

**1. Heating Improvement Program**

- 1.1. Heating System Upgrades and Shell Weatherization
- 1.2. Heating System Repairs
- 1.3. Heater Replacement Eligibility Guidelines
- 1.4. Emergency Heating Replacement
- 1.5. Installing Heating Systems in Vacant Units
- 1.6. Installing Heating Systems Where None Exist
- 1.7. Home Energy Assistance Program Funds for Heating System Replacements
- 1.8. Central Air Conditioning

**2. Hot Water Heaters**

- 2.1 Repair and Replacement of Water Heaters

**3. Assessment, Evaluation and Standards**

- 3.1. Procedure for Approval of Heating System Improvement Services
- 3.2. Instructions for Testing Procedures that can be followed when certain conditions are found during a Heating System Evaluation
- 3.3. Efficiency Standards
  - 3.3.1 Oil Burner Retrofit
  - 3.3.2 Replacement Oil-Fired Heating Systems
  - 3.3.3 Replacement Gas-Fired Heating Systems
- 3.4. Carbon Monoxide (CO) Testing of Heating Systems, Hot Water Tanks and Gas Ranges
  - 3.4.1. Procedures for Combustion Safety Testing
- 3.5. Efficiency Standard for Replacement Furnaces Installed in Mobile Homes
- 3.6. Underground Oil Storage Tanks
- 3.7. Fuel Type Conversions
- 3.8. Heating and Distribution Systems Insulated with Asbestos

**4. Leveraging Landlord Contribution****5. Bidding and Contractor Requirements**

- 5.1. Bidding Procedures for Heating System Upgrades
- 5.2. Required Permits and Documentation
  - 5.2.1 Heating System Permits and Permit Applications
  - 5.2.2 Contractors' Assurances Form and Documentation
  - 5.2.3 Heating System Replacement, Hot Water Heaters
  - 5.2.4 Electrical Upgrades

**6. Client Documentation**

- 6.1. Recommended Client Education Strategies for Recipients of Heating System Improvement Services

**7. Consumer Product Safety Commission Product Warning****8. Walk Away Policy**

## 1. Heating Improvement Program

The Heating Improvement Program (HIP) funded by LIHEAP funds provides low income families assistance in reducing their energy bills by upgrading, repairing and or replacing heating systems. The purpose of this chapter is to provide guidance on heating systems upgrades, repairs, or retrofits with DOE and or LIHEAP funds.

### 1.1. Heating System Upgrades and Shell Weatherization

DOE funds can be used to complete shell work in a unit that receives a heating system upgrade with DHS (LIHEAP WX/HIP) funds. The cost must be reported separately and program averages must be maintained. **The cost of shell work or heater work cannot be split and charged to both grants.**

### 1.2. Heating System Repairs

The eligibility guidelines applicable to repairs are:

1. Client(s) must meet WAP income guidelines as found in Chapter 1, Eligibility and Documentation, Page 2.
2. Client(s) heat with oil.
3. Client(s) have supply of oil and unit is in working condition.
4. Heating system output is less than 300,000 BTU's.
5. Heating system has a life expectancy of at least three (3) years.

WAP Agency's field technicians should be capable of making minor repairs, i.e., cement around flue going into chimney.

### 1.3. Heater Replacement Eligibility Guidelines

1. Client(s) must meet WAP income guidelines as found in Chapter 1, Eligibility and Documentation.
2. Client(s) heat with oil or gas (coal-fired units will be considered for conversion on a case by case basis).
3. Unit has one or more of the following conditions:
  - a. Unit is inoperable.
  - b. Unit is hazardous to operate, i.e., releasing toxic fumes into living area.
  - c. Steady State Efficiency is under 72%.
  - d. EA-QUIP/NEAT/MHEA Audits recommendation for replacement requires a savings to investment ratio of 1.0% or greater.
4. Heating System is rated at less than 300,000 BTU output (Residential Only).
5. Heating System has life expectancy of less than three (3) years.

Retrofitting multi-unit buildings that contain heating system(s) that do not exceed 300,000 BTU's are allowable.

All replacement heating systems must have as minimum efficiencies an AFUE of 82% for new oil or gas steam boilers, an AFUE of 83% for oil furnaces, an AFUE of 85% for oil or gas hot water heaters and an AFUE of 90% for new gas furnaces where not restricted by building design and where cost-effective. Heating contractors must ensure that they install the appropriate furnace type for horizontal applications.

Payment for approved and properly authorized heating system installations which pass all required inspections is to be made directly to the contractor who performed the installation as stated in Chapter 5, Prompt Payment to Contractors.

Reimbursement to client for replacement of a heating system is not permissible in this program.

Each potential candidate for a replacement heating system should be clearly informed that authorization to the contractor to proceed with the replacement can only be granted by the WAP Agency.

The OLIEC encourages that WAP Agencies clearly share this information with participating contractors as an additional step toward avoiding any possible misunderstanding of existing heating system replacement authorization policies.

#### **1.4. Emergency Heating Replacements**

Heating system replacement requests received from October 1st through May 1st are to be considered emergencies because of the correlation of these dates to the need for heat. WAP Agencies must solicit 3 requests for proposals from three different heating contractors with a deadline for submission of 24 hours during the week and 48 hours during the weekends. Only one bid is required for emergency projects, where the client is at the top of the waiting list and is in a no heat and/or no hot water situation.

Heating system replacement requests received from May 2nd through September 30th will not be considered emergency situations. WAP Agencies are required to follow a bidding process as per Local Public Contractors Law, N.J.S.A. 40A:11-1 et. seq. during this time period.

If a heating unit also provides hot water, making year round operation necessary, a separate hot water heater may be installed and handled as an emergency, irrespective of time period.

WAP Agencies are reminded that DOE does not allow heating systems to be replaced based solely on an emergency. The energy audit must recommend replacement with a Savings to Investment Ratio (SIR) of one (1) or greater, or it can be done as a health and safety measure if the cost is within the amount allowed for that purpose per the contract. For example, if the total allowable is \$20,000 for health safety, an agency can charge heaters that need replacement and are not recommended by the energy audit up to that amount. Heaters charged to DOE must be within averages per program year (may add HEA funds up to

\$1,000 when allowable). Heating systems can be repaired, retrofitted or replaced as an emergency with DHS funds up to a maximum cost as reflected per program year below:

<b>Program Year</b>	<b>Average</b>
*2010	\$6,500
*2011	\$6,572
2013	\$6,904
2014	\$6,987
2015	\$7,105

\*As of April 1, 2012 carry over balances where reflected in the 2012 NJ WAP State Plan with an average cost per unit of \$6,769.

Any heating system replacement to be completed with DHS (LIHEAP WX/HIP) funds that exceeds the maximum allowable must be approved by OLIEC. Replacement justification must be verifiable by visual inspection with photographs and test results.

### **1.5. Installing Heating Systems in Vacant Units**

If a unit requiring a single heating system is not occupied the unit must be deferred. If a single family home (1-4 units) with one heating system then the 66% or 50% rule must be met.

### **1.6 Installing Heating and Hot Water Systems Where None Exist**

A heating or hot water unit cannot be installed where none exists if the unit is in a home that was originally for seasonal use (e.g. summer cottages,) and as such, had no heating or hot water system.

If the heating or hot water unit is absent due to theft, vandalism, or removal by the owner, WAP agencies must request that the client submit an affidavit explaining the absence of the unit. WAP agency should determine what type of system the client had by examining the remaining distribution system, to insure compliance with the same fuel source requirement.

### **1.7. Home Energy Assistance Program Funds for Heating System Replacements**

HEA funds must be used for heating system repairs first before WAP funds if the following limitations exists:

1. It must be during the Home Energy Assistance Program emergency period.
2. The recipient is a HEA recipient AND a homeowner.
3. The maximum amount allowable is \$1,000 within a program year.

All heating repairs under \$1,000 reflected on a HESWAP Invoice will be reviewed by State Monitor to confirm that costs cannot be charged to HEA. If the limitations listed above are not applicable then the unit can be charged to HIP grant.

HEA funds used for heating system repair or replacement cannot be reported on the DOE or DHS/WAP report.

All sources of funds used must be documented in the client file and reported by funding source.

## **1.8 Central Air Conditioning**

It is a permissible weatherization tactic to modify, repair, tune-up, and, in limited and specific circumstances, replace air conditioning systems. Replacement of air conditioning systems is permitted whenever replacement is required to facilitate the authorized replacement of (or other modification to) a heating system. This replacement of air conditioning systems should also, where possible, be supported by documentation which indicates that the air conditioning is medically necessary.

All work of any kind involving alterations or replacement of air conditioning systems must receive prior authorization from OLIEC.

## **2. Hot Water Heaters**

Hot water heaters can be replaced with DOE or DHS funds. Shell work may be charged to DOE and the hot water heater to DHS and vice versa.

### **2.1. Repair and Replacement of Water Heaters**

Installation of new water heaters is permissible under the LIHEAP WX, DOE Weatherization, Home Energy, and Heating Improvement Program (HIP).

Replacement of existing domestic water heating systems may be performed under the following circumstances:

1. The domestic water heating system is operating in a hazardous manner, which can only be corrected through complete unit replacement. "Operating in a Hazardous Manner" includes, but is not necessarily limited to:
  - a. Production of excessive Carbon Monoxide (See Section 3.4).
  - b. Flue, venting or installation conditions which permit combustion by-products to enter the living space, present a fire hazard or which otherwise violate applicable codes.
  - c. Inability of the unit to properly regulate temperature of hot water produced.
  - d. Improper configuration or absence of pressure release mechanisms.

2. The domestic water heating system must be replaced in order to facilitate a properly authorized heating system repair, retrofit or replacement.
3. A boiler is authorized to be replaced and the boiler supplies domestic hot water by means of an integral tankless coil (a separate boiler and standard tank-type domestic water heater can be installed).
4. Unavoidable damage is sustained by the domestic water heater in the course of an authorized heater repair, retrofit or replacement.

**New water heaters must meet the minimum energy factors as listed below:**

- a. .62 Gas
- b. .62 Oil
- c. .90 Electric

### **3. Assessment, Evaluation and Standards**

#### **3.1. PROCEDURE FOR APPROVAL OF HEATING SYSTEM IMPROVEMENT SERVICES**

The following policy and procedures will apply for approval of heating systems improvements services, to ensure that proper support documentation is on file for heating system replacements, and to facilitate testing of completed units:

- I. Heater evaluations are mandatory for every unit weatherized. Each client file should contain a copy of the Heating System and Hot Water Heater Survey Report documenting the condition of the appliances. The Heating System Improvement Checklist must be completed in full and maintained on file whenever heating system improvement services are provided. Forms can be found in the Appendix:  
[http://www.nj.gov/dca/divisions/dhcr/offices/docs/wap/wap\\_7\\_survey\\_rpt.pdf](http://www.nj.gov/dca/divisions/dhcr/offices/docs/wap/wap_7_survey_rpt.pdf)  
[http://www.nj.gov/dca/divisions/dhcr/offices/docs/wap/wap\\_7\\_checklist.pdf](http://www.nj.gov/dca/divisions/dhcr/offices/docs/wap/wap_7_checklist.pdf)
- II. Require the contractor who evaluates the heater to provide in writing why the unit must be replaced. The WAP Agency heater specialist must verify the contractors' findings unless the equipment in question (such as a heat pump) is not within his/her area of expertise. In those instances, it is advisable to get a second opinion from another contractor.

A cracked heat exchanger or boiler section is no longer a replacement justification unless the defective exchanger/section cannot be replaced. If the heater is in good condition, the repair option should be explored before replacement is considered. If the heater does not have at least a three year life expectancy, then replacement is the only option.

- III. All heaters must be tested before a determination is made to replace it. If the heater is not working due to defective controls, replacement should not be considered if the controls can be replaced. If the life expectancy of the unit does not warrant repairs (less than three years) then no money should be expended on defective parts. If the client does not have oil, and

this prevents post-installation testing, the agency is authorized to expend up to 100 gallons for oil, to ensure that all post-installation testing can proceed in a timely manner.

- IV. The first priority for oil-fired systems is retrofitting. A unit should not be replaced instead of retrofitted solely on the auditor's opinion that a unit will not last 3 years. That opinion must be supported by facts as called for on the Heating System and Hot Water Heater Survey Form and Heating System Improvement Checklist.
- V. All replacement heaters must be certified as noted on the heater check-list. WAP Agencies must use the Air-Conditioning, Heating, Refrigeration Institute (AHRI) Certification website <https://www.ahridirectory.org>.

**If the unit is not reflected in the AHRI Certification Directory, client file must contain the manufacturers' specifications with required AFUE rating (applicable for replacement heating systems) and/or EF rating (when hot water tank is replaced).**

- VI. Any heater and shell treatments that exceed maximum program per unit costs must have justification in the form of an itemized listing of additional parts and labor. This includes distribution system repair or replacement, chimney lining and repair, oil tank treatments, etc. This data is called for on the Heating System Improvement Checklist and should be supported by cost itemization on the proposal.
- VII. WAP Agencies must stress to contractors that estimates for heater replacements should include all additional parts needed to guarantee that the unit will operate at the minimum efficiency standards. In addition to this efficiency requirement, it is also required that clients be left with heating systems which operate safely and effectively, as well as efficiently, at the conclusion of a repair, retrofit or replacement job.

Individual circumstances may dictate that to achieve this goal, improvements and/or corrections to the venting, distribution, water supply, or power supply systems (for example) may be required.

All heating systems proposed for improvement services (whether retrofit, repair or replacement) must be inspected by the WAP agency field technician prior to the agency soliciting any work proposals from contractors. This pre-installation inspection requirement applies to all heating system work, including the replacement of non-functional systems being serviced on an emergency basis.

The objective of this inspection procedure is to ascertain if there are circumstances present at the work site which the contractor should be aware of before he/she prepares the work proposal. The results of this WAP agency pre-inspection may indicate to the contractor that a site visit is necessary to gather additional information before the work proposal is prepared.

When contractors are solicited for proposals, they should be informed of any WAP Agency observations concerning circumstances at the premises which could either impact the ability of the contractor to complete the job, or the ability of the heater to function safely,



effectively and efficiently following installation. The WAP Agency's observations of potential secondary problems need not necessarily be conclusive, if the circumstances observed are beyond the technical expertise of the WAP Agency field technician to diagnose. Contractors should include the correction of these secondary problems in their proposals, whenever correction is necessary.

Heating system contractors may rely on appropriate subcontractors for secondary problem correction. As an alternative, WAP Agencies may contract with appropriate tradespersons for the correction of secondary problems before authorizing contractors to proceed with heating improvement services. Contractors' proposals must include all costs, including any costs incurred through subcontractors, in their proposals. Contractors' proposals must be sufficiently comprehensive so as to provide the client with a safe, effective and efficient heating system which complies with all applicable codes and regulations.

Contractors must provide clients with a 1 year warranty on parts and labor and manufacturers written material for the new appliance.

### **3.2. Instructions for Testing Procedures that can be followed when certain conditions are found during an Oil Heating System Evaluation.**

#### **CARBON DIOXIDE TOO LOW; OXYGEN TOO HIGH**

This situation is usually a result of too much secondary air infiltrating into the combustion chamber (i.e., air that enters the system other than through the burner). If you suspect this is the case, test to see if the carbon dioxide or oxygen readings change appreciably (more than 1 percent) when the blower comes on. Also, check for an appreciable difference when the barometric damper is open.

Make sure the draft in the breech is less than .03 inches of water. Remember that the new burner puts only 1/3 to 1/2 as much air into the unit, so that the draft loss across the unit is much less than before. Therefore, a low draft is sufficient.

If there is a difference in the carbon dioxide or oxygen reading, check for air leaks in the blast tube, doors, gaps between sections of the boiler, breech, fire box, etc. Seal whatever holes you find with the appropriate material. If the draft is excessive, reduce it.

Then check for infiltration of excess air (through the burner). Have you selected an appropriate head for the nozzle? The shutter and spinner should be set according to the manufacturer's instructions.

#### **SMOKE LEVELS ABOVE "1"**

High smoke levels could be caused by insufficient primary air. Check the air shutter. Consult the installation or manufacturer's literature for proper spinner setting, head, etc.



High smoke levels may also be caused by the flame touching the chamber wall. If this is the problem, consider using a smaller nozzle and higher pump pressure or a chamber liner that heats more rapidly.

This condition may also be caused by oil droplets that escape the circulating air pattern. Check the angle, pattern, and ratings of the nozzle to solve this problem.

### **STACK TEMPERATURES TOO HIGH**

Stack temperatures that are too high often occur when the nozzle is too large. Check previous and present nozzle size to decide if the nozzle should be smaller. Check the heat exchanger to see if something is preventing heat exchange. Check for soot in hard to get at areas of the exchanger.

Check for any path that would allow hot gases to bypass the exchanger. Check for missing baffles or turbulators. It may be that the exchanger is poorly designed. If all else fails, note the manufacturer, design, model number, etc. and report the problem. It may be possible to obtain a waiver.

If the furnace is the hot-air type, make sure hot air flow is unrestricted. Are any supplies or return ducts closed or obstructed? Are the filters dirty? Check the blower motor to see that it is running fast enough, and that the belt is not slipping.

If your efficiency testing equipment consistently reads higher or lower than the Inspector's, check the equipment for maintenance and calibration records. Review the Manufacturer's instructions and re-calibrate.

Make sure when you sample stack gases, you do so from a point near the breech and before the stack control or barometric damper. Steady-state efficiency is an objective test based on chemical principles. Results should be the same no matter what brand of test equipment is used or who performs the test. Some slight variation may occur from one piece of equipment to another, but all commonly used tests similar results if the equipment is functioning, calibrated, and used properly.

## **3.3. Efficiency Standards**

The following standards are applicable to both the retrofit of oil-fired heating systems and the installation of new gas or oil-fired heating systems. Efficiency Standards are found in Section 1.3 Heater Replacement Eligibility Guidelines and 2.1 Repair/Replacement of Water Heaters.

### **3.3.1. Oil Burner Retrofit**

Following the installation of an oil burner retrofit, the following standards shall be verified by the WAP agency heating system specialist:

- 1) A minimum carbon dioxide reading of 10.5%.

- 2) A maximum reading of 1 on the smoke scale.
- 3) A minimum Steady State Efficiency of 83%.
- 4) A maximum carbon monoxide level of 200 ppm as measured or 400 ppm air-free in the flue and 9ppm measured in the ambient air.
- 5) A draft reading/test to ensure flue gases are venting properly.

All five of these standards must be achieved for the retrofitted unit to pass inspection. It will not be possible in all cases to achieve this result. Whenever all five standards are not achieved, the contractor should be informed of the WAP Agency test result and requested to return to the unit to make the needed adjustments.

Blanket waivers have been issued to cover all instances involving either horizontal furnaces or furnaces located in mobile homes. In these cases, the Steady State Efficiency requirement (as verified through the post-installation combustion testing procedure) has been reduced to 78%. The standards for smoke, carbon dioxide, and carbon monoxide are not changed for these installations.

### **3.3.2. Replacement Oil-Fired Heating Systems**

The post-installation inspection procedures, standards, and waiver process are as described above for oil burner retrofits.

Replacement heating systems are also subject to standards based on their rated efficiencies. The WAP Agency must verify these ratings before heating systems are approved for installation. Ratings are verified by checking the proposed unit's efficiency at the following link for the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) at <https://ahridirectory.org>. The AHRI is the trade association represents manufacturers of HVACR and water heating equipment.

The pre-installation standard applicable to oil-fired replacement heating systems is based on Steady State Efficiency. If the Steady State Efficiency is not explicitly listed in the applicable trade reference, it may be calculated by dividing the BTU output by the BTU input.

The pre-installation standard for replacement to oil-fired heating systems is a minimum Steady State Efficiency of 80% for mobile homes. The pre-installation standard is a minimum Steady State Efficiency of 78%.

### **3.3.3. Replacement Gas-Fired Heating Systems**

The pre-installation standard applicable to gas-fired replacement heating systems is based on Annual Fuel Utilization Efficiency (AFUE). The WAP Agency must verify these ratings before heaters are approved for installation. Ratings are verified by checking the proposed unit's efficiency at the following link for the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) (<https://www.ahridirectory.org>). The AHRI

is the trade association represents manufactures of HVACR and water heating equipment.

Following the installation of a new gas-fired heating system, the WAP Agency's heating system specialist must perform a combustion efficiency test to verify that the unit complies with program standards. This test should verify that the oxygen level is no greater than 9%, and that the carbon monoxide level does not exceed 200 ppm as measured or 400 ppm air free in the flue and 9ppm measured in the ambient air.

These standards are only applicable to the extent that they are consistent with manufacturers' recommendations. If a heating system has specifications which require an oxygen level higher than that specified by program standards, manufacturers' literature (or a letter on manufacturers' letterhead) evidencing this specification shall constitute sufficient grounds to establish the manufacturers' specification as an alternate program standard applicable to that installation.

Before contacting the contractor or the manufacturer, the WAP Agency should be certain that the test results are accurate. This can be accomplished by making certain that:

1. The test kit is properly calibrated and the oxygen cell is in good condition.
2. The test probe is inserted in the proper place and the units are tested following the procedures described in the test kit's instruction manual.
3. The heater can be tested accurately, i.e., an air-free sampling of the flue gas is possible.

When the heater is equipped with a positive pressurizable vent (i.e. condensing furnaces low-temperature plastic venting systems), these heating system types cannot be tested by disturbing the vent system. Ambient air testing is therefore acceptable to pass the combustion testing process, along with satisfactory local code and utility company inspections. For additional resources, go to the New Jersey Field Guide.

It is the responsibility of the installing contractor to either: 1) meet the general program standards or; 2) provide the necessary documentation to justify the application of an alternative standard to that installation or; 3) to provide the necessary documentation to establish that the unit cannot be reliably tested under field conditions.

### **3.4. Combustion Safety Testing of Heating Systems, Hot Water Tanks and Gas Ranges**

The OLIEC requires that combustion safety testing be conducted in all heating systems, hot water heaters, and draft hood after the ambient air test is completed. Gas ranges must also be checked for CO at the vent, the oven and in the ambient air. Both pre- and post-work combustion safety tests must be conducted (see Section 3.4.1).

#### **3.4.1. Procedures for Combustion Safety Testing**

A preliminary and post-installation safety inspection of all combustion appliances must be completed as follows:

1. Check for fuel leaks.
2. Test Worst-Case Depressurization in the Combustion Appliance Zone (CAZ).
3. Test Combustion Spillage and CO.
4. Efficiency and Combustion Operating Parameters.

### **1. Check for Fuel Leaks:**

Use a calibrated gas leak detector at joints, fittings, and along pipes to determine if fuel is leaking. Natural gas is lighter than air so test above joints, fittings, and pipes. Propane or LPG is heavier than air so test below the connections. Use soap bubbles to confirm a leak since some types of pipe dope (joint sealant) may set off the detector. See testing procedures in the New Jersey Field Guide. Should there exist a gas leak, the client will be so advised, and the WAP Agency will contact the local utility company for assistance.

### **2. Worst Case CAZ Depressurization Test:**

CAZ depressurization is the leading cause of back drafting and flame roll-out in furnaces and water heaters that vent into naturally drafting chimneys. Instructions to perform the worst-case testing procedures can be found in the New Jersey Field Guide.

### **3. Spillage and CO Testing:**

Testing for CO in the appliance vent is a part of combustion testing that happens under worst-case conditions. The DOE and BPI have two separate CO limits depending on the type appliance. If the following CO limits are exceeded in the undiluted combustion byproducts, the appliance fails the CO test under current DOE and BPI standards.

a. The threshold limit values for carbon monoxide are the following:

- Space heaters and water heaters: 100 ppm as measured or 200 ppm air-free.
- Furnaces or boilers: 200 ppm as measured or 400 ppm air-free.
- Ambient Air Monitoring for CO  
The DOE SWS require contractors to monitor CO during combustion testing to ensure that CO in the combustion appliance zone (CAZ) doesn't exceed 35 ppm as measured. If ambient CO levels in the combustion zone exceed 35 ppm, stop testing for your own safety.

Ventilate the CAZ thoroughly before resuming combustion testing. Investigate indoor CO levels of greater than 9 ppm to find their cause.

- b. Should there exist, a carbon monoxide concentration (ppm) that is above the afore-mentioned threshold limit values, the client will be so advised, and the agency will contact the local utility using the procedures located in Section B (9) and (10).

#### **4. Efficiency and Combustion Operating Parameters:**

Perform combustion analysis at Steady-State Efficiency (SSE) to verify heating system's correct operation. Procedures found in the New Jersey Field Guide.

- a. If the heater in question has been retrofitted, repaired or replaced with WAP funds, the contractor will be contacted by the WAP Agency and required to return to the site to make adjustments to the unit.
- b. If the heater and or hot water heater has been retrofitted, repaired, or replaced with Weatherization Assistance Program funds the following Post Installation Report is required to be completed and signed by the heater specialist. Verifying the unit passed WAP Agency final inspection. Post Installation Report can be found in the Appendix:  
[http://www.nj.gov/dca/divisions/dhcr/offices/docs/wap/wap\\_7\\_installation\\_rpt.pdf](http://www.nj.gov/dca/divisions/dhcr/offices/docs/wap/wap_7_installation_rpt.pdf).

#### **A. Inspection Procedures for Gas Ranges**

##### **1. Visual Inspection**

- a. Check burners for blockage
- b. Check oven and broiler door for proper closure
- c. Check for flammable materials near burners or in oven

##### **2. Interview Client**

- a. Are all components of the appliance operational?
- b. Has the appliance been red-tagged by the local utility?

3. Range-Top Burners: Hold probe of combustion analyzer about 8" above each burner. The reading should max out and then stabilize after about two minutes. Each burner should read less than 25 ppm as measured.

4. Ask client to set the oven to bake on high temperature. If the burners fail to ignite within 3 seconds or the oven fails to fire within 5 seconds, ask the client to turn off the appliance and test the ambient air only.

5. Examine the flame of burners for color and shape (should be blue and consistent, without gaps).

6. After 10 minutes of operation, place probe from testing device well into exhaust vent of oven. This is usually a 1x5 inch hole near the back of the range top. This will be given an undiluted sample of combustion gases.
7. Open the oven door and hold the probe in front of the appliance for an ambient air reading.
8. If there is no significant CO present, ask the client to turn off the appliance.
9. If the CO reading is over 200 ppm as measured or 800 ppm air-free, or if the ambient-air reading exceeds 35 ppm as measured during the test, discontinue testing and contact the clients' utility company and request a "carbon monoxide investigation".
10. If the final reading is greater than 200 ppm as measured or 800 ppm air-free and the ambient air reading is less than 35 ppm as measured the WAP agency will contact the clients' utility company and request an "appliance adjustment for emissions".

B. Client Education

**All clients shall be provided the following information:**

1. A gas range should never be used as a space heater;
2. When using the appliance for cooking, proper ventilation is recommended (an exhaust vent or an open window);
3. Regular cleaning may prevent malfunctions that can create CO emissions.

C. Testing Non-Feasibility

**WAP Agencies should not test the gas range if the following conditions exist:**

1. The appliance is obviously beyond repair, i.e., missing, broken, or inoperable parts.
2. The appliance is clogged with food or other debris, and the client declines to clean the appliance.

D. Replacement Recommendation

If the client is a tenant, and there is an inoperable or hazardous gas range, the landlord should be advised by the WAP agency that the appliance must be replaced for health and safety reasons before weatherization can be done.

### **3.5. Efficiency Standard for Replacement Furnaces Installed in Mobile Homes**

The efficiency standard for new oil-fired furnaces installed in mobile homes is revised. The new standard is a minimum 78% Steady-State Efficiency, a minimum of 10.5% Carbon Dioxide, zero to trace smoke, and a maximum Carbon Monoxide reading of 200 ppm as measured or 400 ppm air-free in the flue and a maximum Carbon Monoxide of 35 ppm as measured. All four standards must be achieved and verified for the unit to pass inspection.

Many mobile homes in New Jersey are equipped with oil-fired furnaces. These furnaces are designed specifically for limited-space installation and use exterior air for combustion. The replacement units often fail to achieve the 80% Steady-State Efficiency requirement by one or two percentage points, due to an elevated stack temperature.

It has been suggested by the Institute for Human Development (IHD) that contractors de-rate the unit to a 0.65gph nozzle (or less) whenever possible in order to minimize the stack temperature and maximize the efficiency (provided that this strategy does not affect the manufacturer's warranty).

A blanket waiver of the 80% Steady-State Efficiency requirement for replacement of oil-fired furnaces installed in mobile homes is provided. However, the unit must achieve the revised standard listed above unless the manufacturer indicates testing of replacement furnace will void warranty.

#### **Mobile Homes equip with gas-fired furnaces.**

Mobile home furnaces must be replaced by furnaces designed and listed for use in mobile homes. If feasible, consider replacing the existing gas furnaces with a sealed-combustion, down flow, condensing furnace.

Be advised that mobile homes seldom have floor drains in which to discharge the condensation from the combustion process. Follow the guidelines found in the New Jersey Field Guide.

### **3.6. Underground Oil Storage Tanks**

The following section describes procedures to be implemented for a leaking underground oil storage tank. Necessary steps include draining, cleaning, filling and capping.

Replacement of leaking oil tanks used for storing residential heating fuel is a permissible tactic under all weatherization programs.

If the tank is underground, replacement will include the proper retirement of the leaking tank. This retirement procedure is as follows:

1. Drain and clean the tank.
2. Fill tank with an insert material (i.e., sand).
3. Cap and permanently seal the tank's fill opening.



In the event that local code officials refuse to grant a work permit, or demand excavation and removal of the tank, request a copy of the local ordinance which prohibits the retirement procedure described above.

WAP Agency should follow local administrative procedures to appeal the decision of the code official and request a waiver or variance on behalf of the client.

### **3.7. Fuel Type Conversions**

Replacement heating systems installed under all weatherization programs must operate with the same type of fuel as the units which they replace.

An exception to this rule applies when the system to be replaced operates on propane, coal or other solid fuels. Solid fuel burning heating systems may be replaced with systems which operate on either oil or gas. The decision whether to install an oil or gas system will be based on an analysis of the full installation cost for each system type. The full installation cost includes such items as oil tanks, gas lines and meters, and venting in accordance with code.

### **3.8. Heating and Distribution Systems Insulated with Asbestos**

Assume asbestos is present in unknown or common asbestos containing covering materials. Encapsulation of friable asbestos is allowed by an AHERA asbestos control professional and should be conducted prior to blower door testing. Removal may be allowed if performed by an AHERA asbestos control professional when no other remedy is possible and the treatment is necessary for the completion of the energy conservation measure. Blower door results can be estimated to complete the audit but must be updated once asbestos work is concluded.

#### Funding:

DOE funds will be used, except to remove or encapsulate intact material necessary to accomplish furnace work being performed through LIHEAP or other funding source, in which case the non-DOE WAP funds should be used.

#### Beyond Scope of DOE WAP:

If beyond the scope of DOE WAP unit will be deferred.

#### Standards for Remedy:

Auditor will perform visual inspection to identify suspected asbestos containing covering materials. If suspected friable asbestos is present, minor asbestos encapsulation or removal may be performed by a certified asbestos contractor. Complete as much of the energy audit as practical without disturbing the material and estimate the blower door numbers. If the material is intact and will not be disturbed by recommended WAP activity, continue with weatherization work. Testing may be allowed where the material is suspected to contain asbestos and cost estimates for the necessary encapsulation or removal are high and could potentially be avoided. Once the friable material is encapsulated or removed or if tests show

that no asbestos is present, perform the blower door tests and complete the energy audit and update estimate numbers to determine the recommended measures.

Standards for Deferral:

Deferral will take place when friable asbestos is unable to be corrected through this plan. Asbestos that is intact but requiring removal for mechanical or other work must also be addressed within the H&S Plan and cannot result in skipping audit-recommended measures. The primary mechanism for determining deferral of a unit is based on costs associated with correcting the H&S condition necessary in order to perform audit-recommended weatherization work as defined in the DCA Deferral & Referral Policy above.

Standards for Referral:

Deferred units shall be referred to publicly funded rehabilitation programs (i.e., CDBG).

Training Provision:

Training will be provided to WAP Agencies to visually identify suspected asbestos and asbestos containing materials. Anyone disturbing suspected asbestos containing material must be a certified AHERA professional.

Client Education:

Inform client of any observed suspected asbestos containing material. Clients should be instructed not to disturb suspected asbestos containing material. Provide asbestos safety information to the client. If deferral is necessary, inform client that work can only continue if the asbestos is removed by a certified professional and appropriate documentation provided.

Disposal Procedures:

Disposal of asbestos containing materials shall be included in the contract with the AHERA certified contractor. All asbestos containing materials must be disposed of in accordance with federal and state regulations.

#### **4. Leveraging and Landlord Contribution**

Heating system and hot water tank replacement in rental properties must have a landlord contribution of at least 50%. This does not apply to landlords that are income eligible.

#### **5. Bidding and Contractor Requirements**

##### **5.1. Bidding Procedures for Heating System Upgrades**

Heating System upgrades include but is not limited to hot water tank replacement, upgrades and repair.

A minimum of three (3) bids must be requested by the WAP Agency for each non-emergency project. The bid request by the WAP Agency shall be by letter advising the contractor to submit a sealed bid and shall provide a cut-off date for submission of said sealed bid.

Heating system replacement requests received from October 1st through May 1st are to be considered emergencies because of the correlation of these dates to the need for heat. WAP Agencies must solicit 3 requests for proposals from three different heating contractors with a deadline for submission of 24 hours during the week and 48 hours during the weekends. Only one bid is required for emergency projects, where the client is at the top of the waiting list and is in a no heat and/or no hot water situation.

Copies of all bid letters shall be placed in the client file.

Projects which require a heating system upgrade, replacement or repair with a total cost of at least \$17,500 shall be awarded pursuant to the procedures in the Local Public Contract Law [http://www.state.nj.us/dca/divisions/dlgs/programs/lpcl\\_docs/njac5\\_34\\_1\\_etseq.pdf](http://www.state.nj.us/dca/divisions/dlgs/programs/lpcl_docs/njac5_34_1_etseq.pdf).

OLIEC recommends that an ad be placed in the local newspaper at the beginning of each grant period inviting area heating contractors to submit the documentation required to be included in the bidding process.

## **5.2. Required Permits and Documentation**

### **5.2.1. Heating System Permits and Permit Applications**

Contractors must apply for a permit before starting a heating system upgrade, unless the installation is an emergency that occurs outside of business hours, in which case, the contractor will apply for the permit the next business day after the emergency occurs.

The contractor will submit either a copy of the permit, or if the permit has not been provided to the contractor at the conclusion of the work, a copy of the application must be provided.

**The application will not be deemed acceptable unless all the following information is included:**

1. The control number and permit number
2. The application date and the permit fee
3. The name of the contractor and homeowner
4. Work to be covered by the permit and location of the work
5. Total cost of the work

If the application does not include the information listed above, the agency may not accept the application, and the contractor may not be paid until the actual permit is received.

WAP Agencies are expected to work with the local code officials to ensure that inspections are completed in a timely fashion and to determine if delays in producing

the required permits are backlogs at the local government level or due to late application filing on the part of the installing contractor.

WAP Agency's final approval of a heating system installation does not relieve the installing contractor of the requirement to make any corrections or repairs that may be required as a result of local code inspections. **Permit must be on file prior to State Monitor issuing final inspection sign off.**

### **5.2.2. Contractors' Assurances Form and Documentation**

Contractors must complete a Contractors' Assurances Form when providing heating system improvement services, other than oil burner retrofits. The form can be found in the Appendix at:

[http://www.state.nj.us/dca/divisions/dhcr/offices/docs/wap/wap\\_7\\_cont\\_assurance.pdf](http://www.state.nj.us/dca/divisions/dhcr/offices/docs/wap/wap_7_cont_assurance.pdf).

It is not mandatory to have a copy of the contractors' assurances form or certificates of insurance in each individual client or facility file. For additional information on required insurance, see Chapter 5, Section 7, Pollution Occurrence Insurance and Lead Safe Work Practices.

WAP agencies are permitted to maintain a separate master file for originals of these documents, which are to be available on demand for inspection by the State Monitor.

WAP agencies have the discretion to only require contractors to sign the assurances form once to cover all furnace and boiler replacements.

Although the contractors' insurance certificates may be kept in a separate file, WAP Agencies are reminded that these documents must be renewed annually for the contractor to remain in active status.

Although individual client/facility files need not contain the contractor administrative documentation, WAP Agencies should be aware that it remains their responsibility to have in their possession original and properly executed, currently effective, contractors' assurances forms and certificates of insurance for each contractor assigned heating system work.

### **5.2.3. Heating System Replacement, Hot Water Heaters**

All heating systems replacements and hot water tank replacements must be documented by a pre and post pictures.

The client file must have a picture showing the existing heater and hot water tank prior to replacement, and another picture showing new installation.

**WAP Agencies are reminded that any heating system upgrades with costs exceeding maximum allowable must be approved by OLIEC before authorization.**

## **5.2.4 Electrical Upgrades**

### **5.2.4.1 Bidding Procedures for Electrical Upgrades**

Electrical upgrades include but is not limited to exhaust fans, upgrades, and repair. A minimum of three (3) bids must be requested by the WAP Agency for each non-emergency project. The bid request by the WAP Agency shall be by the letter advising the contractor to submit a sealed bid and shall provide a cut-off date for submission of said sealed bid. Copies of all bid letters shall be placed in the client file.

### **5.2.4.2 Required Permits and Documentation**

Contractors must apply for a permit before starting any electrical upgrade. The contractor will submit either a copy of the permit, or if the permit has not been provided to the contractor at the conclusion of the work, a copy of the application must be provided.

The application will not be deemed acceptable unless all the following information is included:

1. The control number and permit number
2. The application date and permit fee
3. The name of the contractor and homeowner
4. Work to be covered by the permit and location of the work
5. Total cost of the work

If the application does not include the information listed above, the agency may not accept the application, and the contractor may not be paid until the actual permit is received. WAP Agencies are expected to work with the local code officials to ensure that inspections are completed in a timely fashion and to determine if delays in producing the required permits are backlogs at the local government level or due to late application filing on the part of the installing contractor.

WAP Agency's final approval of an electrical installation does not relieve the installing contractor of the requirement to make any corrections or repairs that may be required as a result of local code inspections. Permits must be on file prior to State Monitors issuing final inspection sign off.

### **5.2.4.3 Contractors' Assurances Form and Documentation**

Contractors must complete a Electrical Assurance Form when providing electrical improvement services. The form can be found in the Appendix at: <http://www.nj.gov/dca/divisions/dhcr/offices/wap.html>. It is not mandatory to have a copy of the contractors' assurance form or certificates of insurance in each individual client or facility file. For additional information on required insurance, see Chapter 5, Section 7, Pollution Occurrence Insurance and Lead Safe Work Practices. WAP Agencies are permitted to maintain a separate master file for originals of these documents, which are to be available on demand for inspection by the State Monitor. WAP Agencies have the discretion to only require contractors to sign the assurance form once a year to cover electrical work performed.

Although the contractors' insurance certificates may be kept in a separate file, WAP Agencies are reminded that these documents must be renewed annually for the contractor to remain in active status.

Although individual client/facility files need not contain the contractor administrative documentation, WAP Agencies should be aware that it remains their responsibility to have in their possession original and properly executed, currently effective, contractors' assurance forms and certificates of insurance for each contractor assigned heating system work.

## **6. Client Documentation**

### **6.1. Recommended Client Education Strategies for Recipients of Heating System Improvement Services**

To ensure that the clients have a basic understanding of the maintenance required to keep their heating systems operating at optimal efficiency, the OLIEC recommends the incorporation of a client education component into all weatherization programs (when applicable).

The WAP Agency field technician should provide the client with the following information at a "post-installation" orientation session:

1. Show the client when and how to change the oil filter.
2. Explain to the client what heating system efficiency is and how to request an efficiency test in writing.
3. Explain the detrimental effects of running out of oil, (i.e., voiding the service warranty by clogging the system with sediment and sludge).
4. Review the periodic maintenance procedures which are the responsibility of the dwelling occupant, with particular emphasis on the operations of steam systems.

5. Ascertain that the contractor has left the instruction booklet (replacement units) with the client.
6. Review with the client the proper procedure for requesting service from the contractor and/or the manufacturer.

7. Leave a completed and signed copy of the Appliance Heating System Evaluation form once all work is done. (Copy of form can be found in the Appendix: [http://www.nj.gov/dca/divisions/dhcr/offices/docs/wap/wap\\_7\\_evaluation.pdf](http://www.nj.gov/dca/divisions/dhcr/offices/docs/wap/wap_7_evaluation.pdf))

Each WAP agency should also develop a sticker to be attached to the unit for recording the date(s) the unit was serviced. The sticker should have enough space to allow for multiple entries and be attached to the heater in a conspicuous place. The sticker should include information on carbon dioxide, oxygen, carbon monoxide, smoke, and steady-state efficiency. The test date and identity of the person performing the test should also be included.

## **7. Consumer Product Safety Commission Product Warning**

WAP agencies should refer to the [Consumer Product Safety Commission Website](#) for all product warnings and recalls.

## **8. Walk Away Policy**

If the cost of a heating system replacement exceeds average cost per unit and additional funds are not available through leveraging and landlord contribution, the replacement cannot be done. A WAP agency cannot charge clients or endorse clients entering into a payment agreement with a contractor for the amount in excess of what is allowable by program guidelines.

Building rehabilitation and hazard remediation work are beyond the scope of WAP. If unit is determined not fit for shell work due to factors listed stated in Chapter 7, Section 3.9, then it follows that the unit is not fit for HIP work. If total cost exceed ACPU + \$3,500, then unit should be deferred.