Manufactured Housing Standards

KEY TAKEAWAYS

- The federal government sets standards for new manufactured homes, an important type of affordable housing. About 100,000 such homes are manufactured each year.
- The current energy standard for manufactured homes is weak and more than 25 years old. The Department of Energy is nine years behind a legal requirement to set a new standard.
- A modest new standard would save the average household almost $4,000 (net after added cost over a 30-year home life) and reduce cumulative nationwide carbon dioxide emissions by 150 million tons. A stronger standard would save much more.

INTRODUCTION

Manufactured homes are made in factories, shipped to where they will be used, and then placed on a foundation (usually concrete blocks). Although they are often called mobile homes, they are rarely moved once placed. There are about 7 million manufactured homes in the United States, with about 4 million of them in rural areas. The median household income for people living in manufactured homes is $33,000, making them one of the most important types of low-income housing in the United States.[1] Manufacturers shipped 94,615 new manufactured homes in 2019, accounting for about 7% of all new homes (see table 1).[2]

Manufactured homes use more than $12 billion in energy each year, or $1,750 for the typical low-income household. The average energy cost per square foot is 70% higher than for the average single-family home.[3] Yet some manufacturers—from Alabama to Vermont—are making highly efficient and even zero-net-energy homes.[4]

Table 1. Number of new manufactured homes shipped in 2019

	Single-wide	Double- (or triple-) wide	Total
South (zone 1)	19,898	23,913	43,811
Central (zone 2)	9,705	14,069	23,774
North (zone 3)	13,135	13,509	26,644
Total (includes unknown)	42,930	51,685	94,615

Double-wides are shipped in two segments that are connected on site. *Source:* U.S. Census (2019 data).

Because manufactured homes are made in factories that may ship to multiple states, they are regulated not by state building codes but by a federal standard (which preempts state regulation). The Department of Housing and Urban Development (HUD) sets the HUD Code on the advice of its Manufactured Housing Consensus Committee (MHCC). The HUD Code has long included energy provisions, but HUD has not changed those provisions since 1994, even when the MHCC has recommended updates.

Recognizing the need to reduce wasted energy in these types of homes, Congress in 2007 directed the Department of Energy (DOE) to set a separate energy standard for manufactured homes by 2011 (in the Energy Independence and Security Act of 2007, section 413). The standard is to be based on the International Energy Conservation Code (IECC), which is the current model energy code for "stick-built" homes (i.e., homes constructed onsite). The standard can be weaker or stronger than the IECC if that would be more cost effective. The standard must be updated within a year after the IECC is revised, which happens every three years.

After long delays, DOE (the Appliance and Equipment Standards Program in the Building Technologies Office in the Office of Energy Efficiency and Renewable Energy) decided to conduct a negotiated rulemaking. In 2015, a working group under DOE's Appliance Standards and Rulemaking Federal Advisory Committee, including manufacturers, efficiency advocates, and other stakeholders, agreed on a proposal based on the 2015 IECC; DOE issued it as a draft standard in 2016.[5] However, the final rule never made it past concerns from HUD, and the new agency leaders withdrew it in 2017. Thus, almost 13 years after the legislation, there still is no DOE standard.[6]

The HUD Code differs in form from the IECC. The key energy provision in the HUD Code is a single cap on the overall heat transmission per square foot through the walls, roof, windows, and door (Uo value—usually, the less heat transmission, the less heating and cooling, and hence less energy use, are required). It also has three climate zones rather than eight as in the IECC. The draft DOE standard used elements of both approaches.

CURRENT STATUS

New manufactured homes remain regulated under the HUD Code as modified in 1994. The DOE standard remains in limbo, with a Notice of Proposed Rulemaking (NPRM) issued in 2016 but the final standard withdrawn from interagency review (and hence not public). The Sierra Club sued DOE for failing to set a standard. Under their settlement, DOE must issue a new draft standard by May 2021 and a final standard by February 2022.[7]

Although DOE's 2016 draft standard was based on a consensus proposal under the negotiated rulemaking process, the leading trade association, the Manufactured Housing Institute, withdrew its support for the proposed standard in 2017 comments to DOE; a smaller trade association, the Manufactured Housing Association for Regulatory Reform (MHARR), had never supported it. In addition, the draft rule was based on the 2015 IECC; while the 2018 edition changed little, the 2021 edition requires significantly greater efficiency.

RECOMMENDATIONS

We recommend the following actions that agencies can take now under current law:

1. Issue a strong DOE energy standard

Issue the current draft DOE standard as soon as possible: The quickest way to set a better energy standard for manufactured homes is for DOE to issue the current draft standard, as it should not require new analysis, a new NPRM, or a public comment period. Dropping the air-sealing provisions may be necessary, as described below (and overcoming any other opposition from

HUD). However, although the draft standard has an effective date one year from when it is finalized, implementation may not be quick. MHARR has indicated that it would sue to block the standard, likely raising concerns in part about the negotiated rulemaking process. Others could sue, claiming (with some justification) that the draft standard is now too weak to meet statutory requirements, but they would likely not seek to block it as it is clearly better than the current standard.

Concurrently develop a standard based on the 2021 IECC: DOE should begin a rulemaking based on the 2021 IECC now, whether or not it issues the current, now outdated, draft. This updated standard should have more-stringent efficiency levels, and DOE should consider different efficiency levels in the two climate zones in the South (the draft standard delineates a total of four zones, but then treats two of them almost the same).[8] DOE should also consider equipment requirements as described below, as well as changing air-sealing requirements. A new standard could produce significantly greater savings, but it would be hard to develop a new draft by the May 2021 deadline set forth in the settlement.

Require improved equipment efficiency: State residential building codes are preempted from requiring any equipment covered by federal appliance standards to meet higher efficiency levels, including furnaces, air conditioners and heat pumps, water heaters, major appliances, and many light bulbs. However, neither HUD nor DOE is preempted. DOE should require heating and cooling equipment, and perhaps other equipment, supplied with new manufactured homes to be efficient. Assuming the requirement applies only to new homes, DOE would not need to consider the cost or difficulty of installing the equipment in existing homes (e.g., for condensing furnaces). In particular, most electric and natural gas furnaces installed in manufactured homes are very wasteful. Highly efficient electric heat pumps (ductless mini-split heat pumps are particularly well suited for manufactured homes) can reduce costs and improve safety and air quality compared with propane or gas heating. Efficient gas furnaces are also available. A straightforward approach would be to require ENERGY STAR® equipment for heating, cooling, and lighting. More-aggressive measures could push further electrification as long as it is cost effective.

2. Address air quality concerns while reducing energy waste (build tight and ventilate right)

Weaken and then tighten air-sealing provisions: To address concerns that air sealing could harm indoor air quality[9] but still issue a standard quickly, it may be necessary to drop any air-sealing requirements in the first standard. This would significantly reduce the energy savings, but avoiding increased air tightness should prevent any effect on air quality. However, when possible (see below), DOE should update the standard to set strong air-sealing requirements, and DOE and HUD should implement strategies to simultaneously improve energy efficiency and air quality. DOE should consider numerical air-tightness requirements as in the IECC (the current draft standard has only specific installation requirements, which are in proposed section 460.104).

Conduct a health study: To address air quality concerns, DOE should commission a health study by a national lab or other experts to examine the effects of increased air tightness in manufactured homes and determine whether any concerns are addressed by improved ventilation, better materials, or other measures.

Improve ventilation requirements in the HUD Code: A leaky home is not an effective way to protect occupant health. Advanced air sealing should be combined with balanced mechanical ventilation to improve indoor air quality, comfort, and energy efficiency.[10] Thus, the HUD code should require improved ventilation based on ANSI/ASHRAE Standard 62.2-2019, *Ventilation and Acceptable Indoor Air Quality in Residential Buildings*. For stick-built homes, the International Residential Code has similar requirements, and HUD has belatedly proposed allowing Standard 62.2-2010 as an alternative to the current HUD Code ventilation requirements. Although it would make sense for the DOE standard to include such requirements to better coordinate with air-sealing requirements, DOE's legal authority would almost certainly be challenged on grounds that this is a health provision, not an energy provision. And given the track record of the HUD Office of Manufactured Housing Programs over the past decades, it will need strong oversight, and perhaps help from HUD's Healthy Homes Program, to ensure timely and effective action.

3. Ensure compliance and encourage greater efficiency

Conduct compliance and test-procedure rulemakings: The draft standard is just the standard; it does not say how DOE will ensure compliance. The law authorizes a penalty but gives no other direction on enforcement. Thus, DOE also started a test-procedure rulemaking that needs to be completed with the standard. Then DOE needs to conduct a third rulemaking on enforcement. The simplest alternative would be for DOE and HUD to agree in a Memorandum of Understanding that HUD will enforce the standard along with the HUD Code. For the HUD Code, HUD has set up a system of manufacturer quality control and self-certification, along with plan and plant inspections by states or by independent companies hired by the manufacturer. However, if DOE uses the HUD system, DOE should measure compliance rates and ensure transparency of enforcement actions and results.

Require efficiency labeling: DOE should also require a label and sales information showing the energy efficiency and energy features of each home, both to assist enforcement and to encourage efficiency beyond the standard. The IECC requires a posted certificate, and HUD requires a "data plate," but both could be more consumer friendly. Better examples are the yellow Energy Guide label for appliances and the fuel economy window sticker on cars, as well as two voluntary home ratings, the DOE Home Energy Score and Home Energy Rating System (HERS) Index.

Provide training and technical assistance: Many manufacturers are small and could use assistance in learning how to modify designs and production to meet a more stringent standard. In addition to training, DOE should provide tools to meet the standard, such as REScheck software, which is widely used for residential code compliance.

Update the ENERGY STAR criteria: When DOE updates the standard, the Environmental Protection Agency will need to update the criteria for ENERGY STAR manufactured homes.

POTENTIAL SAVINGS

DOE estimated that the 2016 draft standard would save occupants of the average manufactured home about $3,900 over the lifetime of the home. That is the discounted energy savings minus the added cost of the home, including financing. These savings would be especially important

for lower-income occupants. The draft standard would reduce the homes' energy use by 27%. Over 30 years of new homes, each used for 30 years, it would reduce national carbon dioxide emissions by 158 million metric tons.

Considerably greater savings should be possible by updating to the efficiency levels in the 2021 IECC, especially if DOE includes equipment requirements.

Conclusion

The federal government regulates about 7% of all new homes—about as many new homes as are regulated by the state of California. But the federal standard for manufactured homes is weak and embarrassingly out of date. A better standard almost made it across the finish line in 2016, and large additional cost-effective savings are available. An efficiency standard would save the millions of low-income households living in manufactured homes billions of dollars while reducing greenhouse gas emissions. It is long past time to act.

Legal Citations

	Legal authority	Regulations	Notes
HUD Code	42 USC 5403(g)	24 CFR 3280 Subpart F	See FR-6075-N-01 for review
Draft amendments		85 FR 5589	See HUD-2020-0015
DOE energy standard	42 USC 17071		
Draft standard		81 FR 39756	See EERE-2009-BT-BC-0021, RFI: 83 FR 38073
Draft test procedure		81 FR 78733	See EERE-2016-BT-TP-0032
DOE appliance standards preemption	42 USC 6297		

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Endnotes

[1] Census Bureau, "2017 American Housing Survey" (2018). www.census.gov/programs-surveys/ahs.html.

[2] Census Bureau, "Manufactured Housing Survey" (2020). www.census.gov/programs-surveys/mhs.html.

[3] EIA (Energy Information Administration), "2015 RECS Survey Data" (2018). www.eia.gov/consumption/residential/data/2015/.

[4] See, e.g., Northwest: www.neemhomes.com/neem-plus, Northeast: www.veic.org/clients-results/reports/zero-energy-modular-factory-initiative, Southeast: www.energy.gov/sites/prod/files/2015/07/f24/DOE_ZEH_SouthernHomesDivision_09-20-14.pdf.

[5] Working group membership details and documents are available at U.S. Department of Energy. 2020. "Appliance and Equipment Standards Rulemakings and Notices." Accessed October 6. www1.eere.energy.gov/buildings/appliance_standards/standards.aspx?productid=64.

[6] In this administration, DOE and HUD have issued Requests for Information on deregulating manufactured housing; DOE is exploring weaker energy standards. HUD issued draft amendments to the HUD Code that had been proposed years ago by the MHCC, but specifically excluded any energy changes due to the pending DOE standard.

[7] See Sabin Center for Climate Change Law, "Sierra Club v. Perry" (2020). climatecasechart.com/case/sierra-club-v-perry/.

[8] ASHRAE Standard 90.2-2018 would be another model as it now covers manufactured homes.

[9] DOE, *Draft Environmental Assessment for Notice of Proposed Rulemaking, 10 CFR Part 460, "Energy Conservation Standards for Manufactured Housing" with Request for Information on Impacts to Indoor Air Quality* (Washington, DC: DOE, 2016). www.energy.gov/nepa/ea-2021-energy-conservation-standards-manufactured-housing-rin-1904-ac11.

[10] For example, the NEEM+ program cited above includes both heat transfer and whole-house ventilation requirements.