**FY22 WHOLE HOME/BUILDING RESIDENTIAL RETROFITS**

**PROJECT DESCRIPTION/SCOPE OF WORK**

***To assist with developing your FY22 application proposal, below is an example of a project description/scope of work for a Whole Home/Building Residential Retrofit. Please note that this is only an example and the scope of work adopted as part of a grant agreement may differ.***

**PROJECT DESCRIPTION**

A whole home/whole building upgrade project includes the installation of cost-effective energy efficiency and weatherization measures for residential dwellings. For each dwelling included in the Project, Grantee must carry out a [Building Performance Institute](https://www.bpihomeowner.org/home-energy-audit)[[1]](#footnote-1) (BPI) energy audit on the residential home or building. Based on the audit results Grantee shall develop energy conservation measures (ECMs), in aggregate, which have a simple payback that is less than 15 years or less, and result in decreased overall household energy usage.

**DELIVERABLES**

The deliverables included below will be designed, purchased, developed, and implemented by Grantee. Each of these deliverables shall include cost effective measures that directly contribute to energy savings or facilitate energy conservation behavioral practices in Maryland.

**1. Energy Efficiency Upgrades**

Grantee shall identify low-to-moderate income homes in the [Insert Region and Counties] that are eligible candidates for an energy efficiency upgrade.

A. Except as specified in (B) below, for the purpose of this Grant, a home or residence shall:

1) Be separately metered for utilities (electric/natural gas/propane/oil/water).

2) Receive electricity service on a residential rate.

3) Have the following characteristics:

 (a) Include at least a bedroom, bathroom, and kitchen facilities that are separate from other residences within the same building;

(b) Include an entry directly to a public street or public hallway; and,

(c) Have HVAC and hot water systems dedicated solely to the residence.

B. MEA may allow an exception on a case-by-case bases for the following:

 1) A building that is master metered; or,

 2) A home or residence that does not meet the requirements set forth in (A).

C. To avoid duplication of materials or work, Grantee shall ensure that any home or residence receiving energy efficiency upgrades and weatherization services under the Grant has not received any recent Building Performance Institute (BPI) level audits or the same weatherization measures proposed in the Grant through another program, including the Maryland Department of Housing and Community Development’s (DHCD) Weatherization Assistance Program (WAP), the EmPOWER Low Income Energy Efficiency Program (LIEEP), or any low-income energy efficiency program previously operated by a Maryland electric utility as part of EmPOWER Maryland.

D. Grantee should consider using utility incentives, in-kind donations, reduced administrative charges, or other grant funding sources to leverage funds in a way that will enable more upgrades.

E. To reduce duplication of effort with other programs serving low-income households (e.g., DHCD’s WAP or LIEEP program) when possible, Grantee should direct program participation to households that fall within the range of “moderate income.”

F. Grantee shall provide personnel to comply with the reporting and invoicing requirements of this Grant.

G. Each reimbursement request for Administrative costs or Indirect costs shall include supporting documentation detailing the work performed.

**2. Residential Energy Efficiency and Weatherization Services**

1. Grantee shall provide cost effective energy efficiency upgrades, and weatherization services to at least XX households in the [Insert Region and Counties]

B. Each home receiving energy efficiency services under this Grant shall first undergo an energy audit, which shall include a visual inspection, a combustion safety test (if applicable), and a pre- and post-retrofit blower door test. Including the use of infrared thermography in the audit is encouraged, but not required.

1) All energy audits funded by the Grant shall be completed by a BPI certified Building Analyst (BA) and in accordance with [BPI Standard 1100-T-2014 -Home Energy Auditing Standard](https://www.bpi.org/sites/default/files/ANSI-BPI-1100-T-2014%20Home%20Energy%20Auditing%20Standard.pdf), and [BPI Standard 1200-S-2017 - Standard Practice for Basic Analysis of Buildings](https://www.bpi.org/sites/default/files/ANSI%20BPI-1200-S-2017%20Standard%20Practice%20for%20Basic%20Analysis%20of%20Buildings.pdf).

1. Energy audits shall result in the development of cost-effective energy improvement packages. An energy efficiency upgrade is defined to be cost effective when the project, on a per home basis (i.e., all measures in aggregate) has a simple payback of 15 years or less. Grantee shall provide the simple payback calculation on the Grant reporting documents.
	1. All building shell improvements shall be completed by a BPI certified contractor or supervised by a BPI certified auditor.
	2. Building shell improvements shall comply with the appropriate approved BPI Technical Standards: <http://www.bpi.org/standards.aspx>.
	3. Projects shall include weatherization of the building shell based upon audit recommendations, unless it can be demonstrated that the dwelling has been weatherized within the last 5 years.

4) After shell tightening measures are completed, all necessary testing as referenced in BPI Standards 1100 and 1200 shall be completed and any failures addressed.

5) In order to educate building occupants on the audit and upgrade process, the Auditor or Grantee shall clearly explain test results, recommended measures, and observations, including combustion safety, indoor air quality, mechanical ventilation, utility bill analysis, insulation, air sealing, health and safety recommendations/concerns, and other matters as necessary.

D. Grantee shall report the primary heating fuel type used by each home that is included in the Project.

E The following energy efficiency measures are eligible for reimbursement under the Grant when identified as “necessary and cost effective” in the applicable energy audit report and installed consistent with applicable BPI standards:

1) Air sealing of the building shell:

(a) Attic insulation to at least R60, where possible, following best practices and allowing for space constraints. If R60 is not feasible due to space constraints, adding insulation to achieve a lower R value is acceptable.

(b) Basement or crawlspace insulation. Grantee shall report the pre/post R value, square footage, and location (wall or ceiling).

2) HVAC tune-up and repairs

 (a) HVAC tune-ups may not exceed $250 per home

(b) if replacement parts are required for simple HVAC system repairs to restore the HVAC system to a proper operating condition that improves system efficiency, up to an additional $500 may be spent on parts for this purpose.

3) HVAC filter replacement

4) Duct sealing and/or insulation

5) Water heater wrap for electric water heaters older than 2004 located in unheated spaces.

6) Hot water pipe wrap with a minimum R-value of 3.

7) ENERGY STAR qualified appliance replacements to include clothes washers, clothes dryers, dishwashers, window air conditioners, heat pump water heaters, freezers, dehumidifiers, natural gas or propane-fired water heaters, and refrigerators.

(a) The maximum MEA reimbursement is $1,000 for an ENERGY STAR refrigerator;

(b) To be reimbursed for an appliance replacement, the original appliance must have been functional within the last year;

8) Incandescent bulb replacements with **ENERGY STAR** labeled LEDs:

(a) MEA will reimburse up to twelve (12) LEDs maximum per home.

(b) **MEA now requires the use of LEDs rather than CFLs**.

9) T12 to LED, T8 or T5 lighting replacements;

10) Installation of low flow showerheads and/or faucet aerators. To facilitate maximum energy savings, MEA strongly recommends:

(a) the installation of EPA’s Water Sense® low flow showerheads (2.0 gal/min maximum); and,

(b) faucet aerators.

11) HVAC Replacements

(a) For HVAC replacements, Manual J heating/cooling load calculations, or equivalent, shall be performed in accordance with the version of the International Energy Conservation Code (IECC) currently required in Maryland. Manual S should be used to properly select the appropriate equipment based on these loads.

(b) Prior to adding or replacing an HVAC system in a residence, the residence shall be weatherized with respect to air sealing and attic insulation (through this program or as noted during inspection as having previously occurred). Weatherization must have been completed within the last five years.

(i) In conjunction with weatherization, the duct leakage testing and sealing requirements specified below in Section F must be implemented.

(c) Heat pump/Air conditioner replacement (to include ductless mini-split heat pumps):

(i) Replacement is an acceptable measure when the existing heat pump has a SEER rating of 10 or less, or has a simple payback of 15 years or less; the entire project, inclusive of the HVAC replacement and other ECMs, has a simple payback of 15 years or less; or the heat pump doesn’t retain its refrigerant charge and runs on emergency electric heat.

(ii) Grantee shall note and report the following attributes of the existing HVAC system being replaced in the Monthly Report:

1. equipment type (i.e., electric baseboard; ASHP; PTAC; furnace)
2. approximate age of unit
3. performance efficiency (i.e., SEER, HSPF, AFUE).

(iii) The existing heat pump or air conditioner shall be replaced with an ENERGY STAR qualified heat pump/air conditioner. For Packaged Terminal Air Conditioner (PTAC) unit replacements that currently do not have ENERGY STAR rating qualifications, PTAC replacements shall have an EER rating meeting the following minimum levels:

|  |  |
| --- | --- |
| **Capacity (Btu/hr)** | **Minimum EER** |
| 8,000 or less | 11.8 |
| 8,001 – 10,500 | 11.4 |
| 10,501 – 13,500 | 10.7 |
| 13,501 or more | 10.0 |

If these EER levels cannot be met due to the size of a replacement PTAC or PTHP, then the EER must be at least 10% greater than the IECC minimum value for replacements.

(d) Furnace/Boiler replacement

(i) Replacement is an acceptable measure if the furnace/boiler system is one of the following: less than 75% efficient based on nameplate AFUE **and** can’t be brought up to 75% efficiency with a clean and tune procedure, is at least twenty (20) years old, or has a simple payback of 15 years or less.

(ii) In cases where an extreme safety issue has been identified during BPI combustion appliance zone (CAZ) testing, replacement is allowed if the MEA program manager determines that the simple payback for the measure is acceptable and the simple payback for the entire upgrade (all energy efficiency measures combined) is equal to 15 years or less.

(iii) Grantee shall note and report the following attributes of the existing HVAC system being replaced in the Monthly Report (see Attachment C):

1. equipment type (i.e. electric baseboard; ASHP; PTAC; furnace);
2. approximate age of unit; and,
3. performance efficiency (i.e. SEER, HSPF, AFUE).

(iv) The existing natural gas, propane, or oil furnace/boiler shall be replaced with an ENERGY STAR qualified furnace.

(e) Duct Leakage Test/ Sealing

(i) A duct leakage test shall be performed for all ASHP or furnace installations and any other HVAC system that utilizes forced air distribution. Ducts that leak to outside or affect health and safety shall be sealed with mastic or aerosol spray duct sealant and/or repaired. Duct tape is not an acceptable method of sealing.

(ii) Duct sealing work shall include two duct leak tests, performed before and after completion of sealing. For each duct leakage test, the distribution efficiency shall be estimated based on the [BPI Duct Efficiency Table](http://www.bpi.org/sites/default/files/Guidance%20on%20Estimating%20Distribution%20Efficiency.pdf), or a comparable method that quantifies the improvement in delivery efficiency.

(iii) Accessible supply and return ducts in the attic shall be insulated to a minimum of R-8 (where ≥ 3-inch diameter) and R-6 (where < 3-inch diameter).

(iv) Existing or new refrigerant lines shall be insulated to a minimum of R-3.

(v) Piping insulation exposed to weather shall be protected from damage, including that caused by sunlight, moisture, equipment maintenance and wind. Adhesive tape is not an acceptable material for wrapping the pipe.

12) Comprehensive Mechanical Upgrades involving Fuel Switching

In addition to the applicable sections above, projects that propose comprehensive mechanical upgrades that include the conversion of propane or heating oil fueled appliances to high efficiency electric technologies, projects shall meet the following requirements:

* + 1. An energy audit shall show the proposed fuel switching measure is cost effective and results in energy savings when measured in aggregate with other recommended measures.
		2. Allowable fuel switching measures for each dwelling unit are:
			1. conversion of a space heating or water heating system fueled by propane or heating oil to a high efficiency electric heat pump system; and,
			2. conversion of a space heating system fueled by propane or heating oil to a dual fuel space heating system, with the existing furnace or boiler retained to provide backup heating to a high efficiency heat pump.
		3. Fuel switching, as outlined in section 12(a) and 12(b) above, may necessitate upgrading the electric service.
			1. If an electric service upgrade (i.e., electrical panel upgrade) is necessary to facilitate the energy efficient mechanical upgrades outlined above, projects shall also upgrade the electric service of the dwelling unit to provide capacity for a future Level 2 Electric Vehicle (EV) charging circuit at the electrical panel only, in order to enable future vehicle energy efficiency measures. Circuit breakers or empty breaker slots installed for future EV charging must be labeled accordingly. Wiring from the panel to a future charging station is not required, nor is this an eligible cost.
			2. This requirement is only applicable to single-family dwellings with a parking spot on the property that is part of, or adjacent to, the building.
				1. For projects that include fuel switching as outlined above in Section 12 and require an upgrade to the electric service to facilitate the energy efficient upgrades, an additional amount of up to $3,000 is available exclusively dedicated for upgrades to a dwelling’s electrical service as needed to facilitate mechanical upgrades,
				2. The electric services upgrade are separate from the incidental repairs outlined below.
		4. Allowable HVAC replacements under this work scope can include:
			1. Oil or propane furnace or boiler to heat pump conversions
			2. conversion from an oil or propane furnace or boiler system to a dual fuel heating system with a heat pump serving as the primary heating system
		5. To be eligible, a conversion described in section 12(d) is an acceptable measure if each of the following conditions is met:
			1. The entire whole house retrofit package results in a Simple Payback of 15 years or less;
			2. The installed heat pump (including ducted or ductless mini-split systems) is ENERGY STAR qualified;
			3. The dwelling’s electric service is upgraded per applicable building codes to address the new load, if necessary, including compliance with the jurisdiction’s permitting and inspection requirements;
			4. Any combustion safety issues created by the removal of the furnace/boiler are addressed and [BPI Standards 1100](http://www.bpi.org/sites/default/files/ANSI-BPI-1100-T-2014%20Home%20Energy%20Auditing%20Standard.pdf) and [1200](http://www.bpi.org/sites/default/files/ANSI%20BPI-1200-S-2017%20Standard%20Practice%20for%20Basic%20Analysis%20of%20Buildings.pdf) are addressed;
			5. Combustion safety testing per BPI Standards 1100 and 1200 is conducted for any existing furnace or boiler systems which are retained for backup heating;
			6. The Grantee shall note and report the following attributes of the existing HVAC system being replaced in the Monthly Report:
				1. equipment type;
				2. approximate age of unit;
				3. performance efficiency (i.e., SEER, HSPF, AFUE); and,
				4. If a furnace or boiler is transitioned into a dual fuel heating system, this must also be noted along with the control settings (switchover temperature) being used to select the furnace/boiler or the heat pump for heating.
		6. Propane water heater conversion to a heat pump water heater- Replacement of a propane fuel-fired water heater with a heat pump water heater is an acceptable measure if each of the following conditions is met:
	1. The comprehensive whole-house retrofit package results in a Simple Payback of 15 years or less;
	2. The installed heat pump water heater is ENERGY STAR qualified;
	3. The dwelling’s electric service is upgraded per applicable building codes to address the new load, if necessary, including compliance with the jurisdiction’s permitting and inspection requirements; and,
	4. Any combustion safety issues created by the removal of the gas/propane water heater are addressed and [BPI Standards 1100](http://www.bpi.org/sites/default/files/ANSI-BPI-1100-T-2014%20Home%20Energy%20Auditing%20Standard.pdf) and [1200](http://www.bpi.org/sites/default/files/ANSI%20BPI-1200-S-2017%20Standard%20Practice%20for%20Basic%20Analysis%20of%20Buildings.pdf) are addressed.

13) Additional Energy Efficiency Measures

1. Additional energy efficiency measures or locations may be approved on a case by case at the complete and sole discretion of MEA.
2. To be eligible, the additional energy efficiency measure must be acceptable, as determined by the MEA program manager, and the simple payback for the entire residential upgrade (all energy efficiency measures combined) must be equal to 15 years or less.
3. MEA approval for any additional energy measure or location shall be in writing by the assigned MEA program manager.

F. Cost Limits and Additional Requirements

1. **MEA Cost Limits**: The cost of MEA’s contribution to the energy efficiency upgrade is capped at a maximum of $7,000 per home for projects not involving a heating, ventilation, and air conditioning (HVAC) system replacement and a maximum of $12,000 per home for a project involving an HVAC system replacement. These limits do not include the cost up to $3,000 that is available for comprehensive mechanical upgrades involving fuel switching and electrical service upgrades, if necessitated by the energy efficiency measures.
	1. Any energy efficiency upgrade estimated to exceed these spending limits must be approved in advance by the MEA program manager.
	2. MEA will not allow a charge for an upgrade that solely includes HVAC.
2. **Incidental Repairs**: Incidental repairs required to correct health and safety issues identified through the energy audit may be performed as long as the total cost of the materials and labor associated with incidental repairs charged to MEA does not exceed a cost of $1,500 per home.
	1. Incidental repair costs shall be included in the overall cost of upgrading the home and count towards MEA’s contribution limits (i.e., $7000 per home without a HVAC upgrade and $12,000 per home with a HVAC upgrade).
	2. To be reimbursable, incidental Repairs / Health and safety measures shall fall into one of these five categories:
		1. Measures that enable the installation of an energy efficiency measure (i.e., a prerequisite to the successful installation of the energy efficiency measure). For example, repairing a hole in a roof that must be patched before installing insulation in the attic would qualify. Items that have no connection to an energy efficiency measure being installed would not qualify (e.g., repairing a dangerous step in a stairwell).
		2. Measures to install carbon monoxide (CO) monitors for homes with combustion appliances or an attached garage.
		3. Measures to correct combustion appliance zone (CAZ) problems.
		4. Measures to install required mechanical ventilation, including the installation of bathroom ventilation fans and controls, and kitchen ventilation fans/hoods (which must be vented to the outdoors).
3. Upon request by MEA, Grantee shall provide a list of all homes, buildings, and residences upgraded using funds from this Grant.
1. <https://www.bpihomeowner.org/home-energy-audit> [↑](#footnote-ref-1)