Navajo Nation
Priority List for Mobile Home Housing

The *Navajo Nation Priority List for Mobile Home Housing* lists the weatherization measures that shall be installed in Navajo mobile homes. The measures should be installed in order, as conditions dictate and funding allows. The most cost-effective measures are listed first. When no electric service is present, a more restrictive list of measures must be followed (see note on Electric Service below). Site-specific audits should be completed for unusual mobile homes, those with additions or when measures not listed below appear suitable for a particular house.

An analysis of typical homes identified the following weatherization measures to be cost effective based on Navajo housing stock, energy costs, and climatic conditions.

Wood Stoves:

- For wood stoves, DOE analysis indicates that **$2,400 of total replacement costs can be financed through program operations funds**. The remaining installed cost should be financed from alternate non-federal funding sources.
- If total installed cost (including chimney kit) is under $2,400, charge to program operations
- If total installed cost is over $2,400, the chimney kit can be charged as health and safety to bring down the total installed cost.
- All wood stoves not being replaced should be checked for draft and CO to ensure they are safe.

Health and Safety Measures:

- DOE Health & Safety Notices (Weatherization Program Notice WPN 11-6 and subsequent versions) contain the guidance on allowable costs.
    - Excludes items such as windows, doors, ramps, and handrails
    - Costs are reasonable as determined by DOE in accordance with the Navajo Nation's approved Annual Plan; **AND**
    - The actions must be taken to effectively perform weatherization work; **OR**
    - The actions are necessary as a result of weatherization work.

Electric Service: Homes with no electric service must not install electricity-based priority list measures, including:

- Duct Sealing
- Lighting Retrofits
- Refrigerator Replacement
- Heating System Replacement

General Heat Waste Measures: (Items must only be performed on homes with hot water service)

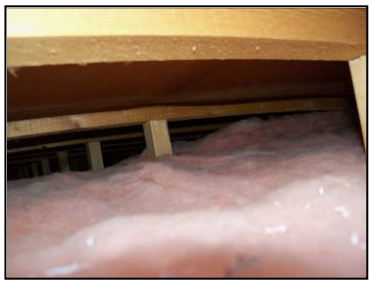
- Set back water heater temperature to 120° F (with client approval)
- Install low-flow shower heads if existing shower head has a flow rate greater than 2.5 gallons per minute (with client approval)
- Install faucet aerators.
- Install insulating blanket on water heater tank if none exists. Follow safety guidelines labeled on the unit and detailed in the *Energy OutWest Field Guide.*
- Install pipe insulation on the first six feet of hot water pipe exiting the water heater.

1. **Duct Sealing: (Skip measure if home is without electric service)**
   - Seal accessible ducts, connections, and boots with mastic.
   - Pressure pan test all registers with blower door running to determine relative air leakage of tested sites. The goal is a cumulative reading of 1 Pascal or less.

2. **Air Sealing:**
   - Use the blower door and digital manometer to guide air sealing.
   - Determine the closure target.
   - Seal plumbing, electrical, and HVAC penetrations through ceiling, flooring, and exterior walls. Use proper materials for high-temperature surfaces.

Primary Space Heating Fuel	Cost limit per 100 CFM50 of reduction:
Wood	$20.00
All other	$35.00

3. **Roof Insulation:**
   - Add blown fiberglass roof insulation to mobile home roofs without existing effective insulation.
   - Air seal penetrations, including wire and plumbing penetrations, around furnace flues, and other bypasses, prior to insulating the roof.
   - Check attic ventilation. There should be 1 square foot (ft^2) of attic net free vent area for every 150 ft^2 of ceiling area if there is no vapor barrier[1], The ratio is 1:300 if a vapor barrier is present, or if 50% to 80% of the vents are placed at least 3 feet above the lower vents.



4. **Belly Insulation:**
   - Repair holes and tears in belly fabric and blow loose-fill fiberglass insulation to uninsulated or poorly insulated belly cavities.
   - Cost should not exceed **$1.50** per square foot.

5. **Lighting Retrofits: (Skip measure if home is without electric service)**
   - Install compact fluorescent lamps (CFLs) in sockets used more than two hours per day.
   - Tip: Use ENERGY STAR-qualified CFLs with a correlated color temperature between 2,700 – 3,000K (warm white).
   - Educate client on proper disposal.

[1] A sound, painted ceiling counts as a vapor barrier.

6. **Replace Refrigerator: (Skip measure if home is without electric service)**
    - Determine annual energy consumption of existing unit by metering it for at least two hours. **Note: DOE requires grantees to meter at least 10% of units that are replaced.** Electricity usage of refrigerators can also be found in the database http://www.waptac.org/sp.asp?mc=techaids_refrigerator.

Table 1 – Refrigerator Replacement: Maximum Measure Cost for a Cost-Effective Refrigerator Replacement

	Annual kWh/yr of New Refrigerator		
Annual kWh/yr Existing Unit	**400** kWh/yr	**500** kWh/yr	**600** kWh/yr
900	$442	$353	$265
1,000	$530	$442	$353
1,100	$618	$530	$442
1,200	$707	$618	$530
1,300	$795	$707	$618
1,400	$795	$795	$707
1,500	$795	$795	$795
1,600	$795	$795	$795

- Replacement refrigerators ***may not*** have through-the-door ice or water service.
- Original units must be removed and decommissioned.

7. **Heating and Cooling Systems: (Skip measure if home is without electric service)**

- Heating system replacements are cost-effective under the circumstances displayed in Table 2.
- Manual J calculations must be completed to appropriately size the heat pump with higher order weatherization measures included.
- A clean and tune not to exceed $150 total cost is appropriate if the existing system does not need to be replaced. Install new furnace filter or air conditioning filter.
- If measured CO level of the heating system is 100ppm or greater the clean and tune is an allowable health and safety cost.
- Inoperable furnaces being replaced with a wood stove is a fuel switch and must be approved on a case by case basis. They must also be replaced with health and safety funds.

Table 2 – Heating System Replacement Maximum Installed Costs

Existing Unit	Replacement Unit	Maximum Installed Cost
Electric Furnace – Ducts in place	Heat Pump	$4,400
Propane Furnace – 75% SSE or less	Propane Furnace – 90 AFUE or better	$3,500

8. **Storm Windows:**
    - Installations can occur to existing single pane windows
    - Maximum installed cost of **$4.80** per square foot.

Incidental Repairs:
- Cost is limited to **$400.00** in total.
- Incidental repairs should only be undertaken after other priority list measures have been performed
- Incidental repairs must be energy related or installed to protect and energy related measure. Some examples include window or door repair.