June 8, 2023





Adoption of Energy Efficiency Standards for New Construction of HUD- and USDA-Financed Housing: Preliminary Determination

Office of Environment and Energy US Department of Housing and Urban Development





Submitting Comments

During the meeting:

Comments can be placed in the chat within Zoom at any time during the meeting.

During the comment portion, please utilize the "raise hand" feature to request to be unmute to provide comments orally. All speakers will be given 3 minutes to speak, we ask that you be respectful and courteous with all comments.

**Note that the webinar (including spoken and written comments) will be recorded, utilized, and memorialized as part of our public comment process.

After the meeting:

Written comments are encouraged and can be submitted to the <u>public comment docket on</u> <u>Regulations.gov</u>





Importance Of Updating Energy Codes

- Establishes baseline efficiency requirements for new construction and substantial rehab – Energy codes are a subset of building codes, so when updated they set minimum efficiency requirements for new and renovated buildings.
- <u>Lowers utility costs</u> LMI households spend a greater share of their income on utilities. Median spending on energy for low-income households is 8.1% compared to the national average of 3.1% of incomes.
- <u>Reduces carbon emissions</u> Contribute to Biden Administration target of 50% reduction in greenhouse gas emissions by 2030.
- Helps address <u>extreme weather</u> Energy efficient homes are more comfortable and less susceptible to extreme heat and can also improve passive survivability with power outages.
- Improves <u>resident health</u> Evidence that weatherized homes also contribute to lower asthma rates, respiratory symptoms, and other health impacts.





The Secretary of Housing and Urban Development and the Secretary of Agriculture shall, not later than September 30, 2006, jointly establish, by rule, energy efficiency standards for—

(A) new construction of public and assisted housing and single family and multifamily residential housing (other than manufactured homes) subject to mortgages insured under the National Housing Act;

(B) New construction of single family housing (other than manufactured homes) subject to mortgages guaranteed or made by the Secretary of Agriculture under Title V of the Housing Act of 1949.

d) Failure to amend the standards

If the Secretary of Housing and Urban Development and the Secretary of Agriculture have not, within 1 year after the requirements of the 2006 IECC or the ASHRAE Standard 90.1–2004 are revised, amended the standards or made a determination under subsection (c), all new construction and rehabilitation of housing specified in subsection (a) shall meet the requirements of the revised code or standard if—

(1) the Secretary of Housing and Urban Development or the Secretary of Agriculture make a determination **that the revised codes do not negatively affect the availability or affordability of new construction** of assisted housing and single family and multifamily residential housing (other than manufactured homes) subject to mortgages insured under the National Housing Act (12 U.S.C. 1701 et seq.) or insured, guaranteed, or made by the Secretary of Agriculture under title V of the Housing Act of 1949 (42 U.S.C. 1471 et seq.), respectively; and (2) the Secretary of Energy has made a determination under section 6833 of this title **that the revised code or standard would improve energy efficiency**.





Covered Programs

USDA – Estimated 15,000 units/year





Two codes listed in the Statute

Single Family and Low Rise Multifamily







Multifamily 4+ Stories



HUD-USDA last updated codes in 2015

Current codes are 2009 IECC and ASHRAE 90.1-2007

Most recent IECC: 2021 Edition

- 8.7% \$ savings over 2018
- 34.3% \$ savings over 2009

https://www.energycodes.gov/determinations

Most recent ASHRAE 90.1 2019

- 4.3% \$ savings over 2018
- 22.5% \$ savings over 2007





Energy Codes – Moving Towards Net Zero





What Energy Codes Do

Energy codes do ...

- Focus on building envelope
 - Insulation levels for ceilings, walls, windows, floors, foundations
 - Seal, insulate, and test ducts, air handlers, and filter boxes
 - Solar heat gain coefficients for windows
- Limited space heating, air conditioning, and water heating requirements
- Set basic lighting equipment requirements

Energy codes do not...

- Prevent installation of any materials
- Prohibit specific building designs or methods of construction not specifically prescribed in this code
- Impose appliance requirements



 Limit HUD or USDA's ability to incentivize above-code green building standards or set competitive grant requirements (Table 2)

How the Energy Code Improves a Home

COMMUNITY PLANNING DEVELOPMENT





Codes include mandatory and climate zone-specific requirements

Mandatory Requirements (apply everywhere):

- ✓ Infiltration control
- Duct insulation, sealing & testing, no use of building cavities
- ✓ HVAC controls
- Piping Insulation and circulating service hot water requirements
- ✓ Equipment sizing
- ✓ Dampers
- ✓ Lighting

Climate-Zone Specific Requirements:

- ✓ Roofs
- ✓ Above grade walls
- Foundations
 - Basements
 - Slabs
 - Crawlspaces



Skylights, windows, and doors Solar Heat Gain Coefficient for windows in warm climates



Three states adopted 2021 IECC, as of September 2022. (Note: +2 states since then, more than 20 currently considering)







Updated as of 03/31/22

Five states adopted ASHRAE 90.1-2019 as of September 2022 Many more have adopted the prior (2016) edition.







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- Affordability analysis addresses incremental costs, life cycle costs savings, annual cash flows, also added down payment requirements
- For energy savings we rely on Department of Energy/Pacific Northwest National Laboratory (PNNL) models.
- We adjust to reflect FHA assumptions smaller size house, lower downpayments, MIP etc.
- Evaluating cost-effectiveness requires three primary steps:
 - Evaluating the energy and energy cost savings of code changes
 - Evaluating the incremental and replacement costs related to the changes
 - Determining the cost-effectiveness of energy codes
- Methodology does not estimate rates of code adoption or compliance
- Cost-effectiveness is defined primarily in terms of Life Cycle Cost Savings





	2009 I	ECC to 202	1 IECC	2018 IECC to 2021 IECC			
Housing Type	Incremental Construction Costs (\$)	First Year Energy Savings (\$)	Simple Payback (years)	Incremental Construction Costs (\$)	First Year Energy Savings (\$)	Simple Payback (years)	
Single-family	5,500	750	7.4	2,400	210	11.3	
Multifamily Low-Rise	2,310	320	7.3	1,300	155	8.5	

*Source: 2009 to 2021 averages for incremental costs and energy savings provided to HUD by PNNL. 2018 to 2021 costs from National Energy Effectiveness Report.

Estimates are engineering estimates from PNNL simulation derived from model homes, construction cost data, and local utility prices



Sample Cash Flow: 30-year FHA Mortgage for 2021 IECC



			2021 IECC over 2009 Baseline		MIP Rolled into Mortgage	
Average first cost		\$	5,555	\$	5,555	
5% Down		\$	278	\$	278	
Amount Financed		\$	5,277	\$	5,369	
A	Incremental downpayment (5%), MIP (\$92)and closing costs (1%)	\$	423	\$	331	
В	Annl Energy Savings	\$	752	\$	752	
С	Anni Mortgage Increase	\$	261	\$	261	
D	deductions, mortgage insurance, property taxes	\$	15	\$	15	
E [B-C+D]	Net annl cash flow savings (Year 1)	\$	506	\$	506	
F = [A/E]	Yrs to positive savings incl. up- front impacts		1		1	





Adoption of 2021 IECC will generally not negatively impact the affordability of homes covered by the statute.

2021 IECC

- Incremental cost averages \$5,500 against the 2009 standard 2.1% of average new construction cost of \$263,000
- Annual energy savings exceed additional debt service by average of \$500/year
- Life Cycle Cost (LCC) savings to consumer \$14,500 over life of mortgage
- Increased down payment 0.13% 0.33% of the average cost of FHA new home
- Rapid paybacks average 7.6-year simple payback
- Positive cash flows average 2 years





ASHRAE 90.1

- Average incremental cost for multifamily projects is \$574 per building or \$18 per unit
- Average annual energy cost savings is \$7,150 per building or \$224 per unit
- Estimated first costs 0.16% of total building cost of \$218/sf
 - In all but 13 states, incremental costs lower vs. ASHRAE 90.1 2007
 - In none of these states is the added construction cost more than \$381/unit
- Average simple payback for all states is 0.1 year (1.2 months)
- Life Cycle Cost savings average \$5,900





Availability Analysis

- No standard definitions of "availability:"
 - While affordability is a function of demand (consumer's ability to pay), availability addresses supply (builder response).
 - What impact will the new code have on builder's willingness to build to higher standard than prevailing code?
 - Cost to developer may include added building costs, potential loss of customers unwilling to pay additional price, and any other distortions in design introduced by regulation.
- Multiple factors impact availability:
 - Impact of higher prices on consumer demand
 - Regional differences in FHA market share: higher market share, e.g. South (24.5% of new homes) vs. Northeast (1% of new homes)
 - Cost to builder of adapting to above-state or local code, which includes operational implications such as additional workforce training





Key Availability Findings

2021 IECC

- HUD price elasticity model indicates a 2% increase in construction cost could reduce production of new homes for FHA-insured borrowers by 1.5%.
 - This does not account for the positive impacts of energy efficiency.
- After adopting the 2009 IECC, HUD found no greater impact on the availability of new FHA-insured homes for states with less stringent standards compared to states with more stringent standards.
- On balance, HUD found no noticeable impact on the supply of single family housing unless very specific conditions are met.





ASHRAE 90.1

- HUD found no negative impacts on availability for multifamily.
- Nominal first cost increases or lower costs in most states
- Strong industry capacity to incorporate higher codes in plans and specs
- Application process allows for incorporating required standards





- Consumers will save as much as \$1.5 billion
- Single Family/IECC Total costs of \$560 million yield lifetime savings from \$972 million - \$1.5 billion*
- Multifamily/ASHRAE Total negative cost of \$10.8 million, life-time savings of \$31
 \$48 million*
- Combined estimated incremental cost of \$550 million with NPV savings \$1.1 billion - \$1.5 billion
- Additional social cost of carbon (SCC) savings \$1.7 million \$15.8 million,* depending on rebound effects and high-low emission factor
- Regulatory Impact Analysis includes detailed discussion of rebound effects, equity impacts

*Range contingent on discount factor used (7% or 3%)





Additional Information

- Federal Register:
 - Preliminary Determination: including full proposed rule and comment submission portal: <u>www.federalregister.gov/documents/2023/05/18/2023-10596/adoption-of-energy-</u> <u>efficiency-standards-for-new-construction-of-hud--and-usda-financed-housing</u>
- HUD:
 - General Rule Information:

www.hud.gov/program_offices/comm_planning/environment_energy/mes_notice

- Regulations.gov
 - Preliminary Determination
 - Environmental Findings
 - Regulatory Impact Analysis (RIA)

https://www.regulations.gov/docket/HUD-2023-0034





HUD and USDA welcome comments on all aspects of the Preliminary Determination, but are especially interested in the following subjects:

- Do the higher first-costs associated with adopting the 2021 IECC over the current 2009 IECC lower homebuyer options, limit availability
- What is the current status of code adoption in states and an anticipated timeline.
- Comments on the cost benefit analysis utilized by PNNL.
- Time required for builders and building designers to familiarize themselves with new codes and any necessary workforce training or technical support.





Subject Areas for Public Comment (Cont.)

- Impact of COVID-related supply chain challenges on price increases for energy related products and materials.
- Current minimum IECC and ASHRAE 90.1 requirements and proposed establishment of the 2021 IECC and ASHRAE 90.1-2019 as the baseline for green building or above-code energy performance standard-setting bodies.
- Impact of manually operated bathroom rans on indoor air quality and health.
- The extent to which the 2021 IECC air leakage requirements present fire code issues and any cost-effective solutions





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Public Comments