute and adapt the Documentation, but solely for its internal business purposes.

4.3. **Restrictions**. CONTRACTOR represents and warrants that it shall comply with the restrictions set out in this Section 4.3 (Restrictions) throughout the Term.

4.3.1. **Copying, Distribution and Use**. CONTRACTOR shall not use or otherwise exploit the CSG Materials, except as set out in this Section 4 (Non-Exclusive Grant of Rights to CONTRACTOR). CONTRACTOR shall not sell, rent, lease, sublicense or redistribute the EM Home Software or the supplied EM Home User Accounts, or permit others to install or directly or indirectly access or use the EM Home Software, its functionality, or EM Home User Account(s).

4.3.2. **Proprietary Notices**. CONTRACTOR shall not alter or remove any copyright, trademark, patent, or other protective notices contained in or on the CSG Materials or the EM Home Reports.

4.3.3. **Competitive Use**. CONTRACTOR shall not provide competitors of CSG with access to the CSG Materials or EM Home Reports, or otherwise use the CSG Materials or EM Home Reports in a manner that it knows or could reasonably be construed as competing with CSG's business, but is permitted to use the EM Home Reports to comply with any requirements of the Arizona Corporation Commission, which may include filing reports in a public forum.

4.3.4. **Reverse Engineering, Decompilation and Disassembly**. CONTRACTOR shall not reverse engineer, decompile, or disassemble the EM Home Software or otherwise attempt to derive any related Source Code.

4.3.5. **Modifications and Derivative Works**. CONTRACTOR shall not modify or create derivative works of the CSG Materials.

4.3.6. **Use of Prior Versions**. CONTRACTOR shall not continue to use prior versions of the EM Home Software after it has installed an Update that wholly replaces the EM Home Software.

4.3.7. **User Accounts**. The EM Home User Accounts are intended solely for CONTRACTOR's use. CONTRACTOR is solely responsible for maintaining the confidentiality and security of the EM Home User Accounts. CONTRACTOR is solely responsible and liable for any and all use of the EM Home User Accounts provided pursuant to this Software Licensing Agreement and for activities that occur on or through the EM Home User Accounts. CONTRACTOR agrees to notify CSG immediately about any unauthorized access to, or use of, EM Home User Accounts. The EM Home Software contains technological measures designed to prevent its unlicensed or illegal use. CONTRACTOR agrees that CSG may use such measures in CSG's discretion if CSG reasonably believes that such measures are necessary to prevent such unlicensed or illegal use and will notify CONTRACTOR in writing with detail describing the particular measure prior to implementing such measure.

4.3.8. **Use of Third Party EM Home Software**. CONTRACTOR shall not use third party software applications specifically developed for use with the EM Home Software besides those provided to CONTRACTOR by, or at the direction of, CSG.

5. **No Implied Licenses**. Any license granted under this Software Licensing Agreement must be expressly provided herein, and there shall be no licenses or rights implied pursuant to this Software Licensing Agreement, based on any course of conduct, or other construction or interpretation thereof. All rights and licenses not expressly granted are reserved.

6. **Term and Termination**. This Software Licensing Agreement shall come into force and effect on the Effective Date and, subject to earlier termination pursuant to the Subcontractor Agreement,

shall automatically expire and be of no further force and effect upon the termination or expiration of the Master Service Agreement (the "**Term**"). Notwithstanding anything to the contrary in this Software Licensing Agreement, a material breach or termination of this Software Licensing Agreement by either Party shall be deemed a material breach or termination (as applicable) of the Subcontractor Agreement. By way of clarifying example, and not limitation, a termination of this Software Licensing Agreement shall automatically terminate the Subcontractor Agreement.

7. **Survival**. The following Sections shall survive any termination or expiration of this Software Licensing Agreement:

Section 3 (Ownership)
Section 6 (Term and Termination)
Section 8 (Incorporation by Reference; Order of Precedence)

8. **Incorporation by Reference**. The terms and conditions contained in the Master Service Agreement are expressly incorporated herein by reference.

IN WITNESS WHEREOF, the Parties hereto have caused this Software Licensing Agreement to be executed by their respective duly authorized representatives as of the Effective Date.

Conservation Services Group, Inc.	**Subcontractor**
By:_____	By:_____
Name:_____	Name:_____
Title: _____	Title: _____

Attachment 4

MASS SAVE HOME ENERGY ASSESSMENT STANDARDS

Mass Save Home Energy Assessment Standards

Version 1.0

July 15, 2010

By:
National Grid
NSTAR Electric & Gas
Western Massachusetts Electric
Cape Light Compact
Bay State Gas
Berkshire Gas
New England Gas
UNITIL

TABLE OF CONTENTS

1.0 Program Overview

1.1 General Overview

1.1.1 Service Description

The focus of the Mass Save® Home Energy Assessment is to deliver on-site services to residential customers and motivate the customers to implement recommended energy efficiency and renewable energy measures.

A customer can receive the Home Energy Assessment through a variety of mechanisms, including a direct referral by calling the general Mass Save phone number, from a Program Administrator, Program Vendor, trade ally, and/or as a result of marketing.

The Home Energy Assessment will include an evaluation of relevant energy efficiency measures and renewable energy measures in the home. The service is fuel-neutral, meaning that end-uses are examined regardless of the fuel used. Specifically, during the HEA, a whole house approach substantially based on the Home Performance with ENERGY STAR® model (HPwES) is used to evaluate the residence which will include a review of the building's heating, HVAC and DHW systems, lighting, thermal building envelope and appliances.

At this time, the Program Administrators require that approved Home Energy Assessment Vendors use an appropriate Home Energy Assessment software tool. Home Energy Assessments based on HPwES "whole-house" model or a rigorous equivalent can qualify. The Program Administrators will consider modifying the Home Energy Assessment software requirements from time to time in consultation with the DOER as needed. The technical session will identify alternative options for reaching technical analysis objectives through alternative software or non-software based analysis techniques.

The objective of the Home Energy Assessment is that the customer has an opportunity to understand the impact of relevant energy efficiency measures and improvements that can be implemented in the home and is motivated to implement major measures. The Energy Specialist will offer Instant Savings Measure (ISM) incentives, Energy Efficiency Incentives, and Renewable Energy Incentives to customers in conjunction with the Home Energy Assessment.

The program is designed for the resident to accompany the Energy Specialist in the examination of the building as appropriate so that explanations and education occur during the course of the visit. The customer is provided with a written report or agreement for work that describes the efficiency of the building and lists measures and available incentives based on order of priority. If needed, the Energy Specialist will provide the necessary paperwork to process the incentives.

1.1.2 Personnel Qualifications

Energy Specialists must be properly trained and certified to perform a comprehensive assessment of the home. All staff will need to receive ongoing training to update their skills and knowledge of evolving and new program elements as well as sales and presentation skills.

- **Training/Certification**

  Staff and contractor training are vital to operating a technically rigorous and effective statewide energy conservation program.

  The training/certification objectives for the program will consist of the following:
  - Annual Statewide Training
  - Continuous staff training by vendors

- Building Performance Institute (BPI) certification
- On-site training for contractors
- Web resources

- **Annual Statewide Training**

With the goal of maximizing statewide program standardization, the Mass Save program will work toward coordinating annual statewide trainings. In order to maximize the effectiveness of rate-payer funding, the program will make every effort to leverage existing building science and energy efficiency trainings, such as those sponsored by the GasNetworks and Affordable Comfort, Inc. (ACI).

Trainings may be geared towards Mass Save vendors, Energy Specialists and/or contractors, depending on the program's training needs identified by the subcommittee. Training will be provided, as needed, to support any new measures added to the program.
An RCS Training Outline will be developed and updated annually, or as needed.

- **Staff Training by Vendors**

It is recognized that the bulk of the training for Energy Specialists and CSR is currently and will continue to be delivered by program vendors, as required by their contracts with program administrators. Program Administrators are responsible for notifying DOER of any new program administrator approved equivalent RCS training. The Mass Save program will have consistent baseline standards and/or certification levels to ensure that RCS home Energy Specialists are providing a comprehensive whole house approach, and those utility customers, regardless of where they reside in the Commonwealth, are receiving consistent information and service.

- **Building Performance Institute (BPI) certification**

In the interest of supporting a 'whole house' building science approach to home energy assessing and analysis, the program will require all home Energy Specialists to achieve Building Analyst BPI certification.

- **Program Structure and Specifications**

The Mass Save home energy assessment may involve two visits, the screening visit and the diagnostic visit. The screening visit is available to any customer eligible to participate in the program and is a visit focused on determining if the house is a good candidate for weatherization, providing information about program incentives, and installing Immediate Savings Measures (ISM's). The diagnostic visit is performed only for homes that need weatherization work performed and focuses on writing specifications for the weatherization work and presenting these to the customer. Air sealing may be performed at the diagnostic visit by Air Sealing Technicians. A comprehensive visit may be scheduled at the original intake when the customer service representative determines that there is reasonable opportunity for weatherization work, customer commitment, and a lack of roadblocks. A comprehensive visit includes all activities from both the screening visit and the diagnostic visit.

The Mass Save program provides a fuel-blind assessment of a home and possible improvements including air sealing, insulation, lights and appliances, water heating, and heating system upgrades.

Prior to receiving a home energy assessment, customers will have spoken to a Mass Save Customer Service Representative (CSR) associated with the appropriate utility company. This CSR will ask the customer a series of questions intended to ensure that the customer is eligible for the home energy assessment. However, it is still important for the Energy Specialist to be aware of the following concerns:

- 5+ Family Residences

The Mass Save RCS program only covers 1-4 family residences. If the Energy Specialist finds him/herself at a building with 5 or more units, the Energy Specialist should immediately call the CSR and confirm the customer's eligibility.

- Low Income Customers

The Mass Save RCS program is not intended for low income customers. There is a network of weatherization agencies that serve these customers, often providing free energy efficiency improvements. Low income eligible customers need to understand that by receiving Mass Save RCS incentives they are forfeiting their eligibility for free weatherization services.

- Correct Program Administrator

The Mass Save RCS program is funded by program administrators such as electric and gas utility companies. These companies only pay for home energy assessments that are for their customers. The Energy Specialist needs to verify that the customer is a customer of the utility company paying for the home energy assessment. If there are any concerns, contact the appropriate CSR before proceeding with the home energy assessment.

1.2 Screening Visit Overview

The Screening Visit is a whole-house assessment of potential energy improvements and a thorough determination of any "roadblocks" preventing weatherization work from proceeding. It is the Energy Specialist's responsibility to install compact fluorescent light bulbs (CFL's) and other qualified energy saving materials as well as to specify air sealing work. The outcome of the screening visit should result in either a clear indication of what roadblocks exist and information for clearing them or scheduling a diagnostic visit and/or no-cost air sealing appointment.

1.3 Diagnostic Visit Overview

After completion of a screening visit, eligible customers who need insulation work, have interest in pursuing that work, and have no roadblocks preventing such work from occurring should receive a diagnostic visit. The goal of the diagnostic visit is to use diagnostic tools to determine opportunities for improving insulation performance and to then present a proposal for services to the customer with encouraging presentation. When scheduling allows and when appropriate, air sealing may occur simultaneously during this visit.

1.4 Comprehensive Visit Overview

If requested by the customer or deemed appropriate, a comprehensive visit may be performed in the place of a screening and diagnostic visit. At this visit all the aspects of a screening visit combined with a diagnostic visit will be performed.

2.0 Screening Visit Specifics

2.1 Customer Interview

During the initial customer interview, important information must be gathered about the residence. This information must include:

- Demographic Information
- Utility account numbers
- Historical fuel use
- Number of occupants

During the customer interview the Energy Specialist will explain to the customer the steps included in the screening visit and the approximate time it will take to complete those steps during the initial visit. The Energy Specialist will also ask the customer what their specific concerns are for receiving the energy assessment and will be sure to address those concerns during the course of the screening visit.

2.2 Refrigerator Assessment

Homeowners who have qualifying refrigerators may be eligible to receive a rebate for purchasing a qualified Energy Star refrigerator and replacing the old inefficient one. Energy Specialists shall determine the existing age, make, and model number for all refrigerators located within the house to determine if they meet the qualifying regulations to warrant replacement. If metering the refrigerator, the minimum metering time is 30 minutes, but the longer the reading, the more accurate it will be. If the refrigerator does qualify, provide a rebate form to the homeowner from the appropriate utility sponsoring the rebate for that particular home. Refrigerators manufactured after 1995 do not need to be assessed. There is a maximum of 2 rebates per Mass Save participating electric utility residential electric account.

2.3 Combustion Safety Testing

A house must successfully pass combustion safety tests prior to installing weatherization measures in the home. It is the intent that this testing be performed at the screening visit or comprehensive visit when there are identifiable measures. Combustion safety evaluation shall be performed in accordance with current Building Performance Institute Building Analyst standards. This includes testing all combustion heating and hot water systems along with combustion ovens and dryers. A summary of the BPI test procedures are listed below. For more information please visit www.bpi.org.

1. Measure the Base Pressure. Start with all exterior doors, windows, and the fireplace damper(s) closed. Set all combustion appliances to the pilot setting or turn off the service disconnect, including: boiler, furnace, space-heaters, and water heater. With the home in this configuration, measure and record the baseline pressure of the combustion appliance zone (CAZ) with respect to outside.
2. Establish the Worst Case. Turn on the dryer and all exhaust fans. Close interior doors that made the CAZ pressure more negative. Turn on the air handler, if present, and leave on if the pressure in the CAZ becomes more negative, then recheck the door positions. Measure the net change in pressure from the CAZ to outside, correcting for the base pressure. Record the “worst case depressurization” and compare to the CAZ Depressurization Limit Table (refer to BPI standards).
3. Test Worst Case Spillage, Draft, CO. Fire the appliance with the smallest Btu capacity first, test for spillage, measure the draft pressure, and then test for CO. Spillage and CO

are tested close to the burner, draft is measured close to the chimney. The spillage test fails if it is still spilling after 1 minute. The CO test fails if the levels are still too high after 10 minutes. Carbon monoxide needs to be tested in other gas fired appliances such as gas dryers and gas ovens if present at the home.

4. If Test Fails: Retest Spillage or Draft under Natural Conditions. If spillage or draft fails under worst case, turn off the exhaust fans, open the interior doors, leave the first appliance running and test for spillage and draft under "natural conditions". If tests pass under natural conditions, try to figure out which change causes the tests to fail.
5. Ambient CO. Monitor the ambient CO in the breathing zone during the test procedure and abort the test if ambient CO goes over 35ppm. Turn off the appliance, ventilate the space, and evacuate the building. The building may be reentered once ambient CO levels have gone below 35ppm. The appliance must be repaired and the problem corrected prior to completing the combustion safety diagnostics. If the ambient levels exceed 35 ppm during the testing under natural conditions, disable the appliance and instruct the homeowner to have the appliance repaired prior to operating it again.

Energy Specialists shall follow any notification protocols set in place by the Program Administrator for combustion failures.

2.4 Recommendation for Replacing Heating Systems & Cooling Systems

Central Heating Systems

Recommend replacement of heating systems if any of the following are true:

- Heating system is estimated to be more than 15 years old
- Heating system is natural gas or propane with atmospheric venting
- Steady state combustion efficiency was measured to be below 80%

Central Cooling Systems

Recommend replacement of cooling system if any of the following are true:

- Cooling system is estimated to be older than 2005
- Cooling system is determined to be below SEER 10

Domestic Hot Water Systems

Recommend replacement of domestic hot water system if any of the following are true:

- Water heating is provided by a tankless coil in an older boiler
- Water heating is provided by an atmospherically vented water heater

Once all system evaluation has been completed, the Energy Specialist shall distribute any necessary rebates and literature to the customer based upon utility sponsor.

2.5 Assessment of the Basement, Walls, and Attic

The goal of assessing all the major parts of the home is to determine the location and performance of the existing thermal envelope and how it can effectively be improved upon through appropriate air sealing and insulation measures. The thermal envelope is the barrier between conditioned and either unconditioned space or the outdoors. It is important that the thermal envelope continuously encase the entire house, if possible, because heat loss is always dominated by the areas with the least insulation / air sealing. The Energy Specialist during the screening visit will determine if insulation is needed and is possible through the Mass Save program. The Energy Specialist during the diagnostic visit will determine the actual depths and

measurements and provide the customer with a written proposal to install the insulation measures.

2.5.1 Assessment of the Basement/Crawlspace

During the screening visit, the Energy Specialist shall evaluate the potential of the basement area for energy efficiency improvements. In order to achieve this, the Energy Specialist must determine how the basement is used by the customer and its relation to the building envelope. This determination will guide how basement measures will be recommended. Generally, basements are semi-conditioned and should be considered inside the thermal envelope. Attempts to reduce heat loss by separating the basement from the home are not usually successful. Exceptions may include some crawlspaces or basements with large openings to the outside. In these rare cases where the basement is outside the thermal envelope, eligible measures to recommend include:

For basements that are clearly outside the thermal envelope (such as a vented crawlspace):

Heating System Distribution Improvements:

- Duct Sealing – Recommend that all ducts located outside the thermal envelope be sealed with mastic or mastic tape to form a durable, tight seal. Duct sealing shall be recommended in conjunction with duct insulation. These improvements should be recommended for implementation by HVAC contractor.
- Duct Insulation – Recommend fiberglass duct insulation with a foil vapor retarder on all heating ducts located outside of the thermal envelope. Duct insulation shall be recommended in conjunction with duct sealing. These improvements should be recommended for implementation by HVAC contractor.
- Hydronic and Steam Pipe Insulation - Recommend pipe insulation for all heating pipes located outside the thermal envelope.

Basement / Crawlspace Ceiling Insulation:

If the basement is located outside of the thermal envelope, insulating the ceiling is the best measure to complete the thermal envelope.

- Fiberglass Insulation – If the ceiling joists are spaced appropriately, fiberglass insulation shall be recommended.
- Densepack cellulose – If minimal to no pipes or wiring are present, the basement is very dry, and the joists are unevenly spaced, recommend ceiling densepack cellulose. If the space is already enclosed, recommend densepack cellulose. If the space needs reinforced mesh in order to hold the densepack cellulose in place, recommend drypack cellulose. Pay close attention to how difficult it may be to install cellulose in the space and if it is possible.
- High Density Polyurethane Spray Foam – Recommend spray foam and any necessary barriers for crawlspace ceilings located outside of the thermal envelope as allowed by Program Administrator.

Basement Stairwell Insulation:

If the basement is considered outside of the thermal envelope and basement ceiling insulation is recommended, insulating the stairwell and door shall be recommended to improve the thermal envelope.

- Fiberglass Insulation - If the joists are evenly spaced and open, recommend fiberglass insulation.
- Drypack Cellulose - If the joists are unevenly spaced and open, recommend drypack cellulose.
- Densepack Cellulose - If the stairwell is already enclosed, recommend densepack cellulose.
- Stairwell Door – Insulate the back of the stairwell door with polyisocyanurate foamboard in conjunction with basement stairwell insulation.

Dirt Floors: All accessible dirt floors shall be recommended for coverage with 6 mil polyethylene plastic sheeting.

For basements that are inside the thermal envelope:

Basement Rim Joist Insulation:

- Fiberglass Insulation – When joists are spaced appropriately, recommend fiberglass insulation for the rim joist area in basements that are within the thermal envelope.
- 2-Part Spray Foam – Recommend 2-part spray foam for basements within the thermal envelope. This insulation application should be recommended when an insufficient ledge depth exists to hold a fiberglass batt in place securely.

2.5.2 Assessment of the Exterior Walls and Enclosed Cavities

In order to create a proper thermal envelope, all exterior walls, overhangs, and enclosed cavities must be fully insulated. Determine the existing level of insulation in enclosed cavities by drilling small holes or checking behind light switch or outlet plates. During the diagnostic visit the Energy Specialist will use an IR camera to help verify the existing level of insulation within wall cavities. All enclosed cavities shall be insulated with densepack cellulose. In order for an enclosed cavity to be properly insulated, at least two inches of free space must exist for the cellulose hose to fit into the cavity properly. The following measures depict the specific types of wall insulation measures available through the Mass Save program.

Exterior Wall Insulation:

- Exterior blow – Recommend an exterior blow if the house has removable siding. If previously blown in insulation is found in the wall cavities, recommend a diagnostic visit to determine the extent of the existing insulation.
- Interior Drill and Blow – Recommend an interior drill and blow if the home has stucco, brick, masonry, or asbestos siding under another type of siding.

Interior Walls: Recommend interiors walls that separate conditioned space from unconditioned space, such as between an apartment and an unconditioned hallway, get insulated with densepack cellulose using the interior drill and blow method.

Overhangs: Recommend any overhangs that are not insulated or are insufficiently insulated be densepacked with cellulose either from the outside, if possible, or through the floor of the living space above.

Garage Ceilings: Recommend garage ceilings be insulated using densepack cellulose as long as hidden distribution pipes and plumbing will be properly protected from cold

temperatures. Proper protection generally involves installing a larger R-value between the pipes and the exterior than between the pipes and the interior of the home.

Flat Ceilings: Recommend densepack cellulose insulation for small enclosed cavities, such as above bay windows and bump-outs, that are uninsulated or insufficiently insulated. These areas shall be insulated either from the interior living space or from the exterior, depending upon the accessibility.

2.5.3 Assessment of the Attic

Insulating an attic is a very cost effective home improvement and shall be recommended anytime the existing level of insulation is below R-30. The Energy Specialist shall determine all existing types of insulation present in a given attic space and use the most predominant type to base R-value from, referencing BPI standards. The Energy Specialist will base the existing R-value off of the most commonly recurring low spot throughout the given attic space. If needed, the attic will be divided into multiple sections to more accurately recommend insulation specifications. In most cases, blown cellulose will be the insulation of choice. The following is a list of eligible attic recommendations:

Open Attic Flat and Kneewall Flat: Recommend blown cellulose for all open attic spaces, including behind the kneewall up to R-38.

Attic Slope: If no insulation is present within an attic slope, recommend densepack cellulose for this space. If the cavity has inadequate preexisting insulation, recommend densepack cellulose to fill the entire cavity, as long as there are two inches of free space and the cellulose can be applied to the cold side of the assembly.

Floored Attic and Floored Kneewall Floor: The floored cavity can be densepacked with insulation as long as three inches of free space exist. The densepack cellulose will compress any preexisting insulation.

Attic Kneewall: Recommend this measure in conjunction with adequately insulating the kneewall floor if there are no heating or hot water pipes and the kneewall area can be effectively sealed off from the living space and vented properly. This is the recommended way to insulate the attic kneewall area.

- Densepack Cellulose - If the attic kneewall is already enclosed, recommend densepack cellulose.
- Drypack Cellulose - If the attic kneewall is not already enclosed, recommend drypack cellulose where reinforced material will be applied to the kneewall joists to create an enclosed cavity, which will then be densepacked with cellulose.
- Fiberglass Batts – If fiberglass batts already exist within an attic kneewall area and only a few bays are missing, recommend fiberglass batts to complete the thermal envelope in that area.
- Polyisocyanurate Foamboard – Recommend this be installed on the attic side of the kneewall when existing fiberglass insulation is present and completely fills each bay.

Attic Kneewall Slope: Recommend this measure only if the kneewall and kneewall floor can not be insulated or kneewall slope insulation already exists. This is not the preferred way to insulate the kneewall area; insulating the kneewall and kneewall floor is.

- Densepack Cellulose - If the attic kneewall slope is already enclosed, recommend densepack cellulose so long as existing insulation will not create air pockets on the cold side of the assembly.
- Drypack Cellulose - If the attic kneewall slope is not already enclosed, recommend drypack cellulose where reinforced material will be applied to the kneewall joists to create an enclosed cavity, which will then be densepacked with cellulose.
- Fiberglass Batts – If fiberglass batts already exist within an attic kneewall slope area and only a few open bays are missing, recommend fiberglass batts to complete the thermal envelope.

Insulate Attic Hatch or Door: Recommend that polyisocyanurate foamboard be applied to the back of all attic hatches and doors to achieve an R-14.

Insulate Attic Pull-Down Stairs: Recommend the installation of an insulated attic-side cover with fastener for all attic pull-down stairs. Additional carpentry may be needed in some cases.

Additional Attic Accesses: Recommend creating additional attic accesses if no existing way of entering the attic area is present.

Housewrap: When recommending the installation of fiberglass insulation into kneewalls, housewrap shall be recommended in conjunction.

2.5.4 Attic Ventilation

Do not recommend insulation in an attic space unless adequate and permanent ventilation is installed.

Adequate cross-ventilation shall be maintained above all attic insulation by providing both low and high vents or gable end vents where possible. One square foot of net-free vent area (NFA) shall be provided for every 300 ft2 of attic area with 50 to 60% of the vent area located near the roof ridge and 40 to 50% located near the eaves. One level of venting may be used provided that adequate cross ventilation can be maintained.

NOTE: Although the use of window vents is allowed, the vents must be permanently fixed and must meet the minimum requirements for free vent area as noted above.

Ventilation should be improved wherever reasonable and practical to meet current code requirements when attic insulation is installed. The details of the types of vents and where they may be practically installed on each specific house varies. Consideration should be given to the type and location of vents to provide as much cross ventilation as possible for the specific application depending on existing conditions and retrofit options.

Options for achieving high ventilation include:

1. Ridge Vent
2. High Gable Vent
3. Window Gable Vent
4. Roof Vent

Options for achieving low ventilation include:

1. Soffit Vents
2. Low Gable Vent
3. Roof Vent

Aluminum Ridge Vent: These vents are made of aluminum and stick up above the roof a few inches. Contractor installation restrictions may apply such as the inability to install aluminum ridge vents in slate or tin roofs.

Gable Vents: Gable vents are generally rectangular and made from aluminum or wood. Gable vents can not be installed through asbestos siding. Contractor installation restrictions may apply such as the inability to install gable vents in aluminum siding.

Soffit Vents: Soffit vents are generally made from aluminum. Contractor installation restrictions may apply such as the inability to install soffit in aluminum soffits.

Propavents: Recommend at least one propavent with each existing soffit vent and for every proposed soffit vent to allow for proper air transfer.

Window Vents: When attics can not be ventilated by other means and windows exist, recommend gable vents to be installed in the existing window sash. Plywood will be constructed around the gable vent which is then fitted into the place of one of the window sashes.

Roof Vents: Roof vents are typically made of metal. Contractor installation restrictions may apply such as the inability to install roof vents in slate, tin, or flat roofs.

Vent Bath Fan to the Outside: Any bathroom exhaust fan vents into an attic, must be vented to the outside. Contractor installation restrictions may apply such as the inability to vent the bath fan to the gable end wall if asbestos siding is present.

2.5.5 Guidelines for Outside Assessment:

After assessment of the interior is complete, the Energy Specialist should complete one full loop around the outside of the home. While outside, it is best to make note of the following building characteristics:

- Siding Type(s)
- Roof Type(s)
- Attic Ventilation Combinations
- Water or Moisture Intrusion Issues
- Peeling, chipping paint

2.5.6 Electric Heat Thermostats

In the case of electrically heated homes, replacing old thermostats with new, programmable thermostats can provide significant energy savings. A minimum number of electric thermostats may need to be achieved according to Program Administrator requirements. In order to install electric heat thermostats the existing thermostats must be wall mounted. Thermostat replacement recommendations and proposals should be issued at the Screening Visit.

2.6 Assessing Air Sealing Potential

During the screening visit, the Energy Specialist must determine the number of hours of air sealing needed in the home to achieve significant energy savings. Most homes could benefit from some amount of air sealing work. Spray foam, caulking, metal flashing, door sweeps, and weatherstripping are used to seal the home. If attic insulation is a recommendation, air sealing must be completed before insulation work can begin. Attic air sealing should be emphasized since that is where the air and heat loss is strongest. Attic air sealing can have a large impact on energy savings and reducing attic moisture problems. Below is a list of significant air sealing features:

- an open chimney chase
- open wall cavities such as found in balloon framing
- attic kneewalls
- ducts in the attic (requires sealing between duct boots and drywall and increases overall air sealing time as the technician must maneuver around the ductwork)
- drawers in attic kneewalls
- open duct chase or other chase
- multiple doors or hatches that need to be weatherstripped
- multiple attic spaces or unheated basements
- recessed lights (air tight insulation barrier boxes can be installed over these)
- floored attic areas and transition areas where densepack cellulose is not going to be installed
- plumbing and electrical penetrations
- rim joist / wall plate seams

2.7 Identifying Roadblocks (Heath and Safety Barriers)

Throughout the screening visit, a primary objective is to identify roadblocks. Roadblocks are problems with the safety of the home that could prevent insulation or air sealing work from proceeding. The main roadblocks are moisture, knob & tube wiring, asbestos-like material, and combustion safety problems. There are also some unusual roadblocks discussed below.

2.7.1 Moisture

In order to insulate a home, it is important to determine that the insulation will not become wet and that the insulation will not significantly worsen any existing moisture problems. Moisture can be a roadblock for some measures or all measures in the home, depending on the severity. Here are some guidelines for deciding when there is too much moisture for insulation or air sealing to occur:

1. General: If the framing cavities into which we would like to install insulation are wet, we cannot insulate. This is a roadblock only for the area of the home that is wet, but typically entire measure should be roadblocked. For example, if one wall of the house is too wet to insulate, it is a good idea to leave all the walls uninsulated. Wet framing cavities can be identified by severely peeling paint, mold growth, moss, mushrooms, rot, moisture content, or by touch.

2. Basements: All basements have an elevated level of moisture compared to the living space because concrete absorbs moisture from the ground. Excessive elevated levels of moisture in the basement shall stop the installation of insulation in the basement. Signs of elevated moisture include staining, mold growth, and dirt floors. If the level of moisture in the basement is especially high, then no insulation or air sealing should occur in the home. Very moist basements may have pools of water or streams running through them, may have signs of flooding, or may have rotten framing.

3. Attics: Attic moisture problems are usually caused by one of three things – 1) roof leaks, 2) ice damming, or 3) condensation.

- Roof leaks: If there are any roof leaks that have not been repaired, this is a roadblock for any insulation work in the attic, including cellulose and fiberglass. In most cases air sealing shall not occur until after a roof leak is addressed by the homeowner. If the source of moisture in an attic cannot be determined, it should be assumed that the source is a roof leak.

- Ice damming: Ice damming is generally caused by too much heat escaping from the home into the attic and melting the snow on the roof, which then refreezes when the temperature drops or the water reaches a lower point on the roof. The moisture seeps into the attic from the outside of the roof. Air sealing, insulating, and venting the attic may reduce ice damming and may solve the moisture problem.

- Condensation: Condensation is generally caused by warm, moist air escaping from the home and condensing on the cold roof deck. Water forms on the underside of the roof decking and in severe cases, the water will freeze on the underside of the roof decking and form icicles. Air sealing and venting will reduce condensation and can solve the moisture problem. Air sealing work must be completed before insulating is added.

2.7.2 Knob & tube wiring

Knob & tube wiring should always be suspected in pre-1950 houses. Energy Specialists need to look carefully through the attic and basement and look for rotary, two button, or porcelain switches. Any evidence of knob & tube wiring roadblocks a diagnostic energy assessment until the homeowner addresses the wiring. Remember that knob & tube wiring is a concern even if the electrical panel has been replaced. If knob & tube wiring is present, it is a roadblock to all insulation in the home, except for areas of the home where fully visible, uninsulated open cavities where the Energy Specialist can visually verify that no knob & tube wiring is present. Air sealing, duct sealing, pipe insulation, and duct insulation can still occur in a home with knob & tube wiring.

When knob & tube wiring is found, the Energy Specialist should inform the customer of how to proceed with getting the knob & tube decommissioned noting the specific areas where insulation is recommended. The customer will need to have an electrician certify that the wiring has been deactivated or removed before proceeding with a diagnostic energy assessment.

2.7.3 Asbestos

If the Energy Specialist finds asbestos-like material on the pipes or ducts in a basement or attic, it is a roadblock to any work occurring in that area for fear of disrupting the material. The Energy Specialist must check where pipes go into floors or walls as asbestos-like material is commonly

missed in these areas. Embossed or smooth paper on ducts could potentially be asbestos-like material. If there is asbestos-like material on pipes in the basement, typically basement air sealing and basement ceiling insulation must be roadblocked. Sometimes small amounts of air sealing or rim joist insulation can be completed if the asbestos-like material will not interfere with these measures. If there appears to be any risk that a worker would touch the asbestos-like material or knock a ladder into it, the work must be roadblocked.

The presence of asbestos-like material or any sign that asbestos-like material used to be present will prevent blower door testing in the home. The Energy Specialist should assume that any steam heat system once had asbestos-like insulation on it, even though not all steam heat systems were insulated with asbestos. The Energy Specialist can assume that any vermiculite insulation contains asbestos-like material, even though not all vermiculite contains asbestos. Cellulose cannot be blown into or on top of an attic area that contains vermiculite insulation.

Due to health concerns, air sealing technicians must not dig through vermiculite insulation in the attic. Therefore the air sealing estimate for the home shall be reduced based on this factor.

Asbestos can also be found in board-like form. This would typically be located directly above the heating system and resemble drywall. If this is found it shall be considered a roadblock to any work that would be done within close proximity.

The Energy Specialist should give the customer the appropriate roadblock information to explain the situation. When informing the customer, the Energy Specialist should take care to emphasize the need for professional removal, testing, and certification. He or she should avoid saying anything that may give the customer the idea that they can solve the problem on their own. After professional removal or encapsulation of the asbestos-like material, the work can proceed. The customer must have a letter from the asbestos removal professional certifying that the asbestos problem has been corrected.

2.7.4 Combustion Safety

Follow all BPI guidelines for checking combustion safety in the home.

If any combustion safety problem is identified as a “stop work” or “emergency” situation, it is a roadblock to any tightening measures on the home, including air sealing and insulation. The only measure that can proceed is thermostat installation. Unvented fossil fuel space heaters will always stop work until they are removed or vented properly.

2.7.5 Other Roadblocks

There are other roadblocks that will prevent work from happening at a customer’s home. Some roadblocks listed below are conditional and should be assessed based on the Energy Specialist’s best judgment. Additional roadblocks are listed below:

- Access to house: Occasionally a home is too far from the road or the walls are inaccessible due to trees or shrubbery. Work that requires access to areas that are blocked by shrubbery or trees must be roadblocked.

- Structural problems: Occasionally the structure to be insulated cannot hold the weight of the insulation. This is true for freestanding ceiling tiles. In this case, the area cannot be insulated.

- Inability to vent: Occasionally an attic needs insulation but cannot be ventilated properly (for example, a home with slate roof, asbestos shingles, and aluminum soffits). For more information on this topic, refer to page 10 section 2.5.4 “Attic Ventilation”.

- No Carbon Monoxide Detector Present: In homes with any type of combustion appliance and/or an attached garage, at least one carbon monoxide detector must be present in the home by the time work is completed. In the case of completely electric homes, no carbon monoxide detector is required unless the home has an attached garage.

- Unvented Bath Fan, Dryer, and/or Kitchen Exhaust Fan: If any exhaust fan vents directly into the attic, the fan must be vented to the outside before work is completed either through the scope of work or by the customer outside of the Mass Save program. If any dryer is not vented to the outside, it is a roadblock for any work until addressed by the homeowner.

- No Return Ductwork: If a home contains a furnace with no return ductwork, work must be roadblocked until a return system is installed.

- Minimum Workspace Clearance: If any space that needs work has inadequate clearance for workers, that particular work must be roadblocked.

- Floored Attics: If a floored attic contains existing insulation up to the floorboard level, but can not be effectively air sealed, no insulation shall be recommended to be installed over the existing floorboards. This measure must be roadblocked until the homeowner removes all the floorboards. Contractor installation restrictions may also apply for floored attics that do not contain at least 3” of free space between the top of the insulation and the floorboards.

- Vermiculite Insulation: No attic space can have additional insulation installed if vermiculite insulation exists.

- Heavy Storage Use and Accessibility: If an area contains excessive storage, work in that area can not proceed until the items are moved and access to the particular area is gained. This includes access to areas of the basement and attic where air sealing and/or insulation measures are recommended.

- Overall Safety and Condition of the Home: If the Energy Specialist discovers any issues at a home that are dangerous or an impediment to proceeding with work, work can not proceed until the issue is addressed by the homeowner. This includes too much bat guano in an attic, unsafe access to the home, basement, or attic areas, unhealthy living conditions, excessive mold or rot, etc.

- Personal Safety: Personal safety of all field staff should be paramount at all times. If any field staff feel unsafe at an appointment, they have the right to leave and have the support and understanding of the Program Administrator.

2.8 In-Home Installation Measures

During the energy assessment, the Energy Specialist will have the opportunity to install items that lead to immediate energy savings. These are referred to as Immediate Savings Measures (ISM's). The most important ISM to install is light bulbs – compact fluorescent light bulbs (CFL's) are a very cost effective way to reduce electricity usage. There is no maximum number of CFL's, but they should only be installed in fixtures that get used regularly (usually not basements, closets, attics, etc.).

Other installations that save electricity or gas are second highest priority. This includes programmable thermostats, showerheads and faucet aerators. Last would be weatherstripping and other draft-stopping measures since these are better performed during an air sealing visit. However, for a customer that is not getting an air sealing visit, draft stopping measures can be very helpful. For a complete list of measures, see Appendix I.

2.9 Presentation of Recommendations and Next Steps

At the end of every screening visit, a receipt for installations completed during the visit must be provided to the customer. For each home, one of the two following scenarios will prevail:

- <u>If No Roadblocks Prevent Work:</u> The Energy Specialist shall inform the customer of what possible insulation measures are applicable to their home and try to sell the diagnostic visit. The Energy Specialist will present an agreement for air sealing work, if applicable, and try to sell the air sealing visit that will happen during or after the diagnostic visit, if a diagnostic visit is needed. The customer will be given the chance to call and schedule their air sealing appointment and diagnostic visit while at the screening visit.

- <u>If the Home is Roadblocked</u>: Distribute all appropriate forms to the customer and clearly explain what must be done in order for them to proceed with the program.

<u>Solar Site Assessment</u>

When requested by a customer or in the judgment of the auditor, a solar site assessment will be recommended.

2.10 Explanation of Incentives

The Energy Specialist will distribute all relevant utility rebates to the home owner. Also, if the homeowner is interested and eligible, the Energy Specialist will distribute all necessary paperwork to apply for the HEAT Loan through a participating lender. If a diagnostic visit is recommended, the Energy Specialist shall explain to the customer any relevant incentives related to the type of energy efficiency improvements the Energy Specialist will present at the diagnostic visit.

3.0 Diagnostic Visit Specifics

3.1 Customer Meeting

The goal of the customer meeting is to thoroughly explain to them the tests and procedures the Energy Specialist will be performing at the home as well as get an understanding of the customers' insulation concerns.

3.2 Assessment of the Basement / Crawlspace

Please refer to all procedures defined in 2.5.1

Information from the screening visit will be used where possible. In addition to the procedures listed in section 2.5.1, the Energy Specialist will measure the area of each component and determine the depth of framing cavities. Refer to 3.8 for more information about calculating areas.

3.3 Assessment of Exterior Walls and Enclosed Cavities

Please refer to all procedures defined in 2.5.2

Information from the screening visit will be used where possible. In addition to the procedures listed in section 2.5.2, the Energy Specialist will measure the area of each component and determine the depth of framing cavities. Refer to 3.8 for more information about calculating areas.

3.4 Assessment of the Attic and Attic Ventilation

Please refer to all procedures defined in 2.5.3 and 2.5.4

Information from the screening visit will be used where possible. In addition to the procedures listed in section 2.5.3 and 2.5.4, the Energy Specialist will measure the area of each component and determine the depth of framing cavities. Refer to 3.8 for more information about calculating areas.

3.5 Roadblocks

It is imperative that the Energy Specialist keep an eye out for roadblocks. It is possible that the Energy Specialist during the screening visit missed a roadblock or that a roadblock has since been created after the initial screening visit. Please refer to 2.7 for detailed information regarding roadblocks.

3.6 Diagnostic Testing

The goal of diagnostic testing is to help provide the Energy Specialist with more in-depth information to help determine the current level of insulation within a home to more accurately prescribe insulation measures.

It is the Energy Specialist's job to use all necessary diagnostic tests to best recommend eligible measures to the customer through the Mass Save program. These tests shall be run to verify the ability to insulate the home or to help convince the customer to get the work done. If air sealing is happening at the same time as the diagnostic visit, the Energy Specialist shall consult with the Air Sealing Technician about what measures to recommend. Here are all the diagnostic tests that an Energy Specialist can utilize during a diagnostic visit:

- **Infrared Camera Scan**

  The infrared scan is performed to learn more about the insulation present in the home. It is helpful for the customer to watch this part of the home energy assessment so they can see the images on the screen. If the Energy Specialist will be running a blower door test, the infrared camera should be used first so that the blower door does not eliminate the needed temperature difference. An 18-degree temperature difference between the inside of the home and the outside of the home is recommended to get a clear picture of the existing insulation. When using the IR camera from inside the home and the temperature outside is cold, if there is no insulation in the walls, the wall framing should appear warmer than the cavities. If the walls

are insulated, the wall framing should appear cooler than the cavities. The Energy Specialist must be careful of situations where the walls may be warmed by the sun or other heat source which could blur or reverse the images. Infrared scans are best done in the morning while it is still cold outside and before the sun shines on the building. Energy Specialists should be especially careful when viewing the south and west wall in the afternoon.

Infrared images of ceilings often don't reveal much because the attic or roof is often warm compared to the outdoors. Infrared images of metal surfaces or glass surfaces can be meaningless since they tend to reflect other infrared light rather than emit their own.

- **Blower Door Test**

  A blower door test shall be run only after determining that no asbestos-like material or vermiculite insulation is present in the home. The Energy Specialist should explain to the customer what they are doing and show the customer areas of the house that are leaking. A blower door test can help determine the relationship of an attic or a basement to the rest of the house based on pressure differential readings. Using the blower door test in conjunction with the IR camera can be helpful in seeing what effect the blower door has on the IR scan.

3.7 Outside Assessment of the Home

The goal of an outside assessment of the home and area calculation is to detail a floor plan of the home to create accurate calculation of the areas to be insulated. These diagrams and calculations will be used to aid the insulation contractor during the insulation and needs to be as accurate as possible. Performing an outside assessment of the home allows the Energy Specialist to gain a 360 degree view of the home, look at siding and ventilation, and accurately measure the entire home.

After completing an assessment of the inside of the home, the Energy Specialist will complete one full loop around the building. The Energy Specialist will take measurements and draw a diagram of the home at this time. The following shall be checked from the outside of the home:

- Check the siding types on all sides and levels of the building where you are recommending wall insulation. Determine if there are multiple layers of siding by checking at the bottom edge and windows and asking the customer if there are multiple layers of siding. Check for the possibility of pre-1979 paint.
- If there are attic insulation opportunities and the attic needs more ventilation, look for ways to add ventilation to the attic. Check for ventilation that was unnoticed from the attic.
- Look for evidence of water intrusion into the building, such as steep valleys with brush caught in them, rotten siding or trim, peeling paint, or incorrectly flashed areas.
- Look for depressions in the ground near the foundation, adequate slope away from the foundation, dampness of the ground around foundation, and type of vegetation (moss, grass, shrubs, etc.).
- Check window wells and bulkhead door for signs of water entry or water damage.
- Condition of siding, grade, and other site conditions that may affect installation.

3.8 Area Calculations

Whenever energy efficiency improvements are recommended, the Energy Specialist will draw a diagram of the home and calculate area and volume. All measurements shall be made to the

nearest six inches. Wall insulation measurements will be gross measurements and therefore subtraction of windows and doors will not be needed.

3.9 Installation Measures

During the diagnostic visit, it is possible for specialty CFL's to be installed if identified during the screening visit.

3.10 Creation of Reports and Contract

At the end of the diagnostic energy assessment, the Energy Specialist should create a report to present to the customer based on the findings and recommendations. As long as all roadblocks are cleared the Energy Specialist during the diagnostic visit will be able to leave an agreement for work with the customer almost every time. It is possible that the Energy Specialist during the screening visit missed a roadblock or a roadblock has since been created. If this ever occurs, the Energy Specialist during the diagnostic visit shall make clear to the customer what has happened and what needs to be done to resolve the roadblock. After the roadblock is cleared, an agreement for work can be sent to the homeowner to proceed with work.

If the customer has received this diagnostic visit based on a contractor referral, a report showing the recommended costs for the proposed measures must be left with the customer but an agreement should not be provided at the audit. The customer can use the proposed measures and prices as a guide when they get the work done through the contractor that referred them to the Mass Save Program.

3.11 Presentation and Sale of Recommended Work with Incentives

After all data has been entered and an agreement for work generated, the Energy Specialist will present this proposal to the homeowner for completion. The Energy Specialist must clearly explain all recommended measures and leave the customer with appropriate handouts for proceeding with and preparing for the work. The Energy Specialist shall try their best to get the homeowner to agree to get work done while at the home energy assessment as long as they have not been referred by a contractor. If the customer does not sign the contract at the home energy assessment, the Energy Specialist must leave the customer with the information they need to schedule in the future. It is imperative that the Energy Specialist also clearly explain what incentives are available for each and every customer. That includes the insulation incentive, the HEAT Loan information, and other utility specific rebates. This will give the customer a greater understanding of what they are eligible for and make them feel more confident when deciding whether or not to get work done through the program. If the Energy Specialist during the screening visit has not already given the customer rebate and HEAT Loan information, the Energy Specialist during the diagnostic visit is responsible for providing this information if the customer is interested and eligible. For additional information regarding rebates and incentives, see Appendix II and III.

4.0 Software

Each home energy assessment must be entered into appropriate home energy assessment software approved by Program Administrators. For each measure proposed, an approximate savings in fuel will be generated.

5.0 Reporting

Information gathered at each home and savings proposed and achieved will be reported to the participating utility company per requirements set forth by the Program Administrator.

APPENDIX I: List of installations (ISM's)

Compact fluorescent light bulbs (CFL's)
Programmable thermostats (oil, propane, natural gas)
Showerhead
Flip aerator
Standard aerator
Pipe insulation
Door weatherstripping
Outlet gasket
Door sweep
Automatic door sweep

APPENDIX II: List of Available Incentives for Recommended Measures

100% Instant Rebate Provided by Utility Sponsor:

- Air Sealing
- Installation of programmable electric heat thermostats. Minimum 4 per household, not located within a bathroom.

75% off up to $2,000.00 Instant Rebate Provided by Utility Sponsor:

- Attic Insulation Measures
- Basement Insulation Measures
- Exterior Wall Insulation Measures
- Duct Sealing
- Heating Duct, Hydronic and Steam Pipe Insulation

Rebates and incentives are subject to change.

APPENDIX III: List of Eligible Rebates

Electric Utility:

- Furnace, furnace with ECM blower, steam boiler, or hot water boiler replacement (oil or propane only)
- Weather responsive control installation with hot water boiler (oil or propane only)
- Indirect water heater (oil or propane only)
- High Efficiency on-demand water heater (propane only)
- ENERGY STAR or 7-day programmable thermostat (oil or propane only)

Gas Utility:

- High efficiency gas furnace or boiler (natural gas only)
- Combined high efficiency boiler and water heating unit (natural gas only)
- High efficiency indirect water heater (natural gas only)
- Condensing gas water heater (natural gas only)
- High efficiency on-demand water heater (natural gas only)

- ENERGY STAR rated storage water heater (natural gas only)
- After-market boiler reset controls (natural gas only)
- ENERGY STAR labeled or 7-day programmable thermostat (natural gas only)

Attachment 5

MASS SAVE PROGRAM STANDARD FOR MATERIALS, INSTALLATION AND CONDUCT FOR ENERGY EFFICIENCY MEASURE INSTALLATION CONTRACTORS

Mass Save Program Standard for Materials, Installation, and Conduct for Energy Efficiency Measure Installation Contractors

Version 0031
Publication Date: May 13, 2010

This Standard applies to all work performed under the Mass Save Program for contracts entered into **beginning July 1, 2010**. Program Administrators will be establishing a Quality Assurance program to verify that work meets the requirements in this Standard. Proposed changes or additions to the Standard will be considered on a regular basis by the Program Administrators or their designee.

By Program Administrators:

Bay State Gas
Berkshire Gas
Cape Light Compact
National Grid
New England Gas
NSTAR Electric & Gas
Unitil
Western Massachusetts Electric

TABLE OF CONTENTS

1.0 PROGRAM DESCRIPTION

The primary objective of the Mass Save Program (the Program) is to provide residential customers with energy efficiency recommendations that enable them to identify and initiate the process of installing cost-effective energy efficiency upgrades. The Mass Save Program makes it easy, clear, and compelling for customers to participate in all comprehensive energy efficiency programs by providing information through bold outreach mechanisms, incentives, and multiple financing options.

The Program promotes a house-as-a-system approach and focuses on the home's thermal envelope (shell insulation and air leakage conditions), mechanical systems (HVAC & DHW), and lighting and appliances to identify cost effective energy efficiency improvement and/or replacement opportunities.

This systematic approach to home improvement that addresses all aspects of building systems requires clear standards to maximize energy savings and assure customer satisfaction. It is important to note that this initial version of the Mass Save Standard for Materials, Installation, and Conduct (the Standards) is primarily focused on traditional weatherization materials and strategies. The Program Administrators ("PAs")view these Standards as a "living document" that will be updated periodically as the Program continues to evolve.

The Program will coordinate with other Massachusetts programs such as GasNetworks and Cool Smart to develop consistent standards across programs as well as to assure consistent customer education and promotion of the house-as-a-system approach.

Future revisions of the Standards may include alternative/new technologies and approaches for new measures (e.g., spray foam in attics). The PAs are in the process of conducting a cost-effectiveness evaluation of new measures, measures packages, and a pay for savings rebate approach to go after deeper savings per house.

The PAs are supportive of more coordinated statewide training as a means to ensure correct installation techniques for the Program. It is expected that training requirements will increase over time in order for contractors to retain their status as an authorized program contractor. The goal is to have a sustainable and experienced workforce that is focused on achievable maximum energy savings ready and able to meet customer demand.

2.0 CONTRACTOR QUALIFICATIONS AND RESPONSIBILITIES

The term "Contractor" as used in this document applies to any individual or company performing covered work that is being performed within the Mass Save program. This applies equally to vendors working directly for the PAs and to independent contractors doing work for homeowners.

The purpose of these guidelines and associated information is to codify the requirements of weatherization contractors who participate in the Mass Save Program. They are intended as *minimum* standards for participation in the program.

2.1 LICENSES and CERTIFICATIONS

a. CONTRACTORS must have all licenses and registrations required for their area of work by the Massachusetts Department of Public Safety. Appropriate documentation must be supplied to The Program upon request.
b. CONTRACTORS must also obtain any certifications or other recognitions required by individual PAs.

2.2 MATERIALS

a. All materials supplied must meet applicable specifications.
b. All materials must conform to catalog listing.
c. Material substitutions are not allowed without a written pre-approval by the PAs.
d. CONTRACTORS will keep a MSDS on the job site for every material used.

2.3 PERFORMANCE OF WORK

a. All labor to be performed in a workmanlike manner.
b. All work must be performed in a lead-safe manner according to all State and/or Federal Requirements in force at the time of the work
c. All work must be performed in conformance with all applicable OSHA requirements and other governmental standards.
d. All measures installed must be in conformance with the Work Order.
e. Pre-Approved written Change Orders by the PA designee are required before any modifications to the original Work Order are made. If the PA designee is unreachable, the contractor should use their best professional judgment to make changes to scope of work, recognizing that final approval for program incentives lie with the program.
f. CONTRACTORS are *required* to make acceptable repairs for all accidental damages made to a customer's property at the contractor's expense.
g. CONTRACTORS will treat homeowners and their property in a respectful and professional manner.

2.4 JOBSITE CLEAN UP

a. CONTRACTORS are responsible to remove all construction debris from the jobsite.
b. CONTRACTORS are responsible to restore every jobsite to its pre-work condition at project completion.

2.5 DOCUMENTATION

a. Before Starting Work - CONTRACTORS must document that a blower door test and combustion safety testing has been performed and an Order to Proceed has been issued.
b. After Work Completion - CONTRACTORS must submit documentation (signed by customer and contractor) that the approved Scope of Work is complete.
c. The Completion document must include:
    - An itemized confirmation that the Program Audit recommendations were addressed.
    - An itemized list of each measure, area, R-value, etc, installed.
    - Document that post -blower door testing and post-combustion safety testing has been performed.

See Appendix 15.4 for Program Forms (to be added)

2.6 COMMUNICATIONS

2.6.2 CONTRACTOR communications with CUSTOMER

a. CONTRACTORS will be courteous to CUSTOMERS at all times.
b. CUSTOMERS and Mass Save must be notified as soon as possible if an appointment must be rescheduled.
c. CONTRACTORS will clearly explain all work procedures and items to be installed to the CUSTOMERS home before and during the work process.
d. CONTRACTORS will answer all CUSTOMER questions in an honest and straightforward manner. If the CONTRACTOR does not know the answer to a question they will refer the CUSTOMER to Mass Save for an answer. CONTRACTORS will not “make it up” answers.
e. CONTRACTORS will inform CUSTOMERS of any fragile items in the work area and request that the CUSTOMER move those items to a safe location prior to start of work.
f. CONTRACTORS will ask CUSTOMERS for permission to use a household restroom.
g. CONTRACTORS will keep CUSTOMERS informed regarding estimated daily arrival, break, and departure times.
h. CONTRACTORS will document any problems and unusual situations as they occur.

2.6.2 CONTRACTOR communications with Mass Save

a. CONTRACTORS will respond promptly and accurately to Mass Saves communications.
b. CONTRACTORS will document problems and unusual situations and promptly report those to Mass Saves.
c. CONTRACTORS will respond promptly to address problems as they occur.

2.7 CONTRACTOR ACTIONS REQUIRING Mass Save RESPONSE

2.7.1 Theft

Theft may result in immediate cancellation or suspension as a Mass Save Approved CONTRACTOR and full legal remedies including but not limited to prosecution. Theft includes but is not limited to:

a. Charging for materials not installed or labor not incurred.
b. Inflating the actual cost for services provided.
c. Unauthorized removal of client personal property.

2.7.2 Other Unacceptable Actions

The following CONTRACTOR actions, as examples but not limited to, may result in immediate cancellation or suspension as a Mass Save Approved CONTRACTOR. Additional training may be required before reinstatement as a Mass Save Approved CONTRACTOR.

a. Charging clients for services while job is open (one year period).
b. Providing false information to Mass Save or the client concerning work requirements.
c. Failure to correct job deficiencies.
d. Use of inferior materials.
e. Repeatedly missing timelines.
f. Repeatedly performing work of poor quality.

2.8 BUILDING PERMITS

CONTRACTORS are required to obtain and to pay for all applicable work site inspection permits, certificates of inspection, and license fees related to work performed through the Mass Save program.

2.9 CONTRACTOR'S INSURANCE

All Mass Save CONTRACTORS shall:

a. provide insurance at the coverage amounts listed below with respect to the work they perform within the Program;
b. maintain this insurance at their own expense and in full force and effect for the full term of the contract;
c. list each Mass Save Program sponsor as "additionally insured" on insurance certificates.

All policies shall be issued by companies authorized to write that type of insurance under the laws of the Commonwealth of Massachusetts.

CONTRACTORS shall provide minimum coverage with respect to the operations performed by any employee, subcontractor or supplier:

Workers Compensation: $500,000
General Liability: $1,000,000
Automobile: $1,000,000
Excess Liability = $1,000,000 Each Occurrence or Aggregate

Contractors who supply subcontractors are subject to additional levels of insurance, which must be purchased prior to commencement of any work.

3.0 HEALTH AND SAFETY

3.1 OVERVIEW

The health and safety of CUSTOMERS, PROGRAM staff and CONTRACTORS is of primary concern to the Mass Save Program. It is important that all personnel maintain a high level of awareness concerning the potential hazards associated with the weatherization process. The requirements set forth in this standard provide only general guidelines for health and safety concerns.

CONTRACTORS must familiarize themselves with all the health and safety issues associated with weatherization. More specific information concerning indoor air quality problems can be obtained through the U.S. Environmental Protection Agency (EPA) and the U.S. Consumer Product Safety Commission.

Detailed specifications regarding the health and safety of workers in the construction industry can be found in Construction Industry OSHA Safety and Health Standards (29 CFR 1926/1910) that is available from the U. S. Department of Labor. (http://www.osha.gov/pls/oshaweb/owastand.display_standard_group?p_toc_level=1&p_part_number=1910)

The above standards are applicable to all CONTRACTORS, their employee's, associated workers, and all SUB-CONTRACTORS providing services using funding under the Mass Save program.

Each home weatherized under the Mass Save program must be individually assessed to determine the existence of potential hazards to CONTRACTORS or CUSTOMERS.

If unsafe conditions exist that would endanger the health or safety of the CUSTOMERS or weatherization CONTRACTOR, and those conditions cannot be corrected, no Mass Save work may be started on that home.

A Mass Save energy assessment must be completed prior to CONTRACTOR'S work. It is the CONTRACTOR'S responsibility to confirm that a Combustion Appliance Zone (CAZ) test and Spillage test on all applicable appliances has been completed prior to the work commencing. This may be achieved through documentation from the PROGRAM.

CONTRACTORS their employee's, associated workers, and all SUB-CONTRACTORS are required to take all reasonable precautions against performing work on homes that will subject occupants to health and safety risks.

CONTRACTORS shall maintain a copy of its Health and Safety Policy, and train all employees accordingly. They shall supply Material Safety Data Sheets (MSDS) for products and materials used by their crews and have these documents available on all jobsites.

Adherence to worker health and safety and applicable OSHA standards are required for all jobs performed by CONTRACTORS their employee's, associated workers, and all SUB-CONTRACTORS.

CONTRACTORS shall ensure lead-safe work practices in all Mass Save program weatherization work.

CONTRACTORS shall fully document and communicate all problems and concerns to the Mass Save program staff.

3.2 CONFIRM COMBUSTION APPLIANCE OPERATION

CONTRACTORS must confirm through documentation that a Carbon Monoxide test and complete combustion appliance inspection was performed by others before beginning work, and that a working CO alarm is in place.

NOTE: The following section takes effect on October 1, 2010. Before that time, PAs may identify an alternate approach.

A. Before leaving the site, the CONTRACTOR or other entity approved by the Program Administrator shall perform combustion safety tests in accordance with the Building Performance Institute's Building Analyst Standard on all atmospheric-vented appliances located within the home after completion of air sealing, duct sealing, closed cavity insulation, or any fan alteration including venting a dryer to the outside.

B. Individuals performing these tests shall either hold the appropriate BPI certification, as determined by the Program Administrator, or shall be an employee of a BPI Accredited company.

C. Results of these tests must be reported by CONTRACTOR in the completion documentation.

D. If spillage continues after five minutes of operation or if fan depressurization exceeds 5 pascals, contractor must immediately notify occupants and the Program.

Exceptions. Tests are not required:
1) On direct vent or power vented appliances.
2) Where equipment is located in an isolated mechanical room with all combustion air from outside including from a vented attic or crawlspace. Note that all equipment in open basements must be tested.

4.0 MEASURE INSTALLATION GUIDELINES

Through the Mass Save program, thermal shell improvements may be installed only after a comprehensive whole house assessment is conducted by a program-approved entity and an approved Scope of Work has been developed.

It is only through a whole house assessment that site-specific appropriate recommendations can be made. While a home may benefit from thermal shell improvements in theory, there may be existing conditions that would preclude safe implementation of the possible energy saving improvements.

Examples of such conditions include, but are not necessarily limited to
- existing moisture problems,
- mold or the appearance of mold like substance,
- structural concerns,
- active knob-and-tube wiring,
- existing conditions of specific building components,
- combustion safety issues,
- indoor air quality,
- inaccessibility,
- infestation,
- etc.

Correcting these conditions is outside the scope of the Mass Save program.

Conditions precluding implementation of thermal shell improvements must be documented and explained to the individual customer. If the customer corrects the noted concerns at their own expense, then the recommended thermal improvements may be able to be implemented. Such corrections must be made prior to program work, and must be documented in writing to the satisfaction of the program.

Not every condition will be found before work. If any of the above is discovered during the course of approved work, the CONTRACTOR must contact the PA designee for instructions to:
1. disclose and leave specific areas unaltered,
2. disclose and suspend work until alterations are made by others,
3. disclose conditions to homeowner and proceed with work.

5.0 MATERIALS

5.1 IMPERMEABLE AIR BARRIER MATERIALS

Materials must be durable, and restrict airflow through the material to no greater than 0.004 CFM_{75} per square foot as tested in accordance with ASTM E283 or E2178. Such materials include:

- Plywood,
- OSB,
- ½" gypsum board,
- rigid closed cell foam boards meeting ASTM C578 and ICC ES AC12,
- rigid fiberglass board with flame spread 25 FSK facing,
- sheet metal flashing and aluminum coil stock,
- foil faced bubble wrap,
- peel-and-stick flashing membranes,
- other air barrier materials as listed in Canada Mortgage and Housing Corporation Research Highlights Technical Series 98-109, "Air Permeance of Building Materials" (http://www.cmhc-schl.gc.ca/publications/en/rh-pr/tech/98109.htm)
- Spray applied foams that meet ICC ES AC 377 including:
    - 2-part open cell polyurethane foam (0.5pcf),
    - 2-part medium density closed cell spray polyurethane foam (2.0pcf)

5.2. SEALANTS

All caulking materials must be rated for a minimum 20-year life. Acceptable sealants used to join materials and block airflow include:

- Foam sealants that meet ICC ES 377 and ASTM C1642-07 such as:
    - 1-part urethane foam, low CFC (e.g. Great stuff, Pur-fil, Insta-foam, or equivalent)
    - 1-part urethane fire-block foam rated for sealing gaps in wood fire blocking
    - 2-part urethane foam kits 1.75pcf density, 2-part Flame Spread 25 foam kits 1.75pcf,
- Siliconized latex sealants meeting ASTM C834,
- Silicone, 1-part gun grade urethane and other elastomeric sealants meeting ASTM C 920, (“Silicone” refers to 100% silicone caulk, clear or pigmented—not acrylic)
- Water based duct sealant meeting UL 181A-M, UL 181B-M ("RCD #6" or equivalent)
- Sealants rated for contact with chimneys and combustion vents such as:
    - Non-combustible fire barrier caulk or furnace cement meeting ASTM E 136
    - Silicone high temp RTV listed for use on gas vents to 500degrees F, meeting ASTM C920

5.3 WEATHERSTRIPPING

- Windows: Schlegel (PF-524-AB, PF-512-AB, PF-102) or equivalent vinyl
- Door, interior: Schlegel "Q-lon" strips, or Schlegel vinyl weather-strip (PF-S72-AB)
- Doors, exterior: Schlegel "Q-lon with carrier" (preferred), Porta Seal (I-D17), or equivalent
- Door sweeps will be aluminum & vinyl, Dennis 905, Pemko P307-AV or equivalent

- Weatherstripping will have a deflection range of at least 1/4". Weather-stripping will remain compliant in cold weather

5.4 ACCESSORIES AND MATERIALS RELATED TO ATTIC PREP

- Glass or mineral fiber insulation as a backer for other sealants, meeting ASTM 665,
- Backer rod (preformed closed cell foam rope) as a backer for other sealants,
- 6 mil (0.l50 mm) polyethylene sheet (used for ground cover or winter-warm side application only),
- Moisture permeable air impermeable house wrap, flame spread 25 (cold side cover),
- Netting to hold blown insulation in open cavity,
- FSK faced duct wrap insulation R-8 nominal 3” meeting ASTM C1290, and C1136 (facing),
- Soffit ventilation air chutes (propa vent or equivalent) for 16 or 24 inch rafter spacing,
- Insulated flex duct 4 and 6 inch diameter for exhaust fans

5.5 INSULATION MATERIALS

- Cellulose (blown-in) loose fill insulation meeting ASTM C739, 16 CFR 1209, 1404,
- Specific Cellulose ICC ES reports required for fire rated details (e.g. ESR-1996 US Greenfiber, ESR-2217 NuWool),
- Mineral fiber batt and blanket insulation meeting ASTM 665,
- Mineral fiber (blown-in) loose fill insulation meeting ASTM C764,
- Fiberglass wool engineered for resisting airflow to less than 3.5cfm/sq ft @50pa, and tested to ASTM C522 (e.g. JM Spider, Knauf Perimeter Plus)
- Rigid closed cell foam boards meeting ASTM C578, ICC ES AC12,
- Specific foam board ICC ES reports required for uncovered use (e.g. NER-681 Thermax, ESR 2142 Dow XPS),
- Rigid Fiberglass faced insulation boards meeting ASTM C553, C612, and C 1136 for facing

6.0 INSTALLATION

6.1 AIRSEALING

Installation of air sealing materials shall follow the Massachusetts Building Code (780 CMR) and manufacturers' instructions.

Prior to installation, test results shall be provided to Mass Save in ICC ES reports or UL listed detail where specific testing is required by code for a specific use. (For example, low density foam left exposed in an unoccupied attic space, cellulose fiber installed as an air retarder and fire-stop in a rated wall between units.)

Approval by the local code authority having jurisdiction must be obtained in writing prior to installation for uses beyond the specific listing.

6.1.1 Performance Criteria

CONTRACTORS will clearly define where the pressure and thermal boundaries of the home are to be, and insure that access hatches, framing voids, and chimney, plumbing and wiring chases between the conditioned space and unconditioned attics, knee walls and other buffer zones are tightly sealed.

Air sealing measures at all openings between intact building materials shall be continuous, durable, able to support all expected loads, and impermeable to airflow as indicated by chemical smoke at a pressure difference of 50 Pascals.

6.1.2 Conditions for Materials Use

a. Air impermeable barrier materials and sealants shall be used within their listing and installed in conformance with all applicable codes and manufacturer's recommendations.
b. Sealant materials applied to exposed joints in interior or exterior finish shall meet all performance requirements, blend in with adjacent materials, and be acceptable to the owner.
c. Backing shall be provided for any sealant installed in gaps wider than 3/8" whether exposed or covered and all joints shall be tooled.
d. Rigid barriers shall be cut to friction fit openings with gaps not more than 1" for foam sealant and extra material on edges for fasteners.
    I. Support shall be provided to prevent sagging.
    II. Larger enclosures of rigid foam or fiberglass board barrier material for pipes, whole house fans, or fold down stairs shall be fastened and sealed at all edges with weatherstrip provided at operable joints and edges sealed to the substrate where fixed.
e. Only non-combustible rigid barriers such as sheet metal or cement board shall be used to bridge the clearance space to heat sources such as chimneys and metal combustion vents.
f. Only non-combustible sealants such as furnace cement or E 136 rated caulk shall contact solid fuel chimneys or oil vents; for gas vents high temp (500 F, 600F) silicone RTV approved for gas vents may be used to seal the gap between the rigid barrier and heat source.
g. In addition to the airtight non-combustible barrier and seal at the opening, a clearance dam is required to maintain 3" or greater clearance around the chimney or vent for the full height of the insulation. Unfaced mineral fiber meets this criteria but a folded metal collar 2-4" taller than the final height of the insulation, folded into the vent to close the top space and fastened at the bottom and vertical seam is recommended.
h. 1 part sealant foam is listed for sealing gaps and annular spaces around penetrations of up to 1-5/16" in width and 1.5" full depth of wood plate for firestop. *Firestop foam is combustible and not allowed for use in contact with heat sources.*
i. 2-part sealant foam requires backing for openings from 2" to 4" wide and infill of rigid barrier material for openings wider than 4"
j. Insulation must be kept 3" or more away from the sides of a non-IC rated recessed light fixture including any wiring box or ballast and no insulation is allowed above.
    i. If an air tight box is installed to limit air leakage, it shall be sized for clearance from the fixture, taller than the adjacent insulation and with a non-insulating moisture permeable top of gypsum board or equivalent material.
    ii. If access does not allow installation of the box, 3" clearance from insulation is still required with no insulation allowed above.
    iii. The gap between the fixture and ceiling may be sealed with silicone or joint compound.
    iv. For airtightness and insulation continuity, replacement with an airtight IC rated fixture or infill of the opening and replacement with a flush mount fixture are preferred alternates.
k. Dimensional limits:

i. Siliconized acrylic shall not be used in openings or cracks over 3/16" without a backer, and generally should not be used in openings or cracks more than 3/8".
ii. Pure silicone shall not be used in openings or cracks over 3/8" without a backer, and generally should not be used in openings or cracks more than ½".
iii. Foam shall not be used to span gaps or openings more than 1 ½" without a backer material.

l. Foam sealant will not be used where exposed to sunlight or other ultraviolet sources. It will not be used near any heat producing device.

6.1.3 Typical Air Sealing Locations

In every specified work area: locate, uncover and seal all building air leakage pathways between conditioned and unconditioned areas.

These areas can include accessible attics, side attics, crawlspaces, unconditioned basements, attached garages, and leakage from basement to outside; gaps, penetrations and fixture openings that allow interior air into inaccessible roofs, slants and outside wall cavities; and major direct openings between conditioned space and outside.
Basements are typically semi-conditioned spaces, and air sealing between the basement and the living space is therefore not warranted in the scope of work.

6.1.4 Common air leakage details include but are not limited to:

- Dropped soffits, dropped ceilings and ceiling height changes
- Plumbing wet walls, duct chases, duct seams, joints and boot leaks
- Chimney and combustion vent chases
- Openings behind and under tubs, showers, and tub/shower enclosures
- Wall tops open into attic, gaps between gypsum ceiling and wall plates
- Annular space at wiring, pipe penetrations through plates, and at ceiling fixtures
- Floors open under kneewalls, walls open at level changes and gable ends
- 2nd story floors open to attached roofs over porches and additions or garages
- Inside framing open into attic stairs and landings,
- Pocket door framing open into floor above and exterior walls
- Seams and openings in walls and ceilings between attached garages and house
- Non-IC recessed light fixtures. IC rated fixtures with no airtight insert
- Bath and kitchen fans venting into the attic
- All joints seams and penetrations in surfaces without an air retarding membrane
- Gaps in tongue in groove paneling where angles change at hips, valleys, and where walls meet slants and ceilings.
- Acoustical tile and suspended ceilings with no gypsum
- Missing gypsum behind decorative ceiling light trays; built in cabinets in kneewalls
- Missing gypsum or open joints above decorative ceiling beams
- Gaps below baseboard and behind carpet nailing strip at subfloor joint to exterior wall
- Common wall openings between dwelling units
- Attic access openings, operable doors and hatches without tight weatherstrip
- Pull down attic access stair covers
- Rim joist junctions and gaps between sill and foundation.
- Utility penetrations and direct openings through foundation walls
- Openings in gypsum board above suspended ceiling and behind cabinets

- Openings between window and door assemblies and their respective jambs and framing

6.1.5 Confirmation of Air Sealing Effectiveness

Confirmation that air sealing is continuous across all openings in a specified area shall be performed by one of the following methods:

- Visual inspection of air leakage locations,
- Visual inspection aided by a chemical smoke test during blower door operation,
- Whole building air leakage test.
    - Whole building air leakage test results of equal to or less than 5 air changes per hour at 50 pa (5 ACH_{50}) or 0.25CFM_{50} per sq ft of enclosure will qualify as completed airsealing.
    - The air leakage test shall be made following equipment manufacturers instructions and in conformance to Standard CAN/CGSB 149.10-1986, ASTM E-1827-07, or ASTM E-779-03,or
- Infrared inspection of the area aided by blower door operation.
    - When performed on a specified area or whole house, infrared inspection shall be done in accordance with ASTM C1060 (1997) and air leakage pathways determined using ASTM E1186 (2009).

6.2 DUCT SEALING/ DUCT INSULATION

All ductwork in attics or vented crawlspaces shall be sealed at all joints, seams, connections and boots, and insulated per the Massachusetts Building Code.

Exception: When ducts are brought within conditioned volume of the house, no duct sealing or testing is required.

6.2.1 Open existing duct insulation, if any, as required to gain access to all connections, joints, start collars and boots. Replace deteriorated flex duct with new where repair not practical.

6.2.2 Duct seams and joints shall be sealed with water based mastic, with gaps ¼" and larger reinforced with fiberglass mesh tape.

a) Alternate: joints shall be cleaned and sealed with butyl backed aluminized tape meeting UL 181FXB.

6.2.3 Post Sealing Tests

a) When the sealed ducts do not exceed 25% of the total duct system, the contractor shall run air handler and test with chemical smoke to confirm completeness of sealing.
b) When duct sealing is performed on more than 25% of the total duct system, contractor shall:
    I. Perform pressure pan testing of branches sealed, with blower door at 50pa and the air handler off, and

    II. Arrange for a licensed HVAC technician to confirm adequate system airflow, and notify the program that such work is complete. Post installation testing of duct leakage to the exterior and airhandler flow under normal operations shall be made conforming to ACCA QI 5 or ASHRAE 152.

6.2.4 Insulate supply and return ducts outside of conditioned space to a minimum of R-8 except where R-5 duct insulation is in place prior to work. Repair any damaged facing and infill missing insulation needed after opening existing duct wrap for sealing.

6.3 ATTIC INSULATION

Installation must meet or exceed the Massachusetts Building Code. Criteria for the installation of insulation include but are not limited to the additional standards set forth below.

6.3.1 Attic Air Sealing Confirmation

Before insulating the attic, the CONTRACTOR will confirm that all bypasses at chimneys, soil stacks, perimeter walls, dropped ceilings, kneewall floors and wall openings, non-IC recessed light enclosures, other attic air sealing is complete per section 6.1 above. If these areas are not properly sealed, CONTRACTOR must notify program to determine next steps before proceeding.

Thermal insulation shall not be installed above a recessed light fixture or within 3 inches of the fixture's enclosure, wiring compartment, or ballast unless it is identified for contact with insulation, Type IC.

6.3.2 Attic Duct Work

Confirm all attic ductwork is sealed and insulated as per section 6.2 above. If these areas are not properly sealed and insulated, CONTRACTOR must notify program to determine next steps before proceeding.

6.3.3 Attic Preparation

Confirm attic prep per ASTM C1015-06 and MA Basic Insulation Authorization including:

a. Clearance dams that maintain 3" space confirmed installed at all combustion vent heat sources,
b. Clearance dams installed at attic access, bath fans, air handlers and between blown and storage areas.
c. Permanent damming shall be installed around all attic hatch covers in a manner that will not interfere with the opening of the hatch cover, and that when opened will prevent insulation from falling into the living area.
    i. The dam shall be made of ½" thick or greater wood and be tightly sealed at the base and seams, or fiberglass batt laid flat on all four sides around the hatch.
    ii. Insulation surrounding the dam must equal the R-value of the rest of the attic space;
    iii. Insulation should not taper to the damming or be less because of the height of the dam.
d. Install vent chutes at all soffit vents and provide wind baffles or block under chutes,
e. Connect attic bath and kitchen fans to exterior with sealed insulated ductwork,
f. Provide thickness markers 1/300 sq ft for open blow area.

6.3.4. Attic Access Doors

a. Insulate and tightly weather-strip attic access doors.
b. Fasten rigid insulation to access hatches. If infeasible, fiberglass batts may be used.
c. Provide minimum R-14 to hatches and R-10 enclosure at pull down stairs (with air seal gasket, e.g., Thermadome) and behind walkup doors.
d. Rigid foam used shall be rated for exposed use in attics on ICC ES report.
e. Provide latch or hook fastener to keep hatch tight against weatherstrip when closed.

6.3.5 Attic Ventilation

a. Provide attic ventilation per code if included in Scope of Work.
b. Provide access openings to inaccessible attics where feasible.

6.3.6 Flat Attic Insulation

a. Blow in attic insulation level over entire area specified at the depth required to give the required settled R-value.
b. Use the number of bags to meet listed coverage per manufacturers' specifications.
c. Provide attic information card per ASTM C1015-06 and 16CFR 460 requirements.
d. The installer must provide a signed and dated statement describing the:
    i. Insulation installed,
    ii. Installed thickness,
    iii. Coverage area,
    iv. *R*-value,
    v. Number of bags used or pounds installed Per FTC Rule 16 CFR 460.

6.3.7 Sloped Ceiling Insulation

Sloped ceilings (between kneewall and upper attic flat) will be densepacked per section 6.5.3.

Exception: Where interior surface will not support densepack, reduced density is allowed.

6.3.8 Open Cavity Insulation

a. Install mineral fiber batt or blanket insulation in all open wall cavities or open floors to R-value in work scope.
b. Installation of blanket or batt insulation shall conform to ASTM C1320 with cavities completely filled with no voids, gaps or compressions.
c. Batt insulation MUST always be installed in full contact with the warm side air barrier.
d. Batt insulation installed in walls MUST always have a solid air barrier on all six sides of the cavity when access allows.
e. Batt insulation with a kraft or foil covering msut be "face stapled" to the framing or frictin fit.
f. Loose fill insulation (cellulose or mineral fiber) is allowed in open walls, open floors, when sprayed in or blown behind netting, rigid foam, drywall, or other barriers.

6.3.9 Rigid Foam Board

Where rigid foam board is installed over mineral fiber batt insulation or on another attic surface, use foam board listed for uncovered use in attic. As an alternative, install a thermal barrier or prescriptive ignition barrier per IRC 2009 R316.5.3 and MA code.In all cases follow manufacturer's installation requirements.

6.3.10 Floor Blocking

Where present, the kneewall floor joist opening from the attic floor to conditioned space under the kneewall shall be blocked airtight with a rigid barrier sealed place below the interior face of the kneewall.

6.3.11 Dense Pack Floor Insulation

At floored areas inaccessible to air sealing using barrier materials, CONTRACTOR shall densepack to retard airflow. Acceptable materials include:

a. cellulose insulation at 3.5 lbs/cu ft or greater density;
b. fiberglass wool tested for air resistance at 2.2 lbs/cu ft or greater density.

Methods can include lifting one floorboard to gain access to each cavity and inserting a 2 to 2-1/2" insulation hose into the floor for faster production. Material use shall be confirmed to match bags used per unit area to achieve density targets.

6.4 ATTIC VENTILATION

6.4.1 Provide attic ventilation per code with roof, soffit, gable, ridge vent or a combination. Provide soffit vent chutes for each soffit vent.

6.4.2 Follow all manufacturer's instructions and applicable codes. Flash properly, seal and fasten to maintain roof and cladding drainage.

6.5 CLOSED SIDEWALL INSULATION

6.5.1 Performance criteria

In existing closed cavities where air sealing is not feasible, densepack insulation into every cavity to prevent settling with no voids or escape routes for heat and get an extra benefit of reduced hidden airflow and protection that wraps around the whole house and connects to the airtight attic.

6.5.2 Pre-Work Inspection Criteria

Pre inspections are to be performed in compliance with ASTM C 1015 and MA Insulation Authorization. Inspect all walls for pre existing hazards including:

- moisture entry and buildup,
- weak or damaged interior finish materials,
- hazardous wiring, and
- potential heat sources in or adjacent to wall cavities.

Confirm that cavities are intact and openings into the house are blocked.

6.5.3 Wall Insulation Procedure

a. Gain access to every wall cavity.
b. Pack insulation uniformly into all corners.
c. Confirm the number of bags and pounds of material used for a specified area of 4" wall cavities is consistent with:
    i. 3.5 lbs/cu ft (1lb/sq ft) for cellulose, or
    ii. 2.2lbs/cu ft (0.6lb/sq ft) for fiberglass wool tested for airflow resistance by demonstrating low airflow on ASTM C 522.
d. In cases where wall finish is intact but will not support 3.5 lbs/cu ft density, use material listed for 2.2 lbs/cu ft.

6.5.4 Wall Cavity Confirmation

Confirm cavity pack is effective and the machine adjustment is within limits by:

a. testing airflow at 50 pa with smoke at a completed but uncovered installation hole, or
b. testing airflow with chemical smoke at first application hole in completed cavity while blowing adjacent cavity.

6.5.5 Inspection

a. Void areas greater than 10 sq ft per 1000 sq ft of achievable wall area, as determined by Program quality assurance procedures, shall be filled by the CONTRACTOR at no additional cost to the homeowner or the program. The CONTRACTOR will return to correct job deficiencies within 14 days of notification.

6.6 FLOOR INSULATION

Floor systems that are determined to be the thermal boundary will be insulated and air sealed in accordance with Massachusetts Building code and Mass Save Application Details.

6.6.1 Performance criteria

An air barrier shall be created across subfloor by sealing large gaps and openings including any ducts in unconditioned space. Floor insulation shall cover all exposed subfloor to level specified for as continuous a thermal barrier is possible.

6.6.2 Preparation

a. Airsealing of a crawlspace or basement ceiling shall be performed per section 6.1 above and the MA Basic Airsealing Authorization.
b. Inspection before installation shall be made in conformance with ASTM C1320-09.
   i. Inspect the attic, crawlspace, or other area to be insulated, postpone installation until:
      - Potentially faulty wiring is corrected and confirmed OK by a licensed electrician
      - Moisture damage and/or entry is corrected and sources controlled
      - Ground cover is in place over exposed soil in crawlspaces wherever possible. Uncovered conditions must be disclosed to customer.
      - All openings allowing air between conditioned space and attic are sealed
c. Confirm that caulk, gasket, or other sealant is installed at penetrations of the interior wall or floor including plumbing, electrical, heat registers, and grills.

6.6.3 Installation

a. Installation of mineral fiber batt or blanket insulation in open cavities shall be made in conformance with ASTM C 1320 and MA code. Exception, facing if any shall be in direct and complete contact with interior surface - no inset stapling allowed in floor.
b. Installation of cellulose or fiberglass blowing wool into closed cavities shall be made in conformance with attic floor insulation methods above 6.3.11 or wall insulation in 6.5.
   - access shall be gained into every cavity with least damage possible and lead safe process in place for painted surfaces in homes built prior to 1978.
   - material use per unit area shall match weight required to give target densities of 3.5lbs/cu ft for cellulose and 2.2lbs/cu ft for fiberglass wool tested for airflow resistance
c. Install batt or blanket insulation to:
   - Maintain 3” clearance from non-IC rated lights and heat sources, none placed above
   - Completely fill every cavity to required depth or more
   - Where double layers are installed over floors, cross the layers with no gaps between layers

d. Where batt fiberglass is installed beneath floors, insulation shall be in full contact with floor above using wire, screen, nylon mesh fastened in place
   - Fit to length and placed snug to edges without gaps, voids or compressions

- Cut and fit around all cross-bracing, outlets, wiring, into narrow cavities
- No exposed facings rated higher than flame spread 25 left
- Where vapor retarder is installed, place to warm-in-winter side
- Never place insulation between piping and the warm side of the wall, to prevent freezing

6.6.4 Rim Joist Insulation

a. When approved within the scope of work, rim joist framing determined as the thermal boundary shall be insulated to a minimum of R-10 with spray polyurethane foam or rigid foam board and be sealed as defined in the air sealing section of this document. Where spray foam or rigid board are infeasible, other insulation materials may be used, such as 1-part foam with fiberglass batt.
b. CONTRACTOR will confirm no insulation is placed between piping and the warm side of the rim joist framing to prevent freezing.

6.7 FOUNDATION INSULATION

When approved within the scope of work, foundation walls that are determined as the thermal boundary may be insulated to a minimum of R-10 and be sealed as defined in the air sealing section of this document. Prior to application, confirm that roof runoff, surface water, and ground water are drained properly.

6.7.1 Performance criteria

Basement or crawlspace shall be brought inside the thermal/pressure boundary by installing rigid insulation at inside of foundation wall, sealed from subfloor to below grade.

6.7.2 Preparation

Primary air leakage shall be substantially reduced by sealing gaps at the rim joist, sill and surface of the foundation wall.

6.7.3 Installation

a. For basements attach R-5 or higher foil faced isocyanurate board listed for uncovered use to foundation wall, full height; and cut pieces to fit into rim joist and across sill. Seal gaps in foam board edges at rim and sill; and tape seams in foam board on wall
b. For crawlspaces attach R-5 or higher XPS rated for uncovered use in crawlspaces to foundation wall, to 24 inches below grade; and cut and fit pieces to fit into rim and across sill. Seal gaps in foam board edges at rim and sill and tape seams in foam board on wall.
c. If XPS foam board is installed in a basement beyond the listing for uncovered use, follow a. and cover foam with thermal barrier

6.8 WEATHERSTRIPPING

Approved window weatherstripping shall be attached as per manufacturers instructions to meeting rail, sill & sash channels. (Note: if applicable, PF-524-AB may be stapled to the sash itself instead of sill & sash channels.) Door weatherstripping installed on interior of doors will be stapled to top and both sides of door. Approved door sweeps shall be attached as per manufacturers instructions to bottom of door.

7.0 WINDOW REPLACEMENT

Windows shall be installed according to manufacturer's instructions to assure proper operation and moisture protection. Rough openings shall be sealed to be air sealed to be air tight prior to installation of casings and sills. Newly installed windows shall be inspected and verified for proper operation of all hardware and locking mechanisms.

Refer to EPA guidelines and local codes for requirements for retrofit window installations in locations where lead and/or asbestos may be present.

8.0 HEATING SYSTEM REPLACEMENT

The furnace or boiler that is to be installed must meet the minimum AFUE ratings set by the Mass Save program. Installation is to be completed in accordance with the manufacturers' instructions while following the State and Local Codes. Any questions should be communicated with the PROGRAM and/or Authority Having Jurisdiction.

9.0 AIR CONDITIONING SYSTEM MEASURES

The air conditioning system that is to be installed must meet the minimum energy ratings set by the Mass Save program. Installation is to be completed in accordance with the manufacturers' instructions while following the State and Local Codes. Any questions should be communicated with the PROGRAM and/or Authority Having Jurisdiction.

10.0 VENTILATION SYSTEM INSTALLATION

The ventilation system that is to be installed must meet the minimum energy ratings set by the Mass Save program. Installation is to be completed in accordance with the manufacturers' instructions while following the State and Local Codes. Any questions should be communicated with the PROGRAM and/or Authority Having Jurisdiction.

11.0 LIGHTING MEASURES

The lighting unit that is to be installed must meet the maximum energy use set by the Mass Save program. Installation is to be completed in accordance with the manufacturers' instructions and fixture restrictions.

12.0 DOMESTIC HOT WATER MEASURES

The domestic hot water unit that is to be installed must meet the minimum Energy Factor ratings or energy efficiency ratings set by the Mass Save program. Installation is to be completed in accordance with the manufacturers' instructions while following the State and Local Codes. Any questions should be communicated with the PROGRAM and/or Authority Having Jurisdiction.

13.0 QUALITY ASSURANCE

Quality Assurance (In-field Quality Assurance Inspections)

Customer Discussion
Visual Inspections and Diagnostic Tests
Inspection Documentation

Contractor Follow-up

The program has the goal of performing on-site in-process and post installation quality assurance inspections where major measures have been installed.

Any issues identified during on-site inspections will need to be successfully addressed prior to release of CONTRACTOR payment.

Contractor Evaluation

CONTRACTORS will be evaluated on an ongoing basis throughout the Program Year. CONTRACTORS should expect random quality control evaluations on a minimum of 10% of their jobs. This is in addition to the standard Final Inspections performed on all work. Evaluations will be performed by Final Inspectors, Field Supervisors, Program Managers, and/or the Quality Control Department, using a standard evaluation format (see Evaluation Form Attachment).

CONTRACTORS who fall repeatedly below 75% on evaluations, and CONTRACTORS who repeatedly receive more than 25% fails (excluding Assessor fails) on jobs, are subject to a 30 day probationary period and additional training as determined by the Quality Control Department. CONTRACTORS who fail to improve after their probationary period are subject to suspension and/or termination as UTILITY Approved CONTRACTOR.

In addition, CONTRACTORS who repeatedly fail to meet timelines, generate an undue number of CUSTOMER complaints, and fail to adequately fulfill warranty obligations are eligible for suspension and/or termination.

14.0 Program Sponsors

Bay State Gas
Berkshire Gas
Cape Light Compact
National Grid
New England Gas
NSTAR Electric & Gas
Unitil
Western Massachusetts Electric

15.0 REFERENCES:

Documents Published by the Canadian General Standards Board (CGSB)
Place du Portage, III, 6B1Gatineau,
Québec, K1A 1G6 Canada
Telephone: (819) 956-0425; Fax: (819) 956-5740; www.pwgsc.gc.ca/cgsb
CAN/CGSB 51.71-2005 Depressurization Test

Documents Published by the National Fire Protection Association (NFPA)
1 Batterymarch Park
Quincy, MA 30169-7471
Telephone: (617) 770-3000; Fax: (617) 770-0700; www.nfpa.org
NFPA 54-2006, ANSI Z223.1-2006 National Fuel Gas Code

16.0 APPENDICES

16.1 Health and Safety Guidance
16.2 K &T Form 2008
16.3 Application Details

APPENDIX 16.1

HEALTH AND SAFETY GUIDANCE

ASBESTOS

Health/Safety Concerns: The US Environmental Protection Agency's description is: "The most dangerous asbestos fibers are too small to be visible. After they are inhaled, they can remain and accumulate in the lungs. Asbestos can cause lung cancer, mesothelioma (a cancer of the chest and abdominal linings), and asbestosis (irreversible lung scarring that can be fatal). Symptoms of these diseases do not show up until many years after exposure began. Most people with asbestos-related diseases were exposed to elevated concentrations on the job; some developed disease from exposure to clothing and equipment brought home from job sites."

Sources in Homes: Until its use was strictly limited in the 1970s asbestos was used in a large number of building products. The most common applications that could involve interaction with weatherization personnel include:

- boiler insulation
- furnace insulation
- pipe insulation
- duct insulation
- asbestos cement sidewall shingles
- vermiculite insulation
- floor tiles
- acoustical materials

To minimize exposure:

- Learn to recognize suspected asbestos containing materials.
- Avoid disturbance of friable asbestos containing materials (ACM). Friable asbestos is "any material containing greater than one percent asbestos by weight or volume that hand pressure can crumble, pulverize or reduce to powder when dry, or any asbestos containing materials that can reasonably be expected, as a result of the demolition or renovation to be undertaken, to become pulverized through breaking, chipping, crumbling, crushing, or other means of rendering fibers available to the ambient air."
- DO NOT CONDUCT A BLOWER DOOR TEST ON A BUILDING WHERE **FRIABLE** ASBESTOS IS PRESENT.
- When Asbestos Cement sidewall shingles are removed and reinstalled as part of a wall insulation procedure, the CONTRACTOR must complete the work in compliance with the requirements of the Massachusetts Department of Environmental Protection.

This information is a general program guidance for Weatherization personnel and does not provide the detailed specifications for the proper handling of ACM. State law concerning asbestos abatement can be found in Commonwealth of Massachusetts Department of Public Health Asbestos Abatement Regulation; CMR 410.353 and 453 CMR 6.00, THE

REMOVAL, CONTAINMENT OR ENCAPSULATION OF ASBESTOS (http://www.alewife.org/asbestos/453cmr6.txt)

LEAD

Health/Safety Concerns: Ingestion or absorption of lead into the blood stream is a serious health hazard causing brain damage over a period of time. This can be a particularly serious problem with small children, who may ingest paint chips or flakes, or dust contaminated with lead products. Serious learning disabilities can result from excessive lead levels in the bloodstream. Workers can be contaminated in the same way as children, but are most likely to be exposed by breathing dust contaminated by sanding or planning surfaces that contain lead based paints.

Sources in Homes: Lead paint is the primary source of lead in a home that was built prior to 1978, when lead became prohibited as an ingredient in paints. Contamination occurs when lead paint is disturbed by drilling, sanding, chipping, or flaking. Lead is also present in the solder used in plumbing pipe joints. Lead can leach into potable water, particularly when water is stagnant in the pipes for a length of time. To a lesser degree, lead contamination can result from inks used in newspapers and magazines.

To minimize risks to CUSTOMERS and Weatherization personnel:

DO NOT DISTURB LEAD PAINT UNLESS ABSOLUTELY NECESSARY AND THEN ONLY BY INDIVUALS CERTIFIED TO COMPLETE WORK USING LEAD-SAFE PROTOCOLS. CONTRACTORS should assume that any paint on windows and doors in homes built before 1978 contains lead unless it has been verified otherwise. **WHEN THERE IS A POSSIBILITY OF DISTURBING LEAD DURING THE WEATHERIZATION PROCESS, CONTRACTORS MUST COMPLETE THE WORK IN A LEAD-SAFE MANNER IN ACCORDANCE WITH EPA AND MASSDEP REGULATIONS.**

Worker Protection: Detailed specifications regarding the health and safety of workers in the construction industry can be found in Construction Industry OSHA Safety and Health Standards (299CFR 1926/1910) and the specific worker safety requirements in the EPA's "Lead; Renovation, Repair, and Painting Program" (LRRPP) Final Rule. **Also refer to Section 5.13 Lead- Safe Weatherization within the Northeast Weatherization Field Guide.**

ALL CONTRACTORS WORKING IN THE MASS SAVE PROGRAM MUST RECEIVE LEAD-SAFE WEATHERIZATION TRAINING, BECOME CERTIFIED PER USEPA REGULATIONS, AND FOLLOW ALL RELEVANT TECHNCIAL AND ADMINISTRATIVE PROCEDURES pursuant to 40CFR Part 745.225.

LEAD SAFE WEATHERIZATION INFORMATION

EPA and MASSDEP are the guiding authorities for Mass Save work.

When Should Lead-Safe Practices be followed?

According to the U.S. EPA, Lead-Safe practices shall be followed when all three components of the following set of criteria are met:

1. The dwelling was constructed before 1978

2. The dwelling has not been determined to be lead-based paint free, and
3. Either, the amount of disturbed lead-based painted surface exceeds six square feet per room of interior surface or twenty square feet of exterior surface.

Renovation Notice About Lead Safety

Federal law requires that owners and occupants of a house or apartment built before 1978 receive the EPA pamphlet, "Renovate Right Important Lead Hazard Information for Families, Child Care Providers and Schools", prior to the start of the renovation work. A written notification of receipt from an adult resident of the home must be received. If this receipt can not be obtained, this requirement can be satisfied by sending the occupant the pamphlet by certified mail with the receipt included in the client file.

Post Weatherization Cleanup

Clearance testing is not a requirement for weatherization work and is not an allowable expenditure of DOE funds. Cleanup at the completion of Lead-Safe Weatherization work requires the use of a HEPA vacuum, (a HEPA filter in a standard vacuum is NOT an acceptable alternative) wet cleaning methods, a visual inspection and the collection and disposition of any dust, debris or chips with the rest of the jobsite waste.

Certification

All Weatherization Contractors must complete an EPA approved Lead- Safety RRP training and certification prior to participating in the Mass Save program. Per USEPA requirements, a certified individual must be on site to ensure proper work.

Pollution Occurrence Insurance Coverage

The following is DOE's most recent guidance concerning Lead-Safe Weatherization. While many of the mandatory regulatory requirements do not begin until April 1, 2010, DOE considers this guidance a "Best Practice" for Lead-Safe Weatherization work and the techniques outlined must be used as a guideline for working safely in homes that may contain lead.

WIRING

Safety Concerns:

- Electric shock while working around wiring in all areas of homes.
- Fire resulting from arcing between loose wiring connections.
- Fire resulting from lack of dissipation of heat due to insulation around heat producing sources (i.e. recessed light fixtures).
- Integrity and safety of knob and tube wiring.

To Minimize Risk:

- Workers must demonstrate caution when working around wiring.
- Verify proper wiring connections and proper fusing.
- Verify proper blocking out of insulation around heat producing sources.

APPENDIX 16.2
KNOB & TUBE WIRING

During the Energy Survey of your home, indications of "knob and tube" wiring were found. This old style of wiring involves individual wires that are run through walls and ceilings in a house, with ceramic "knobs" and "tubes" to prevent contact with wood framing. The knob and tube wiring that has been noted *may or may not appear to be active*. Even if the observed wiring appears to be inactive, there may still be active knob and tube circuits hidden inside walls or other inaccessible areas of the house.

Program guidelines require that you have the home checked by a licensed electrician and certified as being ***free of all active knob & tube wiring***, before insulation and/or air sealing work can be done. Your electrician should fill out and submit a copy of this document to Program Designee in order to verify the absence or inactivity of the knob and tube wiring in the areas of your home where we are proposing insulation to be installed. **Due to the liability involved in signing such a form, we suggest you show or describe this form to your electrician before hiring him to inspect your home to be sure he/she is willing to sign it.** Your home could benefit from insulation and/or air sealing in the:

- ☐ **Attic**
- ☐ **Walls**
- ☐ **Basement**

**** Only after this certification is received by Program Designee can a Contract be issued for energy saving insulation and/or air sealing work. ****

Electrician's Certification
(This form is invalid when any qualifications or alterations are added.)

Company Name &
Address_____

_____

___

Electrician's Name _____ License #
_____

I have performed an inspection of the wiring at the home of:

_____ at _____ in _____
.
(Owner's Name) (Street Address) (City)

Upon completion of my inspection I have found that there is no active knob and tube wiring in the area(s) noted below.

☐ Attic ☐ Walls ☐ Basement

Electrician's Signature _____ Date _____

APPENDIX 16.3

APPLICATION GUIDANCE

This Appendix is provided for additional guidance to the Contractor, and offers general information about materials and installation procedures.

Caulks and Sealants

1. Locations and use of caulks and sealants are governed by cost-effectiveness standards and procedures. The proper caulk will be matched to the location where it is applied. Consideration will be given to durability, paintability, adherence, color, toxicity, flammability, etc.
   i. Siliconized acrylics will generally only be used in interior locations or where paintability is important. When used in visible areas, customer must approve the application, and see a sample before continuing. Clear acrylics, due to their shiny appearance, must be used only where appropriate, and should be approved by the customer prior to use in visible areas. Clear acrylics should be avoided where possible due to greater shrinkage.
   ii. Pure silicone will generally be used in exterior applications, unless paintability is needed. Pure silicone will be used anywhere that sealants are needed between wood and metal, wood and concrete, or other materials with differential expansion as moisture and temperature vary, or where greater flexibility is needed.
2. Caulking is performed on the interior of the dwelling for general air leakage and to prevent moisture penetration into wall cavities.
3. Caulking is performed on the exterior of the dwelling to prevent bulk moisture from entering the envelope of the building and to seal areas of air leakage.
4. When appropriate, windows will be caulked along the full perimeter of the interior (or exterior), including sill area, side stops, apron, and casings.
5. When appropriate, doors will be caulked along the interior (or exterior) casings and door jambs/stops.

Cellulose Insulation

1. Cellulose insulation from most manufacturers is available in at least two grades that are characterized by the fire retardant added to the insulation. The fire retardants are usually 1) a mix of ammonium sulfate and boric acid or 2) boric acid only (termed “borate only”). Mass Save currently accepts both grades.

Insulation Baffles

1. When soffit vents are installed or existing, baffles shall be installed in the space connected to the soffit vents in such a way that the top plate can be insulated. Where possible, a clearance of 2" from the top of the baffle to the underside of the roof sheathing shall be provided in accordance with local building codes. Blocking should be permanent, mechanically fastened at sides and at bottom, and ensure the free movement of air through soffit vents into the attic, but not allow the air to "wind wash" the insulation and reduce its effectiveness. It should be rigid enough to restrain loose-fill insulation from congesting the soffit vents at the eaves and obstructing ventilation.
2. Baffles should be installed per work scope.. These should allow air to flow from soffit or kneewall area into peak. Baffles must be mechanically fastened at sides and at bottom and be carefully fit with insulation packed in place at the bottom to prevent wind intrusion into or under insulation. Flexible Styrofoam baffles may be used for very low pitch roof areas.

Attic Access

1. When ready access to the attic is not available through an existing opening, access to attic areas should be gained from the exterior through attic vent openings when possible. If this is not feasible, then the following criteria shall be used for access openings:
   a. Surface Openings: Cut existing wall board halfway on two studs (preferably through a closet). When closing the opening, the new materials must be flush with existing wall material and taped and covered with one coat of joint compound.
   b. Plywood Openings: Cut existing wall between two studs. Close opening with 1/2 plywood (G1S/AC) with four (4) 1 1/2" x 8 flat head wood screws secured into studs.
   c. Finish Openings: Cut existing ceilings. Head off opening. Install 2 1/2 casing around rough opening. Allow a 3/8" reveal into opening to receive 1/2" plywood (G1S-AC) to complete opening. Plywood cover to be weather-stripped and insulated. Casing to be mitered neatly. When drill and plug method is used on garage ceilings, the holes must be plugged with wooden plugs and finished with a spackle type compound flush with the existing ceiling.

2. In attics with existing fiberglass batts, remove the batt in the last joist bay on any gable end or other perimeter configuration that runs perpendicular to strapping ends. This space should be dense packed with blown-in cellulose or fiberglass wool tested for air resistance to reduce cavity air movement at the inaccessible floor wall joint.

Attic Ventilation

1. Do not install insulation in an attic space unless adequate and permanent ventilation is installed.
2. Adequate cross-ventilation shall be maintained above all attic insulation by providing both low and high vents or gable end vents where possible. One square foot of net-free vent area (NFA) shall be provided for every 300 ft2 of attic area with 50 to 60% of the vent area located near the roof ridge and 40 to 50% located near the eaves. One level of venting may be used provided that adequate cross ventilation can be maintained.

NOTE: Although the use of window vents is allowed, the vents must be permanently fixed and must meet the minimum requirements for free vent area as noted above.

3. Ventilation should be improved wherever reasonable and practical to meet current code requirements when attic insulation is installed. The details of the types of vents and where they may be practically installed on each specific house varies. Consideration should be given to the type and location of vents to provide as much cross ventilation as possible for the specific application depending on existing conditions and retrofit options.

Sidewall Insulation

1. Pre-Installation Requirements: Prior to starting a job, an interior and exterior inspection must be conducted by Contractor to determine any potential problem areas. These problem areas must be identified and addressed prior to working on that area. Examples of some problem areas are recessed radiators, duct work in wall cavities, recessed bookshelves, stairways on exterior walls, loose or cracked plaster on walls, poor siding, etc. Check wall areas for wall hangings that should be removed prior to working on walls. The process and the work that is to be performed should be explained to the CUSTOMER. Any potential problems discovered should be discussed with a CUSTOMER before commencing work.
2. Inspect cavity or framing detail for wiring, piping or ductwork. Do not densepack ductwork or space containing unsealed ductwork, or isolate plumbing from house – provide a sealed

barrier continuous to adjacent airtight cavities or building element. Provide wood or foam plugs in sheathing. Repair openings made in weather barrier, replace siding and refasten with matching or larger fasteners. Touch up nail holes with silicone based.sealant.

3. Installation Procedures
   a. All wall insulation shall be installed through holes with minimum diameters of 2 1/8” or greater, i.e. large enough to accommodate a fill tube. Exception: wall cavities less than 12” in height.
   b. Use of a fill tube to ensure consistent insulation coverage and density is strongly encouraged. Usually one hole is required per cavity, located to allow the fill to reach both ends of the cavity, with additional holes required if there are obstructions in the wall cavity.
   c. Contractor shall only use equipment compatible with the insulation material used or an all fiber machine. Contractor shall follow the manufacturer's recommendations for air pressure and density to achieve dense pack standards. Most small airlock machines are suitable if designed and maintained to provide at least 80 inches of water column or 2.9 PSI static air pressure when operated at full air with the outlet blocked and no feed. Dense pack requires at least 3.5 pounds per cubic foot or higher with a cavity depth over 4”.
   d. Keep a record of the number of bags used to insure the installed insulation conforms to the manufacturer's recommended coverage shown on the material label, 1 pound per square foot for 2x4 wall framing.
   e. Do not leave open holes in wall overnight. Any holes must be plugged before Contractor leaves work site.
4. Drill and Plug (D&P) Applications.
   a. Exterior drill and plug applications on painted surfaces must be completed in the following manner:
      i. After installation, insert the plug so it is flush or slightly (1/16") recessed. At edge irregularities apply one or two coats of an exterior rated filler (Durham Rock Hard wood putty, DAP exterior vinyl spackling or equivalent.)
      ii. This procedure also applies to drill and plug applications on windowsills, frieze boards, and entrances. Note: drilling window sills creates a serious water intrusion risk if not made watertight and should not be performed where a pan flashing or sill wrap is in place. Do not drill sills on homes built since 1990. Foam or urethane sealant below the surface plug may reduce water entry but cannot return integrity of pan flashing.
   b. Exterior drill and plug applications on stained surfaces must be completed in the following manner:
      a. After installation, insert a plug so that is it flush with the existing siding. The plug should be installed by placing a block of wood over the plug and tapping it until the plug is flush with the siding.
   c. Interior drill and plug applications must be completed in the following manner:
      a. After installation, insert a plug so that it is (3/8") recessed. Apply 1-2 coats of setting joint compound, Durabond 90 or equal, patching material or a plaster repair product filling just flush to the existing surface. Allow to dry and skim coat with joint compound or spackle.
      b. Some examples of this application would be exterior walls (not done from the outside), stairway walls, garage ceilings, and slopes.

Post-Installation Procedures

The Contractor shall review the entire job to ensure that all aspects of the job are completed. Before leaving the work site, the Contractor shall assure:

1. All the siding repaired and/or reinstalled
2. All paint touch-up work is completed
3. Shutters are reinstalled
4. The outside work area and yard are cleaned up to pre-existing conditions
5. The basement/house is cleaned of all debris
6. The client satisfied with the quality of the work
7. The Program incentive application is complete with all documentation attached

Weatherstripping

1. All weatherstripping will be permanently installed with fasteners (tacks, staples, brads, etc.) and will make positive contact between surfaces to prevent air leakage.
2. Window weatherstripping
    a. “Three-sided:” LOWER sash channels, & sill; or, if window has spring loaded channels: top, bottom and meeting rail.
    b. “Four-sided:” LOWER sash channels, meeting rail & sill
    c. “Seven-sided:” UPPER & LOWER sash channels, meeting rail, sill & head jamb
3. The weatherstripping will form an air tight seal when the window is closed and latched. A small bead of caulk will be applied as necessary to prevent air leakage behind the weatherstripping
4. The weatherstripping will not interfere with the smooth operation of the door or window.
5. Attic hatch or scuttle openings
    a. Weatherstripping will be permanently affixed to hatch or framing. Generally “Q-lon with carrier” or equivalent is preferred.
    b. A positive closing mechanism will be installed on the hatch if needed.
    c. Existing access to the attic will be maintained.
    d. In the case of drop down folding stairs, an air tight, insulated cap will be built over the opening.
    e. Kneewall access doors will be treated like attic hatch doors whenever possible.

Floor Insulation

1. Locate and note the pathways that plumbing, wiring, heat runs, air return runs and gas lines take through the enclosed floors. Also note any recessed light fixtures in these floors or in nearby floor areas which share the same joist cavities. Take steps to assure that the installation of insulation will not damage or in any way hinder the normal function of those services. In some cases, cavities or groups of cavities may have to be left uninsulated.
2. Insulation should be blown into enclosed floors to capacity.
3. When the drill and plug method is used on garage ceiling, the holes must be plugged and finished with a spackle type compound flush with the ceiling.
4. When the drill and plug method is used on exterior floor overhangs, the holes must be plugged and finished with an exterior wood filler flush with the exterior surface.

APPENDIX 15.4

PROGRAM FORMS

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Attachment 6

SCHEDULE OF UNIT PRICES

a. The following is the current list of Immediate Saving Measures and Weatherization Measures referenced in the body of this document and its' attachments. CSG may modify this list at any time, upon reasonable notice to CONTRACTOR. No products other than items on this list, or a replacement list issued by CSG, may be used without prior written approval by CSG.

b. CONTRACTOR will not knowingly use any defective, second quality or previously used materials.

Part 1- Immediate Saving Measures

NSTAR & National Grid 2011 ISM Prices	
DESCRIPTION	**Price**
15w Harmony Spiral	$6.00
20w Harmony Spiral	$6.31
25w Harmony Spiral	$6.45
Phillips 15w R-30 Reflector	$15.25
GE 15 w R-30 Dimmable Flood	$15.97
TCP 14w A Lamp	$10.81
15w Feit Globe	$8.45
33w Harmony 3-way	$10.46
9w TCP Candle Base	$10.86
15w Max Dim Spiral	$14.08
TCP 14w R20 Dim	$14.40
14 w TCP Globe	$8.20
TCP 14w Mini Spiral Lamp	$5.93
Sylvania 15 watt Dimmable	$15.85
Phillips 16w R-30 Reflector	$16.50
14w Neptune R20 Dim	$14.40
23w TCP Spiral	$6.13
33w 3-way Earthmate	$11.00
Flip Aerator (2.2gpm)	$5.00
Standard Aerator (1.5gpm)	$2.00
1.7gpm Earth Showerhead	$10.00
Instant Thermostat Rebate	$36.00
Instant Thermostat Rebate w install	$86.00

Part 2- Schedule of NSTAR Unit Prices for Weatherization Measures & Schedule of National Grid Unit Prices for Weatherization Measures

NSTAR Electric & Gas Mass Save Home Energy Services 2011 Insulation Measures Pricing		
Description:	**Price:**	**Units:**
Air Sealing-Hours	$77.00	per hour
6mm PolyVB crawlspace	$0.82	per sq.ft.
Therma-Dome	$187.00	each
Therma-Dome with carpentry	$208.00	each
House Wrap	$0.77	per sq.ft.
House Wrap Overhead	$1.02	per sq.ft.
Propavent 2' or 4'	$3.50	each
Fiberglass Batt Removal	$1.05	per sq.ft.
Aluminum soffit vent (4"x16')	$28.50	each
Aluminum soffit vent (6"x16')	$28.50	each
Aluminum soffit vent (8"x16')	$28.50	each
Aluminum gable vent (12"x12")	$95.00	each
Aluminum gable vent (12"x18")	$95.00	each
Aluminum gable vent (12"x24")	$95.00	each
Aluminum gable vent (18"x24")	$95.00	each
8" Roof Vent	$91.00	each
12" Mushroom Vent	$126.00	each
Vent bath fan to gable end	$110.00	each
Vent bath fan to roof flapper	$118.00	each
Vent bath fan/soffit exhaust	$115.00	each
Replace Bath Fan Hose	$22.00	each
Temporary access	$78.50	each
Sheathing access	$33.00	each
Cut and finish access	$104.00	each
Hatch: Polyisocyanurate 2"	$34.00	each
Door: PolyIsocyanurate 2"	$50.00	each

Open Attic 3" Cellulose	$1.16	per sq.ft.
Open Attic 4" Cellulose	$1.20	per sq.ft.
Open Attic 5" Cellulose	$1.24	per sq.ft.
Open Attic 6" Cellulose	$1.28	per sq.ft.
Open Attic 7" Cellulose	$1.32	per sq.ft.
Open Attic 8" Cellulose	$1.36	per sq.ft.
Open Attic 9" Cellulose	$1.40	per sq.ft.
Open Attic 10" Cellulose	$1.44	per sq.ft.
Open Attic 11" Cellulose	$1.48	per sq.ft.
Open Attic 12" Cellulose	$1.52	per sq.ft.
Floored Attic 4" Cellulose	$1.44	per sq.ft.
Floored Attic 5" Cellulose	$1.48	per sq.ft.
Floored Attic 6" Cellulose	$1.52	per sq.ft.
Floored Attic 7" Cellulose	$1.56	per sq.ft.
Floored Attic 8" Cellulose	$1.60	per sq.ft.
Floored Attic 9" Cellulose	$1.64	per sq.ft.
Floored Attic 10" Cellulose	$1.68	per sq.ft.
Floored Attic 11" Cellulose	$1.72	per sq.ft.
Floored Attic 12" Cellulose	$1.76	per sq.ft.
Attic Floor Densepack Cellulose- 4"	$1.77	per sq.ft.
Attic Floor Densepack Cellulose- 5"	$1.86	per sq.ft.
Attic Floor Densepack Cellulose- 6"	$1.95	per sq.ft.
Attic Floor Densepack Cellulose- 7"	$2.04	per sq.ft.
Attic Floor Densepack Cellulose- 8"	$2.13	per sq.ft.
Attic Floor Densepack Cellulose- 9"	$2.22	per sq.ft.
Attic Floor Densepack Cellulose- 10"	$2.31	per sq.ft.
Attic Floor Densepack Cellulose- 11"	$2.40	per sq.ft.
Attic Floor Densepack Cellulose- 12"	$2.49	per sq.ft.
Kneewall Floor Dense Pack 4"	$1.77	per sq.ft.
Kneewall Floor Dense Pack 5"	$1.86	per sq.ft.
Kneewall Floor Dense Pack 6"	$1.95	per sq.ft.
Kneewall Floor Dense Pack 7"	$2.04	per sq.ft.
Kneewall Floor Dense Pack 8"	$2.13	per sq.ft.
Kneewall Floor Dense Pack 9"	$2.22	per sq.ft.
Kneewall Floor Dense Pack 10"	$2.31	per sq.ft.
Kneewall Floor Dense Pack 11"	$2.40	per sq.ft.
Kneewall Floor Dense Pack 12"	$2.49	per sq.ft.
Attic Floor 3.5" Fiberglass Batting	$1.40	per sq.ft.
Attic Floor 6.25" Fiberglass Batting	$1.56	per sq.ft.
Attic Floor 9" Fiberglass Batting	$1.77	per sq.ft.
Attic Slope Dense Pack 4"	$2.05	per sq.ft.
Attic Slope Dense Pack 5"	$2.14	per sq.ft.

Attic Slope Dense Pack 6"	$2.23	per sq.ft.
Attic Slope Dense Pack 7"	$2.32	per sq.ft.
Attic Slope Dense Pack 8"	$2.41	per sq.ft.
Attic Slope Dense Pack 9"	$2.50	per sq.ft.
Attic Slope Dense Pack 10"	$2.59	per sq.ft.
Attic Slopes Int. Dense Pack 4"	$2.05	per sq.ft.
Attic Slopes Int. Dense Pack 5"	$2.14	per sq.ft.
Attic Slopes Int Dense Pack 6"	$2.23	per sq.ft.
Attic Slopes Int.Dense Pack 7"	$2.32	per sq.ft.
Attic Slopes Int Dense Pack 8"	$2.41	per sq.ft.
Attic Slopes Int Dense Pack 9"	$2.50	per sq.ft.
Attic Slopes Int Dense Pack 10"	$2.59	per sq.ft.
Attic Slope 3.5" Fiberglass Batting	$1.40	per sq.ft.
Attic Slope 6.25" Fiberglass Batting	$1.56	per sq.ft.
Attic Slope 9" Fiberglass Batting	$1.77	per sq.ft.
Open Kneewall Floor 3" Cellulose	$1.16	per sq.ft.
Open Kneewall Floor 4" Cellulose	$1.20	per sq.ft.
Open Kneewall Floor 5" Cellulose	$1.24	per sq.ft.
Open Kneewall Floor 6" Cellulose	$1.28	per sq.ft.
Open Kneewall Floor 7" Cellulose	$1.32	per sq.ft.
Open Kneewall Floor 8" Cellulose	$1.36	per sq.ft.
Open Kneewall Floor 9" Cellulose	$1.40	per sq.ft.
Open Kneewall Floor 10" Cellulose	$1.44	per sq.ft.
Open Kneewall Floor 11" Cellulose	$1.48	per sq.ft.
Open Kneewall Floor 12" Cellulose	$1.52	per sq.ft.
Enclosed Kneewall Floor 4" Cellulose	$1.44	per sq.ft.
Enclosed Kneewall Floor 5" Cellulose	$1.48	per sq.ft.
Enclosed Kneewall Floor 6" Cellulose	$1.52	per sq.ft.
Enclosed Kneewall Floor 7" Cellulose	$1.56	per sq.ft.
Enclosed Kneewall Floor 8" Cellulose	$1.60	per sq.ft.
Enclosed Kneewall Floor 9" Cellulose	$1.64	per sq.ft.
Enclosed Kneewall Floor 10" Cellulose	$1.68	per sq.ft.
Enclosed Kneewall Floor 11" Cellulose	$1.72	per sq.ft.
Enclosed Kneewall Floor 12" Cellulose	$1.76	per sq.ft.
Kneewall 3.5" Fiberglass Batting	$1.40	per sq.ft.
Kneewall 6.25" Fiberglass Batting	$1.56	per sq.ft.
Kneewall 9" Fiberglass Batting	$1.77	per sq.ft.
Kneewall Slope 3.5" Fiberglass Batting	$1.40	per sq.ft.
Kneewall Slope 6.25" Fiberglass Batting	$1.56	per sq.ft.
Kneewall Slope 9" Fiberglass Batting	$1.77	per sq.ft.

Polyisocyanurate 1"	$2.70	per sq.ft.
Polyisocyanurate 2"	$3.00	per sq.ft.
Rim Joist 6.25" Fiberglass Batting	$2.00	per linear ft.
Basement Ceiling 3.5" Fiberglass Batting	$1.65	per sq.ft.
Basement Ceiling 6.25" Fiberglass Batting	$1.85	per sq.ft.
Basement Ceiling 9" Fiberglass Batting	$2.05	per sq.ft.
Crawlspace Ceiling 3.5" Fiberglass Batting	$1.75	per sq.ft.
Crawlspace Ceiling 6.25" Fiberglass Batting	$1.95	per sq.ft.
Crawlspace Ceiling 9" Fiberglass Batting	$2.15	per sq.ft.
Crawlspace 4" Cellulose	$1.45	per sq.ft.
Crawlspace 5" Cellulose	$1.49	per sq.ft.
Crawlspace 6" Cellulose	$1.53	per sq.ft.
Crawlspace 7" Cellulose	$1.57	per sq.ft.
Crawlspace 8" Cellulose	$1.61	per sq.ft.
Crawlspace 9" Cellulose	$1.65	per sq.ft.
Crawlspace 10" Cellulose	$1.69	per sq.ft.
Crawlspace 11" Cellulose	$1.73	per sq.ft.
Crawlspace 12" Cellulose	$1.77	per sq.ft.
Crawlspace 4" Dense Pack	$1.85	per sq.ft.
Crawlspace 5" Dense Pack	$1.94	per sq.ft.
Crawlspace 6" Dense Pack	$2.03	per sq.ft.
Crawlspace 7" Dense Pack	$2.12	per sq.ft.
Crawlspace 8" Dense Pack	$2.21	per sq.ft.
Crawlspace 9" Dense Pack	$2.30	per sq.ft.
Crawlspace 10" Dense Pack	$2.39	per sq.ft.
Crawlspace 11" Dense Pack	$2.48	per sq.ft.
Crawlspace 12" Dense Pack	$2.57	per sq.ft.
Garage Ceiling 4" Dense Pack	$1.85	per sq.ft.
Garage Ceiling 5" Dense Pack	$1.94	per sq.ft.
Garage Ceiling 6" Dense Pack	$2.03	per sq.ft.
Garage Ceiling 7" Dense Pack	$2.12	per sq.ft.
Garage Ceiling 8" Dense Pack	$2.21	per sq.ft.
Garage Ceiling 9" Dense Pack	$2.30	per sq.ft.
Garage Ceiling 10" Dense Pack	$2.39	per sq.ft.
Garage Ceiling 11" Dense Pack	$2.48	per sq.ft.
Garage Ceiling 12" Dense Pack	$2.57	per sq.ft.
Overhang 4" Dense Pack	$1.85	per sq.ft.
Overhang 5" Dense Pack	$1.94	per sq.ft.
Overhang 6" Dense Pack	$2.03	per sq.ft.

Overhang 7" Dense Pack	$2.12	per sq.ft.
Overhang 8" Dense Pack	$2.21	per sq.ft.
Overhang 9" Dense Pack	$2.30	per sq.ft.
Overhang 10" Dense Pack	$2.39	per sq.ft.
Overhang 11" Dense Pack	$2.48	per sq.ft.
Overhang 12" Dense Pack	$2.57	per sq.ft.
Overhang 3.5" Fiberglass Batting	$1.65	per sq.ft.
Overhang 6.25" Fiberglass Batting	$1.85	per sq.ft.
Overhang 9" Fiberglass Batting	$2.05	per sq.ft.
Wall Ins. Clapboard Siding 3" Cellulose	$1.87	per sq.ft.
Wall Ins. Clapboard Siding 4" Cellulose	$1.96	per sq.ft.
Wall Ins.3rd FL Clapboard Siding 3" Cellulose	$2.02	per sq.ft.
Wall Ins.3rd FL Clapboard Siding 4" Cellulose	$2.11	per sq.ft.
Wall Ins. Wood Siding 3" Cellulose	$1.87	per sq.ft.
Wall Ins. Wood Siding 4" Cellulose	$1.96	per sq.ft.
Wall Ins.3rd FL Wood Siding 3" Cellulose	$2.02	per sq.ft.
Wall Ins.3rd FL Wood Siding 4" Cellulose	$2.11	per sq.ft.
Wall Ins. Vinyl Siding 3" Cellulose	$1.87	per sq.ft.
Wall Ins. Vinyl Siding 4" Cellulose	$1.96	per sq.ft.
Wall Ins.3rd FL Vinyl Siding 3" Cellulose	$2.02	per sq.ft.
Wall Ins.3rd FL Vinyl Siding 4" Cellulose	$2.11	per sq.ft.
Wall Ins. Asphalt Siding 3" Cellulose	$2.00	per sq.ft.
Wall Ins. Asphalt Siding 4" Cellulose	$2.09	per sq.ft.
Wall Ins.3rd FL Asphalt Siding 3" Cellulose	$2.15	per sq.ft.
Wall Ins.3rd FL Asphalt Siding 4" Cellulose	$2.24	per sq.ft.
Wall Ins. Aluminum Siding 3" Cellulose	$2.10	per sq.ft.
Wall Ins. Aluminum Siding 4" Cellulose	$2.19	per sq.ft.
Wall Ins.3rd FL Aluminum Siding 3" Cellulose	$2.25	per sq.ft.
Wall Ins.3rd FL Aluminum Siding 4" Cellulose	$2.34	per sq.ft.
Wall Ins. Multilayer Siding 3" Cellulose	$2.35	per sq.ft.
Wall Ins. Multilayer Siding 4" Cellulose	$2.44	per sq.ft.
Wall Ins.3rd FL Multilayer Siding 3" Cellulose	$2.50	per sq.ft.
Wall Ins.3rd FL Multilayer Siding 4" Cellulose	$2.59	per sq.ft.

Wall Ins. Asbestos Siding 3" Cellulose	$2.65	per sq.ft.
Wall Ins. Asbestos Siding 4" Cellulose	$2.74	per sq.ft.
Wall Ins.3rd FL Asbestos Siding 3" Cellulose	$2.80	per sq.ft.
Wall Ins.3rd FL Asbestos Siding 4" Cellulose	$2.89	per sq.ft.
Balloon Framing Blocking	$1.00	per linear ft.
Wall Ins. Interior 3" Cellulose	$1.96	per sq.ft.
Wall Ins. Interior 4" Cellulose	$2.05	per sq.ft.
Wall Ins. Interior 5" Cellulose	$2.14	per sq.ft.
Wall Ins. Interior 6" Cellulose	$2.23	per sq.ft.
Wall Ins. 3.5" Fiberglass Batting	$1.40	per sq.ft.
Walls Fiberbatting (6.25")	$1.56	per sq.ft.
Walls Fiberbatting (9")	$1.77	per sq.ft.

Part 2 (Continued)- Schedule of NSTAR Unit Prices for Weatherization Measures & Schedule of National Grid Unit Prices for Weatherization Measures

National Grid Mass Save Home Energy Services 2011 Insulation Measures Pricing		
Description:	**Price:**	**Units:**
Air Sealing-Hours	$75.25	per hour
6mm PolyVB crawlspace	$0.80	per sq.ft.
ThermaDome	$182.75	each
Therma-Dome with carpentry	$209.63	each
House Wrap	$0.76	per sq.ft.
House Wrap Overhead	$1.00	per sq.ft.
Propavent 2' or 4'	$3.44	each
Fiberglass Batt Removal	$1.03	per sq.ft.
Aluminum soffit vent (4"x16')	$27.95	each
Aluminum soffit vent (6"x16')	$27.95	each
Aluminum soffit vent (8"x16')	$27.95	each
Aluminum gable vent (12"x12")	$93.00	each
Aluminum gable vent (12"x18")	$93.00	each
Aluminum gable vent (12"x24")	$93.00	each
Aluminum gable vent (18"x24")	$93.00	each
8" Roof Vent	$89.23	each
12" Mushroom Vent	$123.63	each
Vent bath fan to gable end	$107.50	each
Vent bath fan to roof flapper	$116.10	each
Vent bath fan/soffit exhaust	$112.88	each
Replace Bath Fan Hose	$22.00	each
Temporary access	$77.03	each
Sheathing access	$32.52	each
Cut and finish access	$102.13	each
Hatch: Polyisocyanurate 2"	$33.33	each
Door: PolyIsocyanurate 2"	$49.45	each

Open Attic 3" Cellulose	$1.14	per sq.ft.
Open Attic 4" Cellulose	$1.18	per sq.ft.
Open Attic 5" Cellulose	$1.22	per sq.ft.
Open Attic 6" Cellulose	$1.26	per sq.ft.
Open Attic 7" Cellulose	$1.30	per sq.ft.
Open Attic 8" Cellulose	$1.34	per sq.ft.
Open Attic 9" Cellulose	$1.38	per sq.ft.
Open Attic 10" Cellulose	$1.42	per sq.ft.
Open Attic 11" Cellulose	$1.46	per sq.ft.
Open Attic 12" Cellulose	$1.50	per sq.ft.
Open Attic 13" Cellulose	$1.54	per sq.ft.
Open Attic 14" Cellulose	$1.58	per sq.ft.
Open Attic 15" Cellulose	$1.62	per sq.ft.
Floored Attic 4" Cellulose	$1.41	per sq.ft.
Floored Attic 5" Cellulose	$1.45	per sq.ft.
Floored Attic 6" Cellulose	$1.49	per sq.ft.
Floored Attic 7" Cellulose	$1.53	per sq.ft.
Floored Attic 8" Cellulose	$1.57	per sq.ft.
Floored Attic 9" Cellulose	$1.61	per sq.ft.
Floored Attic 10" Cellulose	$1.65	per sq.ft.
Floored Attic 11" Cellulose	$1.69	per sq.ft.
Floored Attic 12" Cellulose	$1.73	per sq.ft.
Floored Attic 13" Cellulose	$1.77	per sq.ft.
Floored Attic 14" Cellulose	$1.81	per sq.ft.
Floored Attic 15" Cellulose	$1.85	per sq.ft.
Attic Floor Densepack Cellulose- 4"	$1.73	per sq.ft.
Attic Floor Densepack Cellulose- 5"	$1.82	per sq.ft.
Attic Floor Densepack Cellulose- 6"	$1.91	per sq.ft.
Attic Floor Densepack Cellulose- 7"	$2.00	per sq.ft.
Attic Floor Densepack Cellulose- 8"	$2.09	per sq.ft.
Attic Floor Densepack Cellulose- 9"	$2.18	per sq.ft.
Attic Floor Densepack Cellulose- 10"	$2.27	per sq.ft.
Attic Floor Densepack Cellulose- 11"	$2.36	per sq.ft.
Attic Floor Densepack Cellulose- 12"	$2.45	per sq.ft.
Attic Floor Densepack Cellulose- 13"	$2.54	per sq.ft.
Attic Floor Densepack Cellulose- 14"	$2.63	per sq.ft.
Attic Floor Densepack Cellulose- 15"	$2.72	per sq.ft.
Kneewall Floor Dense Pack 4"	$1.73	per sq.ft.
Kneewall Floor Dense Pack 5"	$1.82	per sq.ft.
Kneewall Floor Dense Pack 6"	$1.91	per sq.ft.
Kneewall Floor Dense Pack 7"	$2.00	per sq.ft.
Kneewall Floor Dense Pack 8"	$2.09	per sq.ft.
Kneewall Floor Dense Pack 9"	$2.18	per sq.ft.
Kneewall Floor Dense Pack 10"	$2.27	per sq.ft.

Kneewall Floor Dense Pack 11"	$2.36	per sq.ft.
Kneewall Floor Dense Pack 12"	$2.45	per sq.ft.
Kneewall Floor Dense Pack 13"	$2.54	per sq.ft.
Kneewall Floor Dense Pack 14"	$2.63	per sq.ft.
Kneewall Floor Dense Pack 15"	$2.72	per sq.ft.
Attic Floor 3.5" Fiberglass Batting	$1.35	per sq.ft.
Attic Floor 6.25" Fiberglass Batting	$1.51	per sq.ft.
Attic Floor 9" Fiberglass Batting	$1.70	per sq.ft.
Attic Slope Dense Pack 4"	$2.00	per sq.ft.
Attic Slope Dense Pack 5"	$2.09	per sq.ft.
Attic Slope Dense Pack 6"	$2.18	per sq.ft.
Attic Slope Dense Pack 7"	$2.27	per sq.ft.
Attic Slope Dense Pack 8"	$2.36	per sq.ft.
Attic Slope Dense Pack 9"	$2.45	per sq.ft.
Attic Slope Dense Pack 10"	$2.54	per sq.ft.
Attic Slopes Int. Dense Pack 4	$2.00	per sq.ft.
Attic Slopes Int. Dense Pack 5"	$2.09	per sq.ft.
Attic Slopes Int Dense Pack 6"	$2.18	per sq.ft.
Attic Slopes Int.Dense Pack 7"	$2.27	per sq.ft.
Attic Slopes Int Dense Pack 8"	$2.36	per sq.ft.
Attic Slopes Int Dense Pack 9"	$2.45	per sq.ft.
Attic Slopes Int Dense Pack 10"	$2.54	per sq.ft.
Attic Slope 3.5" Fiberglass Batting	$1.35	per sq.ft.
Attic Slope 6.25" Fiberglass Batting	$1.51	per sq.ft.
Attic Slope 9" Fiberglass Batting	$1.70	per sq.ft.
Open Kneewall Floor 3" Cellulose	$1.13	per sq.ft.
Open Kneewall Floor 4" Cellulose	$1.17	per sq.ft.
Open Kneewall Floor 5" Cellulose	$1.21	per sq.ft.
Open Kneewall Floor 6" Cellulose	$1.25	per sq.ft.
Open Kneewall Floor 7" Cellulose	$1.29	per sq.ft.
Open Kneewall Floor 8" Cellulose	$1.33	per sq.ft.
Open Kneewall Floor 9" Cellulose	$1.37	per sq.ft.
Open Kneewall Floor 10" Cellulose	$1.41	per sq.ft.
Open Kneewall Floor 11" Cellulose	$1.45	per sq.ft.
Open Kneewall Floor 12" Cellulose	$1.49	per sq.ft.
Open Kneewall Floor 13" Cellulose	$1.53	per sq.ft.
Open Kneewall Floor 14" Cellulose	$1.57	per sq.ft.
Open Kneewall Floor 15" Cellulose	$1.61	per sq.ft.
Enclosed Kneewall Floor 4" Cellulose	$1.40	per sq.ft.
Enclosed Kneewall Floor 5" Cellulose	$1.44	per sq.ft.
Enclosed Kneewall Floor 6" Cellulose	$1.48	per sq.ft.

Enclosed Kneewall Floor 7" Cellulose	$1.52	per sq.ft.
Enclosed Kneewall Floor 8" Cellulose	$1.56	per sq.ft.
Enclosed Kneewall Floor 9" Cellulose	$1.60	per sq.ft.
Enclosed Kneewall Floor 10" Cellulose	$1.64	per sq.ft.
Enclosed Kneewall Floor 11" Cellulose	$1.68	per sq.ft.
Enclosed Kneewall Floor 12" Cellulose	$1.72	per sq.ft.
Enclosed Kneewall Floor 13" Cellulose	$1.76	per sq.ft.
Enclosed Kneewall Floor 14" Cellulose	$1.80	per sq.ft.
Enclosed Kneewall Floor 15" Cellulose	$1.84	per sq.ft.
Kneewall 3.5" Fiberglass Batting	$1.35	per sq.ft.
Kneewall 6.25" Fiberglass Batting	$1.51	per sq.ft.
Kneewall 9" Fiberglass Batting	$1.70	per sq.ft.
Kneewall Slope 3.5" Fiberglass Batting	$1.35	per sq.ft.
Kneewall Slope 6.25" Fiberglass Batting	$1.51	per sq.ft.
Kneewall Slope 9" Fiberglass Batting	$1.70	per sq.ft.
Polyisocyanurate 1"	$2.65	per sq.ft.
Polyisocyanurate 2"	$2.97	per sq.ft.
Rim Joist 6.25" Fiberglass Batting	$1.94	per linear ft.
Basement Ceiling 3.5" Fiberglass Batting	$1.56	per sq.ft.
Basement Ceiling 6.25" Fiberglass Batting	$1.76	per sq.ft.
Basement Ceiling 9" Fiberglass Batting	$1.97	per sq.ft.
Crawlspace Ceiling 3.5" Fiberglass Batting	$1.67	per sq.ft.
Crawlspace Ceiling 6.25" Fiberglass Batting	$1.87	per sq.ft.
Crawlspace Ceiling 9" Fiberglass Batting	$2.07	per sq.ft.
Crawlspace 4" Cellulose	$1.44	per sq.ft.
Crawlspace 5" Cellulose	$1.48	per sq.ft.
Crawlspace 6" Cellulose	$1.52	per sq.ft.
Crawlspace 7" Cellulose	$1.56	per sq.ft.
Crawlspace 8" Cellulose	$1.60	per sq.ft.
Crawlspace 9" Cellulose	$1.64	per sq.ft.
Crawlspace 10" Cellulose	$1.68	per sq.ft.
Crawlspace 11" Cellulose	$1.72	per sq.ft.
Crawlspace 12" Cellulose	$1.76	per sq.ft.
Crawlspace 4" Dense Pack	$1.81	per sq.ft.
Crawlspace 5" Dense Pack	$1.90	per sq.ft.
Crawlspace 6" Dense Pack	$1.99	per sq.ft.
Crawlspace 7" Dense Pack	$2.08	per sq.ft.
Crawlspace 8" Dense Pack	$2.17	per sq.ft.

Crawlspace 9" Dense Pack	$2.26	per sq.ft.
Crawlspace 10" Dense Pack	$2.35	per sq.ft.
Crawlspace 11" Dense Pack	$2.44	per sq.ft.
Crawlspace 12" Dense Pack	$2.53	per sq.ft.
Garage Ceiling 4" Dense Pack	$1.81	per sq.ft.
Garage Ceiling 5" Dense Pack	$1.90	per sq.ft.
Garage Ceiling 6" Dense Pack	$1.99	per sq.ft.
Garage Ceiling 7" Dense Pack	$2.08	per sq.ft.
Garage Ceiling 8" Dense Pack	$2.17	per sq.ft.
Garage Ceiling 9" Dense Pack	$2.26	per sq.ft.
Garage Ceiling 10" Dense Pack	$2.35	per sq.ft.
Garage Ceiling 11" Dense Pack	$2.44	per sq.ft.
Garage Ceiling 12" Dense Pack	$2.53	per sq.ft.
Overhang 4" Dense Pack	$1.81	per sq.ft.
Overhang 5" Dense Pack	$1.90	per sq.ft.
Overhang 6" Dense Pack	$1.99	per sq.ft.
Overhang 7" Dense Pack	$2.08	per sq.ft.
Overhang 8" Dense Pack	$2.17	per sq.ft.
Overhang 9" Dense Pack	$2.26	per sq.ft.
Overhang 10" Dense Pack	$2.35	per sq.ft.
Overhang 11" Dense Pack	$2.44	per sq.ft.
Overhang 12" Dense Pack	$2.53	per sq.ft.
Overhang 3.5" Fiberglass Batting	$1.65	per sq.ft.
Overhang 6.25" Fiberglass Batting	$1.85	per sq.ft.
Overhang 9" Fiberglass Batting	$2.05	per sq.ft.
Wall Ins. Clapboard Siding 3" Cellulose	$1.83	per sq.ft.
Wall Ins. Clapboard Siding 4" Cellulose	$1.92	per sq.ft.
Wall Ins.3rd FL Clapboard Siding 3" Cellulose	$2.02	per sq.ft.
Wall Ins.3rd FL Clapboard Siding 4" Cellulose	$2.11	per sq.ft.
Wall Ins. Wood Siding 3" Cellulose	$1.83	per sq.ft.
Wall Ins. Wood Siding 4" Cellulose	$1.92	per sq.ft.
Wall Ins.3rd FL Wood Siding 3" Cellulose	$2.02	per sq.ft.
Wall Ins.3rd FL Wood Siding 4" Cellulose	$2.11	per sq.ft.
Wall Ins. Vinyl Siding 3" Cellulose	$1.83	per sq.ft.
Wall Ins. Vinyl Siding 4" Cellulose	$1.92	per sq.ft.
Wall Ins.3rd FL Vinyl Siding 3" Cellulose	$2.02	per sq.ft.
Wall Ins.3rd FL Vinyl Siding 4" Cellulose	$2.11	per sq.ft.

Wall Ins. Asphalt Siding 3" Cellulose	$1.96	per sq.ft.
Wall Ins. Asphalt Siding 4" Cellulose	$2.05	per sq.ft.
Wall Ins.3rd FL Asphalt Siding 3" Cellulose	$2.15	per sq.ft.
Wall Ins.3rd FL Asphalt Siding 4" Cellulose	$2.24	per sq.ft.
Wall Ins. Aluminum Siding 3" Cellulose	$2.06	per sq.ft.
Wall Ins. Aluminum Siding 4" Cellulose	$2.15	per sq.ft.
Wall Ins.3rd FL Aluminum Siding 3" Cellulose	$2.25	per sq.ft.
Wall Ins.3rd FL Aluminum Siding 4" Cellulose	$2.34	per sq.ft.
Wall Ins. Multilayer Siding 3" Cellulose	$2.31	per sq.ft.
Wall Ins. Multilayer Siding 4" Cellulose	$2.40	per sq.ft.
Wall Ins.3rd FL Multilayer Siding 3" Cellulose	$2.50	per sq.ft.
Wall Ins.3rd FL Multilayer Siding 4" Cellulose	$2.59	per sq.ft.
Wall Ins. Asbestos Siding 3" Cellulose	$2.61	per sq.ft.
Wall Ins. Asbestos Siding 4" Cellulose	$2.70	per sq.ft.
Wall Ins.3rd FL Asbestos Siding 3" Cellulose	$2.80	per sq.ft.
Wall Ins.3rd FL Asbestos Siding 4" Cellulose	$2.89	per sq.ft.
Balloon Framing Blocking	$0.97	per linear ft.
Wall Ins. Interior 3" Cellulose	$1.91	per sq.ft.
Wall Ins. Interior 4" Cellulose	$2.00	per sq.ft.
Wall Ins. Interior 5" Cellulose	$2.09	per sq.ft.
Wall Ins. Interior 6" Cellulose	$2.18	per sq.ft.
Wall Ins. 3.5" Fiberglass Batting	$1.35	per sq.ft.
Walls Fiberbatting (6.25")	$1.51	per sq.ft.
Walls Fiberbatting (9")	$1.70	per sq.ft.

Attachment 7
CREDENTIALS REQUIREMENTS

Home Performance Contractors (HPCs)

Licensing
All Participating HPC's must hold a valid Massachusetts Unrestricted Construction Supervisor's License (CSL) or a valid Massachusetts Insulation Construction Supervisor License (ICSL).

Installation Work Crew Chiefs
The certified crew chief must be at the job-site throughout the duration of the job. Each crew chief must choose one of the following certification pathways.

1. BPI Crew Chief Certification (Residential Building Envelope Whole House Air Leakage Control Crew Chief Certification)*
2. DOE Weatherization Crew Chief certification*
3. Boot Camp Authorization + Combustion Safety Training** (Boot Camp Authorization requires Basic and Advanced Air Sealing Authorizations + Advanced Insulation Authorization)
4. Boot Camp Authorization + BPI Building Analyst Certification** (Boot Camp Authorization requires Basic and Advanced Air Sealing Authorizations + Advanced Insulation Authorization)
5. Other RMC-approved training/authorization that demonstrates knowledge of proper air sealing and dense pack techniques, job site management, and combustion safety testing

* = these certifications are not yet available but are expected soon
**=these additional requirements to supplement the Boot Camp Authorizations with the Combustion Safety Training or BPI Building Analyst Certification are required by October 1, 2011

Installation Work Crew Members
Crew members are not required to hold any particular weatherization or building science certifications but are encouraged to achieve the following certifications:

1. BPI Installer Certification (Residential Building Envelope Whole House Air Leakage Control Installer Certification)
2. Boot Camp Authorization (especially Basic Air Sealing and Basic Insulation)
3. Any other BPI or DOE or WAP weatherization trainings