

Density/Incidence			
Energy Usage	LOW (very sparse/<10% LI)		HIGH (very dense/>20% LI)
LOW	<ul style="list-style-type: none"> - Partner w/ low-income agencies - Deliver cost-effective and low-cost measures at events - No screening or use CARE eligibility 		<ul style="list-style-type: none"> - Canvass or direct install measures to all households - Deliver cost-effective, low-cost measures
MED	Two scenarios: <ol style="list-style-type: none"> 1) above baseline 2) high seasonal use – deliver weather dependent measures, call to inquire about interest 		<ul style="list-style-type: none"> - Direct install measures to all households - Deliver cost-effective and medium-cost measures - Use CARE eligibility
HIGH	<ul style="list-style-type: none"> - Comprehensive treatment of measures - Use current enrollment method 		<ul style="list-style-type: none"> - Comprehensive treatment of measures - Use current enrollment method



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1. Ineffective outreach methods in rural areas = canvassing, referrals from community-based organizations, “word-of-mouth”, and “mass-market advertising” like bill inserts, English and non-English language media advertising
2. Door-to-door or neighborhood blitz approach is more appropriate in densely populated, urban areas
3. If low usage then look at the type of energy used and whether the household is in a municipal area to explain the low usage.
4. The higher the usage, the more likely you should screen and spend more money.
5. Retention of measures is higher in the rural areas.
6. Move the Energy Star market.
7. Encourage bulk purchases of energy efficiency measures.
8. Utilize the use equipment market to help small businesses.
9. LIEE has a different delivery channel because it uses specialty contractors.
10. Look at the utility function.

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Source: KEMA, Inc. Discussion on June 20, 2007 and KEMA, Inc., Draft Report on Phase 2 Low Income Needs Assessment, 2006.

(END OF ATTACHMENT A)

ATTACHMENT B

The June 25th technical meeting was a follow-up to the June 13th workshop, to provide a forum for further discussion of five NGAT-related items/issues and possible options for their resolution. The five items are:

1. Inadequate indoor CVA
2. Improper flue/vent terminations
3. Gas clothes dryer in living space not exhausted outdoors
4. Open combustion space/water heater in mobile home living space
5. Flue/vent termination near an evaporative cooler (conventional/mobile difference)

For each item, background was provided on related building code sections and reasons for tying the LIEE WIS criteria to specific code requirements. It was noted that codes cited apply primarily to new construction; however, they are reflected in the WIS to (a) protect the health and safety of weatherization recipients, and (b) limit the liability of contractors in the low-income weatherization program.

Meeting participants were asked to offer suggestions for mitigating the challenges placed on contractors by current WIS requirements in the five major areas of concern. The following is a brief overview of suggestions presented and conclusions reached.

1. Indoor CVA Options

1. ~~Grandfather it in—assume CVA dimensions at the time of installation were safe.~~
 - Rejected, because of concerns about homeowner notification, occupant safety, and program liability.
2. ~~Define a confined space as an appliance enclosure.~~
 - Rejected because this is contrary to Contractor Mechanical Code, CMC definition of a confined space.
3. Replace the appliance / downsize the appliance (1)
 - *Advantage* – fixes CVA; allows infiltration measures; reduces liability issues; greater customer satisfaction.
 - *Disadvantage* – high cost of replacing with counter flow direct vent unit with same BTU; would need a permit (adding to installation costs); possible higher heating bills for customer.
4. Correct CVA problem. (2)
 - This is what is currently being done per the WIS and P&P.

5. Transfer grill / duct for CVA from one room to another. (3)
 - High and low grilles are already allowed.
 - Need to research CMC to learn if a transfer *duct* is viable; may be prohibited, because it changes direction (goes up, across, then down).
- 5 a Wall heater rear register kit to serve as CVA vent. (3)
 - Will be researched, but it is unlikely that rear register will satisfy code requirement for unobstructed low and high vents/grilles.
6. Outside air via 1-inch hole in floor or outside wall at the bottom of a wall furnace (applied only to units on the ground floor with raised foundation). (2)
 - This has been done in the past (though may not still be acceptable), and some wall furnace manufacturers suggest a hole in the bottom plate below the unit.
 - This option was favored by the group; however, research is needed to verify that it is acceptable, per code, before it is added to the existing list of CVA correction options.
7. Allow selected minor home repairs that eliminate catastrophic leaks and restore dwelling to original condition. This includes replacing broken glass, repairing/replacing broken doors and windows, and patching/repairing large holes in the shell. (Infiltration reduction measures, such as caulking, gaskets, weather-stripping would still not be installed.) Will be researched and given further consideration. (4)
 - *Advantages:* Reduce major sources of infiltration, improve customer comfort, and mitigate health & safety defects.
 - *Disadvantages:* Liability; counter to existing NGAT policy.
8. ~~Perform diagnostic tests (e.g. blower door tests).~~ Requires a blower door, is time consuming, and there are no studies/standards that legitimize substituting a blower door test for correcting inadequate indoor CVA
9. Install an air-to-air heat exchanger. [This is a ventilation device that uses a dual-wall “heat exchanger” to provide “conditioned” fresh air by transferring heat (or cold) from the exhaust air to the incoming fresh air. The least expensive units are the size of, and installed like, a small wall AC. Larger units are installed in the ceiling and vented through the attic, which eliminates the need to cut a hole in the wall but increases overall cost.] (5)
 - *Advantages:* Can provide needed CVA for less than the cost of installing a new furnace that eliminates the CVA deficiency.
 - *Disadvantages:* Cost, need to cut hole in exterior wall (this may be a problem with walls that have stucco and masonry construction) or roof.
10. ~~Conduct a house de-pressurization test to determine if house depressurization is within acceptable limits.~~
 - Rejected, because there are no standards for approving CVA based on house pressure.

11. Coordinate with a LIHEAP provider. (6)

- This is currently being done.
- CSD can replace the cook stove, furnace, and water heaters for both renters and homeowners, and can move water heaters outside.
- *Solution:* Send all furnaces and water heaters to LIHEAP. Do research on how to improve coordination and find out if federal funding is an issue.

OTHER NOTES RE: THE DISCUSSION OF ITEM 1:

- A workshop participant asked whether an appliance test can be run to determine whether it is operating safely on the existing CVA. No participant was aware of a test that could verify steady state performance or predict future performance when CVA is inadequate.
- Prior to 1952, all combustion air was brought in from outdoors. Since 1952, indoor CVA has been allowed in homes of “ordinary tightness”, but the requirement has always been the same (50 cu. ft. per 1,000 Btuh).

2. Improper Vent Termination Options

Background: The rules are based on code requirements, the same as CVA. Possible solutions:

1. No venting requirement when the natural gas appliance does not affect the living space (e.g., located in an outdoor closet more than 4 feet from a door/window, in a garage, or in an indoor closet isolated from the living space).
2. If an instrumented draft test shows an appliance is drafting properly, do not require vent termination correction.

NOTES:

- Analyze cost-effectiveness of making corrections. Need a matrix showing cost of measure, projected savings, and cost to make the NGAT corrections.

3. Gas Dryer in living space Options

1. Keep current standard; evaluate in the future.
 - Both CMC and HUD Code require gas clothes dryers to be exhausted outdoors.
 - Electric dryers do not produce CO, which is why their exhaust is not addressed in the WIS.

4. Open Combustion space/water heater in mobile home Options

Background: Prohibition of open combustion furnaces and water heaters in the living space of a mobile home dates back to the inception of the HUD Code in 1976. Prior to that, federal regulations did not govern construction of mobile homes. But, when they went into effect, it was recognized that open combustion furnaces and water heaters should not be located in the living

space. The current WIS assumes it is unwise to tighten the shell of a mobile home containing interior appliances that have been out of conformance with federal code since 1976. The following options were considered:

1. Install weatherization measures if indoor CVA is adequate (room volume is at least 50 cu. ft. per 1,000 Btuh Input).
2. Add CVA via undercarriage venting for wall furnace (need further research).
2. Replace furnace. Whether or not it is operable? Needs further consideration.
3. For a water heater in an enclosure accessed from indoors, weatherstrip the enclosure door and install CVA vents to outdoors. When the appliance is thus isolated from the living space, infiltration-reduction measures may be installed.
4. Grandfather mobile homes pre-1976. Need to consider current federal code and possible liability issues.

5. Flue/Vent Termination near Evap. Cooler in Mobile homes (Conventional/Mobile Difference) Options

Background: The HUD Code (for mobile homes) simply requires a 3-foot distance from a flue/vent termination to a cooler inlet. However, the CMC (for conventional homes) says vents that terminate within 10 feet of an inlet into the home must terminate at least *3 feet above* the inlet. For example, to meet that standard, a vent pipe located 5 feet from a cooler must be extended until the bottom of the vent cap is 3 feet above the cooler inlet. If the top of the cooler inlet is 3 feet above the roof, the pipe must extend approximately 6 feet above the roof. Guy wires are needed for support, tall vent pipes usually don't look good, and there is concern about stability in high-wind areas. To mitigate the problem, the following options were suggested:

1. If an evaporative Cooler is abandoned and cannot feasibly be repaired by installing new parts, vent termination should be a non-issue. The discussion considered several possible components of a definition for "abandoned cooler" which would include one in which:
 - The grille or other integral part is missing
 - The pan rusted-out
 - The unit has been gutted
2. Use HUD Code clearance for Conventional Homes.

After workshop participants reviewed and discussed the options related to items noted above the following was developed as requiring further study for code compliance and other issues. Jim O'Bannon and his team agreed to investigate each of the following items and report back to the Commission staff.

1. Inadequate indoor CVA prevents infiltration measures in some homes
 - a. Install interior venting to other rooms/areas within the home.
 - b. Reduce CVA minimum room volume per IFGC Equations 3-1 and 3-2.

- c. Use combination of indoor and outdoor air.
 - d. Allow 5% leeway on the 50 cf rule for room volume CVA.
 - e. Install a heat recovery ventilator (HRV)
 - f. Replace natural draft furnace with a direct vent unit or lower Btuh Input unit.
 - g. Allow repair of catastrophic shell and duct leaks.
2. Vent terminating within 4' of a wall must be extended above the wall
Waive the requirement to extend vent pipes 2' above a nearby wall/roof under specific conditions.
 3. Gas dryer in the living space must be exhausted outdoors
No WIS change recommended.
 4. Open combustion space/water heater inside mobile home NIMs unit
 - a. Wall Furnace: Do not NIM the home if room volume is adequate and house depressurization is within limits ... or replace wall furnace with DV unit.
 - b. Water heater: Weatherstrip enclosure accessed from indoors ... or replace existing water heater with DV unit.
 - c. All units: Grandfather pre-1976 mobile homes into NGAT WIS and P&P.
 5. Flue/vent termination near cooler—conventional and mobile differences
 - a. Use HUD Code clearance (3' from cooler inlet) for all homes.
Waive vent termination criterion when the cooler is formally “abandoned.”

(END OF ATTACHMENT B)