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.

<table>
<thead>
<tr>
<th>Primary Space Heating Fuel</th>
<th>Cost limit per 100 CFM50 of reduction:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood</td>
<td>$20.00</td>
</tr>
<tr>
<td>All other</td>
<td>$35.00</td>
</tr>
</tbody>
</table>

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 (ft²) of attic net free vent area for every 150 ft² 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=techaid_refrigerator.

<table>
<thead>
<tr>
<th>Existing Unit</th>
<th>Annual kWh/yr</th>
<th>400 kWh/yr</th>
<th>500 kWh/yr</th>
<th>600 kWh/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>900</td>
<td>$442</td>
<td>$353</td>
<td>$265</td>
<td></td>
</tr>
<tr>
<td>1,000</td>
<td>$530</td>
<td>$442</td>
<td>$353</td>
<td></td>
</tr>
<tr>
<td>1,100</td>
<td>$618</td>
<td>$530</td>
<td>$442</td>
<td></td>
</tr>
<tr>
<td>1,200</td>
<td>$707</td>
<td>$618</td>
<td>$530</td>
<td></td>
</tr>
<tr>
<td>1,300</td>
<td>$795</td>
<td>$707</td>
<td>$618</td>
<td></td>
</tr>
<tr>
<td>1,400</td>
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<td>1,500</td>
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</tr>
<tr>
<td>1,600</td>
<td>$795</td>
<td>$795</td>
<td>$795</td>
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</tbody>
</table>

- 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>
<thead>
<tr>
<th>Existing Unit</th>
<th>Replacement Unit</th>
<th>Maximum Installed Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric Furnace – Ducts in place</td>
<td>Heat Pump</td>
<td>$4,400</td>
</tr>
<tr>
<td>Propane Furnace – 75% SSE or less</td>
<td>Propane Furnace – 90 AFUE or better</td>
<td>$3,500</td>
</tr>
</tbody>
</table>

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.