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DRAFT MINUTES MHCC MEETING

September 23, 2021
October 8, 2021
October 20, 2021
November 19, 2021

DRAFT MINUTES
MANUFACTURED HOUSING CONSENSUS COMMITTEE (MHCC) MEETING

September 23, 2021, October 8, 2021, October 20, 2021, & November 19, 2021

MEETING 1: Thursday, September 23, 2021

Call to Order

The Manufactured Housing Consensus Committee (MHCC) held the first of four meetings regarding the Department of Energy's (DOE) Supplemental Notice of Proposed Rulemaking (SNOPR), on Thursday, September 23, 2021, via Zoom teleconference. Kevin Kauffman, Administering Organization (AO) Home Innovation Research Labs, called the roll and announced that a quorum was present. See Appendix A for a list of meeting participants.

Introduction and Opening Remarks

Teresa Payne, Administrator of the Office of Manufactured Housing Programs, and Designated Federal Officer (DFO) introduced Lopa Kolluri, Principal Deputy Assistant Secretary for the Office of Housing and the Federal Housing Administration.

This MHCC teleconference was focused on the MHCC's response and comments on a Department of Energy (DOA) proposed rule. A summary taken from the proposed rule is below:

> "The U.S. Department of Energy ("DOE" or "the Department") is publishing a supplemental notice of proposed rulemaking ("SNOPR") to establish energy conservation standards for manufactured housing pursuant to the Energy Independence and Security Act of 2007. This document presents an updated proposal based on the 2021 version of the International Energy Conservation Code ("IECC") and comments received during interagency consultation with the U.S. Department of Housing and Urban Development, as well as from stakeholders. This proposal presents two potential approaches—one would provide a set of "tiered" standards based on the manufacturer's retail list price for the manufactured home that would apply the 2021 IECC-based standards to manufactured homes, except that manufactured homes with a manufacturer's retail list price of $55,000 and below would be subject to less stringent building thermal envelope requirements based on manufacturer's retail list price. The alternative approach would apply standards based on the 2021 IECC to all manufactured homes, with no exceptions for building thermal envelope requirements based on manufacturer's retail list price."

Ms. Kolluri welcomed the members to the MHCC meeting. She noted that there is a crisis of affordable homes in the nation and that it will take us all to solve this crisis. Ms. Kolluri assured the MHCC members that this commission is committed to regular updates of the manufactured housing standards to keep up with site-built homes. She explained that this was the first of the three meetings to discuss DOE's notice of proposed rulemaking and the MHCC's review of the proposed rule is vital to the update process and the need to ensure that energy efficiency is balanced with affordability. Ms. Kolluri wished to provide ample time to MHCC to comment on these proposed regulations and asserted that they must continue to work together to maintain the safety and affordability of manufactured homes. She assured the MHCC that their work will

make a difference and that manufactured housing is an important piece of the affordable housing puzzle. Ms. Kolluri closed her remarks by once again thanking the MHCC for their time and continued efforts.

Approval of the Minutes

MHCC Motion: Approve the Draft June 10, 2021 MHCC Meeting Minutes.

Maker: Tara Brunetti **Second: Catherine Yielding**

The motion carried unanimously.

Teresa Payne thanked and appreciated everyone's flexibility and willingness to join the call and participate. Ms. Payne asserted that their office is excited to work with MHCC on the topic. This is an opportunity for HUD, the MHCC, and members of the public to submit their comments on the DOE Proposed Rule. She restated the dates of scheduled meetings on this topic to the members, October 8th and October 20th. She encouraged everyone to ask the hard questions and get the answered needed.

MHCC Chair, Mitchel Baker gave the opening comments. He welcomed the MHCC members and meeting participants to the teleconference, thanked for the public comments and encouraged members to register and participate on DOE's webinar on September 28,2021. Mr. Baker acknowledges that this will be a lot of work, but he looks forward to the productive discussions that will occur over the next three MHCC teleconferences.

Public Comment Period

See Appendix B for written public comments received prior to each meeting.

Mark Weiss, MHARR, stated that this proposed rule is a constitutional overreach. He recalled that back in 2016 when the last potential rule was floated the manufactured housing energy needs were lower than that of a site-built home. Manufactured housing has lower mean and median energy costs than site-built homes. The reality is that these proposed energy standards do not address a "problem" that needs to be fixed and the additional costs would be devastating. Mr. Weiss believes that the two tiers of the standard are arbitrary, along with lots of other areas in the proposed rule. Most double section and almost all single section homes will fall under Tier 2 standards. He believes that implementing the proposed rule in those tier two homes could lead to an approximate cost increase of $4800. These added costs would exclude more than 1 million potential home buyers. He stated that enforcing the 2021 NEC could lead to cost increases as high as $13,000. These higher costs would exclude more than 5 million households based on NAHB cost exclusion methods, which are included in his written comments. This proposal must be fully examined and commented on, including reviewing all the data. MHCC should ask for an extension for the comment deadline to properly examine this rule. Mr. Weiss urged the MHCC to reject this proposal as he believes it would undermine the affordability of manufactured housing and would disproportionally affect smaller home builders. Mr. Weiss asked the vice chair, David Tompos, if he is going to recuse himself from voting on this topic, as NTA is owned by ICC.

John Weldy, Clayton Homes, thanked everyone for their time. He stated that the Federal Standard provides a minimum standard which balances safety and energy consumption concerns with affordability and encourages DOE to be mindful of this balance as it finalizes its energy standards for Manufactured Housing. Mr. Weldy believes that imposing the proposed rule, without a thorough evaluation, will likely impact the affordability of homes, as well as the industry's ability to produce the number of homes to support the demand for affordable housing. The current insulation shortage, which

is projected to continue for a few more years, must also be considered. As the HUD Code significantly increases insulation requirements at the same time as states adopt the 2021 IECC, the manufactured housing industry will not be able to meet the increasing demand for affordable housing. Simply applying the 2021 IECC without considering current manufactured homes standard could be disastrous. Further, the ICC does not have a requirement to take into consideration cost or impact while writing model codes such as the 2021 IECC. Their goal is to simply propose code changes that increases the energy efficiency of the home by a certain percentage compared to the previous version. DOE should team up with HUD to develop additional standards.

Lesli Gooch, MHI, thanked everyone and appreciated comments from Ms. Kolluri about keeping manufactured homes a priority. This committee is crucial in the process of updating the energy standards of manufactured homes. There are serious concerns about the assumptions made in the outline of the technical support document from the DOE. MHI membership represents 85% of those that build HUD code manufactured homes. The impact of any proposed standard on the availability of manufactured homes is paramount. Ms. Gooch believes the proposed rule does not follow a proper cost benefit analysis. The Manufactured homes that are being built today are being manufactured with energy efficient features. Ms. Gooch stated that the MHCC should be the primary vessel to change the energy standards for manufactured homes, not the DOE. She expressed her concern that the proposed rule will make it near impossible to build homes in climate zones 2 and 3 and all the changes required by the rule will greatly change the cost and manner of construction, which would essentially remove manufactured homes as an affordable option. Ms. Gooch believed the premise to base the tiered approach on retail cost is flawed and stated that the proposed rule does not include any enforcement provisions

Discussion of Department of Energy's Supplemental Notice of Proposed Rulemaking and Request for Comment – Energy Conservation Standards for Manufactured Housing

Jason McJury, HUD, provided background on the DOE proposed rule and informed the members of the important documents incorporated by reference or included in footnotes. Mr. McJury stated that the DOE proposed rule is separated into 8 section and proceeded to provide the summary of substance of each section.

> Section 1 – Recap of the statute that established the statute to base the energy standards on the most recent version of the IECC. High level summary of the standards. It provides a summary of the cost benefit analysis.
>
> Section 2 – Detailed intro. Addressing both legal and factual backings for DOE to establish the energy requirements. The approach as to how it was reached and a synopsis of IECC and history of rulemaking.
>
> Section 3 – Detailed narrative of the proposed standards themselves. Included DOE's thought process and how it addressed affordability. Detailed discussion on the rulemaking process. Proposed rule for a test procedure and how to determine compliance and DOE will consider test procedures in the future. This section goes on to address certification, compliance, and

enforcement. DOE did not provide guidance for enforcement but said they would be accepting comments on it. DOE will consult with HUD with any future rulemakings.

Section 4 – Detailed discussion of the economic analysis. Lots of data and background. Lots of tables that DOE published that identifies cost increases for each of the climate zones for each standard tier. Information pertaining to per home savings.

Section 5 – Impacts to the industry and smaller home builders.

Section 6 – Identifies public participation, this section contains 30 questions that DOE has specifically requested input for.

Section 7 – Is a formality.

Section 8 – Proposed regulatory text.

The members provided general comments on the proposed rule. Comments related to inaccurate representation of cost and use of incorrect inflation factors were made and concerns were raised if the members would have sufficient time to properly respond to the rule.

LUNCH BREAK

See Appendix C for the full MHCC Comments on the DOE SNOPR.

During this teleconference, the MHCC developed general comments on the DOE SNOPR and responses/comments to questions 1-10.

Public Comment Period

Mark Weiss, MHARR, thanked the committee on what has been a thoughtful discussion. He expressed their need to reference or build upon the MHCC comments and asked that the minutes be provided as quickly as possible.

Lesli Gooch, MHI, thanked everyone for their time. She appreciated Ms. Kolluri's comments that the administration is committed to get manufactured housing as an affordable option. Houses now are different then when the rule was created in 2016, the numbers need to all be updated to reflect modern data. Ms. Gooch believes that this rule is out of line with respect to materials and processes for manufactured housing. It is important to everyone to recognize that many manufactured homes are equivalent or better than site-built homes in terms of energy efficiency. Manufactured homes are the largest form of unsubsidized affordable housing. The price of these homes cannot keep increasing. Increasing the supply of affordable housing is critical. The law requires HUD to provide affordable homes. The energy standard should not be more efficient than site-built homes. To this date no jurisdiction has adopted the 2021 version of the IECC.

Wrap Up – DFO & AO

Kevin Kauffman announced the closing of comments and reminded the dates of future meetings to the members. DFO Payne appreciated everyone's attention on this topic and participation. Michael Baker also appreciated the member's work on all the sections and thanked them.

Adjourn

The motion to adjourn the meeting was carried.

MEETING 2: Friday, October 8, 2021

Call to Order

The Manufactured Housing Consensus Committee (MHCC) meeting was held on Friday, October 8, 2021, via Zoom teleconference. Kevin Kauffman, Administering Organization (AO) Home Innovation Research Labs, called the roll and announced that a quorum was present. See Appendix A for a list of meeting participants.

Introduction and Opening Remarks

Teresa Payne, Administrator of the Office of Manufactured Housing Programs, and Designated Federal Officer (DFO) welcomed the participants and thanked them for their time. Ms. Payne provided the background of the meeting. This is the second meeting for the MHCC to discuss and provide comments to the DOE on their proposed rule. She appreciated the hard work in the last meeting. The proposed rule has the potential to affect MHCC's mission, and it is necessary to provide comments to DOE. DOE held a meeting that was open to the public, which was scheduled for five hours but only lasted around one hour. Comments from the MHCC will be submitted to the Secretary of HUD, and with the help of the AO will be submitted to DOE. The next meeting for the MHCC on this topic is on the 20th of October, all meetings are scheduled from 10am - 4pm and the meeting information for all 3 meetings are the same. Ms. Payne looked forward to a productive meeting.

MHCC Chair, Mitchel Baker gave the opening comments. He welcomed the MHCC members and meeting participants to the teleconference and thanked them for their time. He also thanked everyone who attended the DOE webinar on 23rd of September. Mr. Baker asserted that they had done some really good work so far and looked forward to submitting good comments to the DOE.

Public Comments Period

See Appendix B for written public comments received prior to each meeting.

Lesli Gooch, MHI, thanked everyone for their time. Ms. Gooch commended the MHCC team led by Ms. Teresa Payne. She expressed her delight that HUD has made sure that consultation is taking place. Formal comments about the DOE rule were submitted as MHI typically does prior to MHCC meetings. She assured that their Senior Vice President was working closely with the manufacturers and stated that they would continue sharing the technical concerns of the DOE proposed rule. Ms. Gooch expressed her concerns about the proposed rule and stated that it was flawed because the cost benefit analysis of DOE fails, and the homeowners will never get the return. She stated that it is important to consider the cost effectiveness along with the technical aspects of the components even though MHI supports energy conservation. Ms. Gooch stated that this rule does not work for factory-built homes but are more applicable to site-built homes.

Mark Weiss, MHARR, thanked everyone for their participance in the meetings. Mr. Weiss stated that MHARR's written comments were submitted to the MHCC. He apologized for the lengthy comments and proceeded to discuss the comments they will be submitting for the next meeting. He urged the members to not be misled by this tiered proposal and assured that it's not carved in stone. Tiered proposal is the alternative proposal to the one tier option. He insisted that the so-called two-tier system

is simply a redo of the 2016 proposed rule which is more stringent because the IECC codes are more stringent. Mr. Weiss also informed the MHCC members that MHARR filed for an extension on the deadline, which the DOE acknowledged receiving at the webinar, but has yet to formally respond to.

John Weldy, Clayton Homes, thanked everyone for their time. Mr. Weldy stated that his previous remarks were focused on evaluating the cost effectiveness of these updates. He expressed his concerns about the DOE proposed rule and explained why it misses the mark of balancing cost with effectiveness. The raw goods (e.g., fiberglass insulation) are under extraordinary supply chain strains and the workforce and logistics cannot keep up with demand. The proposed rule would add a significant demand for insulation, a commodity which is already strained. Adding any code change which adds demand for fiberglass insulation, would have a ripple effect on the industry. No state has adopted the 2021 IECC. Only 13 states have adopted sections of the 2018 IECC standard, 19 states have adopted the 2012 IECC, and others go back to 2009. Requiring manufactured housing to be held to a higher standard than site-built homes, is against the goal of manufactured housing which balances performance with cost. The HUD energy standards haven't been updated since around 1994, and they need to be updated, but moving to the 2021 IECC is way too far of an update in one code cycle. Adoption for these code cycles is typically 3-5 years. Mr. Weldy asked the rule makers to take one step at a time and to restrain from jumping to more restrictive requirements than site-built homes. He believes that the best outcome to develop energy codes, would be for DOE to work directly with HUD and the MHCC, not write a rule and ask for comments. He thanked the members for the important work today.

Discussion of Department of Energy's Supplemental Notice of Proposed Rulemaking and Request for Comment - Energy Conservation Standards for Manufactured Housing and Prepare Comments/Answers about DOE's Questions in Rulemaking for HUD's review

See Appendix C for the full MHCC Comments on the DOE SNOPR.

During this teleconference, the MHCC developed general comments on the DOE SNOPR, reviewed/updated their responses/comments on questions 1-10, and developed responses/comments to questions 11-22. Questions 1-13 were addressed prior to a lunch break, and the discussion continued after the lunch break. Questions 14-22 were addressed after the lunch break.

Public Comment Period

Lesli Gooch, MHI, thanked everyone for their participation and asserted that the meeting was extremely productive. Ms. Gooch praised the comments and work of the members. She restated that MHI believes the proposal is fundamentally flawed. She expressed their concern that the proposed rule does not follow a proper cost benefit analysis. MHI believes the implementation of this rule would require massive changes to plants and could even make shipping homes to some states impossible. The discussion clearly demonstrated that this proposed rule is not cost effective and would eliminate manufactured homes as a cost-effective option. Ms. Gooch stated that their research showed that buyers would not ever get a return on investment for these additional costs, and it also showed a cost increase of at least $1000 for each home. One of the places their research showed savings was in Fairbanks Alaska and the savings were $300 over a 10-year period. She stated that it was clear the proposed rule would hurt prospective home buyers and finally thanked the MHCC for holding the DOE accountable.

Mark Weiss, MHARR, thanked everyone for the discussion and reiterated that MHARR has opposed the proposed rule from the start. Mr. Weiss stated that the reason for this opposition is largely the cost and that the costs were not just abstract ideas. These costs will exclude millions of people from the market. The primary focus must be on purchase price and affordability. Mr. Weiss expressed his concern that none of the small manufacturers were participating in this meeting as it is important to get their input as they will be disproportionately impacted by these regulations.

Wrap Up – DFO & AO

Michael Baker thanked everyone for their participance and announced the next meeting on 20th of October. He asked the members to reach out to him for any question. DFO Payne appreciated everyone's participation and encouraged anyone who has volunteered to take on some questions to bring back to the committee with as much data as possible because the data will help inform the DOE and help them perform analysis. Kevin Kauffman gave the closing comments and thanked everyone.

Adjourn

The motion to adjourn the meeting was carried.

MEETING 3: Wednesday, October 20, 2021

Call to Order

The Manufactured Housing Consensus Committee (MHCC) meeting was held on Wednesday, October 20, 2021, via Zoom teleconference. Kevin Kauffman, Administering Organization (AO) Home Innovation Research Labs, called the roll and announced that a quorum was present. See Appendix A for a list of meeting participants.

Introduction and Opening Remarks

Teresa Payne, Administrator of the Office of Manufactured Housing Programs, and Designated Federal Officer (DFO) thanked the members for their time, restated that this was the last of the three meetings to discuss the DOE proposed rule and looked forward to a productive discussion.

MHCC Chair, Mitchel Baker thanked everyone for their participance. He reminded the members of the amount of remaining work and time.

Public Comments Period

See Appendix B for written public comments received prior to each meeting.

Megan Booth, MHI, reminded the MHCC that MHI had submitted comments prior to the meeting. Ms. Booth was appreciative for the MHCC allowing her this time. She expressed her concerns over the proposed DOE rule stating that it is fundamentally flawed as it does not follow a correct cost benefit analysis. This proposed rule will end up in higher costs for consumers who will never recoup these costs through savings or resale value. The discussions over the last meetings have made clear that this is not a cost-effective solution to increasing the energy efficiency of manufactured homes. The DOE proposal would likely not yield any benefit for consumers and actually would just end up costing them money. MHI's cost benefit analysis determined that this would cost at least $1000 per single unit homes and upwards of $5500 for multi-unit homes. As the MHCC finalizes their comments, MHI would strongly recommend that the energy requirements should be reworked and ensured that they are cost effective and testing and implementation should be covered before publishing a rule. MHI believes it is unnecessary for DOE to develop a new enforcement mechanism as this will only hurt the consumers. DOE must adhere to the statutory requirement to be cost effective.

Mark Weiss, MHARR, thanked everyone for the thorough discussion. There is a need to send the message to DOE that the MHCC members oppose this proposal. By MHARR's calculation, this proposal could exclude millions of potential home buyers. The most effected would be the ones who need the cost-effective housing solution that is manufactured homes. Cost of enforcement and testing must be addressed and included. For those excluded from the market, there will be no life cycle recoupment for this rule because they will be costed out of the market. This is a bad and damaging proposal that should be rejected and withdrawn by the DOE. Mr. Weiss mentioned that their request for additional comment submission time has been acknowledged by the DOE.

John Weldy, Clayton Homes, thanked MHCC for this opportunity. Mr. Weldy reminded the MHCC that he had given reasons on how he thought the proposal misses the mark in the previous meetings. He also mentioned that he had submitted written comments to the committee. Clayton Homes has done their

internal cost estimates for the thermal envelope and through observation of different models, estimated the cost increase in Thermal Zone 1 would be about $600 and for Thermal Zone 3 would be around $7000 which is a huge deal because of construction requirements for colder regions, specifically Thermal Zone 3. He stated that their cost analysis did not include testing, which could be a significant additional cost. They also believed that blower door testing is unnecessary, and DOE agrees as they have removed that requirement from EnergyStar. Clayton Homes believes that requiring energy testing would be a great cost with very little to gain. Mr. Weldy expressed his concern that the backlog of materials could last a few years. With none of the states adopting the 2021 IECC, requiring the manufactured homes to build to a higher standard is contrary to the affordability aspect which is the statutory requirement for manufactured homes. Mr. Weldy also took this opportunity to make a correction on his written comments- the current rule would require southern Virginia to meet the same requirements as a house in Fairbanks Alaska. They appear to have applied the thermal requirements from Fairbanks Alaska to as far south as Virginia. Every three years they look at the IECC and raise the bar incrementally, which is not what is being proposed to the HUD standard.

Discussion of Department of Energy's Supplemental Notice of Proposed Rulemaking and Request for Comment - Energy Conservation Standards for Manufactured Housing and Prepare Comments/Answers about DOE's Questions in Rulemaking for HUD's review

See Appendix C for the full MHCC Comments on the DOE SNOPR.

Stacey Epperson made a presentation to the MHCC which can be found in Appendix D.

During this teleconference, the MHCC developed general comments on the DOE SNOPR, reviewed/updated their responses/comments on questions 1-22, and developed responses/comments to questions 23-30. The discussion and development of comments spanned the lunch break.

Submittal of Comments

MHCC Motion: Submit the comments as recorded over the course of the last 3 MHCC meetings on the DOE Supplemental Notice of Proposed Rulemaking to HUD.

Maker: Russell Watson **Second: Robert Parks**

The motion carried unanimously.

Public Comment Period

Megan Booth, MHI, re-stated that the DOE proposal was fundamentally flawed and has a negative impact on the industry and potential homebuyer at a time when need of affordable housing is acute. The proposal ignores the importance of HUD as the regulator of construction and safety standards for manufactured homes. This rule could require large changes in the manufactured homes and make transportation of manufactured homes in some location impossible. It excludes a proper cost benefit analysis and ignores the cost of enforcement and testing making an independent analysis impossible. This proposal by will reduce the number of manufactured homes consumers as it is not cost effective. These changes will lead to DOE eventually eliminating manufactured housing as affordable housing option.

Mark Weiss thanked the committee for their participation and asked the HUD proposal to be posted as quickly as possible. For the DOE proposal, he encouraged the members to try to quantify the additional costs to the purchaser.

Wrap Up – DFO & AO

Kevin Kauffman announced the closing of comments and projected date for a future meeting on this topic of November 19, 2021. DFO Payne thanked everyone for their time and stated that she looked forward to another meeting as it would be helpful to make sure everything is properly reviewed. Michael Baker also appreciated the work of the members and thanked everyone for their participation.

Adjourn

The motion to adjourn the meeting was carried.

MEETING 4: Friday, November 19, 2021

Call to Order

The Manufactured Housing Consensus Committee (MHCC) meeting was held on Friday, November 19, 2021, via Zoom teleconference. Kevin Kauffman, Administering Organization (AO) Home Innovation Research Labs, called the roll and announced that a quorum was present. See Appendix A for a list of meeting participants.

Introduction and Opening Remarks

Teresa Payne, Administrator of the Office of Manufactured Housing Programs, and Designated Federal Officer (DFO) welcomed the participants and guests and thanked the MHCC for all their hard work over the previous three meetings. Ms. Payne restated that that it is their mission to ensure that manufactured housing is safe, durable, and affordable to all consumers. This proposed rule affects all the manufactured housing industry and encouraged everyone to submit comments before the extended deadline of November 26, 2021. DFO Payne also reminded the teleconference that HUD has recently published an FR notice for applications and inviting nominations of individuals to serve on the committee.

Kevin Kauffman announced that there would be a slight modification to the agenda as the approval of the draft minutes from the previous meeting will not be taking place. Prior to the meeting the decision was made to group the minutes for these 4 meetings together as they are all involving the same topic. He also informed the committee that in the absence of Mitchel Baker (MHCC Chair) and David Tompos (MHCC Vice-chair), who were unable to participate in the teleconference, Manuel Santana would be leading today's meeting.

Public Comment Period

See Appendix B for written public comments received prior to each meeting.

Mark Weiss, MHARR, thanked the committee for meeting again to discuss this important matter. He reminded the committee that MHARR submitted written comments prior to this teleconference. Mr. Weiss believes that the data contained in the NODA does not change anything and still believes that the proposed rule is unacceptable. He called attention to a couple sections of the NODA specifically. Firstly, Mr. Weiss believes that the modification from $55,000 to $63,000 as the threshold between Tier 1 and 2 doesn't substantially change anything as most homes would still fall into the same tier. Secondly, Mr. Weiss believes that the discussion on inflation is inaccurate and that there is substantial evidence to the contrary. He wrapped his comments by thanking the committee for this time.

Megan Booth, MHI, thanked everyone for their time and effort. Since the last meeting the NODA has been published which could be seen as a direct result of this groups efforts. Unfortunately, Ms. Booth believes that this update is not acceptable and should be rejected. She believes that the increase in price threshold for Tier 1 to $63,000 does not actually change much as her data shows the average cost of a manufactured home is $87,000. Ms. Booth believes that the lack of testing, compliance, and enforcement costs, which could be significant, is quite damming as those are critical components to ensure an accurate cost and benefit analysis. She stated that MHI submitted written comments prior to the meeting. Ms. Booth believes that the DOE proposal is fundamentally flawed and it shows a lack of

understanding on how manufactured homes are constructed. The proposal would require significant changes by a manufacturer and would likely make shipping homes to certain markets impossible. She feels that the increased costs would eliminate manufactured housing as an affordable housing solution and the purchasers would never recoup the additional costs and these new regulations would have negative returns.

Discussion of Department of Energy's Notice of Data Availability related to the Supplemental Notice of Proposed Rulemaking and Request for Comment – Energy Conservation Standards for Manufactured Housing and Prepare Comments for HUD's consideration

See Appendix C for the full MHCC Comments on the DOE SNOPR and NODA.

Manuel Santana provided some background on the NODA and informed the committee that he had looked over the NODA and that the MHCC's previously developed comments were still essentially accurate. He sees the NODA as an affirmation on DOE's decisions when drafting the proposed rule.

The MHCC spent some time discussing the merits of the change in the retail list price threshold for Tier 1. The consensus of the group was that the retail list price threshold was inconsequential and that a tiered approach based on retail list price was not appropriate. The MHCC continued to discuss the NODA and develop comments to submit to HUD.

The MHCC made slight wording modifications to their comments on questions 1 and 25.

MHCC Motion: Submit the comments as recorded over the course of the last 4 MHCC meetings on the DOE Supplemental Notice of Proposed Rulemaking and DOE Notice of Data Availability to HUD.

Maker: James Husom **Second: Alan Spencer**

The motion carried unanimously.

Public Comment Period

Mark Weiss. MHARR, thanked the committee for all their dedication and hard work over the last 4 meetings. He believes that the comments that were developed were good and will hopefully have an impact on the proposed rule. He also believes that this type of departmental feedback is essential and an illustration of why the MHCC was formed.

Megan Booth, MHI, believes that the comments developed by the MHCC were great and appreciates all the hard work. She is hopeful that the DOE will get a good result from DOE based on these comments.

Wrap Up – DFO & AO

Teresa Payne thanked everyone for their collective efforts, as this has been a lot of work. She informed the MHCC that the AO will be submitting the comments to HUD on behalf of the MHCC. She encouraged all the participants to submit their own comments to DOE, as the more information DOE has the better. She reminded the participants on the teleconference to submit applications and recommendations for the MHCC.

Manuel Santana thanked the committee and reminded the MHCC that the deadline for comments is November 26.

Adjourn

The motion to adjourn the meeting was carried.

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Appendix A:
MHCC Attendees and Guests

September 23, October 8, October 20, & November 19, 2021
MHCC Meeting

Appendix A:
MHCC Attendees and Guests

	MHCC				
	Name	**Attendance Sept 23**	**Attendance Oct 8**	**Attendance Oct 20**	**Attendance Nov 19**
General Interest / Public Official	Mitchel Baker	Y	Y	Y	
	Tara Brunetti	Y	Y	Y	
	Aaron Howard				Y
	James Husom	Y	Y	Y	Y
	Michael Moglia	Y	Y	Y	Y
	Robert Parks	Y	Y	Y	Y
	David Tompos	Y	Y	Y	
Producers	Luca Brammer				
	Phillip Copeland	Y	Y	Y	Y
	Peter James	Y			
	Manuel Santana	Y			Y
	Alan Spencer	Y			Y
	Cameron Tomasbi	Y	Y	Y	
User	Dave Anderson	Y	Y	Y	Y
	Rita Diienno				Y
	Stacey Epperson	Y	Y	Y	Y
	Joseph Sullivan	Y	Y	Y	Y
	Garold Miller	Y	Y	Y	
	Russell Watson	Y	Y	Y	Y
	Catherine Yielding	Y	Y	Y	Y

HUD Staff

Teresa Payne, DFO
Jason McJury
Barton Shapiro
Demetress Stringfield
Alan Field
Glorianna Peng
Charles Ekiert
Christina Foutz
Tommy Daison
Angelo Wallace
Denair Andersen
Mike Hollar
Liz Davis
Barry Ahuruonye

Guests

William Sherman
Lesli Gooch
Mark Weiss
Michael Lubliner
John Turner
James Turner
Demond Matthews
Kara Beigay
Megan Booth
Antoinette Price
Devin Leary-Hanebrink
Jennifer Hall
Michael Chavez
Nate Kinsey
Pat Walker
James Martin
John Weldy
Nawroz Aziz
John Baily
Bill Sherman
Carrie Paine
Chris Morgan
Courtney Marshall
Jane Hofilena
Morgan Garguilo
Norman Wang
Rory Hoffmann
Tim Ballo
Lisa Kwong
Michael Henretty

AO Staff, Home Innovation Research Labs

Kevin Kauffman
Nay Shah
Elina Thapa

Appendix B: Written Public Comments

Public Comments Received for September 23, 2021	
1	Leslie Gooch, MHI
2	Mark Weiss, MHARR
Public Comments Received for October 8, 2021	
3	Leslie Gooch, MHI
4	Mark Weiss, MHARR
Public Comments Received for October 20, 2021	
5	John Weldy, Clayton Homes
6	Leslie Gooch, MHI
7	Mark Weiss, MHARR
Public Comments Received for November 19, 2021	
8	Leslie Gooch, MHI
9	Mark Weiss, MHARR

Manufactured Housing Institute

September 16, 2021

Manufactured Housing Consensus Committee
Office of Manufactured Housing Programs
U.S. Department of Housing and Urban Development
451 7th Street SW, Room 9166
Washington, D.C. 20410

RE: Notice of a Federal Advisory Committee Meeting: Manufactured Housing Consensus Committee (Docket No. FR-6270-N-02)

Dear Sir/Madam:

The Manufactured Housing Institute (MHI) is pleased to provide feedback to the U.S. Department of Housing and Urban Development (HUD) and the Manufactured Housing Consensus Committee (MHCC) in response to the request for public comments in preparation for the MHCC's upcoming teleconference on September 23, 2021, about the Department of Energy's (DOE) supplemental notice of proposed rulemaking titled "Energy Conservation Program: Energy Conservation Standards for Manufactured Housing."

MHI is the only national trade association that represents every segment of the factory-built housing industry. Our members include home builders, suppliers, retail sellers, lenders, installers, community owners, community operators, and others who serve the industry, as well as 48 affiliated state organizations. In 2020, our industry produced nearly 95,000 homes, accounting for approximately nine percent of new single-family home starts. These homes are produced by 34 U.S. corporations in 138 plants located across the country. MHI's members are responsible for close to 85 percent of the manufactured homes produced each year.

To be clear, MHI and its members have always supported energy conservation efforts and other reasonable environmental protection initiatives, and we will continue to do so. Not only are new factory-built homes as efficient as their site-built counterparts, but in 2020, more than 30 percent of new manufactured homes were built to meet or exceed Energy Star standards. Further, today's manufactured homes already offer many energy efficient options. Just like site-built homes, manufactured homes are constructed and fitted with energy efficient features that are tailored to the climate demands of the region in which each home will be sited.

MHI believes the impact of any proposed energy conservation standards on the availability of manufactured housing needs to be paramount. Any increase in construction costs, even modest increases in response to a new energy conservation standard, could jeopardize homeownership for millions of Americans at time when there is an affordable housing shortage in the country. MHI urges the MHCC to consider the financial impact of cost increases on prospective purchasers of manufactured homes, including the loss of homeownership opportunities, as it reviews the proposed rule and take the following issues and concerns into consideration.

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Reliance on the International Energy Conservation Code

One of the tenets of the National Manufactured Housing Construction and Safety Standards Act (NMHCSS) is the importance of ensuring that manufactured housing remains an affordable housing option for all consumers considering homeownership. The Energy Independence and Security Act of 2007 (EISA) states "energy conservation standards established under this section shall be based on the most recent version of the International Energy Conservation Code (including supplements), **except in cases in which the Secretary finds that the code is not cost effective**, or a more stringent standard would be more cost-effective, based on the impact of the code on the purchase price of manufactured housing and on total life-cycle construction and operating costs."[1] Thus, the reasoning behind requiring DOE to consider the unique aspects and construction techniques of the manufactured housing industry.[2]

The International Code Council (ICC) is a member-focused association that develops model building codes and standards that are used in the design and construction of safe, sustainable, affordable, and resilient structures.[3] The ICC's International Energy Conservation Code (IECC) is a baseline energy standard with guidelines for mechanical systems, lighting systems, service water heating systems, and building envelope, among other areas.

EISA directs DOE to establish energy conservation standards for manufactured housing based on the most recent version of the IECC (unless it is found to be not cost effective), which was published in January 2021. To date no state has adopted the 2021 IECC standards and the vast majority of states are using amended versions of the 2009 IECC in their state building code for site-built homes. While the IECC is respected in the construction industry, it was introduced as a standard specific to commercial and site-built residential housing with no input from the manufactured housing industry. Given that the IECC essentially ignores all the construction aspects unique to manufactured housing, requiring the industry to comply with a building code that was developed without the benefit of our industry's knowledge or participation is not an appropriate solution. The most appropriate code to utilize to update energy standards for manufactured homes is the HUD Code.

Feasibility of DOE's Proposed Changes

The DOE's proposed rule seeks to make changes related to the building thermal envelope; air sealing; installation of insulation; duct sealing; heating, ventilation, and air conditioning (HVAC); service hot water systems; mechanical ventilation fan efficacy; and heating and cooling equipment sizing. If the DOE attempts to enforce the IECC, a code originally developed and intended for commercial and site-built residential buildings, to propose these changes, manufacturers will have to redesign all their current floor plans to accommodate the changes resulting in the possible elimination of some home features.

For example, regulations in the IECC will require thicker insulation which will mean manufactured homes will have to allow for higher heel height, rafter and truss changes, which will not only require redesign but also reviewing how the homes will be transported from the factory to the home site. Another example is the current HVAC systems used in manufactured homes will have to be reviewed. Based on the proposed changes, it is unclear if there are current HVAC systems on the market that could accommodate these requirements, and if not, what the expense will be to redesign the HVAC systems or create new ones, which will ultimately increase the cost of the home and the price the consumer pays for it. Further, all these changes will take time to implement.

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[1] 42 U.S.C. 17071(b)(1).
[2] *Id.* at 17071(b)(2)(A).
[3] International Code Council, https://www.iccsafe.org/about-icc/overview/about-international-code-council/ (accessed July 27, 2021)

There are also additional issues MHI urges the MHCC to consider when reviewing the proposed rule including:

(1) Proposed energy requirements should be revised to reflect a complete and accurate cost benefit analysis, which the Energy Independence and Security Act of 2007 (EISA) requires – correcting requirements based on improper calculations and methodologies (such as the 30-year payback assumption in the proposed rule, when most manufactured home mortgage loans are fully amortized over only 15 years).

(2) The proposed $55,000 low-income tier threshold for streamlined energy efficiency requirements is based on the demonstrably false premise that manufactured homes above $55,000 are not affordable to low-income homebuyers. Affordability needs to be reviewed in the context of the overall housing market, not just within the manufactured housing space.

(3) Energy requirements in the proposed rule that were developed based on an inappropriate site-built housing framework should be revised, particularly those requirements that are redundant or conflict with HUD code requirements and that thereby add unnecessary costs.

(4) Testing requirements for each of the systems being modified in the proposal, must be included. Determining the impact of a system change without knowing the testing parameters is impossible. DOE must not propose a rule without including the required testing requirements, so any analysis can include the true impact.

(5) The proposed rule does not include compliance and enforcement provisions which DOE says it will address at a later date. MHI believes it is unnecessary for the DOE to develop a new enforcement mechanism with any proposed manufactured housing energy conservation standard because the HUD Code is an already-established enforcement mechanism that mandates a uniform standard for design, construction, and installation, including federal requirements for safety, durability, and energy efficiency. Failure to partner with HUD would result in complicated, overlapping requirements that will only increase manufacturing costs, hurting existing homeowners and prospective homebuyers.

While MHI and its members will always support sensible energy conservation efforts, overly burdensome regulations that even modestly increase the cost of a manufactured home will price many consumers out of homeownership. This increase will have a disproportionate impact on minority communities, who face the most significant burden in obtaining affordable homeownership and would be in direct contrast to the Administration's goal of achieving racial equity in homeownership. MHI stands ready to work with DOE, HUD and the MHCC on the development of realistic and achievable energy standards that not only encourages innovation and conservation, but also eliminates regulatory barriers that impede consumer access to safe, affordable manufactured housing.

Sincerely,

Lesli Gooch, Ph.D.
Chief Executive Officer

Manufactured Housing Association for Regulatory Reform

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September 15, 2021

VIA FEDERAL EXPRESS AND ELECTRONIC SUBMISSION

Manufactured Housing Consensus Committee
C/O Home Innovation Research Labs
Administering Organization
400 Prince George's Boulevard
Upper Marlboro, Maryland 20774

Re: Proposed Energy Conservation Standards for Manufactured Housing

Dear Members of the Manufactured Housing Consensus Committee:

The Manufactured Housing Association for Regulatory Reform (MHARR) submits the following comments in connection with the Manufactured Housing Consensus Committee's (MHCC) consideration of a Supplemental Notice of Proposed Rulemaking (SNPR) regarding "Energy Conservation Standards for Manufactured Housing" published by the U.S. Department of Energy (DOE) in the Federal Register on August 26, 2021.[1] MHARR is a national trade association representing producers of manufactured housing subject to federal regulation pursuant to the National Manufactured Housing Construction and Safety Standards Act of 1974 (1974 Act), as amended by the Manufactured Housing Improvement Act of 2000 (2000 reform law), as well as relevant provisions of the Energy Independence and Security Act of 2007 (EISA).

I. INTRODUCTION

The following are MHARR's initial comments regarding the August 26, 2021 DOE manufactured housing energy standards supplemental proposed rule. Because of the compressed time schedule that DOE's sixty-day comment period for the August 26, 2021 proposed standards has effectively imposed on the Manufactured Housing Consensus Committee (MHCC) (and other stakeholders') review, factfinding, analysis, and comment on the proposed standards, these initial comments will focus primarily on policy and cost aspects of the DOE proposal. MHARR will provide additional comments regarding technical and other aspects of the proposed standards as the MHCC review process moves forward.[2]

[1] See, 86 Federal Register, No. 163 (August 26, 2021) at p. 47744.

[2] See, however, section II. A, below, regarding a request for an extension of time for comments in response to the DOE proposed rule.

As MHARR has previously emphasized, the fundamental duties and responsibilities of the MHCC, as is made clear both by its composition and by its enumerated statutory functions, are not merely "technical" in nature. While an analysis of the technical merit of any proposal is an important part of the MHCC's duties, its responsibilities extend much further, to a consideration of: (1) whether a proposal serves to advance the statutory objectives of the 2000 reform law (42 U.S.C. 5401);[3] (2) an analysis of the probable effect of the proposed standard, regulation or interpretation on the "cost of the manufactured home to the public" (42 U.S.C. 5304(e)(4));[4] and (3) whether the benefits of any such proposal outweigh its costs and likely impact on the "availability of affordable manufactured homes." (42 U.S.C. 5401(b)(2)).

These same duties and functions, moreover, were expressly recognized by Congress in connection with manufactured housing energy standards under EISA. EISA section 413 thus specifically provides a review and comment role for the MHCC, and authorizes the MHCC to consider the impact of DOE-proposed energy standards on the purchase price of manufactured housing.[5] MHCC consideration of the current DOE proposal, therefore, involves not just an analysis of its purported technical merit, but also a balancing of whether that proposal, even if technically practicable, would produce destructive cost impacts that would override its value in connection with a type of housing that, as a matter of federal policy, is – and must remain – inherently affordable for every American and, particularly, lower and moderate-income homebuyers.

It is critical to note, moreover, in connection with these comments, that the cost burdens of federal regulation and over-regulation fall disproportionately on smaller businesses (and their consumers), including smaller HUD Code producers represented by MHARR, as well as retailers and communities. A landmark 2010 study of this issue by the U.S. Small Business Administration (SBA), found that "small businesses face an annual regulatory cost … which is 36 percent higher than the regulatory cost facing large firms Defined as firms with 500 or more employees)."[6](Emphasis added). This differential would undoubtedly be much higher today,

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[3] The 2000 reform law provides, in relevant part, "The purposes of this title are – (1) to protect the quality, durability, safety and affordability of manufactured homes [and] (2) to facilitate the availability of affordable manufactured homes and to increase homeownership for all Americans."

[4] The 2000 reform law provides, in relevant part, "The consensus committee, in recommending standards, regulations and interpretations … shall: *** (4) consider the probable effect of such standard on the cost of the manufactured home to the public."

[5] 42 U.S.C. 17071 provides, in relevant part: "(a)(1) Not later than 4 years after December 19, 2007, the Secretary shall by regulation establish standards for energy efficiency in manufactured housing. (2) Standards described in paragraph (1) shall be established after— (A) notice and an opportunity for comment by manufacturers of manufactured housing and other interested parties; and (B) consultation with the Secretary of Housing and Urban Development, who may seek further counsel from the Manufactured Housing Consensus Committee. (b)(1) The energy conservation standards established under this section shall be based on the most recent version of the International Energy Conservation Code (including supplements), except in cases in which the Secretary finds that the code is not cost-effective, or a more stringent standard would be more cost-effective, based on the impact of the code on the purchase price of manufactured housing and on total life-cycle construction and operating costs."

[6] See, U.S. Small Business Administration, "The Impact of Regulatory Costs on Small Firms," (Nicole V. Crain and W. Mark Crain) September 2010 at p. 8: "[Regulatory] costs per employee thus appear to be at least 36 percent higher in small firms than in medium-sized and large firms. *** In large firms, these fixed costs of [regulatory] compliance are spread over a large revenue, output, and employee base, which results in lower costs per unit of output as firm size

following an additional decade-plus of ever-expanding federal regulation. In reviewing the DOE proposed rule, therefore, the MHCC should and must consider not only its likely impact on the purchase cost and availability of manufactured housing generally, but also: (1) the proposed rule's specific potential impacts on smaller manufactured housing producers, retailers and communities; (2) the future viability and market share of those smaller, independent manufactured housing producers, retailers and communities as a consequence of disproportionately-higher regulatory burdens and costs attributable to the DOE proposed rule; and (3) the exacerbation of regulatory cost impacts on consumers as a result of further and more rapid industry consolidation – and a related loss of full and robust intra-industry competition – as a result of excessive and disproportionate cost burdens attributable to the proposed rule. MHARR will address all of these issues in its comprehensive written comments to DOE and in further comments to the MHCC, as the Committee proceeds with its scheduled review and analysis of the proposed "supplemental" rule.

For all of the reasons set forth below, therefore – and that will be detailed in further forthcoming MHARR comments in this matter – MHARR asks the MHCC to reject DOE's proposed manufactured housing energy standards rule, in its current form, as a baseless, unnecessary attack on the availability and affordability of manufactured housing, which will needlessly exclude vast numbers of lower and moderate-income Americans from the American Dream of homeownership in order to satisfy the ideological predilections of "climate" extremists.

II. COMMENTS

A. THE MHCC SHOULD REQUEST AN IMMEDIATE EXTENSION OF THE DOE COMMENT DEADLINE

As an initial procedural matter, MHARR urges the MHCC to request an immediate extension of the DOE written comment deadline in this matter in order to provide sufficient time for the MHCC (and other affected stakeholders) to conduct a valid, legitimate and fully-informed review and analysis of the DOE proposed rule.[7]

DOE acknowledges that its August 26, 2021 proposed manufactured housing energy rule – a rule that, to date, it has spent 14 years developing, and that has been fundamentally flawed from its inception through its current iteration -- is a "significant regulatory action" as determined by the Office of Management and Budget (OMB), meaning that it will likely "Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities."[8]Given the significant and, indeed, extreme

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increases. This is the familiar empirical phenomenon known as economies of scale, and its impact is to provide a comparative cost advantage to large firms over small firms." (Emphasis added).

[7] This request should have the full, express and specific support of the Department of Housing and Urban Development and its Office of Manufactured Housing Programs as the agency charged by federal law with ensuring that the purposes and objectives of federal manufactured housing law as set forth above, are carried out and achieved.

[8] DOE's August 26, 2021 SNPR states, in relevant part: "The Administrator of the Office of Information and Regulatory Affairs ("OIRA") in the OMB has determined that the regulatory action in this document is a significant regulatory action under section (3)(f) of E.O. 12866." See, 86 Federal Register, supra, at p. 47822, col. 3. Section

impacts that this proposed rule would have on both the manufactured housing industry (and especially its smaller businesses) and American consumers of affordable housing, as well as the myriad of technical and related cost considerations entailed in seeking to adapt and conform a code for site-built structures to the unique construction and economic imperatives of federally-regulated manufactured housing, a 60-day comment period (punctuated by at least two federally-designated holidays) is clearly inadequate and fundamentally unfair and inequitable both to the MHCC and to other interested parties, including MHARR, that will submit comment on the proposed rule, likely including comments that reference, rely upon, or amplify comments offered by the MHCC.

While HUD has scheduled three meetings for the MHCC to consider and analyze the DOE proposed rule and prepare responsive comments, with meetings currently scheduled on September 23, 2021, October 8, 2021 and October 20, 2021[9] – just five days before the current DOE comment deadline – these meetings are based on a highly-compressed time schedule that is unlikely to provide sufficient time for thorough, proper and legitimate MHCC consideration and vetting of the DOE proposed rule from the unique perspective of manufactured housing users, producers, retailers and communities. A thorough vetting of this sort is not only authorized and, indeed, required by applicable statutes, as noted above, but is particularly necessary in this rulemaking, where DOE has repeatedly demonstrated its willingness to deceive, connive, obfuscate, distort the facts, conspire and skirt the law, with successive fundamentally flawed proposals, in order to achieve the policy objectives that it institutionally shares with climate extremists and energy special interests.[10]

There is, moreover, recent direct precedent for such an extension. On August 9, 2021, DOE published notice of an extension of the comment deadline for proposed revisions to its so-called "Process Rule" concerning updates to appliance energy standards under the Energy Policy and Conservation Act of 1975.[11]In that notice, DOE stated: "On July 29, 2021, interested parties in this matter, the Joint Commenters, requested an extension of the public comment period for the [Notice of Proposed Rulemaking] to September 13, 2021. The Joint Commenters asked for this additional time due to their assertion that the proposed rule is complex and multi-faceted, which requires more time to effectively review it and formulate their comments."[12](Emphasis added). If anything, the present rulemaking is even more "complex and multi-faceted" than the DOE process rule

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(3)(f) of Executive Order 12866, "Regulatory Planning and Review" (September 30, 1993), in turn, states that a "significant regulatory action" is one that is likely to result in a rule that may: (1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities; (2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or (4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive order."

[9] See, 86 Federal Register No. 171 (September 8, 2021) "Notice of a Federal Advisory Committee Meeting: Manufactured Housing Consensus Committee," at p. 50369.

[10] Fully-documented details of DOE's manipulation of this rulemaking – from its inception – are set forth in MHARR's August 8, 2016 comments to DOE regarding the initial DOE proposed manufactured housing energy standards rule (MHARR2016 DOE Comments), which the current SNPR allegedly "supplements." Those comments are attached hereto as Attachment 1. MHARR hereby incorporates those comments herein as if restated in full.

[11] See, 86 Federal Register No. 150 (August 9, 2021) "Extension of Public Comment Period," at p. 43429, attached hereto as Attachment 2.

[12] Id.

because: (1) it is an entirely new proposed rule, not a mere update of an existing rule; (2) it involves and addresses construction of the entire home rather than specific discrete appliances; (3) entails statutory considerations of cost and cost-effectiveness involved in fundamentally transforming an energy code for site-built homes into standards for affordable manufactured homes, that must be completely and properly considered and evaluated in order to avoid potentially irreparable harm to manufactured housing consumers and smaller industry businesses; and (4) must be thoroughly vetted by the MHCC in light of DOE's egregious 14-year track record of fundamentally flawed and highly-destructive manufactured housing energy proposals.

Accordingly, MHARR asks the MHCC to request a comment deadline extension from DOE for itself and all other commenters – and that it take other steps as necessary to ensure that such an extension is granted – in order to ensure: (1) that all applicable statutory guarantees are observed and honored; (2) that the MHCC can perform its essential vetting and commentary function based on full and complete information and analysis; and (3) to ensure that yet another fundamentally flawed DOE manufactured housing energy proposal is not imposed as a final rule.

B. MANUFACTURED HOME ENERGY USAGE AND COSTS ARE ALREADY LOWER THAN OTHER TYPES OF HOMES

DOE manufactured housing "energy conservation" standards, including the August 26, 2021 proposed standards, are – and always have been – a purported "solution" in search of a problem. Notwithstanding continual efforts by DOE, climate extremists, energy special interests and others to skew, manipulate, obfuscate and distort relevant data, the fact of the matter is that HUD-regulated manufactured homes, under existing HUD manufactured housing standards for energy and energy-related functions, already offer occupants lower monthly energy costs than other types of homes. Indeed, federal government data shows that monthly manufactured housing energy costs have actually fallen further below energy costs for single-family detached site-built homes since DOE published its initial manufactured housing energy standards proposal in 2016.

In its written comments on the 2016 DOE manufactured housing energy rule, MHARR noted:

> "As a consequence of ... pre-existing HUD energy standards, manufactured homes, as established by U.S. Census Bureau data, are already energy efficient without regressive, high-cost DOE energy mandates. Specifically, data from the 2013 American Housing Survey shows that the median monthly housing cost for fuel oil was $92.00 for manufactured homes as compared to $267.00 for other types of housing. The median monthly cost for piped natural gas was $34.00 for manufactured homes as compared with $38.00 for other types of housing, and the median monthly cost for electricity was only slightly higher for manufactured homes (at $119.00) than other types of homes (at $105.00) – a difference of only $168.00 per year."[13]

(Emphasis in original).

[13] See, Attachment 1, supra at p. 23.

Newer data published in the 2019 American Housing Survey (AHS), however, shows that today's modern, HUD Code manufactured homes, have lower median monthly energy costs than detached site-built homes in all fuel categories. Specifically, the 2019 AHS shows that the median monthly cost for fuel oil was $83.00 for manufactured homes, as compared with $125.00 for detached site-built homes.[14]The median monthly cost for natural gas was $40.00 for manufactured homes, as compared with $58.00 for site-built detached housing, and the median monthly cost for electricity was $122.00 for manufactured homes, as compared with $124.00 for site-built homes.[15]The median monthly fuel cost for HUD-regulated manufactured homes across all types and ages, therefore, is already up to 51% less than the monthly median fuel cost for single-family detached site-built homes.[16]Similarly, the mean monthly fuel cost for current manufactured homes, as calculated by the AHS, is also lower than the mean for single-family, detached, site-built homes with respect to monthly fuel costs. Thus, the mean monthly cost for electricity in manufactured homes is $133.00, as compared with $141.00 for detached, single-family, site-built homes, the mean monthly cost for piped gas in manufactured homes is $60.00, as compared with $73.00 for site-built homes, and the mean monthly cost for fuel oil is $88.00 in manufactured homes, as compared with $143.00 for site-built homes.[17]The mean monthly fuel cost for HUD-regulated manufactured homes across all types and all ages, therefore, is already up to 62% less than the mean monthly fuel cost for detached, single-family, site-built homes.[18]

The existing HUD manufactured housing energy standards, accordingly, ensure the energy operating affordability of manufactured homes – on a whole-home basis, as compared with site-built, single-family homes – while maintaining and preserving the overall purchase price affordability of manufactured housing in accordance with, and as required by, applicable federal law. By contrast, alleged "analyses" comparing site-built and manufactured home energy usage and energy costs on a per-square-foot basis, are irrelevant and misleading, because the average size of all manufactured homes in 2020 -- again according to U.S. Census Bureau data – was 1,471 square feet, as contrasted with an average size of 2,527 square feet for a single-family site-built home, a size differential of almost 72%.[19] The MHCC, accordingly, should reject cost comparisons and analyses based on "per-square-foot" energy usage,[20] and should instead base its analyses and conclusions regarding the efficacy and affordability of manufactured housing energy standards

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[14] See, U.S. Census Bureau, 2019 American Housing Survey, Fuel Cost Comparison Table (extract), attached hereto as Attachment 3.

[15] Id.

[16] The 2019 AHS data thus shows that the median monthly cost for electricity is 1.6% less in current HUD Code manufactured homes than in detached, single-family site-built homes, monthly piped gas costs are 45% lower in current manufactured homes, and monthly fuel oil costs are 50.6% lower in HUD-regulated manufactured homes.

[17] See, Attachment 3.

[18] The 2019 AHS data thus shows that the mean monthly cost for electricity is 6% less in current HUD Code manufactured homes than in detached, single-family site-built homes, mean monthly piped gas costs are 21.6% lower in current manufactured homes, and mean monthly fuel oil costs are 62.5% lower in HUD-regulated manufactured homes.

[19] Even limiting the size comparison to larger, double-section manufactured homes, site-built homes are still 43.5% larger.

[20] See e.g., American Council for an Energy Efficient Economy (ACEEE), "A Buildings Efficiency Agenda for 2021 – Manufactured Housing Standards" (October 2020) at p. 1: "Manufactured homes use more than $12 billion in energy each year.... The average energy cost per square foot is 70% higher than for the average single-family home."

based on "whole house" energy usage and cost comparisons. Analyzed in that manner, using authoritative data from federal sources, it is apparent and, indeed, indisputable, that manufactured homes, under existing HUD Code energy standards, are already both energy-efficient and cost-efficient from the perspective of the homeowner as required by applicable federal law.

This result is also compelled by the fact that the cost-benefit language of EISA section 413, requiring that DOE manufactured housing energy standards be based on the most recent version of the IECC, "except in cases in which the Secretary finds that the code (sic) is not cost-effective" (emphasis added), must be construed and applied consistently with the purposes, objectives and requirements of existing law, in this case, the 1974 Act as amended by the 2000 reform law.[21] Therefore, the "cost-effective" proviso of EISA section 413 must be construed and applied – consistently with the 1974 Act, as amended – to ensure that non-life-safety DOE energy standards do not result in purchase price increases to manufactured homes that would significantly impair their affordability, availability and accessibility to all Americans, or otherwise decrease homeownership in violation of 42 U.S.C. 5401.

C. THE PROPOSED DOE STANDARDS WOULD RESULT IN CATASTROPHIC PURCHASE PRICE INCREASES

The manufactured housing market -- and manufactured housing regulation -- is based on purchase price affordability. This statutory and regulatory focus on initial purchase price affordability is consistent with the status of manufactured housing as "the largest source of unsubsidized affordable housing in" the United States and an "important source" of low-income homeownership, as noted by the U.S. Consumer Financial Protection Bureau (CFPB).[22] Applicable law thus recognizes that manufactured housing is uniquely price-sensitive, as its consumer base is comprised largely of lower and moderate-income purchasers. Purchase price affordability, as a result, is necessarily antecedent to – and more critical to the manufactured housing market – than so-called "life-cycle" affordability, because for potential purchasers excluded from the market altogether by excessive, regulatory-driven purchase price increases, there is no home they can afford to purchase and, therefore axiomatically, no "life-cycle." Accordingly, the MHCC's cost analysis of the DOE energy SNPR is crucial should focus first and foremost on its likely purchase price and purchase market impacts.

As currently constituted, the HUD manufactured housing construction and safety standards effectively maintain the purchase price affordability of manufactured homes at monthly energy operating cost levels (as demonstrated above), that are well below the comparable monthly energy operating costs of site-built homes. Current HUD standards, moreover, also ensure that the total monthly operating costs of HUD Code manufactured are significantly lower than those of site-built homes. The 2019 American Housing Survey thus documented a monthly median housing operating cost of $610.00 for manufactured homes, and $1,106.00 for single-family, detached site-

[21] See e.g., "Statutory Interpretation, General Principles and Recent Trends," Congressional Research Service (December 19, 2011) at p. 29, stating: "A court 'must read two statutes to give effect to each if it can do so." Citing Watt v. Alaska, 451 U.S. 259 (1981).

[22] See, Consumer Financial Protection Bureau, "Manufactured Housing Finance: New Insights from the Home Mortgage Disclosure Act Data" (May 2021), pp. 8-9.

built homes, a savings of nearly 58% under the current HUD manufactured housing standards. Consequently, the existing HUD Code standards --including the existing HUD Code energy standards -- are consistent with the affordability and affordability balancing requirements of federal law, which ensure that manufactured homes are not only energy-efficient but are also available at a range of purchase prices that are affordable for lower and moderate-income Americans. The International Energy Conservation Code (IECC), by contrast, is subject to no similar statutory affordability or balancing mandates. As a result, it is a high-cost code, as was demonstrated initially by MHARR in 2016 with respect to the 2015 IECC and by Home Innovation Research Labs (HIRL) – the research arm of the National Association of Home Builders (NAHB)[23] – with respect to the 2021 IECC.

The 2015 IECC, which was the basis for DOE manufactured housing energy standards initially proposed in 2016[24]-- as calculated by MHARR – would have resulted in retail level purchase price increases of $4,601.00 for a single-section manufactured home, and $5,825.00 for a double-section manufactured home.[25]These amounts included industry-standard builder and retailer profit margins,[26] but did not include regulatory testing, compliance or enforcement costs, which were not estimated or considered by DOE in the June 2016 rulemaking proceeding. Consistent with MHARR's 2016 findings, a June 2021 HIRL report found that the 2021 IECC, as published, would result in a national incremental construction cost increase of $6,548.00 to $9,301.00 for a specified reference home of 2,500 square feet, depending on the compliance mechanism selected.[27]The same analysis shows a national simple construction cost payback period ranging from 32 to 67 years, again based on the compliance mechanism. Prorating these amounts to the smaller size of an "average" single-section and double-section manufactured home, as defined by the U.S. Census Bureau, and including industry-standard profit margins identical to those used in MHARR's 2016 calculation, the 2021 IECC, in unmodified form, would yield a minimum incremental retail-level price increase of $7,958.00 for an "average" single section manufactured home and a minimum incremental retail-level price increase of $12,908.00 for an "average" double-section manufactured home.[28]And again, it must be stressed that as large as these amounts are, they are necessarily incomplete, in that: (1) they do not include regulatory testing, compliance or enforcement costs; and (2) do not include costs attributable to future changes to the IECC and the costs of compliance with such future modifications – which are, and would be, totally unnecessary for today's modern, already energy cost-efficient, HUD Code manufactured homes.

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[23] See, Home Innovation Research Labs, "2021 IECC Residential Cost Effectiveness Analysis" (June 2021) (HIRL Report), attached hereto as Attachment 4.

[24] See, 81 Federal Register, No. 117 (June 17, 2016), "Energy Conservation Standards for Manufactured Housing," at p. 39756, et seq.

[25] See, MHARR 2016 DOE Comments, at p. 15, note 42.

[26] Industry-standard builder and retailer profit margins were calculated as multiples of 2.0 and 1.4 by MHARR, based on input from smaller, independent producers.

[27] See, HIRL Report at p. 14.

[28] I.e., for a single-section home: $6,548.00/2,500 square feet = $2.619 per square foot x 1,085 square feet (for an "average" single-section manufactured home) = $2,842.00 x 2 (builder profit) = $5,684.00 x 1.4 (retailer profit) = $7,958.00 retail level price increase. For a double section home: $6,548.00/2500 square feet = $2.619 per square foot x 1,760 square feet (for an "average" double-section manufactured home) = $4,610.00 x 2 (builder profit) = $9,220.00 x 1.4 (retailer profit) = $12,908.00 retail level price increase.

While the August 26, 2021 DOE proposed rule does not incorporate the full 2021 IECC as to either "Tier1" or "Tier 2," and also includes arbitrary DOE modifications to certain 2021 IECC criteria, MHARR expects that a full purchase price analysis of the DOE proposal, based on current costs for smaller, independent producers, will yield expected purchase price increases between the 2016 MHARR projected amounts and the 2021 HIRL projected amounts. Regardless of the precise amount(s), however, price increases of this magnitude – and anywhere within this potential range -- within the highly cost-sensitive manufactured housing market, would be devastating to lower and moderate-income consumers who rely on the purchase price affordability of manufactured housing, in direct violation of federal law.

First, price increases of this magnitude would exclude millions of Americans from the manufactured housing market and from homeownership altogether. An NAHB analysis presented to the DOE Manufactured Housing Working Group in 2014, demonstrated that for every $1,000.00 increase in the purchase price of a single-section manufactured home, 347,901 households are excluded from the market. Similarly, for a double-section home, a $1,000.00 purchase price increase excludes 315,385 households from the market.[29]Extrapolating these amounts to the purchase price increases under the full, unmodified 2021 IECC calculated above, 2,748,417 households would be excluded from the single-section manufactured housing market (and homeownership altogether) and 4,068,466 households would be excluded from the double-section manufactured housing market.[30]In total, therefore, 6,816,883 households that could afford to purchase a manufactured home now, would be totally excluded from the market under the 2021 IECC. At a 2020 annual production level of 94,390 total homes, this degree of consumer exclusion represents a loss of more than 72 years of manufactured home production. Furthermore, for those excluded from the market altogether due to 2021 IECC-driven price increases, by definition, there would be no "life-cycle" savings whatsoever, and no payback period of any kind.

Extrapolating the same analysis to a median purchase price increase level 50% above that calculated by MHARR for the 2016 IECC, and 50% below the unmodified 2021 IECC to reflect the potential impact of DOE SNPR modifications, the corresponding purchase price increase levels would be $6,279.00 for a single-section manufactured home and $9,366.00 for a double-section manufactured home. At these amounts, more than 2,156,986 households would be excluded from the HUD Code single-section market, and more than 2,933,080 households would be excluded from the HUD Code double-section market, for a total of over 5,090,006 households, representing nearly 54 years of production at 2020 market levels.

Even with substantial modifications to the 2021 IECC, therefore, the impact of the DOE proposed rule on the manufactured housing market, manufactured housing consumers, and manufactured housing producers, retailers and communities, including most especially smaller businesses operating at lower profit margins, would be extreme and extremely destructive. Insofar

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[29] See, MHARR 2016 DOE Comments at p. 25.

[30] For single section manufactured homes: $7,958.00 (minimum retail price increase) x 347,901 (excluded from the market per $1,000.00 price increase) = 2,748,417 excluded. For double section manufactured homes: $12,908 (minimum retail price increase) x 315,385 (excluded from the market per $1,000.00 price increase) = 4,068,466 excluded

as it would decimate the affordable manufactured housing market, it should and indeed, must be rejected.[31]

Second, and in addition to this excessive and disproportionate level of total market exclusion that would result from the DOE proposed rule, cost increases of this magnitude would substantially reduce the number of lower and moderate-income purchasers who could qualify to finance a manufactured home purchase. Already, at current retail price levels, the vast majority of applications for manufactured home consumer purchase loans are denied. According to a May 2021 report by the U.S. Consumer Financial Protection Bureau (CFPB),[32] only "a minority (27 percent) of consumers who applied for a loan to buy a manufactured home succeeded in obtaining financing.[33] Of those who did not obtain financing, the majority were denied.... An estimated 42 percent of all manufactured home purchase applications were denied, including 50 percent of chattel [loan] applications.... In comparison, only 7 percent of site-built [loan] applications were denied."[34](Emphasis added). By increasing purchase price levels and corresponding cost burdens for consumers potentially remaining in the market, the number of potential manufactured housing purchasers who could qualify for consumer financing would be reduced even further, and the affordability of manufactured housing in relation to site-built and other types of housing would disappear, again in violation of existing law.

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[31] DOE, in its August 26, 2021 SNPR, attempts to discredit NAHB's market exclusion analysis, stating: "DOE reviewed the 2014 NAHB study referenced by MHARR and [the Alabama Manufactured Housing Association] and found the values cited by MHARR and AMHA from that study are not representative of the manufactured housing market's prospective buyers. The NAHB study estimates the reduction in buyers assuming all American households intend to buy a home. *** Rather than analyzing all American households, DOE's estimate in this [SNPR] calculates the number of households no longer able to purchase a manufactured home from the pool of households planning to purchase a manufactured home (which is smaller than the total number of American households)." Instead, DOE relies on a 2007 study by two academics concluding that manufactured housing consumers "are not nearly as price-sensitive" as projected, because the price of manufactured housing will still be below that of site-built housing and "low- and moderate-income families have few [other] low-cost choices for home ownership." See, 86 Federal Register, supra at p. 47797, col.1. (Citations omitted, emphasis added). The sum total of DOE's argument, accordingly, is: (1) they – and only they, can somehow magically divine the intent of potential home purchasers and can accurately forecast how many potential purchasers "plan" on purchasing a manufactured home, as contrasted with some other type of home; and (2) that those consumers "planning" to purchase a manufactured home will remain in the market because they have nowhere else to go for affordable housing/homeownership. These arguments are absurd on their face, and not worthy of serious consideration. First, there is absolutely no valid or legitimate empirical basis for DOE to assert who is – or is not – "planning" to purchase a manufactured home, either at current price levels or at the price levels that would result from DOE's proposed standard. Second, DOE's "no alternative" argument is a disgraceful corollary of "let them eat cake." It insultingly assumes that because lower and moderate-income purchasers cannot typically afford higher-priced site-built and other types of homes, they will effectively be forced into remaining in the manufactured housing market due to the lack of alternatives. The reality of the matter, however, is that those consumers would more likely drop out of the housing market altogether and effectively be excluded from homeownership – a point that DOE would prefer to ignore.

[32] DOE admits in its August 26, 2021 SNPR that it "is aware of the 2021 CFPB report but has not yet reviewed it in detail" and, "accordingly, did not incorporate any new or additional data from the 2021 CFPB report into" its SNPR analysis. See, 86 Federal Register, supra at p. 47758, col. 1.

[33] This contrasts with a success rate of "74 percent of [loan] applications for site-built homes." See, CFPB Report, supra at p. 4.

[34] See, CFPB Report, supra at p. 15. Chattel, or personal property manufactured home purchase loans, moreover, in 2020, represented 78% of all manufactured home placements, according to the U.S. Census Bureau.

Furthermore, as the May 2021 CFPR Report emphasizes, the higher level of rejection rates within the chattel or personal property manufactured housing purchase loan sector – which will be significantly exacerbated by the proposed DOE energy standards – will disproportionately impact and harm "Hispanic white, Black and African American and American Indian and Alaska Native borrowers" who make up larger shares of [manufactured home] chattel borrowers than among ... site-built loan borrowers."[35]"This will especially be the case for "Black and African American borrowers," who are "overrepresented in [manufactured home] chattel lending compared to site-built.[36]

In summary, then, on cost grounds alone, the IECC, modified or unmodified, is not an appropriate or legitimate code for affordable manufactured homes and cannot be made into an appropriate or legitimate code for manufactured homes through arbitrary and haphazard "modifications." Furthermore, the IECC has been developed – including in its 2021 iteration – pursuant to a voting system that gave final authority over its provisions to state and local building code officials who are not responsible for the development of manufactured housing standards and have not been responsible for such standards since the enactment of the first federal manufactured housing standards law, nearly 50 years ago. Accordingly, the IECC is fundamentally and organically not an appropriate code for manufactured housing and cannot be transformed into one or shoehorned by DOE through changes and modifications around its periphery. Rather, the only appropriate code for manufactured housing is the HUD Code, subject to all applicable law governing its substance and development procedures.

D. DOE'S "TIER ONE" STANDARDS WOULD AFFECT ONLY A FRACTION OF THE MARKET AND COULD BE EXCLUDED FROM A FINAL RULE

DOE, in its August 26, 2021 SNPR, attempts to paper-over these damning purchase price impacts by – at least for now -- bifurcating its proposed standard into two separate "tiers." As explained by DOE, "under the tiered proposal, two sets of standards would be established.... Tier 1 would apply to manufactured homes with a manufacturer's retail list price of $55,000.00 or less,"[37] applying allegedly less costly and more highly-modified 2021 IECC measures to such homes. Tier 2 "would apply to manufactured homes with a manufacturer's retail list price above $55,000.00"[38] and incorporate a broader range of more costly 2021 IECC measures. Significantly, though, DOE's August 26, 2021 SNPR includes, as an "alternative proposal," an "'untiered' approach, wherein energy conservation standards for all manufactured homes would be based only on the 2021 IECC."[39]Put differently, this means that despite all the talk of a "tiered" system, and the use of a tiered proposal to mislead and lure stakeholders, the public and the MHCC into supporting the DOE SNPR, a final rule in this matter could ultimately have no separate cost-based "tiers" at all, and subject all manufactured homes to high-cost market-crushing IECC-based energy standards. For this reason alone, the MHCC should reject the DOE proposed rule. But even assuming that the "tiered" DOE proposal is not a tactical deception that will ultimately be

[35] Id. at p. 31.

[36] Id.

[37] See, 86 Federal Register at pp. 47745-47746.

[38] Id. at p. 47746, col.1

[39] Id.

withdrawn and discarded, the August 26, 2021 proposed standard would still result in grievous harm to the manufactured housing market, manufactured housing consumers and the manufactured housing industry, with disproportionately destructive impacts on smaller industry producers, retailers, communities and other smaller businesses.

First, the selection of a retail list price of $55,000.00 as the demarcation line between the "Tier1" proposed standards and the much harsher and more costly "Tier 2" standards appears to be arbitrary and capricious,[40] and would subject the overwhelming majority of all manufactured homes to the "Tier 2" standards. The most recent U.S. Census Bureau data for manufactured housing, found that the "average" sales price of a single-section manufactured home in 2020, was $57,300.00.[41] Meanwhile, the "average" price of a double-section manufactured home was $108,500.00 and the "average" price of all manufactured homes was $87,000.00.[42]With material costs having increased in 2021, moreover, these amounts are likely substantially higher today. The $55,000.00 demarcation line, accordingly, was in 2020 – and is in 2021 -- less than the average price of a single-section manufactured home. Single-section homes, in turn, comprise less than 45% of the total HUD Code manufactured housing market. The overwhelming majority of the HUD Code market in 2021, therefore, is comprised of homes priced in excess of $55,000.00. As a result, the more costly and burdensome "Tier 2" standards will impact the overwhelming majority of manufactured homes and manufactured housing consumers, with the devastating market consequences detailed above. Accordingly, the "two-tiered" system proposed by DOE – ostensibly to address the devastating market consequences of harsh IECC standards, even as modified by DOE – will have no such ameliorative impact.

Second, and as noted above, at current price levels, only "27 percent of consumers who applied for a loan to buy a manufactured home succeeded in obtaining financing" according to CFPB. This means, conversely, that among households actually seeking to purchase a manufactured home, some 73% of prospective purchasers were denied financing and, presumably, were unable to purchase a HUD Code home (or any home). Insofar, then as the 94,390 HUD Code homes actually purchased in 2020 represent just 27% of the 349,592 homes that potentially could have been purchased in 2020 if all such loan applications had been approved, the 73% of potential manufactured homebuyers rejected for purchase-money financing, represent additional potential sales of 255,202 homes[43]-- which were not manufactured and sold in 2020 because of the unavailability of financing for lower and moderate-income consumers at those existing price levels. Obviously, then, if manufactured home purchase price levels are substantially increased by punitive and discriminatory DOE energy standards, the approval rate for HUD Code home loans

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[40] The Administrative Procedure Act (APA) authorizes courts to invalidate, among other things, agency rules that are "arbitrary capricious, an abuse of discretion or otherwise not in accordance with law." 5 U.S.C. 706(2)(A).

[41] See, U.S. Census Bureau, "Cost and Size Comparisons: New Manufactured Homes and New Single-Family Site-Built Homes, 2014-2020," attached hereto as Attachment 5.

[42] DOE, in its August 26, 2021 SNPR similarly admits that it is "aware" of the existence of these figures, but "has not reviewed [them] in detail or incorporated these new data into the analysis presented" in its SNPR. See, 86 Federal Register, supra, at p. 47758, col. 2.

[43] The 2021 CFPB Report shows a manufactured home purchase loan approval rate of 27%. Assuming for present purposes that all manufactured homes purchased in 2020 were financed, the 94,390 manufactured homes purchased in 2020 are 27% of 349,592. Thus, 349,592 minus 94,390 equals 255,202 homes that could have potentially been purchased if all loan applications had been approved and represents the market loss due to current pricing levels – a market loss that will be significantly exacerbated by the high-cost DOE proposed energy standards.

(with all other factors being held equal) would fall even further, thereby further depressing sales and utilization levels that continue to run far below historic norms.

Nor do any of these cost calculations even begin to consider the likely impact of future IECC code changes. Insofar as EISA section 413 mandates continuing IECC-based standards updates, and the IECC is currently updated on a three-year schedule, future updates will require further modifications of the DOE standards which, in turn, will require engineering updates and related HUD enforcement system approvals for manufacturers, all of which will entail substantial additional costs and even further destructive market disruptions – none of which has been or will be captured by DOE's alleged regulatory cost analysis.

Again, therefore, the regulatory structure and standards envisioned by DOE would be destructive of the manufactured housing market and would destroy the fundamental affordability of manufactured housing in violation of existing federal law.

III. CONCLUSION

For all the foregoing reasons, as well as those which will be further delineated in subsequent MHARR comments, the MHCC should reject the proposed manufactured housing energy standards set forth in DOE's August 26, 2021 SNPR as being inappropriate for manufactured housing, excessively costly in violation of applicable law, destructive of the affordable manufactured housing market, not cost-justified, and fundamentally arbitrary, and should submit comments reflecting that rejection to DOE in advance of the existing (or any extended) comment deadline.

Sincerely,

Mark Weiss
President and CEO

cc: Hon. Jennifer Granholm
Hon. Marcia Fudge
Ms. Shalanda Young (OMB)
HUD Code Industry Producers, Retailers and Communities

Manufactured Housing Association for Regulatory Reform

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August 8, 2016

VIA FEDERAL EXPRESS AND ELECTRONIC SUBMISSION

Mr. Joseph Hagerman
U.S. Department of Energy
Building Technologies Office
Mailstop EE-5B
1000 Independence Avenue, S.W.
Washington, D.C. 20585-0121

Re: Energy Efficiency Standards for Manufactured Housing
Docket No. EERE-2009-BT-BC-0021 – RIN 1904-AC11

Dear Mr. Hagerman:

The following comments are submitted on behalf of the Manufactured Housing Association for Regulatory Reform (MHARR). MHARR is a Washington, D.C.-based national trade association representing the views and interests of producers of manufactured housing regulated by the U.S. Department of Housing and Urban Development (HUD) pursuant to the National Manufactured Housing Construction and Safety Standards Act of 1974 (42 U.S.C. 5401, et seq.) (1974 Act) as amended by the Manufactured Housing Improvement Act of 2000 (2000 Reform Law). MHARR was founded in 1985. Its members include independent manufactured housing producers from all regions of the United States.[1]

I. INTRODUCTION

On June 17, 2016, the U.S. Department of Energy (DOE) published a proposed rule in the Federal Register to establish "Energy Conservation Standards for Manufactured Housing," pursuant to section 413 of the Energy Independence and Security Act of 2007 (EISA). (See, 81 Federal Register, No. 117 at p. 39756, et seq.). EISA section 413 -- in derogation of the comprehensive federal regulatory jurisdiction over manufactured housing[2] construction and safety

[1] All of MHARR's member manufacturers are "small businesses," as defined by the U.S. Small Business Administration (SBA) and "small entities" for purposes of the Regulatory Flexibility Act (5 U.S.C. 601, et seq.).

[2] The 1974 Act defines a "manufactured home" as "a structure, transportable in one or more sections, which, in traveling mode, is eight body feet or more in width or forty body feet or more in length, or, when erected on site, is three hundred twenty or more square feet, and which is built on a permanent chassis and designed to be used as a

delegated to HUD under the National Manufactured Housing Construction and Safety Standards Act of 1974 (as amended)[3] -- directs DOE to establish "energy efficiency" standards for manufactured housing "based on the most recent version of the International Energy Conservation Code (including supplements), except in cases in which the Secretary finds that the code is not cost effective or a more stringent standard would be more cost effective, based on the impact of the code on the purchase price of manufactured housing and on the total life-cycle construction and operating costs." (Emphasis added). EISA further directs DOE to establish those standards pursuant to: (1) public notice and comment; and (2) "consultation with the Secretary of Housing and Urban Development, who may seek further counsel from the Manufactured Housing Consensus Committee" (MHCC) established pursuant to the Manufactured Housing Improvement Act of 2000.

For the reasons set forth below, MHARR strenuously opposes the proposed rule as an unjustified, destructive and ultimately useless burden on both consumers and the industry including, most particularly, its smaller businesses.

The June 17, 2016 proposed rule is the product of a tainted, non-transparent and fatally defective DOE rulemaking process[4] that will needlessly undermine the availability of affordable manufactured housing contrary to existing law, exclude millions of lower and moderate-income Americans from homeownership altogether, and stifle free-market competition within the manufactured housing industry -- to the detriment of those same consumers -- by disproportionately harming smaller industry businesses. Insofar as the proposed rule is premised on a factually worthless, incomplete and affirmatively misleading "cost-benefit analysis," a sham standards-development process, non-transparent information inputs on key issues, and violations of the EISA section 413 "consultation" mandate (by both DOE and HUD), any final rule implementing (or derived from) the June 17, 2016 DOE proposed rule would: (1) violate the 1974 Act (as amended); (2) violate the "arbitrary, capricious [or] abuse of discretion" standard of the Administrative Procedure Act ("APA") (5 U.S.C. 706(2)(A)); (3) violate the Negotiated Rulemaking Act (5 U.S.C. 561, et seq.); (4) violate the EISA statute itself; and (5) violate other applicable requirements of law. MHARR, accordingly, seeks the withdrawal of the June 17, 2016 proposed rule and the commencement of an entirely new, legitimate rulemaking process for appropriate manufactured housing energy standards. Absent such action by DOE, MHARR will pursue all available legal remedies to enjoin and/or invalidate any resulting final rule.

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dwelling with or without a permanent foundation when connected to the required utilities, and includes the plumbing, heating, air conditioning, and electrical systems contained therein...."

[3] HUD's comprehensive federal regulatory jurisdiction over manufactured housing construction and safety already includes – and has included at all times relevant to this matter -- energy standards as codified in Subpart F ("Thermal Protection") of the HUD Manufactured Housing Construction and Safety Standards (24 C.F.R. 3280.501, et seq.)

[4] MHARR hereby incorporates by reference herein: (1) its March 5, 2010 comments in response to DOE's February 22, 2010 Advance Notice of Proposed Rulemaking in this docket (see, 75 Federal Register, No. 34 at p. 7556, et seq.) (Attachment 1, hereto); (2) its July 24, 2013 comments in response to DOE's June 25, 2013 Request for Information in this docket (see, 78 Federal Register, No. 122 at p. 37995, et seq.) (2013 RFI) (Attachment 2, hereto); and (3) its March 13, 2015 comments in response to DOE's February 11, 2015 Request for Information in this docket (see, 80 Federal Register, No. 28 at p.7550, et seq.) (Attachment 3, hereto).

II. BACKGROUND AND PROCEDURAL HISTORY

With public opinion surveys showing public trust in the federal government at an all-time low,[5] the June 17, 2016 DOE proposed rule is a textbook illustration of why a majority of Americans have lost faith and confidence in the federal government generally and in federal agencies, such as DOE and HUD, specifically. Purporting to address a "problem" that does not exist,[6] the DOE proposed rule is a paradigm of over-reaching, oppressive and costly "big government" regulation, that will disproportionately harm lower-income Americans (contrary to stated Obama Administration policy) and crush smaller industry businesses, leading to a further decrease in homeownership (already at record low levels),[7] higher levels of homelessness,[8] and an emasculation of free-market competition -- with corresponding retail price increases -- in an industry already verging on de facto monopolization.[9] Not one of these consumer, industry and societal costs, however – or a multitude of other relevant and significant cost factors – are addressed in DOE's fatally defective and deceptive "cost-benefit analysis," in direct violation of an integral, substantive requirement of EISA section 413.[10]

Significantly, DOE's June 17, 2016 Notice of Proposed Rulemaking (NOPR), by ignoring, disregarding and omitting key facts and material information, continues an Agency whitewash of a tortured, corrupted and irretrievably tainted standards-development process for the June 17, 2016 proposed rule. Those key omitted facts – with citations to supporting documents and information -- are set forth below.

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[5] See, e.g., Gallup, Inc., "Trust in Government" (September 2015) at p.2, showing 61% of respondents having little or no trust or confidence in federal government handling of "domestic issues," the highest such figure since polling began in 1972. See also, Gallup, Inc., "Americans Losing Confidence in All Branches of U.S. Government," (June 30, 2014) showing confidence ratings "for all three branches" of the federal government "are at or near their lowest points to date."

[6] See, detailed discussion at section III A, pp. 22-24, infra, regarding U.S. Census Bureau data showing – contrary to claims by DOE -- that current-production manufactured homes are already energy-efficient, with median monthly energy costs for fuel oil and natural gas lower than the monthly median for site-built homes and electricity costs closely comparable to the median monthly electricity cost for a site-built home.

[7] See, e.g., Money Magazine, "Homeownership Hits Another Record Low," (June 24, 2015).

[8] Ironically, publication of the DOE proposed rule -- which, if adopted as a final rule, will exclude millions of lower and moderate income Americans from the benefits and advantages of home ownership (see, detailed discussion and supporting data at sections III B, pp. 25-26 and III C 2, pp. 28-31, infra) – corresponds with HUD's declaration of June 2016 as "National Homeownership Month." In a June 1, 2016 press release, HUD states: "This week, the U.S. Department of Housing and Urban Development kicks off National Homeownership Month by recognizing how homeownership enhances lives and contributes to thriving communities ... [and] that owning a home remains one of the cornerstones of the American Dream." (Emphasis added). For millions of Americans, however, the DOE rule, if adopted, will mean exclusion from homeownership and the American Dream and, potentially, homelessness, for no valid, legitimate or necessary reason.

[9] See, e.g., American Banker, "Time to End the Monopoly Over Manufactured Housing" (February 23, 2016) referring to "an uncompetitive market, dominated by Clayton Homes, [Inc.] [Clayton]." Clayton could control 50% or more of the national manufactured housing market in 2016, based on 2015 HUD production statistics and subsequent acquisitions of competing manufacturers in 2016.

[10] Pursuant to the express mandate of EISA section 413(b)(1), the Secretary of DOE is required to make a separate, affirmative finding that each element of the manufactured housing energy standards adopted under section 413(a) is "cost-effective."

A. Initial Development and Selective Leak of the DOE Manufactured Housing Rule

Following the enactment of EISA, DOE initiated a conventional rulemaking proceeding to develop energy standards for manufactured homes. On February 10, 2010, DOE published an Advance Notice of Proposed Rulemaking (ANPR) in the Federal Register (see, 75 Federal Register, No. 34 at pp. 7556-7557) seeking public comment on thirteen general issues. MHARR submitted written ANPR comments to DOE on March 10, 2010.

In its ANPR comments, MHARR urged DOE, in light of the drastic decline of the manufactured housing market to historically low production levels after the enactment of EISA,[11] to "delay the development, implementation and enforcement of any new manufactured home energy conservation standards that are not identical to the existing HUD Code energy standards until such time as industry production levels and the availability of affordable, non-subsidized manufactured housing for lower and moderate-income consumers return to pre-2007 levels." In addition, MHARR raised three separate issues related to the substance of any DOE manufactured housing energy standards that could further undermine the affordability and availability of manufactured homes, with little or no corresponding benefit to consumers. In relevant part, MHARR stated:

(1) "...manufactured homes are already subject to HUD energy conservation standards that result in a relatively tight thermal envelope, consistent with overall affordability and are carefully balanced against concerns related to air exchange and condensation within the home living space. Any change to the standards could upset that balance with ... negative consequences."

(2) "With ... manufactured housing consumers unable to obtain or qualify for financing now, matters would be much worse if the purchase price of manufactured homes were unnecessarily increased ... due to DOE energy regulations."

(3) "...the federal government should not impose costly new energy mandates combined with a totally new DOE enforcement system that would parallel the existing HUD system." "...HUD ... is best suited to fully assess and ensure the affordability aspects of energy regulation within the context of the HUD Code and maintain the delicate balance between regulation and affordability that is embedded in relevant federal law."

Subsequent to publication of the ANPR – and without addressing or resolving any of the substantive issues identified by MHARR -- DOE developed a "draft proposed rule" for manufactured housing energy standards (2011 draft proposed rule). That "draft proposed rule" was then selectively leaked to interested parties, including the Manufactured Housing Institute (MHI) -- a Washington, D.C. organization representing the manufactured housing industry's largest businesses (and later a participant in the DOE "negotiated rulemaking" Manufactured Housing

[11] After reaching a modern production record of 374,143 homes in 1998, total industry production of HUD-regulated manufactured homes (as calculated and reported by HUD) fell to a record low of 49,683 homes in 2009, following the enactment of EISA, and has only recovered at a modest pace since that time, reaching 70,544 homes in 2015.

Working Group) -- as indicated by published May 29, 2012 correspondence from MHI to DOE referring to specific requirements and provisions of a "draft proposed DOE rule" and "draft DOE standards" that were not included in the 2010 ANPR, had not been published as a proposed rule, and had not otherwise been made public.[12]

In a July 20, 2012 communication to DOE, MHARR called for a DOE/HUD investigation of the selective leak of the 2011 "draft proposed" DOE energy rule to MHI and other parties in interest, to determine, among other things: (1) how the proposed rule was selectively leaked; (2) who was responsible for that selective leak; and (3) what other parties in interest, if any, were provided inside information concerning this significant rulemaking.[13] MHARR was subsequently contacted by a DOE official, Michael Erbesfeld,[14] who verbally denied any leak.

Subsequent admissions by DOE, however, as well as documents produced by DOE pursuant to MHARR Freedom of Information Act (FOIA) requests, show: (1) that this official denial by DOE was false; (2) that a selective leak of a "draft proposed" DOE manufactured housing energy rule to interested parties did, in fact, occur;[15] and (3) that selective leaks of that "draft proposed rule" were made to multiple subsequent members of the DOE "negotiated rulemaking" Manufactured Housing Working Group (MHWG)[16] which – together with other continuing, undisclosed contacts and coordination between such recipients and DOE[17] – fundamentally tainted that entire process.

B. OMB/OIRA Rejection of DOE "Draft Proposed Rule" and "Start Over" Directive

On June 25, 2013, DOE abruptly published a Request for Information (2013 RFI) concerning manufactured housing energy standards, focusing specifically on the three issues (above) that MHARR had identified in its ANPR comments (i.e., air exchange and condensation, the availability of consumer financing and the enforcement structure and authority for the rule). (See, 78 Federal Register, No. 122 at p. 37995, et seq.). MHARR, in its RFI comments, stressed that the 2013 RFI – seeking information on key aspects of any manufactured housing energy rule – had obviously been prepared and issued after the development of the 2011 "draft proposed rule." As a result, MHARR asserted that the 2011 DOE "draft proposed rule" had necessarily been developed without full and complete information as required by the APA and EISA section 413, itself, and amounted to a predetermined regulatory fait accompli, based on undisclosed

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[12] See, Attachment 4, hereto. That MHI correspondence states, in part, that "the draft DOE standards requires (sic) homes to be tested in the factory" and that "separate testing is required for to measure duct leakage, whole house (building shell) tightness and air infiltration rates for each window." No such details were included in the 2010 ANPR or otherwise published or disclosed to the public. Similarly, the May 29, 2012 MHI correspondence refers to a DOE estimate of a "total cost burden to the industry [of] $4.5 million over four years." Again, no such information was provided in the 2010 ANPR or otherwise disclosed to the public. Indeed, the 2010 ANPR specifically acknowledged that it contained no regulatory impact analysis (RIA), stating: "DOE intends to develop a regulatory impact analysis ... as this rulemaking process proceeds."

[13] See, Attachment 5, hereto.

[14] See, Attachment 6, hereto, produced by DOE pursuant to a May 5, 2015 MHARR FOIA request, indicating that as of August 24, 2011, Mr. Erbesfeld was the "new project manager on (sic) the DOE manufactured housing standards."

[15] See, discussion at section II C, p. 10, infra.

[16] Id.

[17] See, detailed discussion at section II C, pp. 8-14, infra.

communications and input from select, "insider" parties in interest, including MHI and the industry's largest corporate conglomerates, among others.[18] MHARR's comments thus concluded: (1) that the entire manufactured housing rulemaking had been irretrievably tainted by the selective leak of the 2011 DOE "draft proposed rule" to parties in interest; (2) that DOE, therefore, was required to "discard" that "draft proposed rule" in its entirety; and (3) that DOE had to "begin anew its entire process for the development" of that rule. In part, MHARR stated:

> "Now, after the preparation and selective disclosure of a 'draft proposed rule,' complete with a regulatory (cost) impact analysis, DOE, through its June 25, 2013 'Request for Information,' is seeking information concerning the three issues initially raised by MHARR in 2010.... While MHARR commends [DOE] for finally seeking information and data concerning these crucial issues for both the industry and consumers, [DOE's] request for such information after the preparation of a draft proposed rule turns the regulatory process on its head and raises serious issues regarding the legitimacy and integrity of this entire proceeding.... Accordingly, DOE ... should ... begin anew its entire process for the development of this rule from the start, based, this time, on a proper review and consideration of all ... relevant information.[19]

(Emphasis added and in original).

Unbeknownst to MHARR at the time of the 2013 RFI and its comments calling for the DOE rulemaking process to be started "anew" – and not publicly disclosed by DOE until after the inception of its sham "negotiated rulemaking" process -- the DOE 2011 "draft proposed rule" had been forwarded to the Office of Management and Budget's (OMB) Office of Information and Regulatory Affairs (OIRA) on October 14, 2011 for review pursuant to Executive Order 12866,[20] and had been rejected by OMB/OIRA with specific instructions to DOE to "begin the [rulemaking] process anew," as had been sought by MHARR in its 2013 RFI comments.[21]

Contemporaneously -- and consistent with its pervasive pattern of obfuscation and deception concerning this rulemaking -- DOE first attempted to obstruct and then falsely denied the existence of documents responsive to an October 22, 2013 MHARR Freedom of Information Act request seeking, among other things, the production of "any and all correspondence or other communications received by DOE regarding [the 2011 manufactured housing] 'proposed rule' including, but not limited to, communications from any party to whom the said 'draft proposed rule' had been provided."[22] After initially quoting a clearly excessive fee to process MHARR's request (in order to discourage MHARR from proceeding), DOE, on February 18, 2014, denied that it possessed any "responsive" materials.[23] DOE, however, responding to MHARR FOIA

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[18] See, section II D, pp. 14-18, infra, regarding DOE's manipulation of supposed "research" contracts to, among other things, "partner" with the manufactured housing industry's largest manufacturers – characterized as "progressive plants" -- to "drive the adoption" of extreme, unnecessary and costly DOE standards.

[19] See, Attachment 2, hereto at pp. 3-4.

[20] See, Attachment 7, hereto, produced by DOE pursuant to MHARR's May 5, 2015 FOIA request, confirming submission of the "draft proposed" manufactured housing energy rule to OIRA on October 14, 2011.

[21] See, detailed discussion at section II C, pp. 10-11, infra and Attachment 16, infra.

[22] See, Attachment 8, hereto.

[23] See, Attachment 9, hereto, at p. 2.

requests filed after the conclusion of its sham "negotiated rulemaking" process, has produced multiple documents that would have been responsive to this request including, but not limited to, an email communication dated March 14, 2012 from MHI's Vice President for Regulatory Affairs (and a subsequent MHWG member), to DOE attorneys referencing a "meeting with OMB last week" on the DOE 2011 "draft proposed" manufactured housing rule and a follow-up ex parte DOE tour of an MHI-member manufacturing facility,[24] as well as an email communication from subsequent MHWG member Michael Lubliner to DOE stating, in part, "I have attached a document from MHI to DOE. Does MHI have access to draft rules (maybe from OMB) that many other stakeholders have not seen?" (Emphasis added).[25]

The proper and timely disclosure of these documents – and others -- prior to the inception of "negotiated rulemaking," would have: (1) confirmed the selective leak of the 2011 DOE "draft proposed rule" during the 2011-2012 timeframe; (2) exposed ongoing insider contacts between MHI (and other parties in interest) and DOE officials regarding the 2011 DOE "draft proposed rule;" and (3) would have ultimately alerted MHARR (and others) to DOE-"insider" coordination regarding the referral of this matter to "negotiated rulemaking" in sufficient time to object to – and seek to enjoin – any such referral or continuation of the pending manufactured housing rulemaking process. DOE's false denial of the selective leak of the 2011 "draft proposed rule" and MHARR's July 20, 2012 request for a DOE investigation, and its February 18, 2014 denial of the existence of responsive documents pursuant to MHARR's October 22, 2013 FOIA request, have materially prejudiced MHARR's rights -- and the rights of other opponents of the June 17, 2016 proposed rule -- in ways that, in and of themselves, would warrant judicial relief in the event that DOE proceeds with a final rule based on that proposal.

More importantly, though, the selective leak of the 2011 DOE "draft proposed rule" to MHI and others has irretrievably tainted this rulemaking, insofar as it: (1) provided the industry's largest corporate conglomerates – interested parties in this rulemaking – with "insider" information not available to other stakeholders regarding the approach, the substance, the expected enforcement mechanisms and the expected costs of DOE standards for manufactured housing pursuant to EISA section 413,[26] with no evidence whatsoever, to show that the 2011 DOE "draft proposed rule" differs materially from the 2016 proposed rule; and (2) even more significantly, provided the select recipients of that "impermissibly disclosed" draft proposed rule with a fundamentally biased and discriminatory opportunity – not offered to other affected stakeholders – to provide input to DOE and to influence and impact the content of that rule with, again, no

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[24] See, Attachment 10, hereto.

[25] See, Attachment 11, hereto, at p. 2.

[26] Attachment 4, hereto, supra, makes it clear that MHI had been provided access to cost-benefit calculations for the 2011 DOE "draft proposed rule." Moreover, a copy of the table of contents for the DOE 2011 "draft proposed rule" (see, Attachment 12 hereto) -- provided to MHARR in 2012 by an MHI-affiliated recipient of the selectively leaked draft proposed rule -- includes "Compliance and Enforcement" provisions ("Subpart E"), the substance of which was obviously disclosed to the select recipients of that draft rule. Because DOE has yet to publicly propose compliance and enforcement regulations in connection with its 2016 proposed rule, and specifically excluded compliance and enforcement from the "negotiated rulemaking" conducted through the MHWG, it is entirely conceivable that there will be no difference between the 2011 compliance and enforcement provisions and the compliance and enforcement provisions ultimately proposed for the 2016 rule, exposing again, the insidious, discriminatory and unlawful continuing advantage conferred by DOE on the select recipients of the "impermissibly disclosed 2011 "draft proposed rule" at the expense of all other interested parties in this rulemaking. See also, note 31, infra.

evidence whatsoever, to show that the 2011 DOE "draft proposed standard" differs from the 2016 proposed rule in any material respect. The full extent of this illegitimate, biased and discriminatory activity, moreover – and its impact on the current pending DOE manufactured housing energy standards rule – remains the subject of an ongoing cover-up by DOE, which has refused to release either the text of the 2011 "draft proposed rule," or cost-benefit analyses of that rule provided to the select leak recipients and OMB/OIRA.[27]

C. Referral to Sham "Negotiated Rulemaking"

No subsequent public activity on the DOE manufactured housing rule occurred until June 6, 2014, when DOE's obscure Appliance Standards and Rulemaking Federal Advisory Committee (ASRAC) voted – with no advance public explanation -- to establish a "negotiated rulemaking" process with interested parties (i.e., the "Manufactured Housing Working Group") to develop EISA section 413 manufactured housing standards under a two-month completion deadline that was clearly inadequate to achieve the "fresh start" directed by OMB/OIRA on a complex, "significant" federal regulation.[28] The OMB/OIRA "fresh start" directive, however, had not been publicly disclosed by DOE prior to – or at the time of – the ASRAC vote to impose this truncated, impossibly brief deadline.

Multiple documents produced by DOE after-the-fact, however (as well as subsequent DOE admissions), prove that this seemingly random, "out-of-the-blue" ASRAC action resulted from specific non-transparent ex parte coordination between DOE, MHI and other "insider" recipients of the selectively leaked 2011 DOE "draft proposed rule:" (1) to effectively circumvent and negate OMB/OIRA's directive to DOE to start-over the manufactured housing rulemaking process from the beginning; (2) to establish a sham "negotiated rulemaking" process dominated by DOE-favored "insider" recipients of the selectively leaked 2011 "draft proposed rule;" and (3) to produce a pre-ordained regulatory result.

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[27] See, text at pp. 11-12, infra, regarding DOE's refusal to release the 2011 "draft proposed rule" during the MHWG "negotiated rulemaking" process. DOE has also refused to produce either the 2011 "draft proposed rule," or cost-benefit information developed for that rule in response to multiple MHARR FOIA requests, asserting that those documents are "pre-decisional" in their entirety and, therefore, exempt from disclosure under FOIA. DOE, moreover, has refused to exercise its discretion to waive that privilege, notwithstanding direct guidance from the Attorney General "strongly encourag[ing] agencies to make discretionary disclosures of [otherwise exempt] information," i.e., to voluntarily waive otherwise applicable FOIA exemptions. See, Department of Justice Guide to the Freedom of Information Act – Discretionary Disclosure and Waiver at p. 685, note 2.

[28] Pursuant to Executive Order 12866, OIRA is responsible for determining which agency regulatory actions are "significant." Significant regulatory actions are defined in the Executive Order as those that, inter alia, "have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities...." OIRA would not have reviewed the 2011 DOE "draft proposed" manufactured housing rule, had it not found that rule to be a "significant" rule.

Specifically, a February 17, 2014 email to Roland Risser, Director of the Building Technologies Office (BTO)[29] in DOE's Office of Energy Efficiency and Renewable Energy (EERE) -- the DOE office with responsibility for this rulemaking – from Robin Roy, Director of the Natural Resources Defense Council's (NRDC) Building Energy Efficiency and Clean Energy Strategy Program[30] (and subsequent MHWG member) on behalf of the aforesaid "insiders," demonstrates the coordination between DOE officials and those same "insiders" to use a truncated, tightly-controlled and pre-scripted ASRAC/MHWG process to effectively validate and legitimize the OMB/OIRA-rejected 2011 "draft proposed rule." In relevant part, that previously undisclosed, ex parte email states:

> "Hi Roland,
>
> After talking to several interested parties including other efficiency advocates and industry leaders, I find general support and no opposition to using ASRAC to inform the manufactured housing standards process under conditions like these:
>
> - DOE uses the process for effective communication and data gathering, rather than for seeking unanimous consent…;
>
> - DOE commits to a tight schedule (e.g., 2 2-day meetings within 4 months of ASRAC authorization, and perhaps tables the draft NOPR and TSD[31] for initial discussion at the first meeting, possibly with some redaction of elements they consider grossly inadequate or distracting);
>
> - Any additional meetings would only be proposed with the approval of ASRAC…."

(Emphasis added).

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[29] See, section II D, infra, at pp. 14-18, detailing BTO's manipulation and abuse of DOE "research" contracts to improperly influence the ASRAC manufactured housing "negotiated rulemaking" process through a financial conflict of interest.

[30] The selection of Robin Roy to coordinate with DOE on behalf of the DOE-favored "insiders" was not coincidental. Robin Roy, at all times relevant to this proceeding, was the husband of Ms. Cathy Zoi (Zoi), the Assistant Secretary for Energy Efficiency and Renewable Energy at DOE until March 10, 2011. See, "Obama Official Leaves Energy Department for Soros-Backed Cleantech Fund," CNBC (February 24, 2011) ("Zoi, who joined the Obama Administration in 2009, became controversial during early 2010, after it was realized she had a financial interest in two companies that were poised to profit from government spending that promoted energy efficiency.") Following completion of the DOE "negotiated rulemaking" process, in January 2015, Mr. Roy -- with no other apparent background related to manufactured housing -- was appointed by HUD to the Manufactured Housing Consensus Committee notwithstanding the mandate of section 604(a)(3)(B)(i) of the 2000 reform law, that MHCC appointees be "qualified by background and experience to participate in the work of the consensus committee." See, 42 U.S.C. 5403(a)(3)(B)(i). Under EISA section 413, DOE is required to "consult" with the Secretary of HUD regarding manufactured housing standards and the Secretary of HUD, in turn, is authorized to "seek further counsel" from the MHCC.

[31] The existence of a Technical Support Document (TSD) for the 2011 DOE "draft proposed rule" is not mentioned in any other document provided to MHARR. The reference to a TSD in this ex parte, "insider" communication is thus a further indication of undisclosed coordination between DOE and the DOE-favored "insider" group.

This exchange demonstrates: (1) communication and coordination between DOE officials and the DOE-favored "insider" group on a non-transparent, ex parte basis; (2) to create the structure for a sham "negotiated rulemaking" through ASRAC; (3) that was designed to be controlled by DOE and those same DOE-favored "insiders;" (4) that was designed to suppress the effective participation of non-"insiders;" (5) within a clearly inadequate time-frame for a fresh start as mandated by OMB/OIRA; (6) using the 2011 DOE "draft proposed rule" (i.e., "NOPR") and undisclosed Technical Support Document (i.e., "TSD") for that 2011 "draft proposed rule" as the undisclosed basis for the activity of the "working group;"[32] (7) subject to undisclosed "redactions" by DOE.

The same type of ex parte coordination between DOE and the DOE-favored "insider" group to establish a severely-truncated MHWG timeframe and schedule clearly inadequate to legitimately achieve the "fresh start" mandated by OMB/OIRA for a "significant" rule, is reflected in a previously undisclosed May 21, 2014 email exchange between Robin Roy and John Cymbalski, the DOE Designated Federal Official (DFO) for ASRAC:

> "[Roy]: Hi John. In your role as ASRAC DFO, can I send you a letter ... in support of an ASRAC working group on manufactured housing, with diverse signers from our regular MH discussion group...?
>
> [Cymbalski]: That would be great to have sooner than later.
>
> [Roy]: Super, I've asked my group to sign on by COB Tuesday, so aim to send on Wednesday, May 28 [2014].
>
> [Cymbalski]: How much time do you anticipate asking for in terms of negotiating a NOPR [i.e., Notice of Proposed Rulemaking]?
>
> [Roy]: Short. 2 meetings would be great. But we won't be specific in the letter."

(Emphasis added).[33]

Subsequently, and in accordance with the February 17, 2014 and May 21, 2014 email exchanges above, MHI, NRDC and other interested parties later appointed by DOE as voting members of the "negotiated rulemaking" MHWG, submitted a joint written request to ASRAC on May 28, 2014 for "negotiated rulemaking" on manufactured housing energy standards utilizing a working group under ASRAC-auspices, to be held "to a tight meeting schedule with a minimum number of meetings, e.g., 2 two-day meetings to be concluded by September [2014]" – i.e., within less than two months of the first meeting of the MHWG on August 5, 2014. (Emphasis added).[34]

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[32] Absent full and complete disclosure by DOE – which, as demonstrated infra, did not occur -- only insiders would know if any document or proposal presented to the MHWG was, either in whole or in part, the 2011 DOE "draft proposed rule."

[33] See, Attachment 13, hereto, produced by DOE pursuant to MHARR's May 5, 2015 FOIA request.

[34] See, Attachment 14, hereto, produced by DOE pursuant to MHARR's May 5, 2015 FOIA request. MHI also submitted a separate request to DOE for "negotiated rulemaking" through ASRAC on March 14, 2014. This separate request incorporates the same restrictive elements as the Robin Roy Communication with Roland Risser and the

With this clearly inadequate timeframe and sham structure/process established, DOE proceeded to appoint a "Working Group" dominated by the same DOE-favored insiders that – with the exception of MHARR -- had been recipients of the selectively leaked 2011 "draft proposed rule" and had coordinated internally and with DOE to seek and advance the sham, truncated, "negotiated rulemaking." The MHWG thus included five representatives of energy special interest groups and nine MHI officers, member companies and/or affiliates (including representatives of two of the industry's three largest manufacturers) out of 20 non-DOE/non-ASRAC appointees.[35]

At the initial meeting of the manufactured housing negotiated rulemaking "Working Group" (August 5, 2014), MHARR requested full disclosure of the selectively leaked DOE 2011 "draft proposed" manufactured housing energy standards rule, as well as any factual analyses related to that "draft proposed" rule, to determine whether the MHWG, working under an impossibly constrained timeframe was, in fact, "starting over" as mandated by OMB/OIRA, or was established instead to circumvent that directive and function as a fig leaf to re-process and legitimize the substance of the selectively leaked DOE 2011 "draft proposed rule."[36] Once again, consistent with DOE's overall pattern of obfuscation and non-transparency concerning this rulemaking, that request was denied by DOE as reflected by the meeting transcript:[37]

> "Mr. Weiss [MHARR]: What I'm referring to is ... the draft proposed [2011] rule developed by DOE and –
>
> Mr. Cymbalski [DOE]: Yeah, we are not going to hand out anything.
>
> Mr. Weiss [MHARR]: And any – well, let me just finish – any related analysis.
>
> Mr. Cymbalski [DOE]: Right, we're not going to -- we're not – we've moved past that, right, so we're going to have all new data, all new numbers, and we will provide that as a basis to talk about.
>
> ***
>
> Mr. Weiss [MHARR]: Well ... [y]ou say its history and that's fine, but I don't know if its history or not, okay, I don't know – I don't know what it was and how it might relate to where we start from here. So I understand you're saying its history but I don't know one way or the other. And I think to have a clear record in this

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subsequent May 28, 2014 joint request letter, including "a tight time schedule with a minimum of meetings." See, Attachment 15, hereto.

[35] See, "Notice of Membership of the Working Group for Manufactured Housing," 79 Federal Register, No. 136 (July 16, 2014) at p. 41457, col. 1. The only "no" vote against the MHWG "Term Sheet" underlying the proposed rule was cast by MHARR's representative.

[36] A copy of the table of contents for the DOE 2011 "draft proposed rule" (see, Attachment 12 hereto, supra), when compared to the table of contents for the June 17, 2016 DOE proposed rule, shows that eight of ten substantive headings (not including enforcement and compliance-related headings in the 2011 "draft proposed rule," insofar as enforcement and compliance matters have been excluded from the June 17, 2016 NOPR by DOE fiat) are either identical or nearly identical. Such direct overlaps include, "climate zones;" "building thermal envelope requirements," "building thermal envelope air leakage," "duct systems," service water heating" and "ventilation," among others.

[37] See, Attachment 16, hereto, MHWG August 5, 2014 meeting partial transcript.

> proceeding, given the fact that DOE spent some time working on this prior to this proceeding and then we're only talking about two months here potentially, I think we need to see where you were before and where we're going in relation to that.

(Emphasis added).

An attorney from DOE's Office of General Counsel (OGC) subsequently made key admissions concerning previously undisclosed information relating to the selective leak of the DOE 2011 "draft proposed rule," OMB/OIRA's "start over" directive, and the subsequent referral of this matter to "negotiated rulemaking:"

> Mr. Jensen [DOE]: [T]his is Mike Jensen from DOE GC [Office of General Counsel]. *** As far as we're concerned, the document that was sent to OIRA in October 2011 is still a pre-decisional document. I understand that it was impermissibly distributed to many people in this [MHWG] room. But as far as we're concerned, that that's history. We're starting – we're hitting the reset button and we're beginning negotiations again today. That information, the proposed rule and the accompanying documents are still pre-decisional at this point, will not be distributed outside of DOE.[38]
>
> ***
>
> Mr. Jensen [DOE]: In October of 2011, DOE transmitted our pre-decisional draft of the rulemaking at that time to the Office of Management and Budget. There's a section in OMB, the Office of Information and Regulatory Affairs, which is OIRA. That document was never intended to be released to the public and was for OMB's review. That document has since been kicked back to DOE to – with the instructions to begin the process anew, so that's why we're here today."

(Emphasis added).

These admissions, and the attachments hereto, establish the following – none of which is reflected in the DOE June 17, 2016 NOPR:

> 1. The unlawful, biased and discriminatory "impermissible distribution" of the 2011 DOE "draft proposed" manufactured housing energy standards rule to selected parties in interest;
>
> 2. DOE's false denial of that "impermissible distribution" and disclosure to select "insiders" in response to MHARR's July 20, 2012 inquiry to DOE and call for an investigation;
>
> 3. DOE's false denial that it possessed documents responsive to MHARR's October 22, 2013 FOIA request;

[38] DOE, accordingly, has refused to release publicly – or to parties with a specific interest in the credibility and legitimacy this matter, such as MHARR – a critical document that was selectively and by DOE's own admission, "impermissibly" disclosed previously to DOE-favored "insiders."

4. DOE's deceitful failure to admit or acknowledge the "impermissible distribution" of the draft rule to selected parties in interest, including MHWG member organizations, until after ASRAC authorization of negotiated rulemaking and creation of the Working Group;

5. Undisclosed, non-transparent ex parte DOE contacts with select recipients of the "impermissibly distributed" 2011 DOE "draft proposed rule" regarding negotiated rulemaking and the parameters of negotiated rulemaking regarding a manufactured housing energy standards rule;

6. Failure to specifically identify recipients of the 2011 DOE "draft proposed rule;"

7. Failure to disclose any information, materials, comments or input (either written or verbal) received by DOE from these unidentified recipients of the DOE 2011 "draft proposed rule;"

6. Failure to disclose until after ASRAC authorization of negotiated rulemaking and creation of the MHWG, that the May 28, 2014 communication which triggered ASRAC consideration and approval of negotiated rulemaking and creation of the Working Group – and related communications -- was submitted either wholly or in substantial part by select recipients of the "impermissibly distributed" 2011 DOE "draft proposed rule;"

7. Failure to disclose in advance the appointment of recipients (or parties affiliated with recipients) of the "impermissibly distributed" 2011 DOE draft rule as voting members of the MHWG;

8. Failure to disclose OMB/OIRA's rejection of the DOE draft rule and directive to DOE to "begin the [rulemaking] process anew" until after ASRAC authorization of negotiated rulemaking and formation of the MHWG under a two-month deadline;

9. Failure to disclose the specific basis for OMB/OIRA's rejection of the draft rule and directive to start over;

10. DOE's continuing failure to disclose the DOE 2011 "draft proposed rule" itself and related cost information; and

11. DOE's failure to disclose or explain how a negotiated rulemaking process with "2" meetings -- as coordinated by DOE and parties in interest in undisclosed, ex parte communications -- could be consistent with OMB/OIRA's "start over" directive regarding a rule that had been under development at DOE for seven years --

--among other things.

Indeed, despite repeated FOIA requests by MHARR, DOE has failed to disclose the specific content of multiple ex parte communications that it clearly had with MHI and other select

recipients of the "impermissibly disclosed" 2011 DOE "draft proposed rule" regarding the substance of that proposal, or any input or information that it received from or on behalf of those same parties regarding the draft proposed rule. Thus, while the underlying selective leak of the 2011 DOE "draft proposed rule" has been documented and confirmed, together with the coordinated and contrived nature of the referral of this matter to a sham "negotiated rulemaking" process dominated by the same DOE-favored "insiders" in order to circumvent OMB/OIRA's "start over" directive and railroad a manufactured housing standard through a DOE "appliance" standards committee, DOE has never disclosed – and continues to cover-up: (1) when the "proposed draft rule" was selectively leaked to MHI and other parties in interest; (2) if the 2011 "proposed draft rule" was developed in the first instance based on undisclosed input from selective leak recipients; (3) whether the 2011 "proposed draft rule" was revised after DOE receipt of undisclosed input from selective leak recipients – and, if so, how; (4) what the substance of that input was; (5) the specific provisions and text of the 2011 "draft proposed rule;" and (6) how those provisions (and the TSD and cost-benefit analysis for that "draft proposed rule") relate to or correspond with the June 17, 2016 DOE proposed rule.

In each such instance – and cumulatively – DOE's failure to disclose relevant facts concerning this proceeding, ultimately leading to the June 17, 2016 DOE proposed rule, has materially prejudiced the rights of MHARR, its members, other manufactured housing industry members and consumers, and other actual and potential opponents of DOE manufactured housing energy regulation, to object and seek judicial relief regarding a contrived, manipulated and scandalous standards development process. At the same time, ex parte contacts, communications and coordination between DOE, MHI and other select DOE-favored "insiders" – including the manufactured housing industry's largest corporate conglomerates – have given those parties an improper advantage, undue influence, and an "inside track" regarding the development of the June 17, 2016 proposed rule. This fundamentally tainted process – cited, in part, by MHARR's MHWG representative in casting the lone "no" vote against the MHWG Term Sheet -- necessarily invalidates this proceeding.

D. MHWG Financial Conflicts of Interest – DOE Contract Manipulation

In conjunction with DOE's referral of this matter to a contrived, sham "negotiated rulemaking" process – with an ongoing DOE cover-up of the selectively leaked 2011 rule and related cost-benefit analysis – DOE also coordinated, via supposed "research" contracts with MHI-affiliated and/or linked organizations, to covertly influence the MHWG "negotiated rulemaking" process. These contracts, which were never disclosed by DOE to non-"insider" MHWG participants or other stakeholders in the DOE manufactured housing energy rulemaking, have produced a financial conflict of interest that fatally infects the entire "negotiated rulemaking" process and, as a result, all aspects of this rulemaking.

The June 17, 2016 NOPR expressly states that the DOE proposed rule is "based on the negotiated consensus recommendations of the [MHWG]."[39]Those recommendations, however, and the MHWG "Term Sheet" that became the basis for the June 17, 2016 proposed rule, resulted from specific technical and "cost" inputs provided by the Systems Building Research Alliance

[39] See, 81 Federal Register, No. 117 at p. 39756, col. 1.

(SBRA) – an MHI "research" affiliate and MHWG member. SBRA, however, at all times relevant to this rulemaking, shared an interlocking employee/corporate officer structure with "The Levy Partnership" (TLP), a paid DOE subcontractor[40] and grant beneficiary.[41]

As an initial matter, the cost data underlying the MHWG "Term Sheet" and the June 17, 2016 proposed rule – provided to the MHWG by SBRA and MHI during the supposed "negotiated rulemaking" process, has been – and remains, an entirely non-transparent critical data input in this rulemaking. Specifically, the source(s) of the cost data offered by SBRA and MHI – involving alleged costs to manufacturers to implement energy efficiency measures mandated by the MHWG Term Sheet recommendations – has never been disclosed. Disclosure of the source(s) of that "data," as requested by MHARR during the MHWG process, was refused and has never been provided to date – either directly by SBRA/MHI or by DOE. This critical non-transparent data input raises two related issues.

First, given the direct and ongoing financial conflict of interest between DOE and TLP/SBRA, the credibility of any such data – at a minimum – is open to question. Second, even if that data exists and has not been altered or modified in some manner, it has never been tested or verified by any other interested or independent party, or – based on the June 17, 2016 NOPR -- by DOE, to determine its accuracy, veracity, and/or relevance, i.e., whether it reflects representative costs for all manufacturers, regardless of size and production, or whether it represents primarily – or only – costs relevant to larger manufacturers (represented by MHI) which pay lower supply costs based on volume discounts and superior bargaining strength within the supply market. Indeed, significantly higher cost impacts as calculated by MHARR,[42] would indicate that those alleged costs are, at best, materially skewed and cannot provide a reliable, legitimate and lawful basis for any of DOE's cost calculations that are necessary to fully comply with EISA section 413[43] and the APA. But full and complete disclosure regarding those key information inputs has never been provided by either DOE, MHI, or SBRA, and is not contained in the June 17, 2016 NOPR.

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[40] The Levy Partnership, Inc. is a California corporation, established in 1983. The Executive Director of SBRA is simultaneously publicly identified as President of TLP. Similarly, the publicly-identified Vice President of TLP is simultaneously identified as a "Senior Project Coordinator" for SBRA. (See, Attachment 17, hereto). MHARR research has disclosed at least three DOE-TLP subcontracts funneled through DOE's National Renewable Energy Laboratory (NREL), designated KNDJ-0-40347-00, KNDJ-0-40347-03 and KNDJ-0-40347-05. See also, note 45, infra.

[41] In addition to the contracts/subcontracts cited herein, TLP was also awarded part of a $4 million DOE grant announced on May 5, 2015 to "develop and demonstrate new energy efficient solutions for the nation's homes." See, DOE News Release, "Energy Department Invests $4 million to Strengthen Building America Industry Partnerships for High Performance Housing Innovation (May 5, 2015). Consequently, after coordinating with DOE to develop and advance extreme, high-cost energy mandates on the manufactured housing industry, SBRA's alter ego, TLP (with overlapping employees and corporate officials), was rewarded by DOE with a "research" grant to develop the systems and methodologies to comply with those (and similar) mandates. (MHARR also notes with interest that a portion of the same grant was awarded to Home Innovation Research Labs, Inc. (HIRL), the supposedly "independent" Administering Organization (AO) of the HUD Manufactured Housing Consensus Committee (MHCC)).

[42] See, Attachment 18, hereto, an MHARR calculation of basic retail-level manufactured housing price increases attributable to specific elements of the June 17, 2016 DOE proposed rule, showing a cost increase of $5,825.17 for a multi-section manufactured home and $4,601.94 for a single-section home.

[43] See, note 10, supra.

More importantly, a 2015 document issued through DOE's Office of Energy Efficiency and Renewable Energy (EERE) provides direct evidence of DOE's manipulation of supposed energy "research" awards, grants, contracts and other taxpayer-funded activities to "drive the adoption" of its extreme, unnecessary and ruinously costly proposed manufactured housing standards, and simultaneously undermine industry opposition to any such standards. That document, entitled "High Performance Factory Built Housing – 2015 Building Technologies Office Peer Review,"[44] details a complex DOE strategy to use paid manufactured housing energy "research" activities as a pretext to simultaneously drive and support the adoption of baseless, high-cost DOE manufactured housing energy standards through a process of "integration and collaboration" with the industry's largest businesses and MHI.[45]

Detailing just one DOE "research" contract (or subcontract) with The Levy Partnership, awarded since 2010,[46] the 2015 report documents nearly $2 million in actual and projected funds paid by DOE to TLP, to conduct manufactured housing energy "research" on behalf of EERE's Building Technologies Office (BTO)[47] and to "partner" with "progressive" manufactured housing "plants," "responsible for 80%+ of all new" manufactured homes – i.e., large manufacturers -- in order to:

- "Develop and implement [new DOE energy] codes and standards;"[48]
- "Participate in the ongoing [DOE] MH standards development process – informed by [contract] R&D work."[49]

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[44] See, Attachment 19, hereto. The author of this report, detailing DOE misuse of paid contracts to influence the ASRAC manufactured housing "negotiated rulemaking," acted simultaneously as Vice President of TLP and "Senior Project Coordinator" for SBRA.

[45] "Project Integration and Collaboration," as detailed in the 2015 report, including a targeted communications strategy within the manufactured housing industry that specifically identified "MHI Meetings," the MHI "Congress and Expo" and the MHI "MH NewsWire" publication as venues and devices for promoting DOE manufactured housing regulation. In apparent execution of this DOE-funded strategy, a presentation at the April 2015 MHI Congress and Expo by – among others – the TLP President/SBRA Executive Director and Robin Roy (NRDC) – touted the supposed benefits of MHWG-based DOE energy regulation for manufactured homes, while simultaneously promoting compliance technologies and methodologies developed by TLP/SBRA and its large manufacturer "partners" under DOE contracts/subcontracts. See, Attachment 20, hereto. Indeed, as recently as a July 27, 2016 email from MHI's Vice President for Regulatory Affairs to manufactured housing industry state association executives and others, MHI once again confirmed the existence and impact of the financial conflict of interest between DOE and TLP/SBRA stating: "MHI has been working with SBRA on a number of cost effective building methods to address the anticipated new standards, including new roof truss designs and building envelope techniques." See, Attachment 21, hereto. The email fails to mention or disclose that these methods and techniques to "address the anticipated new [DOE] standards," were developed by TLP/SBRA under DOE subcontracts, including DOE/NREL subcontract no. KNDJ-0-40347-05 "Field Evaluation of Four Novel Roof Designs for Energy Efficient Manufactured Homes" (December 15, 2015); DOE/NREL subcontract no. KNDJ-0-40347-00 "Expert Meeting Report: Advanced Envelope Research for Factory Built Housing" (April 2012); and DOE/NREL subcontract no. KNDJ-0-40347-04 "Advanced Envelope Research for Factory Built Housing Phase 3 – Whole House Prototyping" (April 2014).

[46] Coincidentally, 2010 is the same year that the manufactured housing energy rule ANPR was published by DOE.

[47] See, notes 29 and 30 and related text regarding "insider" coordination with Roland Risser, Director of BTO, to establish the sham MHWG "negotiated rulemaking" process.

[48] See, Attachment 19, hereto at p.3.

[49] Id.

- "Dovetail with the [DOE manufactured housing] code update process – hand-in-glove;"[50]
- "Drive the adoption" of new DOE energy standards, while "SBRA helps facilitate [their] adoption;"[51] and
- "Shift" an "industry mindset focused on 1st cost" (i.e., purchase price of a home to the consumer) -- seen by DOE as a "barrier" to its regulatory objectives -- to a focus on "total ownership costs,"[52] in order to achieve "market transformation."[53]

Based on these BTO "objectives," the 2015 report states that paid activity by TLP/SBRA under the contract had already "impacted the ASRAC process" for new manufactured housing energy standards -- referring directly to the sham MHWG "negotiated rulemaking" leading to the June 17, 2016 DOE proposed rule.[54]

Among the various TLP/SBRA contract "partners" in promoting DOE manufactured housing regulation -- listed in the 2015 EERE/BTO report -- are SBRA itself and four members of the SBRA Board of Directors, representing the industry's largest manufacturers.[55] SBRA's Board, in turn, includes six members of the DOE "negotiated rulemaking" MHWG, all of whom voted to support the excessive, unnecessary and unduly costly standards set forth in the June 17, 2016 DOE proposed rule.

The inherent and material financial conflict of interest created by SBRA and multiple SBRA Board members serving as voting MHWG members, as part of a supposedly arms-length "negotiated rulemaking," at the same time that TLP -- with an interlocking personnel relationship with SBRA -- was a paid DOE subcontractor tasked with: (1) supporting, advancing and promoting DOE manufactured housing energy regulation and regulatory objectives; while (2) conducting research to develop ostensible means and measures to comply with those standards (among other things), again, fundamentally and irretrievably taints this entire rulemaking and violates section 563(a)(3)(B) of the Negotiated Rulemaking Act, requiring the appointment of committee members "willing to negotiate in good faith." Further, DOE's failure to fully disclose this ongoing contractual relationship with TLP/SBRA -- with TLP/SBRA effectively functioning as DOE's paid agent (in cooperation with MHI and the industry's largest manufacturers) to improperly influence an MHWG "negotiated rulemaking" already dominated by DOE-favored "insiders" -- has materially prejudiced the rights of MHARR, its members, other manufactured housing industry members and consumers, and other actual and potential opponents of DOE manufactured housing energy regulation, to object to and seek judicial relief from a contrived, manipulated and corrupted standards development process at a meaningful stage of this proceeding.

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[50] Id. at p. 13.
[51] Id. at p. 7
[52] Id. at p. 4.
[53] Id. at p. 10.
[54] Id. at p. 26. All of this, moreover, is consistent with TLP's self-described role as "providing services to public agencies interested in developing" – i.e., mandating – "new technologies for housing and accelerating their adoption by industry." See, Attachment 17, supra, at p. 1. (Emphasis added).
[55] See, Attachment 22, hereto, from the SBRA internet website, listing members of SBRA's Board of Directors.

E. Sham "Consultation" with HUD and the MHCC

Congress, being aware: (1) that EISA section 413 fundamentally conflicts with the purposes, objectives and specific terms of the National Manufactured Housing Construction and Safety Standards Act of 1974, as amended by the Manufactured Housing Improvement Act of 2000; (2) that HUD (and the MHCC), under those laws is required, among other things, to "protect ... the affordability of manufactured homes" and "facilitate the availability of affordable manufactured homes and ... increase homeownership for all Americans; and (3) that the MHCC represents a legitimate, statutorily-balanced consensus forum for the consideration and recommendation of manufactured housing standards and regulations (among other functions) -- specifically provided in section 413(a)(2)(B) that DOE manufactured housing energy standards could be established only "after consultation with the Secretary of Housing and Urban Development," who, in turn, was authorized to "seek further counsel from the Manufactured Housing Consensus Committee." (Emphasis added). By the plain wording of this subsection, and for this consultation directive to have any meaning or positive effect, the required consultation would have had to occur during the formulation of the DOE standards – when it could have some conceivable impact – and not after the development and publication of a proposed rule, near the end of the rulemaking process, when it would be a meaningless afterthought.[56] Indeed, to construe section 413(a)(3)(B) to provide for or permit the required "consultation" after the issuance of the NOPR for this rule -- during and as part of the public comment period, when any member of the public can review and comment of the already-developed proposed rule – would effectively render that section meaningless, contrary to the established cannons of statutory construction.

While DOE claims in its June 17, 2016 NOPR that it "has consulted with HUD,"[57] it has never disclosed either the content of those alleged "consultations," the parties to the alleged "consultations," or when in the rulemaking process those alleged "consultations" occurred. Meanwhile, at the August 2015 and January 2016 MHCC meetings, the HUD manufactured housing program Administrator refused to disclose any information or documents regarding the occurrence, timing or content of any such "consultations." Accordingly, there is no independent evidence or verification of any such consultations with HUD, their substance, or whether they occurred at a meaningful stage in the development of the June 17, 2016 proposed rule, despite the fact that under EISA section 413, DOE bears the burden of establishing that the required consultations occurred as mandated by Congress. Furthermore, even if – and to the extent that – documents reflecting any such alleged "consultations" might nominally exempt from public disclosure, any such exemption could be waived by DOE and/or HUD, but has not.[58]

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[56] See, e.g., Rural Cellular Association v. Federal Communications Commission, 588 F.3d 1095, 1101 (D.C. Cir. 2009) (opportunity for comment must be a meaningful opportunity). See also, C. Coglianese, "Transparency and Public Participation in the Rulemaking Process," University of Pennsylvania School of Law (July 2008) at p. 6: "By the time that the Notice of Proposed Rulemaking (NPRM) is published and the comment period begins, the agency is highly unlikely to alter its policy significantly. Many internal deliberations and policy discussions occur before an agency issues its NPRM.... If public participation does not affect an agency's actual decision making process because it occurs after rules are already formulated, it is hard to see how it can significantly enhance either the quality or legitimacy of rulemaking." (Emphasis added).

[57] See, 81 Federal Register, No. 117, supra at pp. 39762-39763.

[58] See, note 27, supra.

DOE similarly maintains in its June 17, 2016 NOPR that it "attended three MHCC meetings where [it] gathered information from MHCC members." (Emphasis added). MHARR, however, having attended every MHCC meeting since its inception, is aware only of one-sided, summary DOE presentations to the MHCC regarding the manufactured housing rule that DOE has had under development for nine years, and no occasion, whatsoever, where the MHCC, having been provided information on the development and substance of a DOE manufactured housing – in advance – had an opportunity to provide either DOE or HUD with substantive consensus input regarding any aspect of the proposed rule that DOE has now committed-to and published.[59]

Indeed, rather than providing the MHCC with an opportunity to offer independent input on its unduly costly, extreme and unnecessary manufactured housing energy standards at a meaningful point, based on a statutorily-balanced membership and legitimate consensus of manufactured housing program stakeholders, DOE (facilitated by HUD) instead – and as explained above -- chose to "rig" this rulemaking, railroading it through a sham "negotiated rulemaking" conducted through an MHWG dominated and controlled by DOE and its supporters. DOE now touts this phony process and its outcome as a "consensus" result, while it has acted consistently – with the cooperation and assistance of HUD and the HUD manufactured housing program Administrator – to prevent any legitimate consensus consideration and input from the MHCC at a point when it would have mattered.

Indeed, HUD, apparently recognizing its failure to comply with the EISA section 413, on July 25, 2016 – more than four weeks after publication of the June 17, 2016 DOE proposed rule -- published notice in the Federal Register of an August 9, 2016 MHCC telephone conference meeting to "review" a "summary" of the DOE proposed rule and, according to the meeting agenda, consider "Committee recommendations on [the] proposed rule."[60]

Published at the very last minute – in fact, arguably after the last minute allowed by applicable Federal Advisory Committee Act (FACA) regulations requiring published notice "at least 15 calendar days prior to an advisory committee meeting" (emphasis added)[61] -- and scheduled for just days prior to the August 16, 2016 DOE comment deadline, this HUD action appears to be little more than window dressing to whitewash yet another violation of applicable law in a rulemaking process that has been "rigged" from the start. The MHCC, provided an impossibly brief and truncated timeframe to digest a complex, OMB/OIRA-designated "significant rule" (much like the MHWG), will apparently be asked if it wishes to provide comments to DOE that would need to be drafted and approved within less than one week, in order to be submitted prior to the August 16, 2016 public comment deadline. This not only violates the implicit command of section 413 that "consultation" occur at a meaningful time, but is a direct and flagrant insult to the MHCC (and the stakeholders that it represents), offering the Committee a nominal opportunity to "review" a rule that DOE – and HUD – have already committed-to, while

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[59] To the extent, however, that DOE may have solicited or obtained otherwise undisclosed "information," input or comments from any individual MHCC member(s) regarding its manufactured housing energy rule, any such interaction, outside of the MHCC consensus procedures established by the Committee and HUD pursuant to the Manufactured Housing Improvement Act of 2000, would be invalid, illegitimate and not a lawful action of the MHCC.

[60] See, 81 Federal Register, No. 142 at pp.48442-48443.

[61] The scheduled MHCC meeting date falls on the 15th calendar day after the July 25, 2016 meeting notice publication date. The notice, accordingly, does not provide "at least 15" calendar days' notice "prior" to the meeting, as required.

effectively negating any real impact from that review. Again, though, this cynical manipulation of the rulemaking process is entirely consistent with DOE's pervasive pattern of obfuscation and deception concerning this rulemaking.

F. Procedural Summary

As the foregoing recitation of relevant facts selectively omitted from the DOE June 17, 2016 NOPR demonstrates, the DOE proposed rule -- separate and apart from its fatal substantive defects detailed below – is the product of a fundamentally tainted process that was fatally flawed from its earliest phase and has remained fatally flawed throughout, including, but not limited to:

- The selective, "impermissible" leak of the 2011 DOE "draft proposed" manufactured housing energy rule (DPR) to parties in interest, including the industry's largest manufacturers;
- Failure to disclose the existence or substance of ex parte input from recipients of the selectively leaked 2011 DOE draft proposed rule in either the development and/or modification of the 2011 DOE DPR or the DOE 2016 proposed rule;
- Development of the 2011 DPR without necessary and essential information, leading to the 2013 RFI, surreptitiously seeking such information after-the-fact without disclosing the previous development and existence of the 2011 DOE DPR or its rejection by OMB/OIRA;
- False denial of the selective leak of the 2011 DOE-DPR;
- Refusal to conduct an investigation or otherwise provide relevant details concerning the 2011 DOE-DPR selective leak;
- Failure to disclose responsive documents addressing these matters pursuant to MHARR FOIA requests;
- Failure to disclose the OMB/OIRA start-over directive;
- Failure to disclose ex parte coordination with selective leak recipients regarding the referral of manufactured home energy standards to "negotiated rulemaking;"
- Failure to disclose ex parte coordination with selective leak recipients to establish the parameters of that "negotiated rulemaking;"
- Ex parte coordination with selective leak recipients to establish an inadequate and unnecessarily truncated time-frame, schedule and deadline for the completion of that "negotiated rulemaking;"
- Ex parte coordination with selective leak recipients to establish a "negotiated rulemaking" MHWG dominated and controlled by "insider" selective leak recipients;
- Non-transparent and unverified data inputs to the MHWG on crucial rulemaking issues, including cost-benefit;
- Undisclosed MHWG conflicts of interest precluding "good faith" negotiation as required by applicable law;
- DOE manipulation of alleged "research" contracts to steer funds to one or more "insiders" (and MHWG members) to influence the "negotiated rulemaking" process;
- Refusal to disclose the 2011 DOE DPR for comparison to the 2016 DOE proposed rule;

- Refusal to disclose the 2011 DOE "draft" NOPR, TSD and cost-benefit analysis for comparison to the corresponding 2016 DOE rulemaking documents;
- Failure to provide evidence of "consultation" with HUD as required by EISA section 413, the time of that consultation (if any), the substance of any input received from HUD (if any), and any changes made to the June 17, 2016 proposed rule or NOPR as a result; and
- Failure to consult with the MHCC in a timely and legitimate manner as provided by EISA section 413.

In its entirety, this sham process has seriously prejudiced both the procedural and substantive rights of MHARR, its members and other affected stakeholders that were not party to – or part of – a consistent pattern of coordinated activity to benefit certain favored "insiders" at the expense of consumers, smaller industry businesses and other non-"insider" stakeholders. Those specific actions by DOE (and HUD) produced a phony "negotiated rulemaking" process, a phony MHWG, a phony alleged MHWG "consensus" and, ultimately, an illegitimate MHWG Term Sheet and illegitimate proposed rule. For these reasons alone, the DOE proposed rule should either be withdrawn, or – if implemented by DOE as a final rule – vacated upon judicial review. As is demonstrated below, however, the June 17, 2016 DOE proposed rule – beyond this fundamentally corrupted procedure -- is unsupported by factual cost-benefit data as required by EISA section 413 and is otherwise an agency action that is "arbitrary, capricious, or an abuse of discretion" in violation of the Administrative Procedure Act.

III. COMMENTS

The manufactured housing energy standards proposed by DOE in this rulemaking are an appalling and indefensible exercise in federal government overreach and destructive, excessively costly regulatory intervention in the free market to the ultimate and profound detriment of the very consumers that the government -- and particularly the current Administration -- putatively seek to "protect." Even though manufactured homes – after reaching historic-low production levels in 2009 – represent only 7.4% of all housing placements[62] and only 5.9% of all occupied housing units,[63] DOE seeks to impose harsh, needless, discriminatory, excessive and unreasonably costly standards on the nation's most affordable housing and the mostly lower and moderate-income Americans who rely on that affordability to be homeowners instead of renters, government subsidized renters, or homeless altogether. These standards, if adopted, would far exceed in cost and substantive mandates, any requirements currently imposed on the more than 90% of other types of homes in the housing market, including even multi-million dollar site-built homes with far more affluent owners.[64] Instead of allowing consumers to exercise free-choice within a free-market, where HUD Code manufacturers already offer consumers an energy-efficient home and a wide range of enhanced energy features as purchase options, the proposed DOE rule would instead

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[62] See, "Manufactured Homes: A Shrinking Source of Low Cost Housing," Fannie Mae Economic and Strategic Research (June 27, 2013). Reflecting 2012 data, down from 20.2% in 1998.

[63] Id. Reflecting 2011 data, down from 7.0% in 2000.

[64] As of May 2016, the International Code Council (ICC) reported that only six states had adopted the 2015 IECC – the basis for DOE's June 17, 2016 proposed standard. See, Attachment 23 hereto, "International Codes-Adoption by State," International Code Council (ICC) (May 2016).

force consumers to pay for energy features that they cannot afford or would not otherwise want through a one-size-fits-all big government mandate. To impose what is – at best – a regressive, de facto tax on American families already struggling to be and become homeowners, while excluding millions of others from the benefits of homeownership entirely, in order to advance an unrelated, controversial and unproven agenda, constitutes an abuse of power and an abuse of the public trust.

A. HUD-Regulated Manufactured Homes are Already Energy-Efficient In a Manner Consistent with Law and Genuine Affordability

While totally ignored amidst the nearly-impenetrable jargon and disputed junk science that are the hallmark of DOE's June 17, 2016 NOPR, the fact is that HUD-regulated manufactured homes, as a result of the national housing policies and regulatory system established by the National Manufactured Housing Construction and Safety Standards Act of 1974, as amended by the Manufactured Housing Improvement Act of 2000, are already energy efficient -- in a manner consistent with the over-riding purposes and objectives of those laws.

Unlike the "consumer products" (e.g., home appliances) that DOE regulates under the Energy Policy and Conservation Act of 1975 (42 U.S.C. 6291, et seq.),[65] manufactured housing – as a product and as an industry -- is unique, as recognized by Congress and as enshrined in federal law long before the adoption of EISA in 2007. As the nation's most affordable source of non-subsidized housing and homeownership -- as determined by HUD[66] and established by U.S. Census Bureau data[67]-- manufactured homes play a vital role in the American housing market and in American society, providing homeownership opportunities (and all of the attendant benefits of homeownership) for Americans, and particularly lower and moderate-income American families, that might not otherwise be able to afford a home of their own.

As a result, Congress made the continuing (purchase price) affordability of HUD-regulated manufactured homes a central objective of the National Manufactured Housing Construction and Safety Standards Act of 1974. Indeed, the purchase price affordability of manufactured homes is crucial to ensuring that the largest number of Americans possible – at every rung of the economic ladder -- can access and enjoy home ownership and all of its benefits. Congress, moreover, reaffirmed and expanded the law's emphasis on affordability when it amended the 1974 Act with the Manufactured Housing Improvement Act of 2000. The law as amended, therefore, addresses the need to preserve the inherent (purchase price) affordability of manufactured homes in at least four of its eight express "purposes," i.e.: "(1) to protect the quality, durability, safety and

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[65] See, e.g., DOE proposed rules for "residential conventional ovens," published at 80 Federal Register, No. 111 (June 10, 2015) at p. 33030, et seq.

[66] See, U.S. Department of Housing and Urban Development, "Is Manufactured Housing a Good Alternative for Low-Income Families? Evidence from the American Housing Survey" (December 2004). This HUD-sponsored study determined that, over an eight-year sample period, the mean monthly housing cost of consumer-owned manufactured homes was consistently and substantially less than the cost of ownership for other types of homes or even the cost of renting a home.

[67] See, U.S. Census Bureau, "Cost and Size Comparison: New Manufactured Homes and Single-Family Site Built Homes (2007-2014)," showing an average structural price of $65,300 ($45.41 per square foot) for HUD-regulated manufactured homes as compared with an average structural cost (i.e., excluding land) of $261,172 ($97.10 per square foot) for a site-built home.

affordability of manufactured homes; (2) to facilitate the availability of affordable manufactured homes and to increase homeownership for all Americans; *** (4) to encourage innovative and cost-effective construction techniques for manufactured homes; *** and (8) to ensure that the public interest in, and need for, affordable manufactured housing is duly considered in all determinations relating to the federal standards and their enforcement." (See, 42 U.S.C. 5401(b)). In addition, the Act requires that HUD (and the MHCC) "in establishing standards or regulations, or issuing interpretations" under the Act, "consider the probable effect of [that] standard on the cost of the manufactured home to the public...." (See, 42 U.S.C. 5403(e)(4)).

Thanks to this specific national housing policy that recognizes and seeks to preserve the purchase-price affordability of HUD Code manufactured homes, manufactured homes in 2011, according to U.S. Census Bureau data, accounted for 71% of all new homes sold for under $125,000, 50% of all new homes sold for under $150,000 and 30% of all new homes sold for under $200,000.

Manufactured homes, moreover, were already subject to HUD Code energy efficiency standards when EISA was enacted. Under those standards[68]developed and promulgated in accordance with the strict balance of consumer protection and purchase-price affordability mandated by the 1974 Act as amended, HUD Code homes were – and are[69] – required to meet criteria governing condensation control, air infiltration, thermal insulation, heat loss and heat gain and related certifications for heating and "comfort cooling." The HUD standards -- in accordance with the fundamental policy of the 1974 Act, as amended, to "establish," to "the maximum extent possible ... performance requirements,"[70]is designed to achieve certain specified Uo (coefficient of heat transmission) values within three defined geographical zones across the United States.

As a consequence of those pre-existing HUD energy standards, manufactured homes, as established by U.S. Census Bureau data, are already energy efficient, without regressive, high-cost DOE "energy" mandates. Specifically, data from the 2013 American Housing Survey shows that the median monthly housing cost for fuel oil was $92.00 for manufactured homes as compared to $267.00 for other types of housing. The median monthly cost for piped natural gas was $34.00 for manufactured homes as compared to $38.00 for other types of housing, and the median monthly cost for electricity was only slightly higher for manufactured homes (at $119.00) than other types of homes (at $105.00)[71] -- a difference of only $168.00 per year.

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[68] See, 24 C.F.R. 3280.501, et seq.

[69] Nothing in EISA section 413, or in EISA generally, would automatically invalidate or negate the existing HUD energy conservation standards upon the promulgation of any final DOE energy rule. Indeed, EISA section 3, "Relationship to Other Law," states: "Except to the extent expressly provided in this Act or an amendment made by this Act, nothing in this Act supersedes, limits the authority provided or responsibility conferred by, or authorizes any violation of any provision of law (including a regulation)...." (Emphasis added). Accordingly, as DOE concedes, any conflict between existing HUD energy standards and any final DOE standard would leave producers subject to potential enforcement activity by HUD, DOE, or both.

[70] See, 24 C.F.R. 3280.1 – "This standard seeks to the maximum extent possible to establish performance requirements." It is this performance-based nature of the HUD standards, together with their uniform application and enforcement, and effective federal preemption that ensure the fundamental (and unequalled) affordability of HUD Code manufactured homes.

[71] See, Attachment 24 hereto, U.S. Census Bureau, 2013 American Housing Survey, Table C-10AO (National), Housing Costs – All Occupied Units, at p.2.

Because of its broader, inherent and more consistent affordability, however, over a complete range of operating metrics, this minor additional energy cost for electricity is more than subsumed within the expansive operating efficiencies of HUD Code manufactured homes. Thus, U.S. Census Bureau data shows that the median total monthly operating cost for a current-day HUD Code manufactured home is $501.00 per month, as contrasted with $1,322.00 for other new residential structures -- a 164% cost advantage for manufactured home owners under the current HUD standards.[72] Moreover, manufactured housing producers already provide a wide range of enhanced energy packages (including EnergyStar packages), tailored to the specific needs and wants of consumers, on an optional basis. Thus, manufactured homebuyers currently have the freedom to choose whatever type of energy package they wish to purchase and have the financial ability to purchase, while those who wish to spend their money in other ways – or not at all – are free to do so. All this would change, however, under the regressive DOE standards, which would force those remaining in the market to spend money for energy features – without proven returns[73] -- that they otherwise would not purchase.

These indisputable facts, in conjunction with established law, have three major inter-related consequences for this rulemaking.[74] First, the cost-benefit language of EISA section 413, requiring that DOE manufactured housing standards be based on the most recent version of the International Energy Conservation Code, "except in cases in which the Secretary finds that the code (sic) is not cost-effective" (emphasis added), must be construed and applied consistently with the purposes, objectives and mandates of existing law – in this case, the 1974 Act as amended by the 2000 reform law.[75] Therefore, the "cost-effective" proviso of EISA section 413 must be construed and applied -- consistently with the 1974 Act, as amended -- to ensure that non-life-safety energy standards do not result in purchase price increases to manufactured homes that would significantly impair their affordability, availability and accessibility to all Americans, or otherwise decrease homeownership. (See, 42 U.S.C. 5401).

Second – and consistent with Black Letter cannons of statutory construction requiring that statutes be construed consistently to give meaning to all of their provisions -- the cost-benefit analysis required by EISA section 413 is an integral, substantive element of that law. Consequently, a valid, credible and legitimate cost-benefit analysis is a necessary predicate to the proposal and adoption of any standard under EISA section 413. Third – and consistent with all of the foregoing – that cost benefit analysis must definitively establish that the proposed standards do not violate section 413 (construed in accordance with the 1974 Act, as amended), by significantly impairing the purchase price affordability, availability and accessibility of manufactured homes "for all Americans." (See, 42 U.S.C. 5401(b)(2)).

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[72] Id. at p. 1.

[73] See, Section III C, pp. 26-33, infra, regarding DOE's wholly-deficient cost-benefit "analysis."

[74] This data demonstrates, moreover, that EISA section 413 proceeds from a fundamentally false premise and assumption, rooted in decades of official federal government discrimination against HUD-regulated manufactured housing – i.e., that manufactured homes are somehow "deficient" and in need of "improvement." Indeed, the "improvement" of manufactured housing was an initial statutory objective and purpose of the original 1974 federal manufactured housing Act, but was repealed by Congress through the 2000 reform law, in recognition of the equality of HUD-regulated manufactured with all other types of housing for all purposes.

[75] See e.g., "Statutory Interpretation, General Principles and Recent Trends," Congressional Research Service, (December 19, 2011) at p. 29. A court "must read two statutes to give effect to each if it can do so." Citing Watt v. Alaska, 451 U.S. 259 (1981).

As is demonstrated below, however, the cost-benefit analysis offered by DOE in its June 17, 2016 NOPR and related "Technical Support Document" (TSD), is wholly and fatally deficient, and cannot – and does not – support the adoption of the proposed June 17, 2016 DOE standards or their compliance with the "cost-effective" directive of EISA section 413. Insofar as DOE has the "affirmative burden of promulgating and explaining a non-arbitrary, non-capricious rule," see, e.g., Small Refiner Lead Phase-Down Task Force v. U.S. Environmental Protection Agency, 705 F.2d 506, 534-535 (D.C. Cir. 1983), its failure to properly consider all applicable and relevant aspects of the cost-benefit impact of the June 17, 2016 proposed rule necessarily means that the proposed rule fails to meet the applicable legal standards and cannot go forward.

B. The Proposed Standards will Exclude Millions of Americans From Manufactured Housing and Home Ownership Entirely

DOE maintains in the June 17, 2016 NOPR that its proposed standards would add up to $2,422 to the retail price of a single-section manufactured home (with a national average of $2,226) and up to $3,748 to the cost of a new multi-section manufactured home (with a national average of $3,109) – for non-"life-safety" energy measures that are already available to homebuyers who want them as optional features.[76] These figures – as acknowledged by DOE[77] -- are based upon the non-transparent purchase price impact information provided to the "negotiated rulemaking" MHWG by SBRA and MHI.

Even if it were assumed that these amounts reflected the full and true final cost of the DOE proposed rule to consumers – which they do not -- they would have a disastrous impact on the affordability, availability and accessibility of manufactured housing for American families already facing unprecedented difficulty in obtaining consumer financing to purchase a manufactured home. According to a 2014 study by the National Association of Home Builders (NAHB), presented to the MHWG at its initial meeting (the only independent market-impact information or testimony presented to the MHWG as part of DOE's supposed "negotiated rulemaking"), a $1,000.00 increase in the purchase price of a new manufactured home excludes 347,901 households from the market for a single-section home, while the same $1,000.00 increase excludes 315,385 households from the market for a double-section home.[78] Extrapolating this data to the price increases projected by the NOPR shows that the pending DOE standards would exclude more than 1.1 million households from the single-section manufactured housing market and just over 1 million households from the double/multi-section market – extreme numbers considering that the entire industry, since 2006 has been producing fewer than 100,000 new homes a year.

Given the established status of manufactured homes as the nation's most affordable type of housing and homeownership, the exclusion of millions of Americans from the manufactured housing market would effectively mean the exclusion of millions of Americans from

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[76] See, 81 Federal Register, No. 117, supra at p. 39757.

[77] Id. at p. 39783: "These costs are based on estimates for the increased costs associated with more energy efficient components, as provided by the MH working group." The NOPR, moreover, provides no indication that DOE either developed or sought to develop its own independent cost information to compare with these critical unverified, unvetted and totally non-transparent cost inputs. See, discussion in section II D, supra, at pp. 15-16.

[78] See, public testimony of Donald Surrena, Program Manager, Energy Efficiency, NAHB.

homeownership altogether, in violation of the 1974 Act, as amended, and contrary to national housing policy to encourage and support homeownership.[79]

Significantly, though, the cost-benefit "analysis" presented in both the June 17, 2016 NOPR and TSD fails to reflect the full and true cost of the proposed rule. This means that the resulting exclusion of homebuyers from the manufactured housing market will be even greater than the figures extrapolated above and that the numbers of Americans excluded from homeownership altogether will be greater, yielding major individual and societal costs that are not reflected at all in the DOE cost-benefit "analysis." These and other material flaws in the cost-benefit "analysis, as detailed below, make it so deficient as to be worthless for regulatory purposes.

C. DOE's Cost-Benefit "Analysis" is Necessarily Incomplete and Fails to Reflect the True or Complete Costs of the Proposed Rule

DOE's cost-benefit analysis for the June 17, 2016 proposed rule – a necessary and essential predicate for any proposed rule pursuant to EISA section 413, as demonstrated above – is fundamentally incomplete, arbitrary and fatally deficient, in that it does not include or otherwise fails to quantify and/or consider key cost impacts of the proposed standards.[80] This failure to adduce or properly consider all applicable cost elements and impacts of the proposed standards results in cost-benefit and "life-cycle cost" calculations that are factually baseless and therefore, "arbitrary and capricious" per se, in violation of EISA section 413 and the Administrative Procedure Act. (See, 5 U.S.C. 706).[81]

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[79] This regulatory-driven exclusion of millions of lower and moderate-income consumers from the housing market, moreover, would take place in the context of homeownership rates that have already fallen to their lowest levels in more than 50 years. See, e.g., Attachment 25, hereto, "Homeownership Rate in the U.S. Drops to Lowest Since 1965," Bloomberg News (July 28, 2016). Declining homeownership has particularly impacted minority communities according to a 2015 study by the Harvard University Joint Center for Housing Studies ("State of the Nation's Housing") noting that "African Americans [now] have the lowest rate of homeownership [at] 43.8%"

[80] Such defective cost-benefit analyses, moreover, are hardly unprecedented for DOE. In written comments filed on April 3, 2015, in connection with a DOE rulemaking to establish "Energy Conservation Standards for Hearth Products," the Mercatus Center of The George Mason University condemned DOE's supposed cost-benefit "analysis" for failing to include and consider significant cost factors. Among other things, the Center noted that DOE did "not measure the welfare loss from shutting down small businesses and the negative impact on a portion of the population working in this area who this regulation affects. *** This results in additional losses that DOE does not take into account. *** It seems the losers in this regulation lose more than the winners gain, meaning that there is a loss in social welfare that the net standard benefit calculation provided by DOE fails to take into account." The same type of serious, significant and highly relevant analytical defects characterize the supposed cost-benefit "analysis" in this rulemaking as well.

[81] See, e.g., Soler v. G&U, Inc., 833 F.2d 1104 (2d Cir. 1987) (Successful challenge to an agency's decision under the arbitrary and capricious standard must clearly demonstrate that the agency "relied on factors which Congress did not intend it to consider, entirely failed to consider an important aspect of the problem [or] offered an explanation for its decision that runs counter to the evidence before the agency....") (Emphasis added).

1. DOE's Cost-Benefit "Analysis" is Fatally Defective in that it Fails To Quantify or Consider Testing, Enforcement and Regulatory Costs

DOE's June 17, 2016 NOPR states, in part: "DOE estimates that benefits to manufactured homeowners in terms of lifecycle cost (LCC) savings and energy cost savings under the proposed rule would outweigh the potential increase in purchase price for manufactured homes."[82] This claim, however, is necessarily false and the findings of DOE's lifecycle cost analysis are necessarily flawed, skewed and materially inaccurate, in that they do not reflect, consider or account for key cost information. As a result, the claimed benefits of the proposed rule are netted against incomplete and/or inaccurate cost data, thereby yielding alleged "payback" amounts and timeframes that are distorted and biased in favor of the proposed rule. This distortion includes several aspects, which are addressed in this and subsequent sections, below.

Most significantly, the DOE cost-benefit analysis fails to include or consider significant additional costs that will be incurred by manufacturers – and inevitably passed to consumers in the purchase price of new manufactured homes – for: (1) testing, certification, inspections and other related activities to ensure compliance with any new DOE standards (including new testing requirements not currently included in the HUD Code that could be particularly costly and onerous); (2) enforcement compliance and activity; and (3) ongoing regulatory compliance. Although such expenses are – and are recognized as -- an integral component of the ultimate consumer-level cost of any mandatory rule, they are totally excluded from DOE's cost-benefit and LCC analyses in this rulemaking. Those analyses, as a result, are skewed toward greater alleged benefits from the proposed rule and shorter consumer LCC "payback" times than would be the case if all applicable costs were included and considered. Indeed, as it stands now, under DOE's fundamentally flawed and incomplete LCC analysis, the projected consumer "payback" period – i.e. 7.1 years for a single-section home and 6.9 years for a multi-section home -- is already longer than many consumers will live in a new manufactured home. The addition of testing, enforcement and regulatory compliance costs (and other additional un-captured costs set forth below), would extend that payback period even longer, meaning that even fewer homebuyers will ever recapture purchase price increases attributable to the proposed rule.[83]

This deceitful bifurcation of direct standards-generated costs on the one hand and testing, enforcement and regulatory compliance costs on the other – notwithstanding the fact that all such costs, as well as additional costs for compliance with existing HUD Procedural and Enforcement Regulations,[84] will represent additional consumer-level costs under any final DOE rule – began

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[82] See, 81 Federal Register, No. 117, supra at p. 39757.

[83] See, "2012 Mobile Home Market Facts," Foremost Insurance Group, at p. 8, showing that 39% of survey respondents had purchased their manufactured home within the past six years (i.e., 2006-2012). See also, "Is Manufactured Housing a Good Alternative for Low Income Families?" U.S. Department of Housing and Urban Development (December 2004), at p. 44 (55.4% of manufactured home residents moved within 10-year study period, with a mean duration of 2.57 years).

[84] See, 24 C.F.R. 3282.1, et seq. describing HUD's manufactured housing inspection, monitoring and enforcement program. Regardless of whether energy standards developed by DOE pursuant to EISA section 413 are enforced by DOE or HUD, or some combination of both, the changes to HUD-regulated homes that will be required by the proposed DOE standards will result in separate and additional compliance costs under the Part 3282 regulations. These inevitable additional costs will include, but will not be limited to, costs for the re-design of homes; costs for the approval and certification of such new or modified designs; costs for new or additional materials needed to support

with the sham MHWG "negotiated rulemaking" process, where DOE, via its "Designated Federal Official," barred discussion or consideration of any aspect of enforcement or regulatory compliance, or their associated costs. The absurd and misleading bifurcation is continued in the June 17, 2016 DOE NOPR, which states: "DOE is not considering compliance and enforcement in this proposed rule.... As a result, the costs ... resulting from any compliance and enforcement mechanism are not included in the economic impact analysis that is included in this rulemaking."[85]This represents an admission by DOE that its cost-benefit analysis and LCC "calculations" are necessarily inaccurate, incomplete and not reflective of the true and complete costs of the proposed rule.

DOE's consumer-level cost-benefit analysis, therefore, compares "apples to oranges," netting out all conceivable "savings" against only part of the costs that will be added to the price of the home. As a result, there is no basis, whatsoever, for DOE to conclude – in connection with this rule -- that consumer benefits exceed costs, because the full costs of the proposed standards are not known and cannot be known until DOE, at a minimum, settles on a compliance and enforcement system, which – it admits – has not occurred. Nor can a cost-recovery period be accurately calculated because costs -- again – are not known and not fully quantified as of now, and cannot even be accurately estimated with so many unknowns. Indeed, the attempt to pass this off as any kind of legitimate cost-benefit analysis is itself disingenuous. Therefore, DOE's analyses are neither credible nor legitimate and, per se, cannot be – and are not – sufficient to satisfy the substantive cost-benefit directive of EISA section 413 or the "arbitrary, capricious or abuse of discretion" standard of the APA.

2. DOE's Cost-Benefit "Analysis" is Fatally Defective In that it Fails To Quantify or Consider the Cost of Exclusion From Homeownership As a Result of the Rule

In addition to its fatal failure to address or consider testing, enforcement and regulatory compliance cost-impacts at the consumer level, DOE's cost-benefit and LCC analyses are necessarily incomplete, defective and insufficient to meet the requirements of either EISA section 413 or the APA because they totally fail to consider the individual (and societal) cost impacts that will result from the exclusion of millions of Americans from attaining homeownership. This fundamental omission – while evident from the June 17, 2016 NOPR and related TSD – was confirmed by DOE (and its cost-benefit analysis contractor) at the July 13, 2016 DOE public meeting concerning the instant rulemaking.

Using DOE's own fundamentally understated consumer-level cost figures, the 2014 NAHB cost study, cited above, indicates that June 17, 2016 DOE proposed standard would result in the exclusion of more than 1.1 million households from the single-section manufactured housing

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the inclusion of energy efficiency measures required by the proposed rule; and costs related to the certification and approval of such materials, among others. Nor does DOE's analysis consider the cost impact of compliance with HUD's lifetime home recall provisions – Part 3282, Subpart I -- which would be significant, if HUD adopts the DOE standards as part of the HUD Code.

[85] See, 81 Federal Register, No. 117, supra at p. 39783.

market and just over 1 million households from the double/multi-section market[86] and, with that, exclusion from homeownership entirely. This market and homeownership exclusion, moreover, as a direct consequence of the non-life-safety DOE standards, would most severely and harshly impact lower-income purchasers, who comprise the vast majority of current manufactured home purchasers.[87]

For the millions of Americans who would be excluded from homeownership as a direct consequence of the significantly higher manufactured home purchase prices that will be driven by the proposed rule – if adopted – the DOE rule will have no consumer-level benefits. For those consumers, the rule will have only costs.[88] While those costs, axiomatically, will not be the specific "costs" of the rule itself – insofar as they will be excluded from the market – those consumers will nevertheless incur costs as a result of the rule, i.e., the cost of exclusion from homeownership and, in some cases, the cost of homelessness. The consumer-level DOE cost-benefit analysis, however, fails to quantify or account for these costs. Not are these costs reflected in DOE's "national" cost-benefit analysis.

By failing to reflect the impact of the proposed rule on millions of American consumers who would be excluded from the manufactured housing market and homeownership entirely – for whom there would be no "benefits," only "costs," the consumer and national-level DOE cost-benefit analyses are materially skewed, biased and not reflective of the full and true cost of the proposed rule.

Nor can DOE legitimately claim that consumer and national-level costs resulting from homeownership exclusion under the proposed rule are somehow difficult or "impossible" to quantify. If DOE can claim "benefits" for the proposed rule resulting from allegedly reduced carbon emissions, quantified via its "social cost of carbon methodology"[89] -- a global[90] calculation (in violation of OMB Circular A-4, Regulatory Analysis") based on Integrated Assessment Models

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[86] Using the higher cost figures derived by MHARR -- reflecting additional costs over and above costs for a current base-level HUD Code home (see, Attachment 8, supra) -- the number of households excluded from the manufactured housing market – and homeownership – approaches nearly 2 million (i.e., 1.6 million excluded from the single-section market and 1.83 million excluded from the double-section market). These exclusions, with the addition of other costs not captured by DOE's cost-benefit analysis, would easily exceed 2 million.

[87] According to U.S. Census Bureau data, the median household income for all occupied manufactured homes is $28,400. See, U.S. Census Bureau, 2013 American Housing Survey, Table C-09-AO (National), Income Characteristics – All Occupied Units, at p.1. See also, "2012 Mobile Home Market Facts," Foremost Insurance Group, at p. 2, 5 ("55% of [manufactured] home owners reported an annual household income [of] less than $30,000, representing a 16% increase from 2008"). Household income for manufactured housing residents, accordingly, is declining. This income level is only slightly higher than the current federal poverty level – i.e., $24, 250 – for a family of four. As a result, purchase price increases driven by the unnecessary energy efficiency measures of the DOE proposed rule will have a devastating impact on the lower and moderate-income consumers who rely on manufactured housing the most. It should also be noted that market exclusion resulting from the DOE rule would not only impact "homeownership," per se. Significant increases in the purchase price of manufactured homes acquired by manufactured housing communities for rent to lessees would also be passed through to occupants in the form of higher rent payments. Those higher rental payments, in turn, would result in the exclusion of additional households from the manufactured housing market.

[88] Put differently, for consumers excluded from manufactured home ownership by purchase prices driven to levels they simply cannot afford, there is no "life-cycle" – and therefore no possibility whatsoever of "life-cycle savings."

[89] See, 81 Federal Register, No. 117, supra at p. 39791.

[90] See, detailed discussion at section III C 5, pp. 32-33, infra,

incorporating "crucial flaws that make them close to useless as tools for policy analysis,"[91] then there is no reason that DOE cannot quantify and properly consider the costs of market exclusion and homelessness resulting from its proposed rule that will significantly increase the cost of the nation's most affordable housing. It could begin that analysis with the assertion of former HUD Secretary Shaun Donovan, that it costs taxpayers $40,000 per year for each homeless person in the United States.[92]

The proposed rule, accordingly, is, in reality, a tax -- a regressive, discriminatory tax on America's manufactured housing consumers that will fall the hardest on those at the lower end of the economic spectrum who rely on the affordability of manufactured housing the most, while forcing those remaining in the market to spend thousands of dollars for energy conservation features they would not otherwise purchase in a free market, as shown by decades of industry experience with optional enhanced energy packages.

3. DOE's Cost-Benefit "Analysis" is Fatally Defective in that it Fails To Quantify or Consider Larger Cost Impacts on Smaller Producers

The non-transparent "cost" figures provided to the MHWG by MHI/SBRA – upon which the MHWG "Term Sheet," the proposed rule and the DOE cost-benefit analysis are premised – undoubtedly were obtained primarily from larger manufacturers that MHI represents and that participated in the MHWG.[93] Based on calculations derived by MHARR, however, those figures significantly understate the cost of the proposed rule based on the supply costs paid by smaller independent manufacturers which still represent approximately 30% of the total domestic manufactured housing market.[94]

Based on those higher supply costs, MHARR calculations reflect price increases of up to $4,600.00 above current HUD Code performance standards for a single-section manufactured home and up to $5,825.00 for a double-section home.[95] These calculations were provided to DOE by MHARR in March 2015, but have not been included or otherwise addressed or accounted-for in the June 17, 2016 NOPR cost-benefit analysis.

Insofar as these higher supply costs, which will impact a significant portion of the manufactured housing market are not subsumed or reflected in the DOE cost-benefit analysis, that analysis, again: (1) is based on non-transparent, un-vetted crucial information inputs; (2) significantly understates costs attributable to the proposed rule; and (3) is wholly insufficient and inadequate to meet the substantive cost-benefit mandate of EISA section 413 and the "arbitrary, capricious, or abuse of discretion standard of the APA.

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[91] See, "Obama's Climate Action Plan Means Higher Electricity Prices for Business, Consumers," Washington Examiner (January 16, 2014) quoting Professor Robert Pindyck, Massachusetts Institute of Technology.

[92] See, "HUD Secretary Says a Homeless Person Costs Taxpayers $40,000 a Year," PolitiFact (March 12, 2012).

[93] This again demonstrates the material prejudice to MHARR and other stakeholders resulting from the sham DOE "negotiated rulemaking" process.

[94] See, note 107, infra.

[95] See, Attachment 18, hereto, supra

4. DOE's Cost-Benefit "Analysis" is Fatally Defective in that it Fails To Quantify or Consider the Cost Impact of Regular IECC Changes

Further, by requiring DOE to constantly update manufactured housing standards to keep pace with the "latest version" of the IECC – which is revised every two years without regard to cost-benefit, unlike the HUD Code standards -- EISA not only discriminates against manufactured homebuyers vis-à-vis other types of homes regulated under earlier, less stringent and less costly versions of the IECC,[96] but adds an element of ongoing regulatory uncertainty that will further increase manufacturer compliance costs and the cost of manufactured homes to potential consumers that are not captured within DOE's NOPR cost-benefit analysis.

The significant negative impact of ongoing regulatory uncertainty within regulated industries – and, in particular, on regulated industry participants, such as manufactured housing producers – has been addressed extensively by economists, with studies showing that regulatory uncertainty has a pronounced negative impact on investment, growth, and competitiveness, resulting in both consumer, industry and national-level costs that are not addressed, considered or reflected in DOE's cost-benefit analysis.[97]

These negative impacts, that are not addressed, considered, or accounted-for in the June 17, 2016 NOPR cost-benefit analysis, will not only increase the cost of manufactured housing beyond the amounts projected in the NOPR – thereby extending already lengthy LCC cost-payback timeframes that already exceed the period that significant numbers of manufactured homeowners will remain in their homes – they will also: (1) increase the numbers of lower and moderate-income Americans excluded from the manufactured housing market and homeownership altogether; and (2) reduce the availability of affordable manufactured housing, contrary to the mandate, purposes and objectives of existing federal manufactured housing law.

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[96] See, Attachment 23, supra. Two states have adopted the 2006 IECC on a statewide, unmodified basis, sixteen have adopted the unmodified 2009 IECC statewide, eleven have adopted the 2012 IECC, and just six have adopted the 2015 IECC on an unmodified statewide basis. Two states have not adopted any version of the IECC. The largest number of states that have adopted the IECC, therefore, are still enforcing codes dating back at least seven years.

[97] See, e.g., "The Impact of Regulation on Investment and the U.S. Economy," The Mercatus Center, The George Mason University, at pp. 3-4. ("[I]nvestment may be temporarily withheld when there is uncertainty about the size and scope of new regulatory initiatives. This is particularly true for investments that cannot be easily reversed -- i.e., reselling capital for its purchase price. Investment in new capital is inevitably accompanied by the hiring of new labor. For firms that must rely on a constant source of financial capital -- i.e., smaller firms, one current source of uncertainty is how the new financial rules will affect their abilities to borrow. About 1/3 of small firms rely on regular borrowing to finance capital. *** Two types of uncertainty can affect decisions by firms to invest: (a) uncertainty about demand for their products demand uncertainty and (b) uncertainty about factor costs -- labor and capital – [i.e.,] factor uncertainty. Major regulations—such as those recently authorized regarding financial services, health care, or greenhouse gas rules—can affect both demand and factor uncertainty. *** [O]ne key type of factor uncertainty is whether firms will have access to credit in the future. Uncertainty about access to credit has a greater impact on firms, small firms in particular, that need continuous access to credit in order to finance investments.")

5. DOE's Cost-Benefit "Analysis" is Fatally Defective in that Nets Global "Benefits" Against only Partial Domestic "Costs"

DOE's claim, moreover, that the proposed standards would result in "a net benefit to the nation as a whole,"[98] is riddled with even more gaping analytical flaws. DOE cites "environmental benefits" flowing from its proposed rule as a result of "reduced emissions of air pollutants and greenhouse gasses associated with electricity production."[99] As with all of DOE's "climate change" rules, however, that claim relies on a non-transparent pseudo-science/economic "model" developed behind closed doors by a federal "Interagency Working Group." This model, dubbed "SCC," or the "Social Costs of Carbon," purports to estimate the global "monetized damages associated with an incremental increase in carbon emissions within a given year," accounting, among other things, for "changes in net agricultural productivity, human health, property damages from increased flood risk and the value of ecosystem services."

Even assuming that this model were correct and accurate in identifying and quantifying alleged monetary benefits resulting from supposed reductions in carbon emissions properly attributable to a rule affecting less than 10% of the nation's housing, the model is methodologically and statistically invalid in that it compares "apples to oranges," netting the supposedly "global" benefits of the proposed rule against purely domestic costs concentrated (in this case) within a small market and small industry. And even this baseless calculation is further skewed by the fact that only an artificially limited and constrained portion of the total domestic costs of the proposed rule – not reflecting the full market costs detailed above -- is netted against supposedly "global" benefits. This conflation of supposed "global benefits" being netted against only partial domestic costs attributable to the proposed rule, is not only arbitrary and capricious and in violation of EISA section 413, but also violates the directive of OMB Circular A-4, "Regulatory Analysis," which provides that regulatory "analysis should focus on benefits and costs that accrue to citizens and residents of the United States," in that it gives short shrift to domestic costs – excluding significant cost factors – while netting those partial domestic costs against alleged worldwide benefits.[100]

Just as importantly, though, DOE admits that alleged SCC benefits are "uncertain" and "should be treated as revisable."[101] Thus DOE attributes "benefits" to the proposed rule based on metrics acknowledged to be "uncertain," while it totally ignores predictable consumer, industry and national level costs of the proposed rule, which it totally ignores, thus over-inflating the alleged benefits of the proposed rule with junk science while significantly understating its costs. Indeed, while DOE exhibits great concern over the global "social costs" of carbon, it apparently could care less about the domestic social cost of millions of Americans who would be excluded from the benefits of homeownership under its rule, as it makes no effort whatsoever to quantify or consider those costs, which would be enormous.

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[98] See, 81 Federal Register, No. 117, supra, at p. 39758.

[99] Id. at p. 39759.

[100] OMB Circular A-4 expressly states that if "a regulation ... is likely to have effects beyond the borders of the United States," those "effects should be reported separately," not netted against purely (and partial) domestic costs. (Emphasis added).)

[101] See, 81 Federal Register, No. 117, supra at p. 39791.

Beyond the DOE-acknowledged "uncertainty" of the SCC model, however, and the failure of the DOE cost-benefit analysis to correctly, validly and lawfully net costs versus benefits attributable to the proposed rule, independent analysis demonstrates that the SCC model is scientifically and economically invalid. For example, a 2014 report by the Institute for Energy Research states, in relevant part: "[T]he use of the SCC as an input into federal regulatory actions is totally inappropriate. *** [T]he SCC is an arbitrary output from very speculative computer models. *** [T]he SCC as implemented by federal agencies is completely arbitrary and without theoretical or experimental support, not to mention a lack of data supporting the [SCC] calculation." (Emphasis added).[102] Indeed, the most recent independent analysis of the SCC, issued in June 2016, indicates that not only does SCC modelling produce a social cost of carbon that is overstated, but that based on observed temperature changes – and not just climate models – the SCC may actually be negative (i.e., that alleged carbon reduction yields no benefits and in fact, results in societal costs).[103]

Given each of these fatal defects in the utilization of arbitrary and speculative SCC values – and the other fundamental analytical and data failures of the June 17, 2016 DOE cost-benefit analysis, that "analysis" is factually worthless and insufficient to meet the substantive requirements of EISA section 413 and the APA.

D. The DOE Cost-Benefit Analysis Fails to Properly Consider The Impact of the Proposed Rule on Smaller Industry Businesses

While DOE acknowledges that its June 17, 2016 proposed rule would have a significant negative impact on the manufactured housing industry – an industry that has seen production contract by more than 81% since 1998, with corresponding reductions in the number of producers – its cost-benefit analysis fails to fully or properly quantify the likely anti-competitive effects of its proposed rule and the resulting highly-negative impacts on industry small businesses and consumers.

DOE admits in the June 17, 2016 NOPR that its proposed rule would result in a decline in "industry net present value" of $3.1 million to $36.8 million. (See, 81 Federal Register, No. 117, supra at p. 39788). This calculation, however, was derived in significant part from information contained in 10-K filings with the U.S. Securities and Exchange Commission (SEC) (Id. at pp. 39787, 39794) which undoubtedly were filed by the larger industry corporate conglomerates. By contrast, DOE interviewed just "two small manufacturers" regarding expected industry/manufacturer impacts of the proposed rule. As a result of this failure to fully and properly quantify the expected impacts of the proposed rule on smaller businesses, DOE, in its NOPR, concedes that, under the Regulatory Flexibility Act (5 U.S.C. 601, et seq.) "since the proposed standards could cause competitive concerns for small manufacturers, DOE cannot certify that the proposed standards would not have a significant impact on a substantial number of small businesses." (Id. at p. 39794) (Emphasis added).

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[102] See, "Comment on Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order No. 12866," Institute for Energy Research (February 24, 2014).

[103] See, "Empirically-Constrained Climate Sensitivity and the Social Cost of Carbon," Heritage Foundation (2016).

Insofar as DOE has the "affirmative burden of promulgating and explaining a non-arbitrary, non-capricious rule," see, Small Refiner Lead Phase-Down Task Force v. U.S. Environmental Protection Agency, supra – DOE's failure to fully quantify and certify the effect of its proposed rule on small industry manufacturers is, per se, a fatal defect that should invalidate the June 17, 2016 proposed rule.

And while it is not the burden of public commenters or stakeholders to quantify, justify, or disprove any proposed agency action or standard, the proposed rule would have a disproportionately and profoundly negative impact on smaller manufacturers and smaller industry businesses. As has been documented by the U.S. Small Business Administration (SBA), federal regulation generally has a disproportionately negative impact on smaller businesses in any industry.[104] As a matter of basic business economics, larger businesses can amortize regulation-driven price increases over a broader base of production than smaller businesses, resulting in a diminished overall and per-unit impact. Further, and more importantly, the industry's largest corporate conglomerate[105] with nearly 50% of the domestic HUD Code market, has already demonstrated that it has the resources and ability to offset – for its customers – purchase price increases of the magnitude that will be caused by the DOE proposed rule. Specifically, in June 2015, Clayton Homes, Inc. (Clayton) offered purchasers of upgraded "Energy Smart" Clayton homes a rebate of up to $3,000.00 on energy utility bills during the first year after purchase of the home.[106] Not coincidentally, this amount approximates the average retail manufactured home price increase information provided to the MHWG and DOE, and incorporated in the DOE June 17, 2016 NOPR. Consequently, there is already significant evidence that Clayton – having supported the DOE-proposed standard during the MHWG "negotiated rulemaking" process – will use its superior resources and market strength to cushion or offset DOE standards-driven purchase price increases for its customers, drawing potential homebuyers away from smaller producers.

Over time, this phenomenon will result in further consolidation within an industry that has already seen a substantial reduction in the number of producing companies and the emerging domination of the industry by three large corporate conglomerates[107]with a corresponding reduction in competition and – ultimately – higher prices and fewer choices for consumers.

Again, though, DOE's cost-benefit analysis fails to address, consider or account-for these negative impacts – and their related costs -- on consumers, the industry and the nation as a whole.

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[104] See, "The Impact of Regulatory Costs on Small Firms," U.S. Small Business Administration (September 2010).

[105] I.e., Clayton Homes, Inc., a corporate subsidiary of Berkshire Hathaway, Inc.

[106] See, Attachment 26, hereto.

[107] See, "2015 Home Buyers' Outlook," The Grissim Guides to Manufactured Homes and Land ("[T]the MH industry contraction during the recession brought with it a lot of bankruptcies, closures, mergers and acquisitions. As a consequence the industry landscape today is markedly different than it was as recently as January 2008 when more than 60 companies nationally were building homes in 195 production facilities around the country. Currently, only 46 active corporations remain, and the number of factory production lines has dropped to 125 (a loss of 70). One upshot of this shake-out is that roughly 68% of the MH industry is now dominated by three major producers and their subsidiaries: Clayton Homes, Inc. (with a market share of 41%), Champion Home Builders, Inc. (15%) and Cavco Industries (12%). Of these three ... Clayton Homes, Inc. is far and away the dominant player. Not only is its market share way more than its two nearest competitors combined, but the company also owns two major banks–Vanderbilt Mortgage and 21st. Century–that specialize in retail MH loans which together account for 35% of all MH home loans. In fact, annual combined profit from the two banks significantly exceeds that from the sale of homes from Clayton and its many subsidiary builders."

This type of extreme negative economic and societal impact was correctly explained in the DOE "hearth products" rule comments submitted by the Mercatus Center of The George Mason University: "[T]his regulation will disproportionately burden small businesses and benefit large manufacturers. This regulation will become an income transfer scheme as small businesses go out of business competing with large manufacturers, giving large manufacturers access to a larger consumer base and increasing their income. This is an income transfer scheme that will produce unintended consequences, including causing an industry to be dominated by a few large firms." Id. at p. 5.

Insofar as none of these significant cost impacts and factors are considered by DOE in its cost-benefit analysis for the June 17, 2016 proposed rule, that rule is fatally deficient, unsupported by proper and sufficient evidence and legally unsustainable.

IV. CONCLUSION

From the start, this rulemaking has been fundamentally and irretrievably tainted. The entire process utilized by DOE to produce the current proposed standards has been ill-conceived, deceptive, non-transparent, biased and, ultimately, unlawful. Instead of engaging in a legitimate rulemaking process, designed to elicit relevant facts and considerations, and then proceed to a well-reasoned proposal, this process has been one of a costly, disruptive and draconian pre-ordained result seeking "cover" from self-interested and special interest supporters participating in a coordinated, sham proceeding. That phony proceeding has now led to a proposed rule based on a deceitful and fatally defective cost-benefit analysis that nets all conceivable (and entirely speculative) alleged benefits, on a "global" scale, against a blatantly incomplete and deficient assessment and analysis of corresponding consumer, industry and national costs.

For all of the foregoing reasons, as detailed herein, MHARR strenuously opposes the June 17, 2016 proposed rule both procedurally and substantively and calls on DOE: (1) to withdraw that proposed rule; (2) to establish a credible, legitimate and untainted rulemaking process to develop appropriate standards consistent with EISA section 413 and existing federal manufactured housing law from a "fresh start" as originally directed by OMB/OIRA; and (3) to develop credible, reasonable and cost-effective standards consistent with EISA section 413 that will not result in the exclusion of millions of lower and moderate-income Americans from the manufactured housing market or homeownership entirely.

Very truly yours,

Mark Weiss
President and CEO

cc: Hon. Ernest Moniz
Hon. Julian Castro
Chairman and Ranking Member, Senate Energy and Natural Resources Committee
Chairman and Ranking Member, House Energy and Commerce Committee
Chairman and Ranking Member, Senate Banking Housing and Urban Affairs Committee
Chairman and Ranking Member, House Financial Services Committee
Office of Advocacy, U.S. Small Business Administration

Proposed Rules

Federal Register
Vol. 86, No. 150
Monday, August 9, 2021

This section of the FEDERAL REGISTER contains notices to the public of the proposed issuance of rules and regulations. The purpose of these notices is to give interested persons an opportunity to participate in the rule making prior to the adoption of the final rules.

DEPARTMENT OF ENERGY

10 CFR Part 430

[EERE–2021–BT–STD–0003]

RIN 1904–AF13

Energy Conservation Program for Appliance Standards: Procedures, Interpretations, and Policies for Consideration in New or Revised Energy Conservation Standards and Test Procedures for Consumer Products and Commercial/Industrial Equipment

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Extension of public comment period.

SUMMARY: On July 7, 2021, the U.S. Department of Energy ("DOE") published a notice of proposed rulemaking ("NOPR") pertaining to procedures, interpretations, and policies for consideration in new or revised energy conservation standards and test procedures for consumer products and commercial/industrial equipment. The notice provided an opportunity for submitting written comments, data, and information by August 23, 2021. On July 29, 2021, DOE received a request from the Association of Home Appliance Manufacturers, the Air Conditioning, Heating, and Refrigeration Institute, and the National Electrical Manufacturers Association ("Joint Commenters"), to extend the public comment period to September 13, 2021. DOE has reviewed this request and is granting an extension of the public comment period to allow public comments to be submitted until September 13, 2021.

DATES: The comment period for the NOPR published on July 7, 2021 (86 FR 35668) is extended. DOE will accept comments, data, and information regarding this NOPR on or before September 13, 2021.

ADDRESSES: Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at *www.regulations.gov*. Follow the instructions for submitting comments. Alternatively, interested persons may submit comments, identified by docket number EERE–2021–BT–STD–0003 by any of the following methods:

1. *Federal eRulemaking Portal: www.regulations.gov*. Follow the instructions for submitting comments.

2. *Email:* To *processrule2021STD0003@ee.doe.gov*. Include docket number EERE–2021–BT–STD–0003 in the subject line of the message.

No telefacsimilies ("faxes") will be accepted.

Although DOE has routinely accepted public comment submissions through a variety of mechanisms, including postal mail and hand delivery/courier, the Department has found it necessary to make temporary modifications to the comment submission process in light of the ongoing COVID–19 pandemic. DOE is currently suspending receipt of public comments via postal mail and hand delivery/courier. If a commenter finds that this change poses an undue hardship, please contact Appliance Standards Program staff at (202) 586–1445 to discuss the need for alternative arrangements. Once the COVID–19 pandemic health emergency is resolved, DOE anticipates resuming all of its regular options for public comment submission, including postal mail and hand delivery/courier.

Docket: The docket for this activity, which includes **Federal Register** notices, comments, and other supporting documents/materials, is available for review at *www.regulations.gov*. All documents in the docket are listed in the *www.regulations.gov* index. However, not all documents listed in the index may be publicly available, such as information that is exempt from public disclosure.

The docket web page can be found at: *www.regulations.gov/docket/EERE-2021-BT-STD-0003*. The docket web page contains instructions on how to access all documents, including public comments, in the docket.

FOR FURTHER INFORMATION CONTACT: Mr. John Cymbalsky, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, EE–5B, 1000 Independence Avenue SW, Washington, DC 20585–0121. Telephone: (202) 287–1692. Email: *ApplianceStandardsQuestions@ee.doe.gov*.

Mr. Pete Cochran, U.S. Department of Energy, Office of the General Counsel, GC–33, 1000 Independence Avenue SW, Washington, DC 20585–0121. Telephone: (202) 586–9496. Email: *Peter.Cochran@hq.doe.gov*.

For further information on how to submit a comment or review other public comments and the docket contact the Appliance and Equipment Standards Program staff at (202) 287–1445 or by email: *ApplianceStandardsQuestions@ee.doe.gov*.

SUPPLEMENTARY INFORMATION: On April 12, 2021, DOE proposed major revisions to the Department's "Procedures, Interpretations, and Policies for Consideration of New or Revised Energy Conservation Standards and Test Procedures for Consumer Products and Certain Commercial/Industrial Equipment" ("Process Rule") in a notice of proposed rulemaking that accepted comments on those proposed revisions through May 27, 2021 (86 FR 18901). In a subsequent NOPR that published on July 7, 2021, DOE proposed additional revisions to the Process Rule and requested comment on the proposals and any potential alternatives (86 FR 35668). These additional proposed revisions are consistent with current DOE practice and would remove unnecessary obstacles to DOE's ability to meet its statutory obligations under the Energy Policy and Conservation Act ("EPCA"). On July 29, 2021, interested parties in the matter, the Joint Commenters, requested an extension of the public comment period for the NOPR to September 13, 2021.[1] The Joint Commenters asked for this additional time due to their assertion that the proposed rule is complex and multi-faceted which requires more time to effectively review it and formulate their comments. The Joint Commenters also stated that they would need more time after the public webinar to formulate and submit their comments.

DOE has reviewed the request and is extending the comment period to September 13, 2021 to allow additional

[1] The joint commenters submitted the request to DOE via email and is available in the docket at *https://www.regulations.gov/document/EERE-2021-BT-STD-0003-0047*.

time for interested parties to submit comments.

Signing Authority

This document of the Department of Energy was signed on August 2, 2021, by Kelly Speakes-Backman, Principal Deputy Assistant Secretary and Acting Assistant Secretary for Energy Efficiency and Renewable Energy, pursuant to delegated authority from the Secretary of Energy. That document with the original signature and date is maintained by DOE. For administrative purposes only, and in compliance with requirements of the Office of the Federal Register, the undersigned DOE Federal Register Liaison Officer has been authorized to sign and submit the document in electronic format for publication, as an official document of the Department of Energy. This administrative process in no way alters the legal effect of this document upon publication in the **Federal Register**.

Signed in Washington, DC, on August 3, 2021.

Treena V. Garrett,

Federal Register Liaison Officer, U.S. Department of Energy.

[FR Doc. 2021–16828 Filed 8–6–21; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF ENERGY

10 CFR Part 431

[EERE–2020–BT–STD–0018]

RIN 1904–AE54

Energy Conservation Program: Energy Conservation Standards for Certain Commercial and Industrial Equipment; Early Assessment Review; Commercial and Industrial Pumps

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Request for information.

SUMMARY: The U.S. Department of Energy ("DOE") is undertaking an early assessment review for amended energy conservation standards for commercial and industrial pumps ("pumps") to determine whether to amend applicable energy conservation standards for this equipment. Specifically, through this request for information ("RFI"), DOE seeks data and information to evaluate whether amended energy conservation standards would result in a significant savings of energy; be technologically feasible; and be economically justified. DOE welcomes written comments from the public on any subject within the scope of this document (including those topics not specifically raised in this RFI), as well as the submission of data and other relevant information concerning this early assessment review.

DATES: Written comments and information are requested and will be accepted on or before September 8, 2021.

ADDRESSES: Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at *https://www.regulations.gov.* Follow the instructions for submitting comments. Alternatively, interested persons may submit comments, identified by docket number EERE–2021–BT–STD–0018, by any of the following methods:

1. *Federal eRulemaking Portal: https://www.regulations.gov.* Follow the instructions for submitting comments.
2. *Email:* to *Pumps2021STD0018@ee.doe.gov.* Include docket number EERE–2021–BT–STD–0018 in the subject line of the message.

No telefacsimiles ("faxes") will be accepted. For detailed instructions on submitting comments and additional information on this process, see section III of this document.

Although DOE has routinely accepted public comment submissions through a variety of mechanisms, including postal mail and hand delivery/courier, the Department has found it necessary to make temporary modifications to the comment submission process in light of the ongoing Covid–19 pandemic. DOE is currently suspending receipt of public comments via postal mail and hand delivery/courier. If a commenter finds that this change poses an undue hardship, please contact Appliance Standards Program staff at (202) 586–1445 to discuss the need for alternative arrangements. Once the Covid–19 pandemic health emergency is resolved, DOE anticipates resuming all of its regular options for public comment submission, including postal mail and hand delivery/courier.

Docket: The docket for this activity, which includes **Federal Register** notices, comments, and other supporting documents/materials, is available for review at *https://www.regulations.gov.* All documents in the docket are listed in the *https://www.regulations.gov* index. However, some documents listed in the index, such as those containing information that is exempt from public disclosure, may not be publicly available.

The docket web page can be found at: *http://www.regulations.gov/docket/EERE-2021-BT-STD-0018.* The docket web page contains instructions on how to access all documents, including public comments, in the docket. See section III for information on how to submit comments through *https://www.regulations.gov.*

FOR FURTHER INFORMATION CONTACT:

Mr. Jeremy Dommu, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, EE–5B, 1000 Independence Avenue SW, Washington, DC 20585–0121. Telephone: (202) 586–9870. Email: *ApplianceStandardsQuestions@ee.doe.gov.*

Mr. Michael Kido, U.S. Department of Energy, Office of the General Counsel, GC–33, 1000 Independence Avenue SW, Washington, DC 20585–0121. Telephone: (202) 586–8145. Email: *Michael.Kido@hq.doe.gov.*

For further information on how to submit a comment or review other public comments and the docket, contact the Appliance and Equipment Standards Program staff at (202) 287–1445 or by email: *ApplianceStandardsQuestions@ee.doe.gov.*

SUPPLEMENTARY INFORMATION:

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I. Introduction

DOE has established an early assessment review process to conduct a more focused analysis to evaluate, based on statutory criteria, whether a new or amended energy conservation standard is warranted. Based on the information received in response to the RFI and DOE's own analysis, DOE will determine whether to proceed with a rulemaking for a new or amended energy conservation standard. If DOE makes an initial determination that a new or amended energy conservation standard would satisfy the applicable statutory criteria or DOE's analysis is inconclusive, DOE would undertake the preliminary stages of a rulemaking to issue a new or amended energy conservation standard. If DOE makes an

ATTACHMENT 3

Characteristics	Units by Structure Type									
	Total	1, detached	1, attached	2 to 4 Units	5 to 9 Units	10 to 19 Units	20 to 49 Units	50 or more	Manufactured/ mobile home	Other (Boat, RV, van, etc.)
	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
Monthly Cost Paid for Electricity										
Electricity paid separately	118,193	78,288	6,219	8,280	5,393	4,743	4,028	4,613	6,557	72
Less than $25	1,440	653	S	213	114	84	120	142	S	.
$25 to $49	9,582	3,297	440	1,709	992	872	766	1,060	416	S
$50 to $74	19,455	10,062	1,052	2,295	1,525	1,295	1,191	1,266	754	S
$75 to $99	20,761	12,779	1,161	1,750	1,132	1,105	875	965	988	S
$100 to $149	32,361	22,947	1,873	1,590	1,183	1,012	821	849	2,071	S
$150 to $199	17,833	14,202	885	499	316	254	185	232	1,255	S
$200 or more	16,760	14,348	784	225	131	122	70	98	982	.
Median (dollars)[5]	109	124	108	74	75	77	73	72	122	69
Mean (dollars)[5]	126	141	125	84	85	85	81	80	133	82
Included in rent, other fee, or obtained free	5,827	969	247	830	610	420	675	1,855	197	S
Monthly Cost Paid for Gas										
Gas paid separately	76,452	56,924	4,466	4,847	2,254	1,788	1,518	1,813	2,782	59
Less than $25	9,979	4,728	505	1,152	727	561	650	903	718	S
$25 to $49	24,417	17,259	1,419	1,809	994	769	510	601	1,044	S
$50 to $74	19,728	16,051	1,276	933	333	301	201	186	447	S
$75 to $99	10,083	8,421	680	425	104	94	100	61	194	6
$100 to $149	7,690	6,595	402	334	72	S	S	48	180	S

$150 to $199	2,258	1,891	119	115	S	S	S	S	73	S
$200 or more	2,296	1,979	66	80	S	S	S	S	126	S
Median (dollars)[5]	53	58	54	40	31	32	28	25	40	S
Mean (dollars)[5]	68	73	64	53	40	41	40	31	60	S
Included in rent, other fee, or obtained free	8,273	2,044	312	1,172	825	809	951	1,904	233	S
Monthly Cost Paid for Fuel Oil[4]										
Fuel oil paid separately	5,408	4,548	275	247	S	S	32	37	172	.
Less than $25	325	228	S	S	S	S	S	S	S	.
$25 to $49	363	294	S	S	.	S	.	.	S	.
$50 to $74	640	504	S	S	S	S	S	.	31	.
$75 to $99	717	599	45	37	S	S	S	S	S	.
$100 to $149	1,212	1,051	42	S	S	S	.	S	62	.
$150 to $199	917	795	S	S	S	S	S	S	S	.
$200 or more	1,235	1,076	51	62	.	S	S	S	S	.
Median (dollars)[5]	125	125	100	100	S	S	S	150	83	.
Mean (dollars)[5]	141	143	125	163	55	148	S	159	88	.
Included in rent, other fee, or obtained free	1,891	269	63	288	205	130	282	641	S	.
Monthly Cost Paid for Other Fuel										
Other fuel paid separately	4,530	3,719	93	98	59	36	S	31	465	.
Less than $25	2,067	1,712	48	53	50	29	S	S	147	.
$25 to $49	1,079	897	S	S	S	S	S	S	129	.
$50 to $74	601	482	S	S	S	.	.	S	88	.
$75 to $99	361	310	S	S	S	.	S	S	S	.
$100 to $149	238	175	S	S	S	.	S	.	44	.
$150 to $199	103	79	S	.	.	.	S	S	S	.

$200 or more	80	63	.	.	.	.	.	.	S	.
Median (dollars)[5]	25	25	S	21	S	S	S	S	33	.
Mean (dollars)[5]	42	41	41	32	23	10	58	S	55	.
Included in rent, other fee, or obtained free	4,684	3,875	120	103	43	56	S	112	317	

Home Innovation
RESEARCH LABS™

2021 IECC Residential Cost Effectiveness Analysis

Prepared For

National Association of Home Builders

June 2021

Report No. CR1391_06112021

400 Prince George's Blvd. | Upper Marlboro, MD 20774 | 800.638.8556 | HomeInnovation.com

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ACRONYMS, ABBREVIATIONS, AND DEFINITIONS

AC	Air Conditioner
AFUE	Annual Fuel Utilization Efficiency
c.i.	Continuous Insulation
COP	Coefficient of Performance
CZ	Climate Zone
EA	Each
EF	Energy Factor
ERI	Energy Rating Index
GF	Gas Furnace
HP	Heat Pump
HPWH	Heat Pump Water Heater
HSPF	Heating Seasonal Performance Factor
IECC	International Energy Conservation Code
IRC	International Residential Code
LF	Linear Feet
O&P	Overhead and Profit
SEER	Seasonal Energy Efficiency Ratio
SF	Square Feet
UEF	Uniform Energy Factor
WH	Water Heater

BACKGROUND

The 2021 International Energy Conservation Code (IECC) includes several changes which impact both energy savings and construction costs for residential construction.

The objective of this analysis is to quantify the incremental construction cost and energy use cost savings associated with constructing a house compliant with the 2021 IECC relative to a 2018 IECC baseline and to evaluate the cost-effectiveness of the code changes.

METHODOLOGY

To evaluate the cost effectiveness of the 2021 IECC changes, Home Innovation Research Labs (Home Innovation) determined incremental construction costs and energy use costs using a Standard Reference House with multiple configurations and in multiple locations, constructed in accordance with the prescriptive compliance requirements of the 2018 IECC and 2021 IECC Residential Provisions ("Sections R401 through R404" in the 2018 IECC; "Prescriptive Compliance Option" in the 2021 IECC). The results provided a basis for estimating energy use savings and simple paybacks.

The analysis for this study is based on a methodology[1] developed by Home Innovation (formerly NAHB Research Center) to calculate energy savings. This methodology defined a Standard Reference House, including the building configuration and energy performance parameters, that was originally used to report an analysis of the 2012 IECC code changes[2].

For analysis in this report, annual energy use costs were developed using BEopt[3] 2.8.0.0 hourly simulation software and energy prices from the U.S. Energy Information Agency[4]. The energy prices are national average annual 2019 residential prices: $0.1301/kWh for electricity; $1.051/therm for natural gas.

Construction costs were developed based on RSMeans[5] 2021 Residential Cost Data. Costs for mechanical equipment were sourced from distributor web sites. Costs associated with testing or documentation provided by an energy rater were estimated based on an internet search of fees on rater web sites. Cost details are provided for individual code changes in Appendix A and by climate zone in Appendix B.

Appendix A costs are reported as both total to the builder and total to consumer. The total cost to builder includes overhead and profit (designated in the tables as "w/O&P") applied to individual component costs (materials and labor) to represent the cost charged by the sub-contractor. The total cost to consumer is based on applying a builder's gross profit margin of 19.0% to the builder's total cost[6]. These represent national average costs. For specific locations, the Appendix A costs could be

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[1] Methodology for Calculating Energy Use in Residential Buildings. NAHB Research Center, May 2012.

[2] 2012 IECC Cost Effectiveness Analysis. NAHB Research Center, May 24, 2012.

[3] BEopt (Building Energy Optimization Tool) software: https://beopt.nrel.gov/home

[4] Energy Information Agency: https://www.eia.gov/

[5] RSMeans, https://www.rsmeans.com/

[6] Industry average gross profit margin for 2017, as reported in NAHB's Builder's Cost of Doing Business Study, 2019 Edition. https://eyeonhousing.org/2019/03/builders-profit-margins-continue-to-slowly-increase/?_ga=2.73913042.1310550892.1620653840-1896975365.1593698293

modified by applying the appropriate location adjustment factor from RSMeans; selected location adjustment factors from RSMeans are listed in Appendix C.

Standard Reference House

The building geometry (Figure 1) used in this analysis is documented in the methodology paper and was originally developed using Home Innovation's 2009 Annual Builder Practices Survey (ABPS) for a representative single-family detached home. The parameters represent the average values from the ABPS for building areas and features not dictated by the IECC. The geometry has been updated based on Home Innovation's 2019 ABPS. Table 1 shows the floor, attic, wall, and window areas used in the Standard Reference House for this study.

Table 1. Average Wall and Floor Areas of the Reference House

Reference House Component	Area (SF)
1st floor conditioned floor area (CFA)	1,875
2nd floor CFA	625
Total CFA without conditioned basement	2,500
Foundation perimeter, linear feet (LF)	200 LF
Slab/basement/crawl floor area	1,875
Total CFA with conditioned basement	4,375
Ceiling area adjacent to vented attic	1,875
1st floor gross wall area (9' height)	1,800
2nd floor gross wall area (8.75' height)	875
Total above grade wall area (excludes rim areas)	2,675
Basement wall area (8' height; 2' above grade)	1,600
Crawlspace wall area (4' height; 2' above grade)	800
Window area (15% of CFA above grade)	375

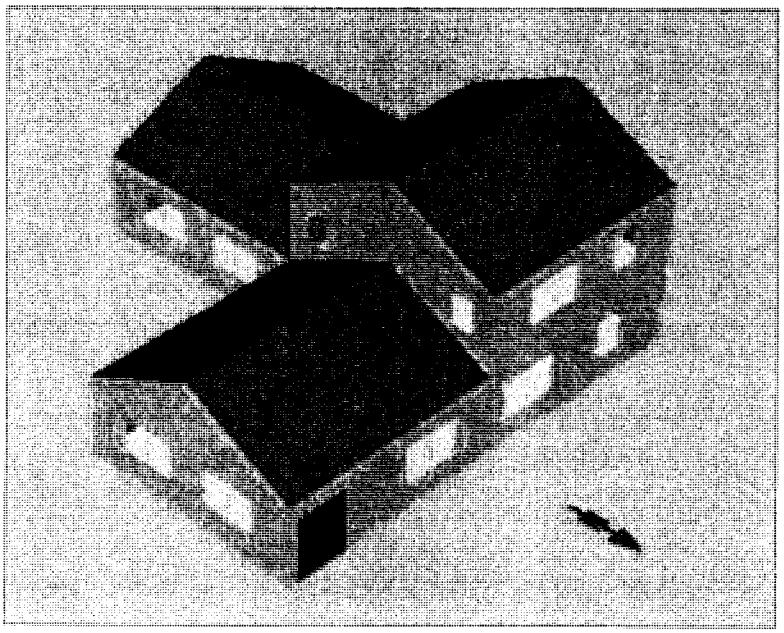


Figure 1. Simulation Model of Standard Reference House

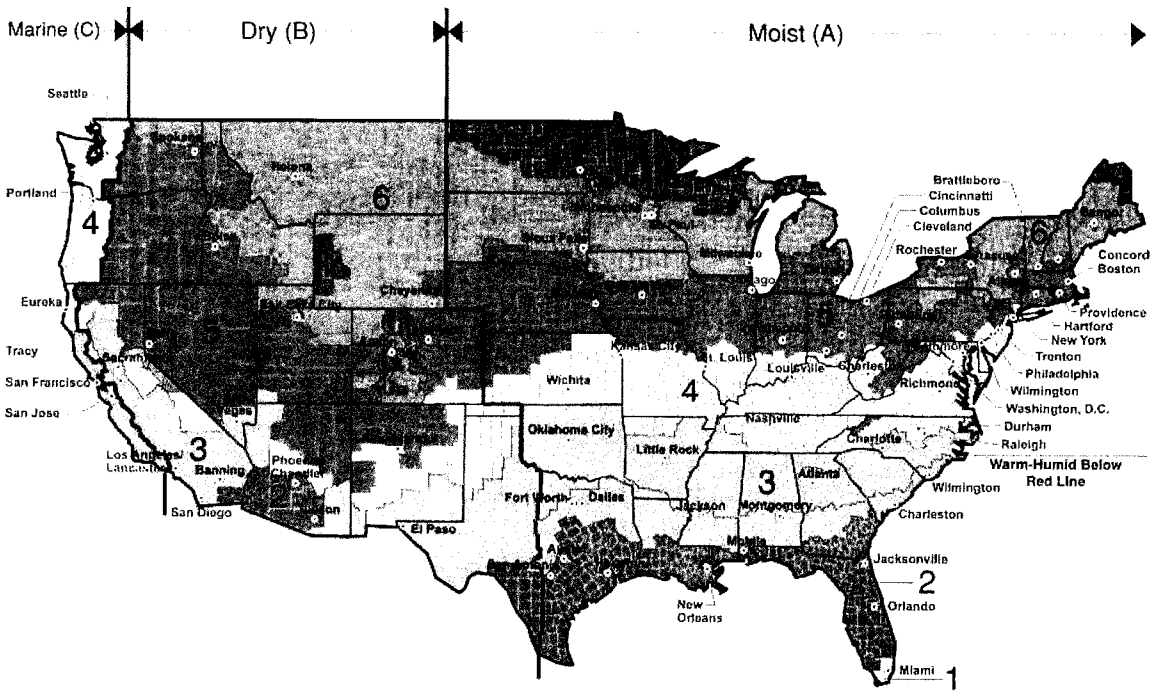
Representative Locations

Six cities (Table 2) representing DOE Climate Zones 2 through 7 (Figure 2) were selected to quantify energy savings for their respective climates.

Table 2. Representative Locations

Climate Zone	**2**	**3**	**4**	**5**	**6**	**7**
City	Phoenix	Memphis	Baltimore	Chicago	Helena	Duluth
State	Arizona	Tennessee	Maryland	Illinois	Montana	Minnesota
Moisture Region	Dry	Moist	Moist	Moist	Dry	N/A
HDD65*	1,050	2,960	4,600	6,330	7,660	9,570
CDD65*	4,640	2,110	1,233	842	317	162

*Daily Average Weather Data (TMY). Source: Residential Energy Dynamics, redcalc.com



All of Alaska in Zone 7 except for the following Boroughs in Zone 8: Bethel, Dellingham, Fairbanks, N. Star, Nome North Slope, Northwest Arctic, Southeast Fairbanks, Wade Hampton, and Yukon-Koyukuk

Zone 1 includes: Hawaii, Guam, Puerto Rico, and the Virgin Islands

Figure 2. DOE Climate Zone Map

Configurations and Weighted Averaging

Weighted averaging was applied both within and across climate zones based on market statistics for new single-family detached homes as reported by the 2019 ABPS. Within climate zones, weight factors were applied for wall types (light-framed and mass walls) and foundation types (slab, basement, and crawlspace).

The heating fuel used for this analysis, either natural gas or electric, was selected based on the predominant heating fuel in each climate. The predominant fuel for heating is also used for domestic hot water. All other appliances are electric.

Once the costs within a climate zone were determined, a weighted calculation according to housing starts for each climate zone was performed to obtain a national average across climate zones. Weighting averages used for this analysis are shown in Table 3.

Table 3. Construction Data. Source: adapted from Home Innovation's 2019 ABPS

	CZ 2	CZ 3	CZ 4	CZ 5	CZ 6	CZ 7
Component	**Phoenix**	**Memphis**	**Baltimore**	**Chicago**	**Helena**	**Duluth**
Primary heating fuel	Electric	Electric	Nat Gas	Nat Gas	Nat Gas	Nat Gas
Mass Wall	30%	10%				
Frame Wall	70%	90%	100%	100%	100%	100%
Slab Foundation	100%	75%	20%	15%	5%	30%
Basement Foundation, finished		10%	60%	70%	90%	5%
Crawlspace, vented		15%	20%			
Crawlspace, conditioned				15%	5%	65%
Housing Starts	28%	28%	21%	17%	5%	1%

HVAC and Water Heating Equipment

The Reference Houses utilize federal minimum efficiency HVAC systems and water heaters as shown in Table 4, except where the 2021 IECC houses are evaluated separately with higher efficiency equipment options suitable for the climate as shown in Table 5.

High efficiency HVAC systems for electric houses consist of air-source heat pump systems (i.e., not ground source or geothermal systems) with variable speed compressors ("inverter" drive compressors that provide variable refrigerant flow). The inverter systems are generally required to meet the minimum HSPF requirement for the heat pump efficiency option for 2021 (10 HSPF/16 SEER; see next section for description of 2021 efficiency package options). In addition to higher efficiencies, inverter systems are considered more suitable for colder climates because these can ramp up to provide higher heating capacities at lower outdoor temperatures compared to typical single-stage or two-stage equipment.

High efficiency water heaters for electric houses consist of heat pump water heater, 50 gallon capacity, 2.0 EF[7]

Table 4. Standard Efficiency Equipment

Reference House	Equipment
Gas	80 AFUE gas furnace + 13 SEER air conditioner (CZ 5-7) or 14 SEER (CZ 4)
	40 gallon gas natural draft water heater, 0.58 UEF
Electric	14 SEER/8.2 HSPF air source heat pump
	50 gallon electric water heater, 0.92 UEF

Table 5. High Efficiency Equipment Options

Reference House	Equipment
Gas	95 AFUE gas furnace + 16 SEER air conditioner
	Tankless gas direct vent water heater, 0.82 UEF
Electric	16 SEER/10 HSPF inverter heat pump, rated to 7°F (CZ 2-3) or -13°F (CZ 5)
	Heat pump water heater, 50 gal, 2.0 EF

[7] UEF (Uniform Energy Factor) is the current measure of water heater overall efficiency; the higher the UEF value, the more efficient the water heater; UEF is determined by the Department of Energy's test method outlined in 10 CFR Part 430, Subpart B, Appendix E.

Changes for 2021

There are significant changes in the 2021 IECC compared to the 2018 IECC that impact construction cost and energy use cost. Changes to the prescriptive insulation and fenestration requirements include increased ceiling insulation (CZ 2-8), increased continuous insulation on frame walls (CZ 4-5), increased slab insulation (CZ 3-5), and lower window U-factor (CZ 3-4); these changes are shown in Appendix D.

Additional requirements include changes for lighting efficiency and controls; additional air sealing; duct testing even if ducts are entirely inside conditioned space; increased fan efficacy and testing for whole-dwelling ventilation fans; installing an HRV or ERV in CZ 7-8.

The 2021 IECC also has a new section that establishes additional requirements appliable to all compliance approaches to achieve additional energy efficiency (R401.2.5 Additional energy efficiency). The prescriptive approach requires installing one of the five prescribed additional efficiency package options:

- Enhanced envelope performance (5% improvement of UA and SHGC)
- More efficient HVAC equipment performance (minimum 95 AFUE natural gas furnace and 16 SEER air conditioner, 10 HSPF/16 SEER air source heat pump, or 3.5 COP ground source heat pump)
- Reduced energy use in service water-heating (minimum 0.82 EF fossil fuel water heater, 2.0 EF electric water heater, or 0.4 solar fraction solar water heating system)
- More efficient duct thermal distribution system (100% of ducts and air handlers located entirely within the building thermal envelope, 100% ductless systems, or 100% duct system located in conditioned space as defined by Section R403.3.2)
- Improved air sealing (max 3.0 ACH50) and efficient ventilation (ERV or HRV: min 75% SRE; max 1.1 CFM/Watt; shall not use recirculation as a defrost strategy; min 50% LRMT for ERV). For this study, when evaluating this option, the ERV (CZ 2-4) or HRV (CZ 5-7) was modeled in accordance with the 2021 IRC that provides for a ventilation rate credit of 30% where certain criteria are met; houses in CZ 2 were also modeled with a tighter building enclosure (3 ACH50 instead of 5 ACH50).

For houses that already meet the requirements for the efficient duct option (e.g., ducts and air handlers located entirely inside conditioned space) or efficient ventilation/improved air sealing option (e.g., HRV or ERV is now required in CZ 7), no additional efficiency package is required; otherwise, one of the efficiency packages must be selected at additional cost. For this study, the methodology defines houses with basement and conditioned crawlspace foundations as having ducts and air handlers inside conditioned space, and houses with slab and vented crawlspace foundatons as having some ducts outside of conditioned space. Therefore, only houses with slab and vented crawlspace foundations were evaluated for the efficient duct option.

The enhanced envelope option was not evaluted for this study due to it is not considered a reasonably viable option for builders at this time.

For the 2021 IECC, 10 code changes were identified that are considered to have a direct impact on energy use in residential buildings, for a sufficient number of new homes, and which can be reasonably

quantified in estimating energy impact. Those 10 changes were included in the energy modeling and are identified in Table 6 with an asterisk.

RESULTS

Construction Costs

The incremental construction costs for the individual code changes that were selected to be evaluated for this study are summarized in Table 6. The cost details are provided in Appendix A for individual changes; Appendix B shows costs by climate zone. The weighted averages of construction costs are shown in Table 7. Changes that represent potential additional construction costs that may or may not affect the Reference House are shown separately in Table 8.

Table 6. Incremental Construction Cost of Individual Code Change for the Reference House

Proposal	Description	Affected CZ	Reference House
RE7*	Lighting: revised definition of high-efficacy	All	$0
RE18/20/21	Certificate: additional info	All	$99
RE29*	Frame wall, c.i.: R5 to R10 (2x4); R0 to R5 (2x6)	4-5	$4,970
RE32*	Slab edge: NR to R10/2 (CZ3)	3	$1,988
"	Slab edge: R10/2 to R10/4 (CZ4-5)	4-5	$993
RE33*	Ceiling insulation R38 to R49	2-3	$1,366
RE36*	Ceiling insulation R49 to R60	4-7	$1,366
RE34	Floors, removes exception for min R19 if fills cavity	5-8	NA
RE35*	Windows: reduces U-value from 0.32 to 0.30	3-4	$76
RE37	Windows: changes SHGC form NR to 0.40	5 & 4C	$0
RE105	Windows: reduces max SHGC tradeoff from 0.50 to 0.40	2-3	$0
RE46	Attic access hatch: no direct cost; cost of additional insulation	All	$13
RE49	Baffles at attic access	All	$12
RE72	Air seal narrow framing cavities	All	$156
RE82	Air seal rim (basement; unvented crawlspace)	All	$1,252
"	Air seal rim (slab, vented crawlspace)	All	$417
RE96	House tightness, allows trade-off for performance path	All	$0
RE103	Air seal electrical & communication outlet boxes	All	$369
RE106	Thermostat: requires 7-day programming	All	$0
RE112	Removes exception for duct test (basement, unvented crawl)	All	$247
RE130	Adds requirement to test whole-dwelling ventilation	All	$62
RE133*	Updates ventilation fan efficacy (affects bath EF)	All	$66
RE139*	Requires ERV/HRV in CZ 7-8 (includes RE134 reqs.)	7	$3,206
RE145*	Lighting: 100% high-efficacy; controls (slab)	All	$49
"	Lighting: 100% high-efficacy; controls (basement, crawl)	All	$60
RE148	Lighting, commercial	All	NA
RE149	Lighting: exterior controls	All	$25
RE151	Performance path backstop: 2009 IECC	All	NA
RE178	Performance path ventilation type to match proposed	All	NA
CE40.2	Insulation certificate if no manufacturer mark (i.e., blown)	All	$15
CE151.2	Defines duct TDE; adds requirements for underground ducts	All	NA

RE209*	Additional efficiency package options:	All	
	HVAC, gas house, 95 AFUE/16 SEER for 13 SEER baseline	5-7	$1,494
	HVAC, gas house, 95 AFUE/16 SEER for 14 SEER baseline	4	$1,317
	HVAC, electric house, 10 HSPF/18 SEER heat pump rated to 7F	2-3	$5,721
	HVAC, electric house, 10 HSPF/16 SEER (10/18, rated -13F)	5	$8,196
	Water Heater, gas house, tankless direct-vent, 0.82 UEF	All	$740
	Heat Pump Water Heater, electric house, 50 gal, 2.0 EF	2-3	$1,331
	Ventilation, gas house	4-7	$3,206
	Ventilation, electric house	3-5	$3,109
	Ventilation, electric house with improved air tightness	2	$4,591
	Duct, slab house, buried ducts in attic	2-3	$4,125
	Duct, slab house, buried ducts in attic	4-7	$1,736
	Duct, vented crawlspace house	3	($852)
	Duct, vented crawlspace house	4	($193)

*Indicates a code change that was included in the energy modeling analysis for this study (10 total)

Table 7. Incremental Construction Cost for 2021 Reference House, weighted averages

Configuration	National Average	CZ 2 Phoenix	CZ 3 Memphis	CZ 4 Baltimore	CZ 5 Chicago	CZ 6 Helena	CZ 7 Duluth
Total without additional efficiency package options	$5,477	$2,648	$4,326	$8,550	$8,695	$3,685	$6,618
Total with HVAC option	$9,301	$8,369	$10,047	$9,867	$10,188	$5,179	$8,112
Total with Water Heater option	$6,548	$3,979	$5,657	$9,290	$9,435	$4,426	$7,358
Total with Ventilation option	$9,011	$7,238	$7,435	$11,755	$11,900	$6,891	$6,618
Total with Duct option, slab house	$8,550	$6,773	$8,451	$10,286	$10,431	$5,421	$8,354
Total with Duct option, vented crawlspace house			$3,474	$8,356			

Table 8. Potential Additional Cost of Individual Code Change for the Reference House

Proposal	Description	Affected CZ	Reference House
RE47	Attic pull-down stair: adds exception to insulation requirements	2-3	($90)
	Same	4	($119)
RE49	Baffles at tray ceiling (example)	2-3	$183
	Same	4-7	$231
RE52	Walls: removes exception for reduced c.i. at WSP	3-7	$640-$2,652
RE55	Adds requirements for unconditioned basements	4-5	$59
RE109	Floor insulation for ducts in conditioned space: min R19	2	$87
RE134	Adds min efficacy for air handlers if integrated w/ventilation	All	$1,222

Energy Use Costs and Savings

The modeling results for annual energy use costs are shown in Table 9. The estimated energy savings, as a percentage of energy use costs, are shown in Table 10. The values shown in Table 9 and Table 10 are weighted averages; energy use details are provided in Appendix E.

Cost Effectiveness

The construction costs (Table 7) and annual energy use costs (Table 9) provide the basis to calculate simple paybacks, shown in Table 11.

Table 9. Annual Energy Use Cost for Reference House, weighted averages

Configuration	National Average	CZ 2 Phoenix	CZ 3 Memphis	CZ 4 Baltimore	CZ 5 Chicago	CZ 6 Helena	CZ 7 Duluth
2018 baseline, all houses	$2,129	$2,224	$2,027	$1,934	$2,280	$2,388	$2,599
slab houses only	$2,074	$2,224	$2,024	$1,807	$2,156	$2,221	$2,735
vented crawl houses only			$1,959	$1,826			
2021 without additional efficiency package options	$2,016	$2,163	$1,890	$1,797	$2,137	$2,310	$2,514
2021 with HVAC option	$1,882	$2,045	$1,768	$1,680	$1,959	$2,113	$2,266
2021 with Water Heater option	$1,922	$2,028	$1,741	$1,761	$2,106	$2,283	$2,505
2021 with Ventilation option	$1,994	$2,144	$1,876	$1,778	$2,104	$2,251	$2,495
2021 with Duct option, slab house	$1,851	$2,046	$1,789	$1,585	$1,889	$1,985	$2,418
2021 with Duct option, vented crawlspace house			$1,845	$1,644			

Table 10. Energy Cost Savings relative to 2018 Baseline Reference House

Configuration	National Average	CZ 2 Phoenix	CZ 3 Memphis	CZ 4 Baltimore	CZ 5 Chicago	CZ 6 Helena	CZ 7 Duluth
2021 without additional efficiency package options	5.3%	2.7%	6.8%	7.1%	6.3%	3.3%	3.3%
2021 with HVAC option	11.6%	8.0%	12.8%	13.1%	14.1%	11.5%	12.8%
2021 with Water Heater option	9.7%	8.8%	14.1%	8.9%	7.7%	4.4%	3.6%
2021 with Ventilation option	6.4%	3.6%	7.5%	8.1%	7.7%	5.7%	na
2021 with Duct option, slab house	10.7%	8.0%	11.6%	12.3%	12.4%	10.6%	11.6%
2021 with Duct option, vented crawlspace house			5.8%	10.0%			

Table 11. Simple Payback relative to 2018 Baseline Reference House, years

Configuration	National Average	CZ 2 Phoenix	CZ 3 Memphis	CZ 4 Baltimore	CZ 5 Chicago	CZ 6 Helena	CZ 7 Duluth
2021 without additional efficiency package options	48	43	31	62	61	47	78
2021 with HVAC option	38	47	39	39	32	19	24
2021 with Water Heater option	32	20	20	54	54	42	79
2021 with Ventilation option	67	90	49	75	68	50	63
2021 with Duct option, slab house	38	38	36	46	39	23	26
2021 with Duct option, vented crawlspace house			30	46			

As mentioned in the Methodology section, houses were evaluated based on using either natural gas or electricity as the fuel for heating and hot water: electric in CZ 2-3; gas in CZ 4-7. To illustrate the difference in energy savings for comparison purposes by way of an example, houses in CZ 3 were also modeled using gas, and sample results are shown in Table 12. For houses with the water heater option, the energy savings decreased from 14.1% for electric houses (from Table 10) to 9.9% for gas houses, with a weighted average of 12.2%; the national average energy savings decreased from 9.7% (from Table 10) to 9.3%.

Table 12. Example Comparison of Gas vs. Electric Energy Cost Savings relative to 2018 baseline

Configuration	CZ 3 Memphis			National Average
	Electric	Gas	Weighted Ave*	
2021 without additional efficiency package options	6.8%	7.6%	7.1%	5.5%
2021 with Water Heater option	14.1%	9.9%	12.2%	9.3%

*Weighted average based on 55% electric houses and 45% gas houses, adapted from ABPS

Cost Effectiveness of Selected Code Changes

Individual code changes were selected for evaluation. The results are shown by applicable climate zone for thermal envelope changes in Tables 13 through 16, the required HRV in CZ 7 in Table 17, and the additional efficiency package options in Tables 18 through 21.

Table 13. Incremental Construction Cost of Thermal Envelope Changes

	CZ 2	CZ 3	CZ 4	CZ 5	CZ 6	CZ 7
Component	Phoenix	Memphis	Baltimore	Chicago	Helena	Duluth
Ceiling insulation	$1,366	$1,366	$1,366	$1,366	$1,366	$1,366
Slab insulation		$1,988	$993	$993		
Wall continuous insulation			$4,970	$4,970		
Window U-factor		$76	$76			

Table 14. Annual Energy Use Cost of Thermal Envelope Changes

	CZ 2	CZ 3	CZ 4	CZ 5	CZ 6	CZ 7
Configuration	Phoenix	Memphis	Baltimore	Chicago	Helena	Duluth
2018 baseline, all houses	$2,224	$2,027	$1,934	$2,280	$2,388	$2,599
2018 baseline, slab houses only		$2,024	$1,807	$2,156		
2018 + 2021 ceiling insulation	$2,216	$2,016	$1,925	$2,268	$2,376	$2,584
2018 + 2021 slab insulation, slab houses only		$1,936	$1,772	$2,120		
2018 + 2021 wall continuous insulation			$1,886	$2,217		
2018 + 2021 window U-factor		$2,020	$1,924			

Table 15. Energy Cost Savings of Thermal Envelope Changes relative to 2018 Baseline Reference House

	CZ 2	CZ 3	CZ 4	CZ 5	CZ 6	CZ 7
Configuration	Phoenix	Memphis	Baltimore	Chicago	Helena	Duluth
2018 + 2021 ceiling insulation	0.3%	0.6%	0.5%	0.5%	0.5%	0.6%
2018 + 2021 slab insulation, slab houses only		4.3%	1.9%	1.7%		
2018 + 2021 wall continuous insulation			2.5%	2.8%		
2018 + 2021 window U-factor		0.3%	0.5%			

Table 16. Simple Payback relative to 2018 Baseline Reference House for Thermal Envelope Changes, years

	CZ 2	CZ 3	CZ 4	CZ 5	CZ 6	CZ 7
Configuration	Phoenix	Memphis	Baltimore	Chicago	Helena	Duluth
2018 + 2021 ceiling insulation	177	122	152	118	105	90
2018 + 2021 slab insulation, slab houses only		23	28	28		
2018 + 2021 wall continuous insulation			103	78		
2018 + 2021 window U-factor		11	7			

Table 17. Cost effectiveness of HRV in CZ 7

Configuration	CZ 7 Duluth
Incremental cost of HRV	$3,206
Annual energy cost, 2021* without HRV	$2,538
Annual energy cost, 2021* with HRV	$2,514
Energy cost savings for HRV	1.0%
Simple payback, years	131

*Without additional efficiency package options

Table 18. Incremental Construction Cost of Additional Efficiency Package Options

Component	CZ 2 Phoenix	CZ 3 Memphis	CZ 4 Baltimore	CZ 5 Chicago	CZ 6 Helena	CZ 7 Duluth
HVAC option	$5,721	$5,721	$1,317	$1,494	$1,494	$1,494
Water heater option	$1,331	$1,331	$740	$740	$740	$740
Ventilation option	$4,591	$3,109	$3,206	$3,206	$3,206	
Duct option, slab house	$4,125	$4,125	$1,736	$1,736	$1,736	$1,736
Duct option, vented crawlspace house		($852)	($193)			

Table 19. Annual Energy Use Cost of Additional Efficiency Package Options

Configuration	CZ 2 Phoenix	CZ 3 Memphis	CZ 4 Baltimore	CZ 5 Chicago	CZ 6 Helena	CZ 7 Duluth
2021 without additional efficiency package options, all houses	$2,163	$1,890	$1,797	$2,137	$2,310	$2,514
slab houses only	$2,163	$1,867	$1,655	$1,999	$2,165	$2,639
vented crawlspace houses only		$1,890	$1,711			
2021 with HVAC option	$2,045	$1,768	$1,680	$1,959	$2,113	$2,266
2021 with Water Heater option	$2,028	$1,741	$1,761	$2,106	$2,283	$2,505
2021 with Ventilation option	$2,144	$1,876	$1,778	$2,104	$2,251	$2,495
2021 with Duct option, slab house	$2,046	$1,789	$1,585	$1,889	$1,985	$2,418
2021 with Duct option, vented crawlspace		$1,845	$1,644			

Table 20. Energy Cost Savings of Additional Efficiency Package Options relative to 2021 without packages

Configuration	CZ 2 Phoenix	CZ 3 Memphis	CZ 4 Baltimore	CZ 5 Chicago	CZ 6 Helena	CZ 7 Duluth
HVAC option	5.4%	6.4%	6.5%	8.3%	8.5%	9.9%
Water Heater option	6.2%	7.9%	2.0%	1.5%	1.2%	0.3%
Ventilation option	0.9%	0.7%	1.1%	1.5%	2.6%	0.8%
Duct option, slab house	5.4%	4.2%	4.2%	5.5%	8.3%	8.4%
Duct option, vented crawlspace house		2.4%	3.9%			

Table 21. Simple payback of efficiency package options relative to 2021 house without packages, years

Configuration	CZ 2 Phoenix	CZ 3 Memphis	CZ 4 Baltimore	CZ 5 Chicago	CZ 6 Helena	CZ 7 Duluth
HVAC option	49	47	11	8	8	6
Water Heater option	10	9	21	24	27	89
Ventilation option	240	226	167	97	54	0
Duct option, slab house	35	53	25	16	10	8
Duct option, vented crawlspace house		0	0			

CONCLUSIONS

Home Innovation conducted a cost effectiveness analysis of the 2021 IECC code changes for residential construction based on incremental construction costs and energy use costs developed for a Standard Reference House with multiple configurations and in multiple locations.

Key findings are summarized here for the 2021 Reference House relative to the 2018 Baseline Reference House, based on weighted averages within climate zones (foundation type, wall type) and across climates for national averages (based on housing starts):

- The national average incremental construction cost ranges from $6,548 to $9,301 depending on the additional efficiency package option selected for compliance.
- Depending on climate zone, the weighted average incremental construction cost may range up to $11,900.
- The national average energy use cost savings ranges from 6.4% to 11.6% depending on the additional efficiency package option selected for compliance.
- The national average simple payback for complying with the 2021 IECC ranges from 32 years to 67 years.
- The average simple paybacks for selected individual envelope code changes within associated climate zones are 78-103 years for wall continuous insulation, 23-28 years for slab insulation, and 90-177 years for ceiling insulation.
- The average simple payback for the additional efficiency package options within associated climate zones is 6-11 years for natural gas heating and 47-49 years for heat pump heating, 9-10 years for a heat pump water heater in CZ 2-3 relative to a conventional resistance water heater and 21-27 years for a natural gas water heater (except 89 years for a gas water heater in CZ 7), 54-240 years for Ventilation option, 25-53 years for Duct option for slab houses in CZ 2-4 and 8-16 years for Duct option in CZ 5-8.

APPENDIX A: COST OF INDIVIDUAL CODE CHANGES

The estimated construction costs for the selected individual code changes are shown below. Construction costs were developed using RSMeans[8] 2021 Residential Data. Costs for mechanical equipment were sourced from distributor web sites[9]. Costs associated with testing or documentation provided by an energy rater were estimated based on an internet search of rater web sites. See Appendix B for costs by climate zone.

RE7

Reference Code Section

R202 Defined terms; R404.1 Lighting equipment

Summary of the Code Change:

This code change revised the definition of HIGH EFFICACY LIGHT SOURCES. The new minimum efficacy is 65 lumens per watt for lamps and 45 lumens per watt for luminaires. Previously, the minimum efficacy was 60 lumens per watt for lamps over 40 watts, 50 for lamps over 15 watts to 40 watts, and 40 for lamps 15 watts or less (R202). The code change excludes kitchen appliance lighting fixtures from high efficacy requirements for permanently installed lighting fixtures. (R404.1).

Cost Implication of the Code Change:

This code change should not increase the cost of construction as typical CFL and LED lamps meet or exceed the new efficacy requirements. (See RE 145 for lighting changes that do impact cost.)

[8] RSMeans, https://www.rsmeans.com/

[9] Mechanical equipment cost sources include: hvacdirect.com; supplyhouse.com; acwholesalers.com; menards.com

RE18, RE20, RE21

Reference Code Section

R401.3 Certificate

Summary of the Code Change:

This code change requires additional information on the certificate for PV systems (RE18), code edition and compliance path (RE20), and area-weighted average insulation value (RE21).

Cost Implication of the Code Change:

This code change will increase the cost of construction. The analysis is based on an estimate of the additional time required by a rater to collect and add this information to the certificate.

Cost to add information to the certificate

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Incremental time for rater	HR				80.00	1	80
Total to Builder							**80**
Total to Consumer							**99**

RE29

Reference Code Section

Table R402.1.2; Table R402.1.3

Summary of the Code Change:

This code change increases the prescriptive R-value of continuous insulation (c.i.) on frame walls in CZ 4-5 from "R20 or 13+5" to "R20+5 or 13+10 or 0+15".

Cost Implication of the Code Change:

This code change will increase the cost of construction for frame walls in CZ 4-5. The analysis is based on the cost to increase c.i. from R5 to R10 for 2x4 walls and from none to R5 for 2x6 walls. The costs include associated additional trim at windows and doors and longer fasteners for cladding based on vinyl siding. A weighted average cost is then determined based on market data for walls (per the 2019 ABPS), as shown below.

Weighted Average Cost to Increase Continuous Insulation (c.i.)

Component	Unit	Cost, from below	Weight	Cost, weighted
2x4 wall, increase c.i. from R5 to R10	$/house	1,101	24.9%	274
2x6 wall, increase c.i. from R0 to R5	$/house	6,504	72.2%	4,696
Total to Consumer				**4,970**

Cost to increase c.i. from R5 to R10 for 2x4 wall

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
XPS, 15 psi, 1", R5	SF	0.68	0.45	1.13	1.49	(2,675)	(3,986)
XPS, 15 psi, 2", R10	SF	0.83	0.49	1.32	1.72	2,675	4,601
Window/door casing, PVC trim exterior	LF	0.55		0.55	0.61	415	251
Siding attachment, 2.5" roofing nail galv	LB	3.06		3.06	3.37	(21)	(71)
Siding attachment, 3.5" common nail galv	LB	1.78		1.78	1.96	49	96
Total to Builder							**892**
Total to Consumer							**1,101**

Cost to increase c.i. from none to R5 for 2x6 wall

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
XPS, 15 psi, 1", R5	SF	0.68	0.45	1.13	1.49	2,675	3,986
Door/window casing, PVC trim exterior	LF	0.55	1.47	2.02	3.03	415	1,258
Siding attachment, 1.5" roofing nail galv	LB	2.78		2.78	3.06	(13.0)	(40)
Siding attachment, 2.5" roofing nail galv	LB	2.78		2.78	3.06	21.0	64
Total to Builder							**5,268**
Total to Consumer							**6,504**

RE32

Reference Code Section

Table R402.1.2, Table R402.1.3

Summary of the Code Change:

This code change increases the slab edge insulation requirements in CZ 3 from none to R10/2 (R10, 2-feet deep) and in CZ 4-5 from 10/2 to 10/4 (R10, 4-feet deep).

Cost Implication of the Code Change:

This code change will increase the cost of construction for slab homes in CZ 3-5. The analysis is based on the cost to install this insulation at the Reference House with a foundation perimeter of 200 linear feet, so the quantity of insulation 2-feet deep is 400 square feet. Note that the incremental quantity and cost of insulation is assumed to be the same for CZ 3 and CZ 4-5; however, for CZ 3, the cost of flashing at the top edge of the insulation is included.

Cost of additional slab edge insulation, CZ 3

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
XPS, 25 psi, 2" thick, R-10	SF	1.23	0.40	1.63	2.01	400	804
Flashing, vinyl coated aluminum	SF	1.92	1.17	3.09	4.03	200	806
Total to Builder							**1,610**
Total to Consumer							**1,988**

Cost of additional slab edge insulation, CZ 4-5

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
XPS, 25 psi, 2" thick, R-10	SF	1.23	0.40	1.63	2.01	400	804
Total to Builder							**804**
Total to Consumer							**993**

RE33, RE36

Reference Code Section

Table R402.1.2, Table R402.1.3, R402.2.1

Summary of the Code Change:

These code changes increase ceiling insulation from R38 to R39 in CZ 2-3 (RE33) and from R49 to R60 in CZ 4-8 (RE36). The code change also updates the exception for ceiling insulation above wall top plates at eaves to include where R60 is now required.

Cost Implication of the Code Change:

This code change will increase the cost of construction in CZ 2-8. The analysis is based on the incremental cost of blown fiberglass insulation in a vented attic. The incremental cost is assumed to be the same for both changes. The analysis does not address any potential costs associated with raised-heel trusses.

Cost to Increase ceiling insulation from R-38 to R-49 or from R-49 to R-60

Component	Unit	Material	Labor	Equip	Total	w/O&P	Quantity	Cost
R-38 attic insulation, blown fg	SF	0.69	0.61	0.36	1.66	2.14	(1,875)	(4,013)
R-49 attic insulation, blown fg	SF	0.91	0.76	0.45	2.12	2.73	1,875	5,119
Total to Builder								**1,106**
Total to Consumer								**1,366**

RE34

Reference Code Section

Table R402.1.3

Summary of the Code Change:

This code change removed the footnote "g" exception for reduced insulation in floors for CZ 5 and Marine 4 through CZ 8. The deleted exception alternatively allowed insulation sufficient to fill the framing cavity providing not less than an R-value of R-19, instead of the prescribed values of R30 (CZ 5-6 and Marine 4) or R38 (CZ 7-8). Note that the prescribed floor insulation values did not change for 2021.

Cost Implication of the Code Change:

This code change may increase the cost of construction in some cases (e.g., installing spray foam insulation with a higher R-value per inch, or installing taller floor joists to accommodate sufficient insulation, may now be required to meet prescriptive floor insulation values), but there is no cost impact for the Reference House because the Reference House does not have floors above unconditioned space.

RE35

Reference Code Section

Table 402.1.2 and Table R402.1.3

Summary of the Code Change:

This code change reduces the prescriptive maximum U-factor for windows in CZ 3-4 from 0.32 to 0.30. The change also adds a footnote that a maximum window U-factor of 0.32 shall apply in CZ 5/Marine 4 through CZ 8 for buildings located above 4,000 feet in elevation above sea level or in windborne debris regions where protection of openings is required.

Cost Implication of the Code Change:

This code change will increase the cost of construction in CZ 3-4. The analysis is based on an incremental material cost of $0.15/SF for improving window U-factor from 0.32 to 0.30 as determined by the California Energy Commission[10].

The Department of Energy and EPA Energy Star along with those involved in the development of energy codes have traditionally had problems developing a clear incremental cost for changes in window thermal performance. An earlier report based on cost data collected by the U.S. Department of Energy indicated an incremental cost of $0.18/SF window area for improving U-value from 0.35 to 0.32[11]. In this analysis, prices used to develop the incremental cost associated with the code change are a best guess based on the available data.

Cost to reduce the window U-factor from 0.32 to 0.30

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Incremental cost of window	SF	0.15		0.15	0.17	375	62
Total to Builder							**62**
Total to Consumer							**76**

[10] CEC report, see table 9: https://efiling.energy.ca.gov/GetDocument.aspx?tn=222199&DocumentContentId=27369

[11] https://www.energycodes.gov/sites/default/files/documents/iecc2018_R-2_analysis_final.pdf

RE37

Reference Code Section

Table 402.1.2 and Table R402.1.3

Summary of the Code Change:

This code change changes the window SHGC in CZ 5 and CZ 4C Marine from "NR" to "0.40".

Cost Implication of the Code Change:

It is anticipated that this change will not affect the cost of construction because windows in these climate zones commonly meet the new requirement already. Energy Star criteria include maximum 0.40 SHGC in "North-Central" climates since 2015. Further, energy modeling typically assigns a value of 0.40 where SHGC is NR.

RE105

Reference Code Section

R402.5 Maximum fenestration U-factor and SHGC

Summary of the Code Change:

This code change reduces the average maximum fenestration SHGC permitted using tradeoffs in CZ 0-3 from 0.50 to 0.40.

Cost Implication of the Code Change:

It is anticipated that this change will not affect the cost of construction because windows in these climate zones commonly meet the new requirement already. Energy Star criteria include maximum 0.25 SHGC in "South-Central" and "Southern" climates since 2015.

RE46

Reference Code Section

R402.2.4 Access hatches and doors

Summary of the Code Change:

This code change does not add new requirements; rather, it separates the prescriptive (required insulation levels) and mandatory (weatherstripping) provisions into separate sections.

Cost Implication of the Code Change:

This code change does not directly impact the cost of construction. However, additional insulation is required due to increased prescriptive ceiling insulation requirements. The analysis is based on the cost to install an additional R-11 insulation above a 24" x 36" attic access hatch.

Cost to increase the insulation above an attic access by R-11

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
EPS, 3" thick, R-11.5	SF	0.96	0.40	1.36	1.72	6	10
Total to Builder							**10**
Total to Consumer							**13**

RE47

Reference Code Section

R402.2.4 Access hatches and doors

Summary of the Code Change:

This code change adds an exception to the attic access insulation requirement. Attic pull-down stairs in CZ 0-4 are not required to comply with the insulation level of the surrounding surfaces provided that the hatch meets all the following: average maximum U-0.10 insulation or average minimum R-10 insulation; at least 75% of the panel area shall be minimum R-13 insulation; maximum net area of the framed opening is 13.5 SF; the perimeter of the hatch shall be weatherstripped.

Cost Implication of the Code Change:

This code change may decrease construction costs where pull-down attic stairs are utilized in CZ 0-4. The analysis is based on the cost savings of less insulation above the access: for this study, R13 versus R49 in CZ 2-3, and R13 versus R60 in CZ 4.

Cost savings to reduce insulation above attic pull-down stair for CZ 2-3 (R49 ceiling)

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
XPS, 15 psi, 1", R5 (one 1" layer)	SF	0.68	0.45	1.13	1.49	13.5	20
XPS, 15 psi, 2", R10 (one 2" layer)	SF	0.83	0.49	1.32	1.72	13.5	23
XPS, 15 psi, 2", R10 (five 2" layers)	SF	0.83	0.49	1.32	1.72	(67.5)	(116)
Total to Builder							**(73)**
Total to Consumer							**(90)**

Cost savings to reduce insulation above attic pull-down stair for CZ 4 (R60 ceiling)

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
XPS, 15 psi, 1", R5 (one 1" layer)	SF	0.68	0.45	1.13	1.49	13.5	20
XPS, 15 psi, 2", R10 (one 2" layer)	SF	0.83	0.49	1.32	1.72	13.5	23
XPS, 15 psi, 2", R10 (six 2" layers)	SF	0.83	0.49	1.32	1.72	(81.0)	(139)
Total to Builder							**(96)**
Total to Consumer							**(119)**

RE49

Reference Code Section

R402.2.4 Access hatches and doors

Summary of the Code Change:

This code change adds a requirement for baffles to prevent loose-fill attic insulation from spilling into higher to lower sections of the attic, and from attics covering conditioned spaces to unconditioned spaces. Baffles at the attic access to prevent spilling into livings space are still required (although those must be taller now).

Cost Implication of the Code Change:

This code change will increase the cost of construction for the attic access hatch. This code change may increase the cost of construction where ceiling height varies or attics above unconditioned spaces.

The analysis develops an incremental cost to construct a taller baffle (by 4") for a 24" x 36" attic access hatch for all CZs. The analysis also develops a cost to install baffles for a hypothetical tray ceiling (est. 48 LF): for blown fiberglass insulation at R-3.2/inch, the baffles would need to be 16" tall plus a 3" nailing surface for CZ 2-3 and 19" tall plus a 3" nailing surface for CZ 4-7.

Cost to increase the height of insulation baffles at attic access hatch

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Plywood, 3/4" CDX	SF	1.38	0.60	1.98	2.50	4	10
Total to Builder							**10**
Total to Consumer							**12**

Cost to add baffles at tray ceiling (est. 48 LF) for CZ 2-3

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Plywood, 1/2" CDX	SF	1.00	0.52	1.52	1.95	76	148
Total to Builder							**148**
Total to Consumer							**183**

Cost to add baffles at tray ceiling (est. 48 LF) for CZ 4-8

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Plywood, 1/2" CDX	SF	1.00	0.52	1.52	1.95	96	187
Total to Builder							**187**
Total to Consumer							**231**

RE52

Reference Code Section

Deleted 2018 IECC R402.2.7 Walls with partial structural sheathing

Summary of the Code Change:

This code change deleted a section that allowed continuous insulation (c.i.) to be reduced, where c.i. is required and structural sheathing covers 40 percent or less of the gross wall area of all exterior walls, to result in a consistent total sheathing thickness on areas of the walls covered by structural sheathing.

Cost Implication of the Code Change:

This code change would increase the cost of construction in CZ 3-8 where the exception was utilized. The analysis is based on the additional cost to increase the foam sheathing thickness to 1-1/2-inch where it was 1-inch before, and to 1-inch where it was ½-inch before over the structural sheathing. A second cost is developed separately based on the additional cost to install ½-inch structural sheathing over the entire wall area and 1-inch thick foam sheathing over the structural sheathing. Both costs are based on using XPS foam sheathing and the assumption that wood structural sheathing originally covered 40% of the wall area (1,070 SF) and the remaining 60% of the wall area (1,605 SF) was originally covered by foam only (i.e., not by wood structural sheathing).

Cost to install additional 1/2-inch thickness of continuous insulation

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
XPS, 15 psi, 1/2", R3	SF	0.60	0.43	1.03	1.37	(1,070)	(1,465)
XPS, 15 psi, 1", R5	SF	0.68	0.45	1.13	1.49	1,070	1,594
XPS, 15 psi, 1", R5	SF	0.68	0.45	1.13	1.49	(1,605)	(2,391)
XPS, 15 psi, 1.5", R7.5	SF	0.76	0.49	1.25	1.64	1,605	2,639
Window/door casing, add 1/2"	LF	0.23		0.28	0.31	415	128
Siding attachment, 2" roofing nail galv	LB	3.06		3.06	3.37	(17)	(57)
Siding attachment, 2.5" roofing nail galv	LB	3.06		3.06	3.37	21	71
Total to Builder							**518**
Total to Consumer							**640**

Cost to install OSB over entire wall and cover with 1-inch XPS

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
XPS, 15 psi, 1/2", R3	SF	0.60	0.43	1.03	1.37	(1,070)	(1,465)
XPS, 15 psi, 1", R5	SF	0.68	0.45	1.13	1.49	1,070	1,594
OSB, wall, 1/2"	SF	0.41	0.44	0.85	1.17	1,605	1,878
Window/door casing, add 1/2"	LF	0.23		0.28	0.31	415	128
Siding attachment, 2" roofing nail galv	LB	3.06		3.06	3.37	(17)	(57)
Siding attachment, 2.5" roofing nail galv	LB	3.06		3.06	3.37	21	71
Total to Builder							**2,148**
Total to Consumer							**2,652**

RE55

Reference Code Section

R402.2.8 Basement walls

Summary of the Code Change:

This code change adds requirements for how to insulate and seal unconditioned basements including at the floor overhead, walls surrounding the stairway, door leading to the basement from conditioned space; the requirements also include no uninsulated duct, domestic hot water or hydronic heating surfaces exposed to the basement, and no HVAC supply or return diffusers serving the basement.

Cost Implication of the Code Change:

This code change will increase the cost of construction where insulation requirements are greater for 2021, i.e., increased continuous insulation (c.i.) for exterior walls in CZ 4-5 for this analysis. The analysis develops a cost to increase c.i. in the walls surrounding the stairway. This analysis assumes that builders were already constructing unconditioned basements as described by the code change.

Cost to increase wall insulation in the stairway

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
XPS, 15 psi, 1", R5	SF	0.68	0.45	1.13	1.49	(200)	(298)
XPS, 15 psi, 2", R10	SF	0.83	0.49	1.32	1.72	200	344
Drywall screw, 2.5"	LB	5.98		5.98	6.58	(1.3)	(9)
Drywall screw, 3.5"	LB	5.98		5.98	6.58	1.6	10
Total to Builder							**48**
Total to Consumer							**59**

RE72

Reference Code Section

Table R402.4.1.1 Air barrier, air sealing and insulation installation

Summary of the Code Change:

This code change adds a new requirement that "narrow cavities of an inch or less that are not able to be insulated shall be air sealed".

Cost Implication of the Code Change:

This code change may increase the cost of construction as applicable. The analysis is based on an estimated quantity of small cavities that would require the installation of sealant.

Cost to install additional sealant for narrow framing cavities

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Sealant, latex acrylic, 3/4" x 1" bead	LF	1.28	1.28	2.56	3.51	36	126
Total to Builder							**126**
Total to Consumer							**156**

RE82

Reference Code Section

Table R402.4.1.1 Air barrier, air sealing and insulation installation

Summary of the Code Change:

This code change adds a new requirement to air seal the rim board at the sill plate and subfloor. Rim areas in vented crawl spaces and attics are exempt.

Cost Implication of the Code Change:

This code change will increase the cost of construction. The analysis is based on the linear feet of sealant required for the Reference House designs with a foundation perimeter of 200 LF and a second story perimeter of 100 LF. For basement and unvented crawlspace designs, the quantity of sealant is 600 LF (300 LF of rim area, multiplied by two to capture the sealant required at both the sill plate and subfloor). For slab and vented crawlspace designs, the quantity of sealant is 200 LF (100 LF of rim area for the second floor).

Cost to install sealant at rim joists for basement or unvented crawlspace designs

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Sealant, latex acrylic, 1/4" x 1/4" bead	LF	0.10	0.96	1.06	1.69	600	1,014
Total to Builder							**1,014**
Total to Consumer							**1,252**

Cost to install sealant at rim joists for slab or vented crawlspace designs

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Sealant, latex acrylic, 1/4" x 1/4" bead	LF	0.10	0.96	1.06	1.69	200	338
Total to Builder							**338**
Total to Consumer							**417**

RE96

Reference Code Section

R402.4.1.2 Testing

Summary of the Code Change:

This code change makes house air tightness prescriptive and allows a trade-off option up to 5.0 ACH50 or 0.28 CFM/SF enclosure area (0.30 CFM/SF exception for attached dwellings and dwellings 1,500 SF or smaller). The prescriptive limits remain the same: 5.0 ACH50 in CZ 1-2; 3.0 ACH50 in CZ 3-8.

Cost Implication of the Code Change:

This code change may decrease construction costs in some cases where a builder trades-off air leakage for other efficiency improvements for a house in CZ 3-8, but there is assumed to be no cost impact for the Reference House because there is not a straightforward approach to reasonably quantify such a change.

RE103

Reference Code Section

R402.4.6 Electrical and communication outlet boxes (air-sealed boxes)

Summary of the Code Change:

This code change adds a new section that requires electrical and communication outlet boxes installed in the building thermal envelope (i.e., exterior walls and ceilings adjacent to vented attics) to be air sealed. These outlet boxes must be tested and labeled in accordance with NEMA OS 4.

Cost Implication of the Code Change:

This code change will increase the cost of construction for all locations. The analysis is based on the cost to substitute a rated airtight box for a standard blue plastic new-work electrical box, using an estimated quantity of affected boxes for the Reference House.

Cost of air sealed electrical and communication outlet boxes

Component	Unit	Material	Labor	Total	w/O&P	Quantity*	Cost
Standard electric box, 1-gang	EA	0.34		0.34	0.37	(42)	(16)
NEMA OS 4 Airtight box, 1-gang	EA	5.52		5.52	6.07	42	255
Standard electric box, ceiling	EA	1.19		1.19	1.31	(10)	(13)
NEMA OS 4 Airtight box, ceiling	EA	6.60		6.60	7.26	10	73
Total to Builder							**299**
Total to Consumer							**369**

***Estimated quantity of affected boxes**

Box type	Quantity
Wall receptacle outlet (one every 10 LF of exterior wall)	30
Wall switch outlet	6
Wall communication outlet	6
Ceiling light fixture/smoke detector	10

RE106

Reference Code Section

R403.1.1 Programmable thermostat

Summary of the Code Change:

This code change modifies the required capabilities for programmable thermostats: in addition to being capable of controlling different set point temperatures at different times of the day, thermostats must now be capable of controlling this for different days of the week (i.e., a 7-day thermostat, versus a 5-2 day or 5-1-1 day).

Cost Implication of the Code Change:

This code change may increase the cost of construction in some cases, depending on the make and model of thermostat normally used, but a review of distributor websites indicated the lowest cost programmable thermostat by a leading national manufacturer already has 7-day capability for single-stage heat pump or gas furnace with air conditioner systems. Therefore, this code change is not anticipated to affect the cost of construction. There is not an energy use cost savings associated with this change because the energy modeling does utilize thermostat set-back settings.

RE109

Reference Code Section

R403.3.2 Ducts located in conditioned space

Summary of the Code Change:

This code change adds requirements for ducts within floor or wall cavities to be considered ducts in conditioned space. The requirements include minimum R-19 insulation for floors above unconditioned space, e.g., above a garage, so there are implications for CZ 1-2 where the prescriptive minimum floor insulation is R-13.

Cost Implication of the Code Change:

This code change may increase the cost of construction in some cases although the Reference House does not have floors above unconditioned space and it is assumed there are no ducts within any wall cavities. The analysis is based on the incremental cost to install R-19 floor insulation instead of R-13 above a garage, assuming ducts occupy two joist bays (each 2' wide x 20' long), and to substitute oval duct for round duct so that the oval duct (typically 3") plus the R-19 insulation (typically 5.5") fits within the height of a 2x10 floor joist.

Cost to increase floor insulation within joist bay from R-13 to R-19

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
R-13 unfaced fiberglass batt	SF	0.49	0.42	0.91	1.22	(80)	(98)
R-19 unfaced fiberglass batt	SF	0.60	0.49	1.09	1.46	80	117
7" round metal duct	LF	2.00		2.00	2.20	(40)	(88)
7" oval metal duct	LF	3.16		3.16	3.48	40	139
Total to Builder							**70**
Total to Consumer							**87**

RE112

Reference Code Section

R403.3.5 Duct testing, R403.3.6 Duct leakage

Summary of the Code Change:

This code change removes the exception for testing where ducts and air handlers are located entirely within the building thermal envelope (R403.3.5). The code change also increases the total leakage limit from 4.0 to 8.0 CFM25/100SFcfa where ducts and air handlers are located entirely within the building thermal envelope (R403.3.6).

Cost Implication of the Code Change:

This code change will increase the cost of construction where ducts and air handlers are already installed in conditioned space but testing for duct leakage is now required. The analysis is based on a typical charge by a rater to conduct this test during the same visit as the house tightness test. Any cost of remediation for a failed test is not included. For the Reference Houses, it is assumed that this test will now be required for basement and unvented crawlspace designs.

Estimated cost of the duct leakage test

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Charge by rater	EA				200.00	1	200
Total to Builder							**200**
Total to Consumer							**247**

RE130

Reference Code Section
R403.6.3 Testing (new)

Summary of the Code Change:
This code change requires whole-dwelling mechanical ventilation systems to be tested and verified to provide the minimum required ventilation flow rates.

Cost Implication of the Code Change:
This code change will increase the cost of construction for all houses. The analysis is based on a typical charge by a rater to conduct this test during the same visit as the house tightness test. Testing is in addition to duct leakage testing. Testing is now required for the ventilation system of record (e.g., bath exhaust fan, HRV/ERV, supply-type ducted to the return plenum of a central system). Any cost of remediation for a failed test is not included.

Estimated cost of the mechanical ventilation test

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Charge by rater	EA				50.00	1	50
Total to Builder							**50**
Total to Consumer							**62**

RE133

Reference Code Section

R403.6 Mechanical ventilation, Table R403.6.2

Summary of the Code Change:

This code change updates the fan efficacy requirements for fans used to provide whole-dwelling mechanical ventilation (supply and exhaust fans now must meet the current EnergyStar requirements). The minimum efficacy for an exhaust fan increased from 1.4 to 2.8 CFM/watt for airflow rates less than 90 CFM and from 2.8 to 3.5 CFM/watt for airflow rates 90 CFM and above. The minimum efficacy for an ERV/HRV did not change.

Cost Implication of the Code Change:

This code change may increase the cost of construction in some cases depending on the make and model of fan already being installed. The Reference House uses a bath exhaust fan for whole-dwelling mechanical ventilation and requires a continuous ventilation rate of 63 CFM for slab and crawlspace designs or 82 CFM for basement designs. The analysis is based on the case where an exhaust fan with an efficacy of at least 1.4 CFM/watt but less than 2.8 CFM/watt must be replaced with unit with efficacy of at least 2.8 CFM/watt.

Incremental cost of high efficacy bath exhaust fan

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Bath fan, 90 CFM, 1.8 CFM/W (Air King)	EA	40.15		40.15	44.17	(1)	(44)
Bath fan, 90 CFM, EnergyStar (Air King)	EA	88.43		88.43	97.27	1	97
Total to Builder							**53**
Total to Consumer							**66**

RE134

Reference Code Section

R403.6 Mechanical ventilation, Table R403.6.2

Summary of the Code Change:

This code change adds efficacy requirements to air-handlers where integrated with whole-dwelling mechanical ventilation: minimum 1.2 cfm/watt, the "design outdoor airflow rate/watts of fan used".

Cost Implication of the Code Change:

This code change may increase the cost of construction for integrated supply-type ventilation (ducted to the return plenum of the HVAC system) or balanced ventilation that is partially ducted (HRV or ERV ducting integrated with the HVAC system).

This change does not impact the Reference House that utilizes exhaust ventilation. However, a cost is developed for supply-type ventilation (this cost will also be a component of installing balanced ventilation where an HRV or ERV is integrated with the central duct system). The analysis is based on substituting a variable-speed furnace (constant-airflow ECM air drive) for a multi-speed furnace (constant-torque ECM air drive) to meet the efficacy requirement. During fan-only operation (no heating or cooling), the variable-speed furnace or air handler can be adjusted to operate at 25% of normal heating or cooling airflow, and at this lower airflow system will generally meet the efficacy requirement (although this value is typically not published in the manufacturer product data). Additionally, at this lower airflow, the differential pressure at the return plenum will not be sufficient to draw in the required amount of outdoor air, so an additional ventilation fan will normally be required. The analysis assumes the existing ventilation control is already accounted for.

Incremental cost of variable-speed furnace

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Gas furnace, 80 AFUE, multi-speed	EA	818.00		818.00	899.80	(1)	(900)
Gas furnace, 80 AFUE, variable-speed	EA	1323.00		1323.00	1455.30	1	1,455
Total to Builder							**556**
Total to Consumer							**686**

Cost of both variable-speed furnace and ventilator fan

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Furnace, total to Builder from above							556
Ventilator fan with damper	EA	293.04	39.90	332.94	388.18	1	388
Ventilation damper	EA	85.99		85.99	94.59	(1)	(95)
15-amp circuit, duplex outlet, 20' 14/2 NM	EA	7.30	23.50	30.80	46.00	1	46
Wire, 14/2, add 20'	LF	0.17	1.37	1.54	2.41	20	48
GFCI 15-amp 1-pole breaker	EA	41.99		41.99	46.19	1	46
Total to Builder							**989**
Total to Consumer							**1,222**

RE139

Reference Code Section

R403.6.1 Heat or energy recovery ventilation (new)

Summary of the Code Change:

This code change requires an HRV or ERV system in CZ 7-8. The system shall be balanced with a minimum 65% SRE at 32°F at a flow greater than or equal to design airflow.

Note that in the 2021 IRC, Section M1505.4.3, there is a whole-dwelling ventilation rate credit of 30% available for a balanced ventilation system with a ducted supply to each bedroom and to one or more of the following rooms: living room; dining room; kitchen.

Cost Implication of the Code Change:

This code change will increase the cost of construction in CZ 7-8. The analysis develops a cost to install an ERV that meets the efficiency requirements and substitutes a standard bath fan for a high efficacy fan that was used for exhaust-type whole-dwelling ventilation. The cost also includes substituting a variable-speed furnace (constant-airflow ECM air drive) for a multi-speed furnace (constant-torque ECM air drive) to meet the efficacy requirement for air handlers integrated with whole-dwelling mechanical ventilation (RE134); alternatively, the ERV would need to be ducted independently.

Cost to install an ERV

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Bath fan, 90 CFM, EnergyStar (AirKing)	EA	88.43		88.43	97.27	(1)	(97)
Bath exhaust fan controller	EA	56.60		56.60	62.26	(1)	(62)
Bath exhaust fan, standard	EA	28.24		28.24	31.06	1	31
Gas furnace, 80 AFUE, multi-speed blower	EA	818.00		818.00	899.80	(1)	(900)
Gas furnace, 80 AFUE, variable-speed blower	EA	1323.00		1323.00	1455.30	1	1,455
ERV, 100 CFM	EA	991.99		991.99	1091.19	1	1,091
HRV/ERV controller	EA	82.99		82.99	91.29	1	91
Installation, labor	HR		39.90	39.90	65.84	2	132
Installation, material	EA	40.00		40.00	44.00	1	44
15-amp circuit, duplex outlet, 20' 14/2 NM	EA	7.30	23.50	30.80	46.00	1	46
Wire, 14/2, add 20'	LF	0.17	1.37	1.54	2.41	20	48
GFCI 15-amp 1-pole breaker	EA	41.99		41.99	46.19	1	46
Grille, exhaust (from house)	EA	35.00	14.50	49.50	62.50	1	63
Duct, flexible insulated, 6" dia	LF	3.81	2.21	6.02	7.85	50	393
Wall cap, 6" dia duct	EA	54.50	29.00	83.50	108.00	2	216
Total to Builder							**2,597**
Total to Consumer							**3,206**

RE145

Reference Code Section

R404.1 Lighting equipment; R404.2 Interior lighting controls (new)

Summary of the Code Change:

This code change mandates that all permanently installed lighting fixtures contain only high-efficacy lamps (previously 90%) and have built-in lighting controls (dimmer, occupant sensor, or other control) excluding bathrooms, hallways, exterior lighting fixtures, lighting designed for safety or security.

Cost Implication of the Code Change:

This code change will increase the cost of construction for all houses. The analysis is based on an estimated quantity of high-efficacy lamps and dimmers required at the Reference Houses.

Cost of high-efficacy lamps and dimmer switches (slab)

Component	Unit	Material	Labor	Total	w/O&P	Quantity*	Cost
CFL lamp	EA	1.99		1.99	2.19	4	9
Incandescent lamp	EA	1.02		1.04	1.12	(4)	(4)
Dimmer switch, toggle	EA	9.99		9.99	10.99	4	44
Standard toggle switch	EA	1.99		1.99	2.19	(4)	(9)
Total to Builder							**39**
Total to Consumer							**49**

Cost of high-efficacy lamps and dimmer switches (basement or crawl space)

Component	Unit	Material	Labor	Total	w/O&P	Quantity*	Cost
CFL lamp	EA	1.99		1.99	2.19	4	9
Incandescent lamp	EA	1.02		1.99	1.12	(4)	(4)
Dimmer switch, toggle	EA	9.99		9.99	10.99	5	55
Standard toggle switch	EA	1.99		1.99	2.19	(5)	(11)
Total to Builder							**48**
Total to Consumer							**60**

***Quantities**

Room	Lamps	Dimmer
Dining room	6	1
Kitchen	6	1
Breakfast	4	1
Family Room	2	1
Halls	2	0
Baths (3)	10	0
Bedrooms	0	0
Exterior	2	0
Basement or crawlspace	4	1
Total, basement or crawl	36	5
Total, slab	32	4
Additional lamps required	4	

RE148

Reference Code Section

R404.1.1 Exterior lighting

Summary of the Code Change:

This code change requires compliance with Section C405.4 of the IECC for connected exterior lighting for Group R-2, R-3, and R-4 buildings.

Cost Implication of the Code Change:

This code change will not impact the cost of construction for homes constructed to the IRC.

RE149

Reference Code Section

R404.3 Exterior lighting controls (new)

Summary of the Code Change:

This code change requires automatic controls where permanently installed exterior lighting power exceeds 30 watts.

Cost Implication of the Code Change:

This code change may increase the cost of construction. The analysis assumes two 100-watt equivalent, 18-watt actual, exterior lamps and is based on installing two light-sensing devices.

Cost of exterior lighting control with light sensor

Component	Unit	Material	Labor	Total	w/O&P	Quantity*	Cost
Control, 100-watt rated, screw-in type	EA	9.20		9.20	10.12	2	20
Total to Builder							**20**
Total to Consumer							**25**

RE151

Reference Code Section

R405.2

Summary of the Code Change:

This code change creates a backstop for the performance path that requires the building thermal envelope greater than or equal to levels of efficiency and solar heat gain coefficients in the 2009 IECC.

Cost Implication of the Code Change:

It is anticipated that this change will not affect the cost of construction.

RE178

Reference Code Section

Table R405.4.2

Summary of the Code Change:

This code change updates the mechanical ventilation system type for the standard reference design to match the proposed design when using the performance compliance option.

Cost Implication of the Code Change:

It is anticipated that this change will not affect the cost of construction.

RE209

Reference Code Section

R401.2.5 Additional energy efficiency (new); R408 Additional efficiency package options (new)

Summary of the Code Change:

This code change establishes additional requirements appliable to all compliance approaches to achieve additional energy efficiency. Compliance for the prescriptive approach requires installing at least one of the five prescribed efficiency package options:

- Enhanced envelope performance (5% UA and SHGC improvement)
- More efficient HVAC equipment performance (minimum 95 AFUE natural gas furnace and 16 SEER air conditioner, 10 HSPF/16 SEER airs source heat pump, or 3.5 COP ground source heat pump)
- Reduced energy use in service water-heating (minimum 0.82 EF fossil fuel water heater, 2.0 EF electric water heater, or 0.4 solar fraction solar water heating system)
- More efficient duct thermal distribution system (100% of ducts and air handlers located entirely within the building thermal envelope, 100% ductless systems, or 100% duct system located in conditioned space as defined by Section R403.3.2)
- Improved air sealing (max 3.0 ACH50) and efficient ventilation (ERV or HRV: min 75% SRE; max 1.1 CFM/Watt; shall not use recirculation as a defrost strategy; min 50% LRMT for ERV). [For this study, when evaluating this option, the ERV (CZ 2-4) or HRV (CZ 5-7) was modeled in accordance with the 2021 IRC that provides for a ventilation rate credit of 30% where certain criteria are met, and houses in CZ 2 were modeled with a tighter building enclosure (3 ACH50 instead of 5 ACH50)].

Cost Implication of the Code Change:

This code change will increase the cost of construction. The analysis evaluates the costs associated with the additional efficiency package options except for the enhanced envelope option.

HVAC equipment option for Gas House with baseline 13 SEER AC (CZ 5-7 for this study)

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Gas furnace, 80kBtuh, AFUE 80%	EA	761.00		761.00	837.10	(1)	(837)
Gas Chimney Vent, 4" dia.	LF	9.65	8.45	18.10	24.50	(25)	(613)
Gas Chimney Vent, 3" dia. (water heater)	LF	7.95	8.00	15.95	22.00	25	550
Gas furnace, 80kBtuh, AFUE 95%	EA	1,295.00		1,295.00	1,424.50	1	1,425
Vent piping, PVC, 2" dia.	LF	3.05	3.02	6.07	8.30	40	332
2" concentric vent kit	EA	59.95		59.95	65.95	1	66
Condenser, 3 ton, 13 SEER	EA	1,085.00		1,085.00	1,193.50	(1)	(1,194)
Condenser, 3 ton, 16 SEER	EA	1,346.00		1,346.00	1,480.60	1	1,481
Total to Builder							**1,210**
Total to Consumer							**1,494**

HVAC equipment option for Gas House adjusted for baseline 14 SEER AC (CZ 2-4 for this study)

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Total to Builder, from above							**1,210**
Condenser, 3-ton, 14 SEER	EA	1,215.00		1,215.00	1,336.50	(1)	(1,337)
Condenser, 3-ton, 13 SEER	EA	1,085.00		1,085.00	1,193.50	1	1,194
Total to Builder							**1,067**
Total to Consumer							**1,317**

HVAC option for Electric House: variable speed inverter heat pump, rated to 7F (CZ 2-4)

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Heat Pump, 8.2 HSPF/14 SEER	EA	1,629.00		1,629.00	1,791.90	(1)	(1,792)
Air Handler, matching	EA	988.00		988.00	1,086.80	(1)	(1,087)
Heat Pump, inverter, minimum 10 HSPF/16 SEER, 7F rated	EA	6,830.00		6,830.00	7,513.00	1	7,513
Total to Builder							**4,634**
Total to Consumer							**5,721**

HVAC option for Electric House: variable speed inverter heat pump, rated to -13F (CZ 5-7)

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Heat Pump, 8.2 HSPF/14 SEER	EA	1,629.00		1,629.00	1,791.90	(1)	(1,792)
Air Handler, matching	EA	988.00		988.00	1,086.80	(1)	(1,087)
Heat Pump, inverter, minimum 10 HSPF/16 SEER, -13F rated	EA	8,652.00		8,652.00	9,517.20	1	9,517
Total to Builder							**6,639**
Total to Consumer							**8,196**

Water Heater option for Gas House: Tankless Direct Vent Water Heater

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
40 gal gas water heater, 0.58 UEF	EA	559.00	165.00	724.00	883.52	(1)	(884)
Tankless gas water heater, 0.82 UEF	EA	799.00	174.00	973.00	1,162.17	1	1,162
Concentric vent wall termination kit	EA	90.00		90.00	99.00	1	99
Concentric vent 39" extension	EA	37.59		37.59	41.35	1	41
Gas Chimney Vent, 3" dia. (WH connector)	LF	7.95	8.00	15.95	22.00	(4)	(88)
Gas piping, 1/2"	LF	2.69	5.25	7.94	11.50	(10)	(115)
Gas piping, 1"	LF	3.73	6.25	9.98	14.25	10	143
15-amp circuit, toggle, 40' #14/2 NM	EA	51.00	85.50	136.50	195.00	1	195
GFCI 15-amp, 1-pole breaker	EA	41.99		41.99	46.19	1	46
Total to Builder							**600**
Total to Consumer							**740**

Water Heater option for Electric House: 50 gal Heat Pump Water Heater (HPWH)

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
50 gal electric water heater	EA	419.00		419.00	460.90	(1)	(461)
HPWH, 50 gal, minimum 2.0 EF	EA	1,199.00		1,199.00	1,318.90	1	1,319
Mixing valve	EA	175.00	16.50	191.50	220	1	220
Total to Builder							**1,078**
Total to Consumer							**1,331**

Ventilation Option Gas House

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Bath fan, 90 CFM, EnergyStar (AirKing)	EA	88.43		88.43	97.27	(1)	(97)
Bath exhaust fan controller	EA	56.60		56.60	62.26	(1)	(62)
Bath exhaust fan, standard	EA	28.24		28.24	31.06	1	31
Gas furnace, 80 AFUE, multi-speed blower	EA	818.00		818.00	899.80	(1)	(900)
Gas furnace, 80 AFUE, variable-speed blower	EA	1323.00		1323.00	1455.30	1	1,455
ERV, 100 CFM	EA	991.99		991.99	1091.19	1	1,091
HRV/ERV controller	EA	82.99		82.99	91.29	1	91
Installation, labor	HR		39.90	39.90	65.84	2	132
Installation, material	EA	40.00		40.00	44.00	1	44
15-amp circuit, duplex outlet, 20' 14/2 NM	EA	7.30	23.50	30.80	46.00	1	46
Wire, 14/2, add 20'	LF	0.17	1.37	1.54	2.41	20	48
GFCI 15-amp 1-pole breaker	EA	41.99		41.99	46.19	1	46
Grille, exhaust (from house)	EA	35.00	14.50	49.50	62.50	1	63
Duct, flexible insulated, 6" dia	LF	3.81	2.21	6.02	7.85	50	393
Wall cap, 6" dia duct	EA	54.50	29.00	83.50	108.00	2	216
Total to Builder							**2,597**
Total to Consumer							**3,206**

Ventilation Option Electric House

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Bath fan, 90 CFM, EnergyStar (AirKing)	EA	88.43		88.43	97.27	(1)	(97)
Bath exhaust fan controller	EA	56.60		56.60	62.26	(1)	(62)
Bath exhaust fan, standard	EA	28.24		28.24	31.06	1	31
Heat Pump system, multi-speed blower	EA	2394.00		2394.00	2633.40	(1)	(2,633)
Heat Pump system, variable-speed	EA	2828.00		2828.00	3110.80	1	3,111
ERV, 100 CFM	EA	991.99		991.99	1091.19	1	1,091
HRV/ERV controller	EA	82.99		82.99	91.29	1	91
Installation, labor	HR		39.90	39.90	65.84	2	132
Installation, material	EA	40.00		40.00	44.00	1	44
15-amp circuit, duplex outlet, 20' 14/2 NM	EA	7.30	23.50	30.80	46.00	1	46
Wire, 14/2, add 20'	LF	0.17	1.37	1.54	2.41	20	48
GFCI 15-amp 1-pole breaker	EA	41.99		41.99	46.19	1	46
Grille, exhaust (from house)	EA	35.00	14.50	49.50	62.50	1	63
Duct, flexible insulated, 6" dia	LF	3.81	2.21	6.02	7.85	50	393
Wall cap, 6" dia duct	EA	54.50	29.00	83.50	108.00	2	216
Total to Builder							**2,518**
Total to Consumer							**3,109**

Ventilation Option Electric House in CZ 2

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Associated ERV cost to builder from above							2,518
Improve ACH50 from 5 to 3, estimate							1,200
Total to Builder							**3,718**
Total to Consumer							**4,591**

Duct Option: Slab House, Buried Ducts, CZ 2-3

Component	Unit	Material	Labor	Equip	Total	w/O&P	Quantity	Cost
R13 duct: add FSK min R5 over R8 duct	SF	0.27	1.70		1.97	3.14	680	2,135
Add ceiling insulation, R49 f.g. blown	SF	0.91	0.76	0.45	2.12	2.73	340	928
Mechanical closet, 3'x4', partition wall	LF	7.40	4.89		12.29	16.15	10	162
Mechanical closet, drywall, finished	SF	0.38	0.61		0.99	1.41	140	197
Mechanical closet door	EA	135.00	34.50		169.50	205.00	1	205
Delete attic platform decking, 3/4, 8'x8'	SF	1.38	0.38		1.76	2.14	(64)	(137)
Delete attic platform joist framing, 2x12	LF	2.53	0.58		3.11	3.73	(40)	(149)
Total to Builder								**3,341**
Total to Consumer								**4,125**

Duct Option: Slab House, Buried Ducts, CZ 4-7

Component	Unit	Material	Labor	Equip	Total	w/O&P	Quantity	Cost
Add ceiling insulation, R60 f.g. blown	SF	1.13	0.91	0.54	2.58	3.32	340	1,128
Mechanical closet, 3'x4', partition wall	LF	7.40	4.89		12.29	16.15	10	162
Mechanical closet, drywall, finished	SF	0.38	0.61		0.99	1.41	140	197
Mechanical closet door	EA	135.00	34.50		169.50	205.00	1	205
Delete attic platform decking, 3/4, 8'x8'	SF	1.38	0.38		1.76	2.14	(64)	(137)
Delete attic platform joist framing, 2x12	LF	2.53	0.58		3.11	3.73	(40)	(149)
Total to Builder								**1,406**
Total to Consumer								**1,736**

Duct Option: Convert Crawlspace from Vented to Unvented, CZ 3

Component	Unit	Material	Labor	Equip	Total	w/O&P	Quantity	Cost
Floor insulation, R19	SF	0.60	0.49		1.09	1.46	(1,875)	(2,738)
Wall insulation, foil-faced polyiso, 1", R6	SF	0.81	0.37		1.18	1.50	1000	1,502
Foundation vents	EA	7.98			7.98	8.78	(6)	(53)
Class 1 vapor retarder on ground	SF	0.08	0.08		0.16	0.22	1875	413
Supply duct, 38 cfm (1 cfm/50sf)	EA				125.00	137.50	1	138
Transfer grille	EA	24.00	13.30		37.30	48.50	1	49
Total to Builder								**(690)**
Total to Consumer								**(852)**

Duct Option: Convert Crawlspace from Vented to Unvented, CZ 4

Component	Unit	Material	Labor	Equip	Total	w/O&P	Quantity	Cost
Floor insulation, R19	SF	0.60	0.49		1.09	1.46	(1,875)	(2,738)
Wall insulation, foil-faced polyiso, 2", R12	SF	1.25	0.40		1.65	2.04	1000	2,035
Foundation vents	EA	7.98			7.98	8.78	(6)	(53)
Class 1 vapor retarder on ground	SF	0.08	0.08		0.16	0.22	1875	413
Supply duct, 38 cfm (1 cfm/50sf)	EA				125.00	137.50	1	138
Transfer grille	EA	24.00	13.30		37.30	48.50	1	49
Total to Builder								**(157)**
Total to Consumer								**(193)**

CE40.2

Reference Code Section

R303.1.2 Insulation mark installation

Summary of the Code Change:

This code change adds a new requirement for an insulation certificate to certify the installed R-value of insulation products without an observable manufacturer's R-value mark such as blown-in attic insulation. The certificate must be left by the installer immediately after installation in a conspicuous location within the building.

Cost Implication of the Code Change:

This code change may increase the cost of construction. The analysis is based on the estimated additional time for the installer to complete and post the certificate.

Cost to provide insulation certificate

Component	Unit	Material	Labor	Total	w/O&P	Quantity	Cost
Insulation installer	HR		29.23	29.23	48.23	0.25	12
Total to Builder							**12**
Total to Consumer							**15**

CE151.2

Reference Code Section

R202 Defined terms (new); R403.3.1 Ducts located outside conditioned space

Summary of the Code Change:

This code change adds a definition for Thermal Distribution Efficiency (TDE) and requirements for ducts buried underneath buildings.

Cost Implication of the Code Change:

This code change may decrease the cost of construction in some cases, e.g., where ducts are buried beneath buildings, but this change does not impact cost for the Reference House.

APPENDIX B: CONSTRUCTION COST BY CLIMATE ZONE

Incremental Construction Cost of Individual Code Chage for the Reference House				CZ 2 Phoenix	
				Mass (30%) Electric	Frame (70%) Electric
Proposal	Description	Affected CZ	Reference House	Slab 100%	Slab 100%
RE7	Lighting: revised definition of high-efficacy	All	$0		
RE18/20/21	Certificate: additional info	All	$99	$99	$99
RE29	Frame wall, c.i.: R5 to R10 (2x4); R0 to R5 (2x6)	4-5	$4,970		
RE32	Slab edge: NR to R10/2 (CZ3)	3	$1,988		
"	Slab edge: R10/2 to R10/4 (CZ4-5)	4-5	$993		
RE33	Ceiling insulation R38 to R49	2-3	$1,366	$1,366	$1,366
RE36	Ceiling insulation R49 to R60	4-7	$1,366		
RE34	Floors, removes exception for min R19 if fills cavity	5-8	NA		
RE35	Windows: reduces U-value from 0.32 to 0.30	3-4	$76		
RE37	Windows: changes SHGC form NR to 0.40	5 & 4C	$0		
RE105	Windows: reduces max SHGC tradeoff from 0.50 to 0.40	2-3	$0		
RE46	Attic access hatch: no direct cost; cost of additional insulation	All	$13	$13	$13
RE49	Baffles at attic access	All	$12	$12	$12
RE72	Air seal narrow framing cavities	All	$156	$156	$156
RE82	Air seal rim (basement; unvented crawlspace)	All	$1,252		
"	Air seal rim (slab, vented crawlspace)	All	$417	$417	$417
RE96	House tightness, allows trade-off for performance path	All	$0		
RE103	Air seal electrical & communication outlet boxes	All	$369	$369	$369
RE106	Thermostat: requires 7-day programming	All	$0		
RE112	Removes exception for duct test (basement, unvented crawl)	All	$247		
RE130	Adds requirement to test whole-dwelling ventilation	All	$62	$62	$62
RE133	Updates ventilation fan efficacy (affects bath EF)	All	$66	$66	$66
RE139	Requires ERV/HRV in CZ 7-8 (includes RE134 air handler integration)	7	$3,206		
RE145	Lighting: 100% high-efficacy; controls (slab)	All	$49	$49	$49
"	Lighting: 100% high-efficacy; controls (basement, crawl)	All	$60		
RE148	Lighting, commercial	All	NA		
RE149	Lighting: exterior controls	All	$25	$25	$25
RE151	Performance path backstop: 2009 IECC	All	NA		
RE178	Performance path ventilation type to match proposed	All	NA		
CE40.2	Insulation certificate if no manufacturer mark (i.e., blown)	All	$15	$15	$15
CE151.2	Defines duct TDE; adds requirements for underground ducts	All	NA		
	Sub-total without additional efficiency package options			$2,648	$2,648
	Weighted average, foundations				$2,648
			Nat Ave	**CZ 2**	
	Weighted average without additional efficiency package options		5,477	2,648	
RE209	HVAC option		3,824	5,721	
RE209	Water Heater option		1,071	1,331	
RE209	Ventilation option		3,570	4,591	
RE209	Duct option, slab houses		3,074	4,125	
RE209	Duct option, vented crawlspace houses		na		
	Total with HVAC option		9,301	8,369	
	Total with Water Heater option		6,548	3,979	
	Total with Ventilation option		9,047	7,238	
	Total with Duct option, slab houses		8,550	6,773	
	Total with Duct option, vented crawlspace houses		na		

Incremental Construction Cost of Individual Code Chage for the Reference House

				CZ 3 Memphis					
				Mass Wall (10%) Electric			Frame Wall (90%) Electric		
Proposal	Description	Affected CZ	Reference House	Slab 75%	Basement 10%	Crawl 15%	Slab 75%	Basement 10%	Crawl 15%
RE7	Lighting: revised definition of high-efficacy	All	$0						
RE18/20/21	Certificate: additional info	All	$99	$99	$99	$99	$99	$99	$99
RE29	Frame wall, c.i.: R5 to R10 (2x4); R0 to R5 (2x6)	4-5	$4,970						
RE32	Slab edge: NR to R10/2 (CZ3)	3	$1,988	$1,988			$1,988		
"	Slab edge: R10/2 to R10/4 (CZ4-5)	4-5	$993						
RE33	Ceiling insulation R38 to R49	2-3	$1,366	$1,366	$1,366	$1,366	$1,366	$1,366	$1,366
RE36	Ceiling insulation R49 to R60	4-7	$1,366						
RE34	Floors, removes exception for min R19 if fills cavity	5-8	NA						
RE35	Windows: reduces U-value from 0.32 to 0.30	3-4	$76	$76	$76	$76	$76	$76	$76
RE37	Windows: changes SHGC form NR to 0.40	5 & 4C	$0						
RE105	Windows: reduces max SHGC tradeoff from 0.50 to 0.40	2-3	$0						
RE46	Attic access hatch: no direct cost; cost of additional insulation	All	$13	$13	$13	$13	$13	$13	$13
RE49	Baffles at attic access	All	$12	$12	$12	$12	$12	$12	$12
RE72	Air seal narrow framing cavities	All	$156	$156	$156	$156	$156	$156	$156
RE82	Air seal rim (basement; unvented crawlspace)	All	$1,252		$1,252			$1,252	
"	Air seal rim (slab, vented crawlspace)	All	$417	$417		$417	$417		$417
RE96	House tightness, allows trade-off for performance path	All	$0						
RE103	Air seal electrical & communication outlet boxes	All	$369	$369	$369	$369	$369	$369	$369
RE106	Thermostat: requires 7-day programming	All	$0						
RE112	Removes exception for duct test (basement, unvented crawl)	All	$247		$247			$247	
RE130	Adds requirement to test whole-dwelling ventilation	All	$62	$62	$62	$62	$62	$62	$62
RE133	Updates ventilation fan efficacy (affects bath EF)	All	$66	$66	$66	$66	$66	$66	$66
RE139	Requires ERV/HRV in CZ 7-8 (includes RE134 air handler integration)	7	$3,206						
RE145	Lighting: 100% high-efficacy; controls (slab)	All	$49	$49			$49		
"	Lighting: 100% high-efficacy; controls (basement, crawl)	All	$60		$60	$60		$60	$60
RE148	Lighting, commercial	All	NA						
RE149	Lighting: exterior controls	All	$25	$25	$25	$25	$25	$25	$25
RE151	Performance path backstop: 2009 IECC	All	NA						
RE178	Performance path ventilation type to match proposed	All	NA						
CE40.2	Insulation certificate if no manufacturer mark (i.e., blown)	All	$15	$15	$15	$15	$15	$15	$15
CE151.2	Defines duct TDE; adds requirements for underground ducts	All	NA						
	Sub-total without additional efficiency package options			$4,712	$3,816	$2,735	$4,712	$3,816	$2,735
	Weighted average, foundations					$4,326			$4,326
			Nat Ave			**CZ 3**			
	Weighted average without additional efficiency package options		5,477			4,326			
RE209	HVAC option		3,824			5,721			
RE209	Water Heater option		1,071			1,331			
RE209	Ventilation option		3,570			3,109			
RE209	Duct option, slab houses		3,074			4,125			
RE209	Duct option, vented crawlspace houses		na			(852)			
	Total with HVAC option		9,301			10,047			
	Total with Water Heater option		6,548			5,657			
	Total with Ventilation option		9,047			7,435			
	Total with Duct option, slab houses		8,550			8,451			
	Total with Duct option, vented crawlspace houses		na			3,474			

Incremental Construction Cost of Individual Code Chage for the Reference House					CZ 4 Baltimore Frame Wall Gas	
Proposal	Description	Affected CZ	Reference House	Slab 20%	Basement 60%	Crawl 20%
RE7	Lighting: revised definition of high-efficacy	All	$0			
RE18/20/21	Certificate: additional info	All	$99	$99	$99	$99
RE29	Frame wall, c.i.: R5 to R10 (2x4); R0 to R5 (2x6)	4-5	$4,970	$4,970	$4,970	$4,970
RE32	Slab edge: NR to R10/2 (CZ3)	3	$1,988			
"	Slab edge: R10/2 to R10/4 (CZ4-5)	4-5	$993	$993		
RE33	Ceiling insulation R38 to R49	2-3	$1,366			
RE36	Ceiling insulation R49 to R60	4-7	$1,366	$1,366	$1,366	$1,366
RE34	Floors, removes exception for min R19 if fills cavity	5-8	NA			
RE35	Windows: reduces U-value from 0.32 to 0.30	3-4	$76	$76	$76	$76
RE37	Windows: changes SHGC form NR to 0.40	5 & 4C	$0			
RE105	Windows: reduces max SHGC tradeoff from 0.50 to 0.40	2-3	$0			
RE46	Attic access hatch: no direct cost; cost of additional insulation	All	$13	$13	$13	$13
RE49	Baffles at attic access	All	$12	$12	$12	$12
RE72	Air seal narrow framing cavities	All	$156	$156	$156	$156
RE82	Air seal rim (basement; unvented crawlspace)	All	$1,252		$1,252	
"	Air seal rim (slab, vented crawlspace)	All	$417	$417		$417
RE96	House tightness, allows trade-off for performance path	All	$0			
RE103	Air seal electrical & communication outlet boxes	All	$369	$369	$369	$369
RE106	Thermostat: requires 7-day programming	All	$0			
RE112	Removes exception for duct test (basement, unvented crawl)	All	$247		$247	
RE130	Adds requirement to test whole-dwelling ventilation	All	$62	$62	$62	$62
RE133	Updates ventilation fan efficacy (affects bath EF)	All	$66	$66	$66	$66
RE139	Requires ERV/HRV in CZ 7-8 (includes RE134 air handler integration)	7	$3,206			
RE145	Lighting: 100% high-efficacy; controls (slab)	All	$49	$49		
"	Lighting: 100% high-efficacy; controls (basement, crawl)	All	$60		$60	$60
RE148	Lighting, commercial	All	NA			
RE149	Lighting: exterior controls	All	$25	$25	$25	$25
RE151	Performance path backstop: 2009 IECC	All	NA			
RE178	Performance path ventilation type to match proposed	All	NA			
CE40.2	Insulation certificate if no manufacturer mark (i.e., blown)	All	$15	$15	$15	$15
CE151.2	Defines duct TDE; adds requirements for underground ducts	All	NA			
	Sub-total without additional efficiency package options			$8,686	$8,786	$7,705
	Weighted average, foundations					$8,550
			Nat Ave		**CZ 4**	
	Weighted average without additional efficiency package options		5,477		8,550	
RE209	HVAC option		3,824		1,317	
RE209	Water Heater option		1,071		740	
RE209	Ventilation option		3,570		3,206	
RE209	Duct option, slab houses		3,074		1,736	
RE209	Duct option, vented crawlspace houses		na		(193)	
	Total with HVAC option		9,301		9,867	
	Total with Water Heater option		6,548		9,290	
	Total with Ventilation option		9,047		11,755	
	Total with Duct option, slab houses		8,550		10,286	
	Total with Duct option, vented crawlspace houses		na		8,356	

Incremental Construction Cost of Individual Code Chage for the Reference House

				CZ 5 Chicago					
				Frame Wall Gas (60%)			Frame Wall Electric (40%)		
Proposal	Description	Affected CZ	Reference House	Slab 15%	Basement 70%	Crawl 15%	Slab 15%	Basement 70%	Crawl 15%
RE7	Lighting: revised definition of high-efficacy	All	$0						
RE18/20/21	Certificate: additional info	All	$99	$99	$99	$99	$99	$99	$99
RE29	Frame wall, c.i.: R5 to R10 (2x4); R0 to R5 (2x6)	4-5	$4,970	$4,970	$4,970	$4,970	$4,970	$4,970	$4,970
RE32	Slab edge: NR to R10/2 (CZ3)	3	$1,988						
"	Slab edge: R10/2 to R10/4 (CZ4-5)	4-5	$993	$993			$993		
RE33	Ceiling insulation R38 to R49	2-3	$1,366						
RE36	Ceiling insulation R49 to R60	4-7	$1,366	$1,366	$1,366	$1,366	$1,366	$1,366	$1,366
RE34	Floors, removes exception for min R19 if fills cavity	5-8	NA						
RE35	Windows: reduces U-value from 0.32 to 0.30	3-4	$76						
RE37	Windows: changes SHGC form NR to 0.40	5 & 4C	$0						
RE105	Windows: reduces max SHGC tradeoff from 0.50 to 0.40	2-3	$0						
RE46	Attic access hatch: no direct cost; cost of additional insulation	All	$13	$13	$13	$13	$13	$13	$13
RE49	Baffles at attic access	All	$12	$12	$12	$12	$12	$12	$12
RE72	Air seal narrow framing cavities	All	$156	$156	$156	$156	$156	$156	$156
RE82	Air seal rim (basement; unvented crawlspace)	All	$1,252		$1,252	$1,252		$1,252	$1,252
"	Air seal rim (slab, vented crawlspace)	All	$417	$417			$417		
RE96	House tightness, allows trade-off for performance path	All	$0						
RE103	Air seal electrical & communication outlet boxes	All	$369	$369	$369	$369	$369	$369	$369
RE106	Thermostat: requires 7-day programming	All	$0						
RE112	Removes exception for duct test (basement, unvented crawl)	All	$247		$247	$247		$247	$247
RE130	Adds requirement to test whole-dwelling ventilation	All	$62	$62	$62	$62	$62	$62	$62
RE133	Updates ventilation fan efficacy (affects bath EF)	All	$66	$66	$66	$66	$66	$66	$66
RE139	Requires ERV/HRV in CZ 7-8 (includes RE134 air handler integration)	7	$3,206						
RE145	Lighting: 100% high-efficacy; controls (slab)	All	$49	$49			$49		
"	Lighting: 100% high-efficacy; controls (basement, crawl)	All	$60		$60	$60		$60	$60
RE148	Lighting, commercial	All	NA						
RE149	Lighting: exterior controls	All	$25	$25	$25	$25	$25	$25	$25
RE151	Performance path backstop: 2009 IECC	All	NA						
RE178	Performance path ventilation type to match proposed	All	NA						
CE40.2	Insulation certificate if no manufacturer mark (i.e., blown)	All	$15	$15	$15	$15	$15	$15	$15
CE151.2	Defines duct TDE; adds requirements for underground ducts	All	NA						
	Sub-total without additional efficiency package options			$8,610	$8,710	$8,710	$8,610	$8,710	$8,710
	Weighted average, foundations					$8,695			$8,695
			Nat Ave		**CZ 5 Gas**			**CZ 5 Electric**	
	Weighted average without additional efficiency package options		5,477		8,695			8,695	
RE209	HVAC option		3,824		1,494			8,196	
RE209	Water Heater option		1,071		740			2,503	
RE209	Ventilation option		3,570		3,206			3,109	
RE209	Duct option, slab houses		3,074		1,736			1,736	
RE209	Duct option, vented crawlspace houses		na						
	Total with HVAC option		9,301		10,188			16,890	
	Total with Water Heater option		6,548		9,435			11,198	
	Total with Ventilation option		9,047		11,900			11,804	
	Total with Duct option, slab houses		8,550		10,431			10,431	
	Total with Duct option, vented crawlspace houses		na						

Incremental Construction Cost of Individual Code Chage for the Reference House

Proposal	Description	Affected CZ	Reference House	CZ 6 Helena Frame Wall Gas Slab 5%	CZ 6 Helena Frame Wall Gas Basement 90%	CZ 6 Helena Frame Wall Gas Crawl 5%	CZ 7 Duluth Frame Wall Gas Slab 30%	CZ 7 Duluth Frame Wall Gas Basement 5%	CZ 7 Duluth Frame Wall Gas Crawl 65%
RE7	Lighting: revised definition of high-efficacy	All	$0						
RE18/20/21	Certificate: additional info	All	$99	$99	$99	$99	$99	$99	$99
RE29	Frame wall, c.i.: R5 to R10 (2x4); R0 to R5 (2x6)	4-5	$4,970						
RE32	Slab edge: NR to R10/2 (CZ3)	3	$1,988						
"	Slab edge: R10/2 to R10/4 (CZ4-5)	4-5	$993						
RE33	Ceiling insulation R38 to R49	2-3	$1,366						
RE36	Ceiling insulation R49 to R60	4-7	$1,366	$1,366	$1,366	$1,366	$1,366	$1,366	$1,366
RE34	Floors, removes exception for min R19 if fills cavity	5-8	NA						
RE35	Windows: reduces U-value from 0.32 to 0.30	3-4	$76						
RE37	Windows: changes SHGC form NR to 0.40	5 & 4C	$0						
RE105	Windows: reduces max SHGC tradeoff from 0.50 to 0.40	2-3	$0						
RE46	Attic access hatch: no direct cost; cost of additional insulation	All	$13	$13	$13	$13	$13	$13	$13
RE49	Baffles at attic access	All	$12	$12	$12	$12	$12	$12	$12
RE72	Air seal narrow framing cavities	All	$156	$156	$156	$156	$156	$156	$156
RE82	Air seal rim (basement; unvented crawlspace)	All	$1,252		$1,252	$1,252		$1,252	$1,252
"	Air seal rim (slab, vented crawlspace)	All	$417	$417			$417		
RE96	House tightness, allows trade-off for performance path	All	$0						
RE103	Air seal electrical & communication outlet boxes	All	$369	$369	$369	$369	$369	$369	$369
RE106	Thermostat: requires 7-day programming	All	$0						
RE112	Removes exception for duct test (basement, unvented crawl)	All	$247		$247	$247		$247	$247
RE130	Adds requirement to test whole-dwelling ventilation	All	$62	$62	$62	$62	$62	$62	$62
RE133	Updates ventilation fan efficacy (affects bath EF)	All	$66	$66	$66	$66	$66	$66	$66
RE139	Requires ERV/HRV in CZ 7-8 (includes RE134 air handler integration)	7	$3,206				$3,206	$3,206	$3,206
RE145	Lighting: 100% high-efficacy; controls (slab)	All	$49	$49			$49		
"	Lighting: 100% high-efficacy; controls (basement, crawl)	All	$60		$60	$60		$60	$60
RE148	Lighting, commercial	All	NA						
RE149	Lighting: exterior controls	All	$25	$25	$25	$25	$25	$25	$25
RE151	Performance path backstop: 2009 IECC	All	NA						
RE178	Performance path ventilation type to match proposed	All	NA						
CE40.2	Insulation certificate if no manufacturer mark (i.e., blown)	All	$15	$15	$15	$15	$15	$15	$15
CE151.2	Defines duct TDE; adds requirements for underground ducts	All	NA						
	Sub-total without additional efficiency package options			$2,648	$3,740	$3,740	$5,853	$6,946	$6,946
	Weighted average, foundations					$3,685			$6,618
			Nat Ave		CZ 6			CZ 7	
	Weighted average without additional efficiency package options		5,477		3,685			6,618	
RE209	HVAC option		3,824		1,494			1,494	
RE209	Water Heater option		1,071		740			740	
RE209	Ventilation option		3,570		3,206			0	
RE209	Duct option, slab houses		3,074		1,736			1,736	
RE209	Duct option, vented crawlspace houses		na						
	Total with HVAC option		9,301		5,179			8,112	
	Total with Water Heater option		6,548		4,426			7,358	
	Total with Ventilation option		9,047		6,891			6,618	
	Total with Duct option, slab houses		8,550		5,421			8,354	
	Total with Duct option, vented crawlspace houses		na						

APPENDIX C: LOCATION ADJUSTMENT FACTORS

State	City	Cost Adjustment Factor	State	City	Cost Adjustment Factor
Alabama	Birmingham	0.84	Montana	Billings	0.89
Alabama	Mobile	0.83	Nebraska	Omaha	0.90
Alaska	Fairbanks	1.21	Nevada	Las Vegas	1.03
Arizona	Phoenix	0.84	New Hampshire	Portsmouth	0.95
Arizona	Tucson	0.84	New Jersey	Jersey City	1.18
Arkansas	Little Rock	0.83	New Mexico	Albuquerque	0.86
California	Alhambra	1.15	New York	Long Island City	1.36
California	Los Angeles	1.15	New York	Syracuse	0.99
California	Riverside	1.13	North Carolina	Charlotte	0.99
California	Stockton	1.20	North Carolina	Hickory	0.93
Colorado	Boulder	0.90	North Carolina	Raleigh	0.94
Colorado	Colorado Springs	0.87	North Dakota	Fargo	0.87
Colorado	Denver	0.91	Ohio	Columbus	0.91
Connecticut	New Haven	1.10	Oklahoma	Oklahoma City	0.84
Delaware	Dover	1.02	Oklahoma	Tulsa	0.83
District of Columbia	Washington, D.C.	0.92	Oregon	Bend	1.02
Florida	Fort Meyers	0.79	Pennsylvania	Norristown	1.05
Florida	Miami	0.83	Pennsylvania	State College	0.94
Florida	Orlando	0.82	Rhode Island	Providence	1.09
Florida	Tampa	0.81	South Carolina	Greenville	0.97
Georgia	Atlanta	0.90	South Dakota	Sioux Falls	0.92
Hawaii	Honolulu	1.22	Tennessee	Memphis	0.87
Idaho	Boise	0.89	Texas	Austin	0.80
Illinois	Chicago	1.25	Texas	Dallas	0.84
Indiana	Indianapolis	0.92	Texas	Houston	0.84
Iowa	Des Moines	0.92	Texas	San Antonio	0.83
Kansas	Wichita	0.81	Utah	Ogden	0.84
Kentucky	Louisville	0.89	Utah	Provo	0.85
Louisiana	Baton Rouge	0.85	Utah	Salt Lake City	0.85
Maine	Portland	0.94	Vermont	Burlington	0.95
Maryland	Baltimore	0.93	Virginia	Fairfax	1.00
Massachusetts	Boston	1.18	Virginia	Winchester	0.99
Michigan	Ann Arbor	0.99	Washington	Tacoma	1.05
Minnesota	Minneapolis	1.09	West Virginia	Charleston	0.94
Mississippi	Biloxi	0.83	Wisconsin	La Crosse	0.95
Missouri	Springfield	0.86	Wyoming	Casper	0.85

*Source: RSMeans *Residential Cost Data 2021*. Sample cities are listed in this table; check RSMeans for additional locations.

APPENDIX D: 2021 IECC INSULATION AND FENESTRATION CHANGES

The table below shows the insulation and fenestration requirements for the 2018 IECC and 2021 IECC. For comparison purposes, the 2021 IECC values are shown only where those have been changed from the 2018 values.

Insulation and Fenestration Requirements. Source: adapted from the 2018 and 2021 IECC.

	CZ 2		CZ 3		CZ 4 except 4C		CZ 5 and 4C		CZ 6		CZ 7	
	Phoenix		Memphis		Baltimore		Chicago		Helena		Duluth	
Component	**2018**	**2021**	**2018**	**2021**	**2018**	**2021**	**2018**	**2021**	**2018**	**2021**	**2018**	**2021**
Fenestration U-factor	0.40		0.32	0.30	0.32	0.30	0.30		0.30		0.30	
Fenestration SHGC	0.25		0.25		0.4		NR	0.40	NR		NR	
Skylight U-factor	0.65		0.55		0.55		0.55		0.55		0.55	
Ceiling R-value	38	49	38	49	49	60	49	60	49	60	49	60
Frame Wall R-value (selected for modeling)	13		13+5		13+5	13+10	13+5	13+10	13+10		13+10	
Mass Wall R-value (<half/>half on interior	4/6		8/13		8/13		13/17		15/20		19/21	
Floor R-value	13		19		19		30		30		38	
Basement wall R-value, ci/cavity	0		5/13		10/13		15/19		15/19		15/19	
Slab R-value/depth	0		0	10/2	10/2	10/4	10/2	10/4	10/4		10/4	
Crawl wall R-value, ci/cavity	0		5/13		10/13		15/19		15/19		15/19	

APPENDIX E: ENERGY USE BY CLIMATE ZONE

		Annual Energy Use CZ 2 Phoenix					
		Mass Wall (30%)			Frame Wall (70%)		
		Electric			Electric		
Configuration		**kWh/yr**	**$/yr**	**Savings***	**kWh/yr**	**$/yr**	**Savings***
2018 Baseline	Slab Basement Crawl**	17,107	2,225		17,087	2,223	
2018 + 2021 ceiling insulation	Slab Basement Crawl**	17,052	2,218	0.3%	17,028	2,215	0.4%
2018 + 2021 slab insulation	Slab Ave for CZ						
2018 + 2021 wall cont. insulation	Slab Basement Crawl**						
2018 + 2021 window U-Factor	Slab Basement Crawl**						
2021 without efficiency options	Slab Basement Crawl**	16,638	2,164	2.7%	16,615	2,162	2.7%
2021 + HVAC option	Slab Basement Crawl**	15,727	2,046	8.0%	15,715	2,045	8.0%
2021 + Water Heater option	Slab Basement Crawl**	15,618	2,030	8.8%	15,589	2,027	8.8%
2021 + Ventilation option	Slab Basement Crawl**	16,506	2,147	3.5%	16,465	2,142	3.6%
2021 + Duct option	Slab Crawl**	15,768	2,051	7.8%	15,715	2,044	8.1%

*Cost savings ($/yr) relative to 2018 baseline

**Crawl: vented CZ 3-4; conditioned CZ 5-7

Configuration		Annual Energy Use CZ 3 Memphis Mass Wall (10%) Electric kWh/yr	$/yr	Savings*	Frame Wall (90%) Electric kWh/yr	$/yr	Savings*
2018 Baseline	Slab	15618	2031		15,557	2,023	
	Basement	16612	2161		16547	2152	
	Crawl**	15144	1970		15056	1958	
2018 + 2021 ceiling insulation	Slab	15536	2021	0.5%	15,472	2,012	0.5%
	Basement	16521	2149	0.6%	16,451	2,140	0.6%
	Crawl**	15053	1958	0.6%	14,959	1,946	0.6%
2018 + 2021 slab insulation	Slab	14938	1943	4.3%	14,877	1,935	4.3%
	Ave for CZ					1,936	
2018 + 2021 wall cont. insulation	Slab						
	Basement						
	Crawl**						
2018 + 2021 window U-Factor	Slab	15566	2024	0.3%	15,501	2,016	0.3%
	Basement	16553	2154	0.3%	16,489	2,145	0.3%
	Crawl**	15091	1963	0.4%	14,994	1,951	0.4%
2021 without efficiency options	Slab	14,408	1,874	7.7%	14,344	1,866	7.8%
	Basement	15,903	2,068	4.3%	15,832	2,059	4.3%
	Crawl**	14,610	1,900	3.6%	14,519	1,889	3.5%
2021 + HVAC option	Slab	13,485	1,754	13.6%	13,450	1,749	13.5%
	Basement	14,824	1,928	10.8%	14,786	1,924	10.6%
	Crawl**	13,561	1,765	10.4%	13,502	1,756	10.3%
2021 + Water Heater option	Slab	13,277	1,726	15.0%	13,212	1,718	15.1%
	Basement	14,742	1,916	11.3%	14,669	1,907	11.4%
	Crawl**	13,470	1,752	11.1%	13,382	1,740	11.1%
2021 + Ventilation option	Slab	14,326	1,864	8.2%	14,259	1,855	8.3%
	Basement	15,727	2,046	5.3%	15,651	2,036	5.4%
	Crawl**	14,446	1,879	4.6%	14,346	1,867	4.6%
2021 + Duct option	Slab	13,816	1,797	11.5%	13,749	1,788	11.6%
	Crawl**	14,273	1,857	5.7%	14,174	1,844	5.8%

*Cost savings ($/yr) relative to 2018 baseline

**Crawl: vented CZ 3-4; conditioned CZ 5-7

Configuration		Annual Energy Use CZ 4 Baltimore Frame Wall Natural Gas kWh/yr	thrm/yr	$/yr	Savings*
2018 Baseline	Slab	8,262	697	1,807	
	Basement	9,848	696	2,012	
	Crawl**	8,669	665	1,826	
2018 + 2021 ceiling insulation	Slab	8,244	690	1,797	0.6%
	Basement	9,833	689	2,003	0.4%
	Crawl**	8,652	659	1,818	0.4%
2018 + 2021 slab insulation	Slab	8,180	674	1,772	1.9%
	Ave for CZ			1,772	
2018 + 2021 wall cont. insulation	Slab	8,177	661	1,758	2.7%
	Basement	9,763	660	1,964	2.4%
	Crawl**	8,590	629	1,778	2.6%
2018 + 2021 window U-Factor	Slab	8,256	687	1,796	0.6%
	Basement	9,848	686	2,002	0.5%
	Crawl**	8,666	656	1,816	0.5%
2021 without efficiency options	Slab	7,673	626	1,655	8.4%
	Basement	9,159	649	1,873	6.9%
	Crawl**	8,174	616	1,711	6.3%
2021 + HVAC option	Slab	7,348	565	1,550	14.2%
	Basement	8,795	580	1,753	12.9%
	Crawl**	7,761	552	1,590	12.9%
2021 + Water Heater option	Slab	7,670	604	1,624	10.1%
	Basement	9,188	617	1,835	8.8%
	Crawl**	8,171	594	1,678	8.1%
2021 + Ventilation option	Slab	7,931	586	1,648	8.8%
	Basement	9,481	584	1,847	8.2%
	Crawl**	8,420	575	1,700	6.9%
2021 + Duct option	Slab	7,495	581	1,585	12.3%
	Crawl**	7,732	607	1,644	10.0%

*Cost savings ($/yr) relative to 2018 baseline

**Crawl: vented CZ 3-4; conditioned CZ 5-7

Configuration		Annual Energy Use CZ 5 Chicago Frame Wall Natural Gas (60%) kWh/yr	thrm/yr	$/yr	Savings*
2018 Baseline	Slab	7635	1098	2156	
	Basement	9,297	1,089	2,355	
	Crawl**	7,720	999	2,054	
2018 + 2021 ceiling insulation	Slab	7,691	1,090	2,146	0.5%
	Basement	9,285	1,080	2,343	0.5%
	Crawl**	7,702	991	2,043	0.5%
2018 + 2021 slab insulation	Slab	7,647	1,071	2,120	1.7%
	Ave for CZ				
2018 + 2021 wall cont. insulation	Slab	7,617	1,049	2,093	2.9%
	Basement	9,209	1,040	2,291	2.7%
	Crawl**	7,635	952	1,993	3.0%
2018 + 2021 window U-Factor	Slab				
	Basement				
	Crawl**				
2021 without efficiency options	Slab	7,142	1,018	1,999	7.3%
	Basement	8,614	1,037	2,210	6.2%
	Crawl**	7,216	947	1,934	5.8%
2021 + HVAC option	Slab	6,770	898	1,824	15.4%
	Basement	8,209	914	2,029	13.8%
	Crawl**	6,838	837	1,769	13.9%
2021 + Water Heater option	Slab	7,169	1,002	1,977	8.3%
	Basement	8,655	1,007	2,175	7.6%
	Crawl**	7,245	929	1,910	7.0%
2021 + Ventilation option	Slab	7,400	966	1,978	8.3%
	Basement	8,927	960	2,170	7.9%
	Crawl**	7,482	901	1,921	6.5%
2021 + Duct option	Slab	7,022	929	1,889	12.4%
	Crawl**				

*Cost savings ($/yr) relative to 2018 baseline

**Crawl: vented CZ 3-4; conditioned CZ 5-7

Configuration		Annual Energy Use CZ 6 Helena Frame Wall Natural Gas kWh/yr	thrm/yr	$/yr	Savings*	Annual Energy Use CZ 7 Duluth*** Frame Wall Natural Gas kWh/yr	thrm/yr	$/yr	Savings*
2018 Baseline	Slab	7,374	1,201	2,221		7,178	1,676	2,735	
	Basement	8,962	1,166	2,391		8,664	1,612	2,873	
	Crawl**	7,345	1,057	2,066		7,119	1,473	2,515	
2018 + 2021 ceiling insulation	Slab	7,359	1,192	2,210	0.5%	7,116	1,665	2,722	0.5%
	Basement	8,945	1,155	2,378	0.5%	8,649	1,599	2,857	0.6%
	Crawl**	7,333	1,047	2,054	0.6%	7,105	1,460	2,499	0.6%
2018 + 2021 slab insulation	Slab								
	Ave for CZ								
2018 + 2021 wall cont. insulation	Slab								
	Basement								
	Crawl**								
						CZ 7 2021 no HRV, for reference:			
2018 + 2021 window U-Factor	Slab					7,087	1,671	2,678	2.1%
	Basement					8,479	1,607	2,791	2.9%
	Crawl**					7,028	1,466	2,454	2.4%
2021 without efficiency options	Slab	6,970	1,198	2,165	2.5%	7,321	1,605	2,639	3.5%
	Basement	8,379	1,162	2,311	3.3%	8,787	1,523	2,743	4.5%
	Crawl**	6,937	1,052	2,008	2.8%	7,283	1,419	2,438	3.1%
2021 + HVAC option	Slab	6,586	1,054	1,964	11.6%	6,879	1,403	2,369	13.4%
	Basement	7,984	1,024	2,115	11.5%	8,344	1,333	2,486	13.5%
	Crawl**	6,583	930	1,833	11.3%	6,870	1,244	2,201	12.5%
2021 + Water Heater option	Slab	7,037	1,188	2,155	3.0%	7,400	1,600	2,635	3.7%
	Basement	8,441	1,135	2,282	4.6%	8,854	1,499	2,718	5.4%
	Crawl**	7,005	1,038	1,993	3.5%	7,353	1,409	2,429	3.4%
						CZ 7 2021 HRV .75 SRE v. .65:			
2021 + Ventilation option	Slab	7,198	1,126	2,120	4.5%	7,307	1,588	2,619	4.2%
	Basement	8,672	1,068	2,250	5.9%	8,772	1,502	2,719	5.4%
	Crawl**	7,189	995	1,980	4.2%	7,271	1,403	2,420	3.8%
2021 + Duct option	Slab	6,832	1,043	1,985	10.6%	7,210	1,409	2,418	11.6%
	Crawl**								

*Cost savings ($/yr) relative to 2018 baseline

**Crawl: vented CZ 3-4; conditioned CZ 5-7

***For CZ 7 all 2021 results include an HRV

Home Innovation
RESEARCH LABS™

ATTACHMENT 5

Cost & Size Comparisons:
New Manufactured Homes and New Single-Family Site-Built Homes
2014 - 2020

	2020	2019	2018	2017	2016	2015	2014
New Manufactured Homes							
All[1]							
Avg. Sales Price	$ 87,000	$ 81,900	$ 78,500	$ 71,900	$ 70,600	$ 68,000	$ 65,300
Avg. Square Feet	1,471	1,448	1,438	1,426	1,446	1,430	1,438
Avg. Cost per Sq. Ft.	$ 59.14	$ 56.56	$ 54.59	$ 50.42	$ 48.82	$ 47.55	$ 45.41
Single							
Avg. Sales Price	$ 57,300	$ 53,200	$ 52,400	$ 48,300	$ 46,700	$ 45,600	$ 45,000
Avg. Square Feet	1,085	1,072	1,072	1,087	1,075	1,092	1,115
Avg. Cost per Sq. Ft.	$ 52.81	$ 49.63	$ 48.88	$ 44.43	$ 43.44	$ 41.76	$ 40.36
Double							
Avg. Sales Price	$ 108,500	$ 104,000	$ 99,500	$ 92,800	$ 89,500	$ 86,700	$ 82,000
Avg. Square Feet	1,760	1,747	1,747	1,733	1,746	1,713	1,710
Avg. Cost per Sq. Ft.	$ 61.65	$ 59.53	$ 51.26	$ 53.55	$ 51.26	$ 50.61	$ 47.95
Housing Starts vs. MH Shipments (*Thousands of units*)							
New Single Family							
Housing Starts	991	888	876	849	782	715	648
Percent of Total	91%	90%	90%	90%	91%	91%	91%
Manufactured Home Shipments							
Shipped	94	95	97	93	81	71	64
Percent of Total	9%	10%	10%	10%	9%	9%	9%
Total	1,085	983	973	942	863	786	678
New Single-Family							
Site-Built Homes Sold (Home and Land Sold as Package)							
Avg. Sales Price	$ 391,900	$ 383,900	$ 385,000	$ 384,900	$ 360,900	$ 352,700	$ 347,700
Derived Average Land Price	$ 83,303	$ 84,485	$ 87,253	$ 91,173	$ 82,491	$ 80,246	$ 84,444
Price of Structure							
Avg. Square Feet	2,527	2,518	2,602	2,645	2,650	2,724	2,707
Avg. Price per Sq Ft. (excl. land)	$ 122.12	$ 118.91	$ 114.43	$ 111.05	$ 105.06	$ 100.02	$ 97.25
Manufactured Home Shipments							
Total	94,390	94,615	96,555	92,902	81,136	70,544	64,331
Single-Section	42,578	42,930	44,979	46,305	38,944	32,210	30,218
Multi-Section	51,812	51,685	51,576	46,597	42,192	38,334	34,113
New Manufactured Homes Placed (*for Residential Use*)							
Located in Communities	27%	31%	37%	32%	34%	34%	33%
Located on Private Property	73%	69%	63%	68%	66%	66%	67%
Titled as Personal Property	78%	76%	77%	76%	77%	80%	80%
Titled as Real Estate	19%	19%	17%	17%	17%	14%	13%

[1] Includes manufactured homes with more than two sections.

Source: U.S. Census Bureau and U.S. Department of Housing and Urban Development, Survey of Construction, https://www.census.gov/construction/chars/ ; https://www.census.gov/construction/nrc/xls/starts_cust.xls

Source: U.S. Census Bureau and U.S. Department of Housing and Urban Development,Manufactured Housing Survey

October 1, 2021

Manufactured Housing Consensus Committee
Office of Manufactured Housing Programs
U.S. Department of Housing and Urban Development
451 7th Street SW, Room 9166
Washington, D.C. 20410

RE: Notice of a Federal Advisory Committee Meeting Manufactured Housing Consensus Committee (Docket No. FR-6270-N-02)

Dear Sir/Madam:

The Manufactured Housing Institute (MHI) is pleased to provide feedback to the U.S. Department of Housing and Urban Development (HUD) and the Manufactured Housing Consensus Committee (MHCC) in response to the request for public comments in preparation for the MHCC's upcoming teleconference on October 8, 2021, about the Department of Energy's (DOE) supplemental notice of proposed rulemaking titled "Energy Conservation Program: Energy Conservation Standards for Manufactured Housing."

MHI is the only national trade association that represents every segment of the factory-built housing industry. Our members include home builders, suppliers, retail sellers, lenders, installers, community owners, community operators, and others who serve the industry, as well as 48 affiliated state organizations. In 2020, our industry produced nearly 95,000 homes, accounting for approximately nine percent of new single-family home starts. These homes are produced by 34 U.S. corporations in 138 plants located across the country. MHI's members are responsible for close to 85 percent of the manufactured homes produced each year.

To reiterate MHI's position from its previous comment letter and remarks, the DOE's proposed rule is fundamentally flawed, both because it does not follow an accurate cost-benefit analysis as the statute requires and because it ignores the importance of HUD as the primary regulator of construction and safety standards for manufactured homes.

Ownership Related Costs

MHI urges the MHCC to call on the DOE to revise its proposed energy requirements to reflect a complete and accurate cost benefit analysis which is required by the Energy Independence and Security Act of 2007 (EISA).

The DOE's proposal is based on improper calculations and methodologies including underestimating the current costs of homes and the costs of the new materials to construct them, and not considering the cost of testing procedures and compliance. Further, the DOE significantly underestimates the fact that the first buyer of an energy efficient manufactured home would likely never reap the economic benefit. Based on MHI's industry data, buyers usually sell their homes within seven to ten years of purchase. Further, it is unlikely that a manufactured homebuyer financing the purchase of a new manufactured home would even recover these upfront costs at a future sale. Consequently, as result of the DOE's proposal, homeowners will not realize incremental value for energy features that increase a home's purchase or sale price.

At the efficiency levels proposed by the DOE in its recent rulemaking, MHI's survey of manufacturers found that it is unlikely that a buyer purchasing a new home and financing 90 percent of the purchase price would even recover these upfront costs at a future sale. Instead, the DOE's proposal would likely yield a

negative return over the ownership period. While several reasons contribute to this, including purchase price and availability of financing options, the fact that homebuyers usually sell their homes within the first seven to ten years of purchase is the most relevant.

Using the DOE's assumptions of cost and location as outlined in the Technical Support Document, which assumes a 30-year mortgage which is not the norm for manufactured housing, MHI conducted a cost-benefit analysis using a more realistic loan term which is being utilized in the market today. Assuming a down-payment of 10 percent, an interest rate of nine percent, a loan term of 20 years, and a tenancy period of 10 years, MHI's cost-benefit analysis found that the DOE's proposal will add at a minimum almost $1,000 to the cost of a new single-section manufactured home and up to $5,500 to the cost of a multi-section home depending on location (See Appendix I)[1]. Such price increases would be financially devasting for homebuyers looking to finance the purchase of a manufactured home.

It is important to note that only place that MHI's analysis shows a savings is in Fairbanks, Alaska, where the savings is only $369 after ten years. In 2020, Alaska had only 64 homes shipped to the state and as of July 2021 only five homes had been shipped there. Further, the locations selected by the DOE for its analysis are locations that do not as a group represent their respective climate regions and tend to overestimate the energy benefits relative to the average of all locations.

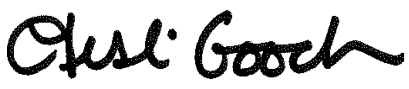
Given these facts, any new energy conservation standard must avoid creating a scenario where the upfront increase to the purchase price of a home prices many consumers out of the market, even if those upfront costs could be amortized over the life of the home.

Compliance and Enforcement

As MHI has previously stated, it is unnecessary for the DOE to develop a new enforcement mechanism because the HUD Code is an already-established enforcement mechanism that mandates a uniform standard for design, construction, and installation, including federal requirements for safety, durability, and energy efficiency. While MHI recognizes that the DOE has the authority to develop an energy conservation standard for manufactured housing, it should be, as is required by ESIA, developed in coordination with HUD to ensure that any proposed rules are integrated into the HUD Code for enforcement. Failure to partner with HUD will result in complicated, overlapping requirements that will only increase manufacturing costs, hurting existing homeowners and prospective homebuyers.

While MHI and its members will always support sensible energy conservation efforts, overly burdensome regulations that even modestly increase the cost of a manufactured home will price many consumers out of homeownership. This increase will have a disproportionate impact on minority communities, who face the most significant burden in obtaining affordable homeownership and would be in direct contrast to the Administration's goal of achieving racial equity in homeownership. MHI stands ready to work with DOE, HUD and the MHCC on the development of realistic and achievable energy standards that not only encourages innovation and conservation, but also eliminates regulatory barriers that impede consumer access to safe, affordable manufactured housing.

Sincerely,



Lesli Gooch, Ph.D.
Chief Executive Officer

[1] When costs for compliance and testing are added, the homebuyer losses will increase, potentially significantly.

Appendix I – Cost Benefit Analysis

The tables below provide Life Cycle Cost results for the DOE proposed rule. The figures offer a glimpse of the benefits and costs for a homebuyer purchasing either a single or two section home. The inputs for location selection, average home cost, increase in home cost related to the energy investment and resultant monthly energy savings match DOE's assumptions contained in the Technical Support Document (TSD). The table sums the major costs and benefits as experienced by the buyer over a 10-year, average occupancy period to yield a net benefit (cost) including incremental mortgage payment, added down payment and monthly energy savings. A negative value indicates that the buyer can expect to lose money on the energy investment making the home less affordable. For example, a purchaser of a single section home in Phoenix, AZ, can on average expect to experience a net cost of nearly $4,900 over the 10-year period of occupancy. Other assumptions made in generating the tables are provided below. Note: all figures are expressed in current dollars. Further, it is assumed that the buyer does not realize an incremental price increase associated with the energy measures at the time of sale, an assumption that is based on a lack of evidence that energy features can demand a higher home price.

Assumptions

Down payment	10%
Principal	90%
Mort. interest rate	9%
Loan term (yrs)	20
Occupancy term (yrs)	10
Principal recapture rate	0%

			Single Section Home								
HUD Standards Climate Zone	**Sample Locations**	**Average home cost (DOE)**	**Increase in home cost (DOE)**	**Percent increase in cost**	**Down payment**	**Inc. in mortgage**	**Inc. monthly mort. pay.**	**Energy savings ($/mth) (DOE)**	**Net Mthly. Savings/ Cost**	**Principal repayment**	**Net benefit (cost)**
1	Miami	$57,300	$2,574	**4.5%**	$257	$2,317	$21	$20	($1)	$1,646	**($2,010)**
1	Houston	$57,300	$2,574	**4.5%**	$257	$2,317	$21	$24	$3	$1,646	**($1,493)**
1	Atlanta	$57,300	$2,574	**4.5%**	$257	$2,317	$21	$29	$8	$1,646	**($891)**
1	Charleston	$57,300	$2,574	**4.5%**	$257	$2,317	$21	$26	$5	$1,646	**($1,340)**
1	Jackson	$57,300	$2,574	**4.5%**	$257	$2,317	$21	$28	$7	$1,646	**($1,048)**
1	Birmingham	$57,300	$2,574	**4.5%**	$257	$2,317	$21	$27	$7	$1,646	**($1,106)**
2	Phoenix	$57,300	$4,820	**8.4%**	$482	$4,338	$39	$28	($11)	$3,081	**($4,897)**
2	Memphis	$57,300	$4,820	**8.4%**	$482	$4,338	$39	$32	($7)	$3,081	**($4,432)**
2	El Paso	$57,300	$4,820	**8.4%**	$482	$4,338	$39	$30	($9)	$3,081	**($4,658)**
2	San Francisco	$57,300	$4,820	**8.4%**	$482	$4,338	$39	$23	($17)	$3,081	**($5,543)**
2	Albuquerque	$57,300	$4,820	**8.4%**	$482	$4,338	$39	$30	($9)	$3,081	**($4,666)**
3	Baltimore	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$33	($4)	$2,978	**($3,967)**
3	Salem	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$26	($12)	$2,978	**($4,892)**
3	Chicago	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$34	($4)	$2,978	**($3,930)**
3	Boise	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$28	($10)	$2,978	**($4,605)**
3	Burlington	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$35	($3)	$2,978	**($3,812)**
3	Helena	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$36	($2)	$2,978	**($3,686)**
3	Duluth	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$49	$11	$2,978	**($2,144)**
3	Fairbanks	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$69	$32	$2,978	**$369**

			Multi Section Home								
HUD Standards Climate Zone	**Sample Locations**	**Average home cost (DOE)**	**Increase in home cost (DOE)**	**Percent increase in cost**	**Down payment**	**Inc. in mortgage**	**Inc. monthly mort. pay.**	**Energy savings ($/mth) (DOE)**	**Net Mthly. Savings/ Cost**	**Principal repayment**	**Net benefit (cost)**
1	Miami	$108,500	$4,143	3.8%	$414	$3,729	$34	$33	($1)	$2,648	**($3,134)**
1	Houston	$108,500	$4,143	3.8%	$414	$3,729	$34	$40	$6	$2,648	**($2,313)**
1	Atlanta	$108,500	$4,143	3.8%	$414	$3,729	$34	$48	$15	$2,648	**($1,306)**
1	Charleston	$108,500	$4,143	3.8%	$414	$3,729	$34	$42	$8	$2,648	**($2,065)**
1	Jackson	$108,500	$4,143	3.8%	$414	$3,729	$34	$46	$12	$2,648	**($1,597)**
1	Birmingham	$108,500	$4,143	3.8%	$414	$3,729	$34	$45	$11	$2,648	**($1,696)**
2	Phoenix	$108,500	$6,167	5.7%	$617	$5,550	$50	$40	($10)	$3,942	**($5,714)**
2	Memphis	$108,500	$6,167	5.7%	$617	$5,550	$50	$45	($5)	$3,942	**($5,170)**
2	El Paso	$108,500	$6,167	5.7%	$617	$5,550	$50	$42	($8)	$3,942	**($5,496)**
2	San Francisco	$108,500	$6,167	5.7%	$617	$5,550	$50	$31	($19)	$3,942	**($6,835)**
2	Albuquerque	$108,500	$6,167	5.7%	$617	$5,550	$50	$42	($8)	$3,942	**($5,535)**
3	Baltimore	$108,500	$5,839	5.4%	$584	$5,255	$47	$45	($2)	$3,732	**($4,584)**
3	Salem	$108,500	$5,839	5.4%	$584	$5,255	$47	$34	($14)	$3,732	**($5,949)**
3	Chicago	$108,500	$5,839	5.4%	$584	$5,255	$47	$46	($2)	$3,732	**($4,502)**
3	Boise	$108,500	$5,839	5.4%	$584	$5,255	$47	$37	($10)	$3,732	**($5,508)**
3	Burlington	$108,500	$5,839	5.4%	$584	$5,255	$47	$47	($0)	$3,732	**($4,364)**
3	Helena	$108,500	$5,839	5.4%	$584	$5,255	$47	$48	$0	$3,732	**($4,271)**
3	Duluth	$108,500	$5,839	5.4%	$584	$5,255	$47	$66	$18	$3,732	**($2,105)**
3	Fairbanks	$108,500	$5,839	5.4%	$584	$5,255	$47	$94	$47	$3,732	**$1,292**

Manufactured Housing Association for Regulatory Reform

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October 1, 2021

VIA FEDERAL EXPRESS AND ELECTRONIC SUBMISSION

Manufactured Housing Consensus Committee
C/O Home Innovation Research Labs
Administering Organization
400 Prince George's Boulevard
Upper Marlboro, Maryland 20774

Re: Energy Conservation Standards for Manufactured Housing – Second Comments

Dear Members of the Manufactured Housing Consensus Committee:

The Manufactured Housing Association for Regulatory Reform (MHARR) submits the following second set of comments in connection with the Manufactured Housing Consensus Committee's (MHCC) consideration of a Supplemental Notice of Proposed Rulemaking (SNPR) regarding "Energy Conservation Standards for Manufactured Housing" published by the U.S. Department of Energy (DOE) in the Federal Register on August 26, 2021.[1] MHARR is a national trade association representing producers of manufactured housing subject to regulation pursuant to the National Manufactured Housing Construction and Safety Standards Act of 1974 (1974 Act), as amended by the Manufactured Housing Improvement Act of 2000 (2000 reform law), as well as relevant provisions of the Energy Independence and Security Act of 2007 (EISA).

I. INTRODUCTION

The following are MHARR's second set of comments regarding MHCC consideration of DOE's August 26, 2021 manufactured housing energy standards supplemental proposed rule. MHARR's initial comments, submitted September 15, 2021, principally addressed policy issues related to the proposed standard, including its predictably destructive cost impact on manufactured housing consumers, the manufactured housing market and the manufactured housing industry – with disproportionate impacts on smaller industry businesses – as well as the absence of any genuine or legitimate need for excessive and discriminatory manufactured housing energy standards, based on U.S. Census Bureau data showing that manufactured housing residents already pay less for all types of home energy sources (i.e., oil, piped gas and electricity) than residents of detached, single-family homes, under existing HUD standards. The comments below will address: (1) the fundamental incompatibility of the International Energy Conservation Code (IECC) – either

[1] MHARR's September 15, 2021 comments are hereby incorporated herein by reference.

"modified" by DOE or not – with manufactured housing construction and affordability; (2) the fundamental incompatibility of the IECC's stated objectives and voting system (through 2021) with the objectives and consensus processes of the Manufactured Housing Improvement Act of 2000; and (3) an initial statement of specific DOE proposed standards that would be inappropriate, non-cost-effective for manufactured housing, or otherwise destructive of manufactured housing and the manufactured housing market.

Again, for the reasons set forth in these comments, as well as MHARR's September 15, 2021 comments, and the comments that MHARR will submit in advance of the MHCC's scheduled October 20, 2021 meeting, the August 26, 2021 proposed DOE manufactured housing energy standards rule should be rejected by the MHCC with relevant comments submitted to DOE, as well as a request for an extension of the current October 25, 2021 comment deadline, in order to ensure a complete and thorough review of the DOE proposal, and proper stakeholder input.

II. COMMENTS

A. THE IECC IS NOT AN APPROPRIATE CODE FOR MANUFACTURED HOUSING OR A LEGITIMATE BASIS FOR MH ENERGY STANDARDS

The International Energy Conservation Code (IECC), as acknowledged by DOE,[2] is not and never has been a code for manufactured homes. Whereas the Federal Manufactured Housing Construction and Safety Standards (FMHCSS) and FMHCSS energy standards developed and maintained by the U.S. Department of Housing and Urban Development (HUD) are specifically tailored to the unique size, affordability and construction imperatives of manufactured homes based on a balance between homeowner protection and affordability expressly mandated by federal law,[3] the IECC standards are not now – and never have been – developed for manufactured homes or the affordability needs of actual and potential manufactured home consumers. Nor have they ever been developed, voted-on, or approved (including in their 2021 iteration) by individuals with a direct knowledge of either manufactured housing or the unique construction and affordability challenges required to comply with federal manufactured housing law. The IECC, accordingly, is fundamentally contrary to applicable federal manufactured housing law and cannot be transformed into an appropriate code for affordable manufactured homes through arbitrary, piecemeal DOE modifications.

Because the IECC is not developed based on the specific construction and affordability aspects of manufactured housing, the IECC would devastate the affordable manufactured housing market. For example, the 2015 IECC – the basis for DOE manufactured housing energy standards

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[2] See, 86 Federal Register, No. 163 (August 26, 2021) "Energy Conservation Standards for Manufactured Housing," p. 47744, at p. 47754, col. 3: "DOE notes that the IECC is designed for building structures that have a permanent foundation. Manufactured housing structures, however, are not built on permanent foundations but are built on a steel chassis to enable them to be moved or towed when needed. As a result, because they present their own set of unique considerations that the IECC was not intended to address, some aspects of the IECC are unable, or highly impractical, to be applied to manufactured housing." (Emphasis added).

[3] See e.g., 42 U.S.C. 5403(e)(4): "The consensus committee ... and the Secretary, in establishing standards ... under this section shall – consider the probable effect of such standard on the cost of the manufactured home to the public." (Emphasis added).

initially proposed in 2016 -- would have resulted in retail level purchase price increases of $4,601.00 for a single-section manufactured home, and $5,825.00 for a double-section manufactured home as calculated by MHARR members.[4] These amounts included industry-standard builder and retailer profit margins,[5] but did not include regulatory testing, compliance or enforcement costs, which were not estimated or considered by DOE in the June 2016 manufactured housing energy rulemaking.

Consistent with MHARR's 2016 findings, a June 2021 Home Innovation Research Labs (HIRL) report,[6] found that the 2021 IECC, as published, would result in an incremental construction cost increase of $6,548.00 to $9,301.00 for a specified site-built reference home of 2,500 square feet, depending on the compliance mechanism selected.[7]The same analysis shows a national simple construction cost payback period ranging from 32 to 67 years, again based on the compliance mechanism. Prorating these amounts to the smaller size of an "average" single-section and double-section manufactured home, as defined by the U.S. Census Bureau, and including industry-standard profit margins identical to those used in MHARR's 2016 calculation, the 2021 IECC, in unmodified form, would yield a minimum incremental retail-level price increase of $7,958.00 for an "average" single section manufactured home and a minimum incremental retail-level price increase of $12,908.00 for an "average" double-section manufactured home.[8]These amounts, though, are necessarily partial and incomplete, in that: (1) they do not include regulatory testing, compliance or enforcement costs; and (2) do not include costs attributable to future changes to the IECC and the costs of compliance with such future modifications – which are, and would be, totally unnecessary for today's modern, already energy cost-efficient, HUD Code manufactured homes.

The fundamental incompatibility between the IECC and standards that would be appropriate for HUD Code manufactured housing is due, in part, to the absence of a statutory purchase price affordability mandate for the IECC,[9] comparable to the 1974 Act as amended by the 2000 reform law. It is also due to the nature and composition of the IECC committee and the IECC development process, through and including the 2021 IECC used by DOE as the basis for its proposed standards. Specifically – and unlike FMHCSS standards under the 2000 reform law -- all iterations of the IECC through the 2021 version, were subject to a "governmental consensus" process, in which local government building code officials with no responsibility for the regulation

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[4] See, MHARR August 8, 2016 written comments to DOE (2016 DOE Comments), at p. 15, note 42.

[5] Industry-standard builder and retailer profit margins were calculated as multiples of 2.0 and 1.4 by MHARR, based on input from smaller, independent producers.

[6] See, Attachment 4 to MHARR's September 15, 2021 MHCC comments.

[7] See, HIRL Report at p. 14.

[8] I.e., for a single-section home: $6,548.00/2,500 square feet = $2.619 per square foot x 1,085 square feet (for an "average" single-section manufactured home) = $2,842.00 x 2 (builder profit) = $5,684.00 x 1.4 (retailer profit) = $7,958.00 retail level price increase. For a double section home: $6,548.00/2500 square feet = $2.619 per square foot x 1,760 square feet (for an "average" double-section manufactured home) = $4,610.00 x 2 (builder profit) = $9,220.00 x 1.4 (retailer profit) = $12,908.00 retail level price increase.

[9] The absence of a purchase price affordability mandate for the IECC is reflected in its Statement of Intent (R-101.3) (2021), which provides: "This Code shall regulate the design and construction of buildings for the effective use and conservation of energy over the useful life of each building. This code is intended to provide flexibility to permit the use of innovative approaches and techniques to achieve this objective. This code is not intended to abridge safety, health, or environmental requirements contained in other applicable codes or ordinances." (Emphasis added).

of manufactured housing and no sensitivity to the affordability concerns implicated by extreme price increases, were exclusively empowered to consider and approve the final standards.[10] Indeed, there is no evidence or indication that the IECC committee – through its 2021 iteration -- has ever had any members representing manufactured housing producers or stakeholders with specific knowledge of the industry, its homes, its consumers, its market characteristics, or the consumer financing of its homes. This stands in sharp contrast with the MHCC process, where proposed standards are considered and recommended by a congressionally-mandated consensus committee, with members "qualified by background and experience to participate in the work" of the Committee (emphasis added),[11]representing all relevant categories of stakeholders.

The National Association of Home Builders (NAHB), moreover, has maintained (with supporting evidence) that this "governmental consensus" process was "manipulated" and "abused" by energy special interests during the 2021 revision cycle. While this charge has led to significant changes in the IECC process for the 2024 cycle, those changes do not even come close to a cure for the fatal flaws that make the IECC inappropriate and unacceptable as a basis for any manufactured housing energy standards.

Specifically, the 2021 IECC revision process saw multiple high-cost proposals previously rejected by IECC committees, reinstated and adopted, during the final government-official-only vote, after a behind-the-scenes campaign by energy special interests to lobby and pressure government officials to cast votes in favor of those previously-rejected proposals. A site-builder group, Leading Builders of America (LBA), explained this "manipulation" of the IECC process in a January 26, 2021 letter, stating: "For the building community, the 2021 [IECC] update is a cause for serious concern. Multiple code changes were approved that will increase the cost of a new home by up to $10,000 with only modest savings for consumers. Some of the new requirements have payback periods over 100 years. Each of these 'high-cost-low-benefit' code changes were twice rejected during the code development process. They were approved as a result of an unprecedented effort to manipulate the ICC's governmental online consensus vote." (Emphasis added). To support these claims, LBA provided recordings of conference calls with special interest activists lobbying government official voters to follow a "voting guide" showing the previously-rejected proposals the activists sought to have reinstated in the final IECC vote.

As a result of this "political manipulation," the ICC Board of Directors, in March 2021, voted to convert the IECC from a government code process to an American National Standards Institute (ANSI)-based consensus process. Under the Board's decision, however, this change will not become effective until the 2024 revision process begins. And even though the 2024 (and beyond) process will change because of the special interest "manipulation" implicitly confirmed through the decision of ICC Board, the Board incongruously decided to keep in place not only the "politically manipulated" and thus tainted 2021 revisions adopted through the "government only"

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[10] Under the IECC "governmental consensus" process, final votes on proposed changes and additions were cast exclusively by ICC-approved state and/or local government officials (i.e., other interest groups had no say whatsoever, in the final provisions of the code). In a February 2, 2021 letter to Congress, ICC explained the IECC process as follows: "[V]olunteer government officials with experience and expertise exercise by far the most control in the process. Volunteer [state and local] government officials have the final vote on any proposed code change." (Emphasis added). Thus, while industry and consumer stakeholders could participate in the IECC committee process, they had no vote at all on the final code.

[11] See, 42 U.S.C. 5403(a)(3)(B)(i).

system then in place, but all of the IECC provisions previously approved through that same tainted and flawed system. The Executive Summary of the ICC Board's decision thus states: "The 2024 IECC will start from the content of the 2021 IECC." (Emphasis added).[12]While thus effectively acknowledging the validity of the claims of a fundamentally-tainted IECC 2021 process, the ICC decision will leave the results of that tainted process in place as a springboard to further contaminate future IECC revisions that would build upon a fundamentally-tainted "foundation."

The ICC Board's decision concerning the nature of the IECC is relevant to the August 26, 2021 DOE proposed rule in that it affirmatively confirms that the IECC, through the 2021 iteration specifically utilized and relied-upon by DOE, was: (1) not only approved in its final form by land use officials with no background whatsoever in manufactured housing; but (2) that it was developed and approved through a process that was "abused" and "manipulated" to impose measures that are excessively-costly and produce no positive results for consumers over a normal homeownership tenure period. Consequently and particularly in light of the extreme purchase price impacts documented by the HIRL report, it is not – and should not be -- surprising that the 2021 IECC, to date, has not been adopted for site-built or modular homes by any jurisdiction in the United States.[13]More importantly, though, such a code, that since its inception has been under the exclusive control of state and/or local governments officials that: (1) exclude or otherwise discriminate against manufactured homes and manufactured homebuyers;[14] and (2) have no direct experience, knowledge, or expertise regarding manufactured home construction or regulation -- is not now, never has been, and never could be a proper or legitimate basis for manufactured housing energy standards.

Moreover, even after the IECC process changes for the 2024 revision cycle, the IECC would remain a fundamentally unsuitable and unacceptable code for supposedly "affordable" manufactured housing. First, there continues to be no purchase price affordability mandate for IECC standards comparable to that contained in the 1974 Act as amended. Second, an official statement published by the ICC Board states that local building officials with no involvement whatsoever with any other aspect of manufactured housing regulation – and often opponents of equitable zoning and placement for manufactured homes – "will continue to have a leading voice" in the IECC development process.[15]Third, ICC appointments to the 2024 IECC residential committee exclude any representatives of smaller, independent manufactured housing producers or businesses, but do include representatives of "climate change" special interest groups with no

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[12] See, International Code Council, "Path Forward on Energy and Sustainability to Confront a Changing Climate." (2021), attached hereto as Attachment 1.

[13] See, IECC adoption chart, attached hereto as Attachment 2. As a result, under the August 26, 2021 DOE proposed rule, manufactured homes with a list retail price over $55,000.00 would be built to stricter and much more costly energy standards than million dollar-plus site-built homes located anywhere.

[14] The same local governments that have controlled the IECC, have – for years – used zoning ordinances, which they exclusively control, to either discriminatorily exclude or restrict the placement and use of manufactured homes.

[15] See, Attachment 1, supra. According to state energy code adoption data maintained by DOE, seven states do not have any type of statewide energy code, and another 30 states have adopted the 2009 (or earlier) version of the IECC. See, Attachment 2, hereto. Requiring manufactured homes to comply with a 2021 IECC that, according to ICC itself, is 40% more stringent than the 2009 IECC and only 10% below net-zero energy for residential buildings, not only imposes drastic, costly and market-destructive mandates on manufactured housing, but also discriminates against manufactured homes (comprising just 6% of the nation's housing stock), manufactured housing consumers and manufactured housing industry businesses.

conceivable knowledge of manufactured housing, its construction, its consumers, or its market.[16] Fourth, the same official ICC statement makes it clear that the focus and primary purpose of the IECC is related to the supposed effects of "climate change," not to ensuring the availability of affordable housing and combating the devastating economic and societal impacts of homelessness or housing insecurity. The ICC Board statement thus asserts, in relevant part: "The Code Council will build on the technical solutions provided by the International energy Conservation Code ... to create a portfolio of advanced mitigation solutions to battle the impacts of our changing climate. This portfolio will provide a menu of options for jurisdictions, from a strong and increasing set of minimum requirements, to pathways to net zero energy and additional greenhouse gas reduction policies."[17]The IECC's purposes, objectives and processes, consequently, are in conflict with and violate the affordable housing and housing availability requirements and policies of pre-existing federal manufactured housing law.

Accordingly, (and for the additional reasons set forth in MHARR's initial September 15, 2021 comments) the MHCC should reject the August 26, 2021 proposed DOE standards based upon the 2021 IECC.

B. DOE'S COST "ANALYSIS" IS INCOMPLETE AND MISLEADING AS IT FAILS TO REFLECT THE FULL COST OF THE PROPOSED RULE

DOE's August 26, 2021 SNPR contains an alleged cost-benefit analysis of its proposed manufactured housing energy conservation rule. That supposed analysis, however – which is affirmatively required by both EISA and the 1974 Act, as amended – is flawed, incomplete and misleading for multiple reasons, as explained in the following sections. And because that statutorily-required cost-benefit analysis is flawed, incomplete and misleading, the DOE August 26, 2021 proposed rule: (1) violates the substantive mandate of EISA section 413 (42 U.S.C. 17071) and section 604(e)(4) of the 1974 Act as amended (42 U.S.C. 5403(e)(4)); but is also (2) "arbitrary, capricious and not in accordance with law" in violation of the federal Administrative Procedure Act (APA).[18] As a result of this inherent, fatal and fundamental defect in the August 26, 2021 proposed rule, the MHCC should reject the proposed rule and recommend its withdrawal as published.

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[16] For example, the 2024 IECC residential committee has no manufactured housing small business representatives but does include a "Senior Energy Policy Advocate" from the Natural Resources Defense Council (NRDC) an extremist "environmental" group. It also includes a representative from Clayton Homes, Inc. the largest manufactured housing corporate conglomerate, owned by Berkshire Hathaway Corp. (which also, coincidentally, also owns Johns Manville Corp., a major insulation producer).

[17] Id. Indeed, in March 2021 "Frequently Asked Questions" published by ICC with respect to changes implemented for the 2024 IECC cycle, ICC states: "The 2021 IECC will be the starting point for revisions for the 2024 IECC. The 2021 IECC base efficiency requirements are only 10% from net zero for residential buildings; the new framework requires future IECC editions to increase base efficiency requirements...." (Emphasis added).

[18] See, 5 U.S.C. 706(2)(a): "[A] reviewing court shall -- hold unlawful and set aside agency action, findings, and conclusions found to be ... arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." See also, Department of Homeland Security v. Regents of the University of California, 591 U.S. ___, 140 S. Ct. 1891 (2020) regarding application of the "arbitrary, capricious, or abuse of discretion" standard.

1. DOE'S COST CALCULATIONS ARE – AND HAVE BEEN -- MATERIALLY FALSE AND DEFECTIVE

As an initial matter, it should be noted that the cost-benefit "analysis" offered by DOE in support of its now supposedly-withdrawn 2016 proposed rule,[19] was materially false and defective, as is the cost-benefit analysis for the 2021 DOE proposed rule. DOE, for example, maintained in its June 17, 2016 Notice of Proposed Rulemaking (NPR) that its proposed standards would add up to $2,422 to the retail price of a single-section manufactured home (with a national average of $2,226) and up to $3,748 to the cost of a new multi-section manufactured home (with a national average of $3,109).[20] The reality, however, as calculated by MHARR, with a specific focus on smaller, independent manufacturers, was that the 2016 DOE proposed manufactured housing energy standards would have added a minimum $4,601.00 to the retail price of a new single-section manufactured home,[21] and a minimum of $5,825.00 to the cost of a double-section manufactured home. Consequently, the actual purchase price cost-impact of DOE's 2016 proposed rule would have been 90% higher than DOE's estimate for single-section manufactured homes, and 55% higher than DOE's partial estimate for double-section homes.

Significantly, the same material flaw is incorporated within DOE's 2021 proposed rule. Thus, according to DOE, its "Tier 2" IECC-2021-based standards would result in a national average $3,914.00 price increase for single-section manufactured homes (again, excluding likely significant costs related to enforcement, testing and regulatory compliance) and a $5,289.00 price increase for double-section manufactured homes. As calculated by HIRL, however, the prorated purchase price impact of the unmodified 2021 IECC, would be $7,958.00 for a single-section manufactured home and $12,928.00 for a double-section home – a full 103% and 144% higher than DOE's 2021 estimate. Even if the HIRL figures were reduced to correspond to the same differentials illustrated by the 2016 data however (i.e., actual cost impacts 90% higher than DOE-estimated for single-section homes and 55% higher for double-section homes) in order to account for the potential impacts of DOE modifications to the 2021 IECC in the August 26, 2021 proposed rule, the resulting purchase price increases would still be devastating for the affordability-based manufactured housing market, with a $7,436.00 average retail price increase for single-section homes and a $8,197.00 average retail price increase for double-section manufactured homes. These higher amounts, moreover, under DOE's own analysis, would impact at least 75% of all manufactured homes produced annually under DOE's "tiered" approach and, obviously, 100% of all manufactured homes under the un-tiered, "Tier 2-only" approach.[22]

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[19] See, 86 Federal Register, supra at p. 47746, stating that "both" proposed 2021 DOE manufactured housing energy standards (i.e., "Tier 1" and "Tier 2"), "replace DOE's June 2016 proposal."

[20] See, 81 Federal Register, No. 117, (June 17, 2016) "Energy Conservation Standards for Manufactured Housing" at p. 39757.

[21] Not including enforcement, testing and regulatory compliance costs which were not estimated by DOE in 2016 and still have not been quantified.

[22] See, 86 Federal Register, supra at p. 47760, col.2: "Using this [$55,000] threshold, Tier 1 consists of approximately 25 percent of the total sales (single-section and multi-section) of manufactured homes. Tier 2 consists of approximately 75 percent of the sales total (single-section and multi-section) of manufactured homes." These percentages, however, as is demonstrated in MHARR's September 15, 2021 MHCC comments, are based on outdated U.S. Census Bureau information. The most recent (2020) U.S. Census Bureau data, shows that the average sales price of a single-section manufactured home has increased to $57,300 (see, Attachment 5 to MHARR's September 15, 2021 MHCC comments) and, today, is likely even higher, given subsequent and continuing increases in the cost of construction materials. As

2. DOE'S COST ANALYSIS FAILS TO CONSIDER THE PRICE IMPACT OF ONGOING REGULATORY COMPLIANCE COSTS

DOE's August 26, 2021 SNPR asserts that proposed manufactured housing energy conservation standards will result in net "life-cycle" operating cost savings to manufactured housing purchasers that would offset and exceed projected purchase price increases attributable to the proposed standards.[23]The findings of DOE's cost analysis are necessarily flawed, skewed and materially inaccurate, however, in that they do not reflect, consider or account for key cost information. As a result, the claimed benefits of the proposed rule are netted against incomplete and/or inaccurate cost data, thereby yielding alleged "payback" amounts and timeframes that are distorted and biased in favor of the proposed rule. This distortion includes several aspects, which are addressed in this and subsequent sections, below.

Most significantly, the DOE cost-benefit analysis fails to include or consider significant additional costs that will be incurred by manufacturers – and inevitably passed to consumers in the purchase price of new manufactured homes – for: (1) testing, certification, inspections and other related activities to ensure compliance with any new DOE standards; (2) enforcement compliance and activity; and (3) ongoing regulatory compliance. Although such expenses are – and are recognized as -- an integral component of the ultimate consumer-level cost of any mandatory rule, they are totally excluded from DOE's cost-benefit and life-cycle cost (LCC) analyses in this rulemaking.[24] Those analyses, as a result, are skewed toward greater alleged benefits from the proposed rule and shorter consumer LCC "payback" times than would be the case if all applicable costs were included and considered. Indeed, as it stands now, under DOE's fundamentally flawed and incomplete LCC analysis, the projected consumer "payback" period – i.e. 10.9 years for a single-section home and 10.6 years for a multi-section home under "Tier 2"[25] -- is already longer than many consumers will live in a new manufactured home.[26] The addition of testing, enforcement and regulatory compliance costs (and other additional uncaptured costs set forth below), would extend that payback period even longer, meaning that even fewer homebuyers (i.e., those not excluded from the market altogether due to prohibitive purchase price increases

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a result, even under a "tiered" standards system, fewer than the previously-estimated 25% of manufactured homes would fall under Tier 1, and more than the previously-estimated 75% would fall under Tier 2, necessarily resulting in greater levels of market exclusion that claimed by DOE.

[23] See e.g., 86 Federal Register, supra at p. 47746, col. 3: "... DOE tentatively estimates that benefits to manufactured homeowners – in terms of lifecycle cost ('LCC') savings and energy cost savings of the requirements as proposed in both proposals [i.e., "Tier 1" and "Tier 2"] – could outweigh the potential increase in home price for manufactured homes." (Emphasis added). This phraseology is somewhat remarkable in its failure to state a firm, specific and evidence-supported conclusion regarding the supposed cost-benefit justification for the proposed rule.

[24] Id. at p. 47759, col. 1: "DOE is not proposing any testing, compliance or enforcement provisions at this time. DOE has also not included any potential associated costs of testing, compliance or enforcement."

[25] These periods are, as noted above, already materially skewed and too short because DOE's analysis underestimates the purchase price impact of the substantive standards themselves. A larger increase in a home's purchase price necessarily results in a longer "payback" period.

[26] See, 86 Federal Register, supra at p. 47747, Table 1.4. While the same table indicates a "simple payback period" of 3.7 years under "Tier1" for a single-section home, and 3.5 years for a double-section home, these figures are misleading in themselves, in that: (1) the final DOE rule, as DOE admits in its SNPR, may impose the "Tier 2" standards alone – without any "Tier 1;" and (2) few if any double-section homes will qualify for "Tier 1" treatment in any event, if DOE maintains its current proposed $55,000.00 retail purchase price demarcation.

attributable to the proposed rule) will ever recapture purchase price increases necessitated by the proposed rule.

This deceitful bifurcation of direct standards-generated costs on the one hand and testing, enforcement and regulatory compliance costs on the other – notwithstanding the fact that all such costs, as well as further costs for compliance with existing HUD Procedural and Enforcement Regulations,[27] will represent additional consumer-level costs under any final DOE rule – began during the sham "negotiated rulemaking" process, where DOE, via its "Designated Federal Official," barred discussion or consideration of any aspect of enforcement or regulatory compliance, or their associated costs. The absurd and misleading bifurcation was continued in DOE's initial June 17, 2016 NPR,[28] and is now incorporated in the 2021 SNPR.[29] The intentional omission of such cost data, however, represents an admission by DOE that its cost-benefit analysis and LCC "calculations" are necessarily inaccurate, incomplete and not reflective of the true and complete costs of the proposed rule.

DOE's consumer-level cost-benefit analysis, therefore, compares "apples to oranges," netting out all conceivable "savings" against only part of the costs that will be added to the price of the home. As a result, there is no basis, whatsoever, for DOE to conclude – in connection with this rule -- that consumer benefits exceed costs, because the full costs of the proposed standards are not known and cannot be known until DOE, at a minimum, settles on a compliance and enforcement system, which – it admits – has not occurred. Nor can a cost-recovery period be accurately calculated because costs -- again – are not known and not fully quantified as of now, and cannot even be accurately estimated with so many unknowns. Indeed, the attempt to pass this off as any kind of legitimate cost-benefit analysis is itself disingenuous. Therefore, DOE's analyses are neither credible nor legitimate and, per se, cannot be – and are not – sufficient to satisfy the substantive cost-benefit directive of EISA section 413, the 1974 Act as amended, or the "arbitrary, capricious or abuse of discretion" standard of the APA.

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[27] See, 24 C.F.R. 3282.1, et seq. describing HUD's manufactured housing inspection, monitoring and enforcement program. Regardless of whether energy standards developed by DOE pursuant to EISA section 413 are enforced by DOE or HUD, or some combination of both, the changes to HUD-regulated homes that will be required by the proposed DOE standards will result in separate and additional compliance costs under the Part 3282 regulations. These inevitable additional costs will include, but will not be limited to, costs for the re-design of homes; costs for the approval and certification of such new or modified designs; costs for new or additional materials needed to support the inclusion of energy efficiency measures required by the proposed rule; and costs related to the certification and approval of such materials, among others. Nor does DOE's analysis consider the cost impact of compliance with HUD's lifetime home recall provisions – Part 3282, Subpart I -- which would be significant if HUD adopts the DOE standards as part of the HUD Code.

[28] See, 81 Federal Register, No. 117, supra at p. 39783, stating: "DOE is not considering compliance and enforcement in this proposed rule.... As a result, the costs ... resulting from any compliance and enforcement mechanism are not included in the economic impact analysis that is included in this rulemaking." (Emphasis added).

[29] See e.g., 86 Federal Register at p. 47759, col.1: "DOE acknowledges that it has not fully enumerated testing and enforcement costs at this time."

3. DOE'S COST "ANALYSIS" IS DEFECTIVE IN THAT IT FAILS CONSIDER THE IMPACT OF SUBSEQUENT IECC CHANGES

By requiring DOE to constantly update manufactured housing standards to keep pace with the "latest version" of the IECC – which is revised every three years without regard to cost-benefit -- EISA not only discriminates against manufactured homebuyers vis-à-vis other types of homes regulated under earlier, less stringent and less costly versions of the IECC,[30] but also adds an element of ongoing regulatory uncertainty that will further increase manufacturer compliance costs and the cost of manufactured homes to potential consumers that are not captured within DOE's NOPR cost-benefit analysis.

The significant negative impact of ongoing regulatory uncertainty within regulated industries – and, in particular, on regulated industry participants, such as manufactured housing producers – has been addressed extensively by economists, with studies showing that regulatory uncertainty has a pronounced negative impact on investment, growth, and competitiveness, resulting in both consumer, industry and national-level costs that are not addressed, considered or reflected in DOE's cost-benefit analysis.[31]

These negative impacts, that are not addressed, considered, or accounted-for in the August 26, 2021 SNOPR,[32] will not only increase the cost of manufactured housing beyond the amounts projected by DOE – thereby extending DOE-estimated LCC cost-payback timeframes that already exceed the period that significant numbers of manufactured homeowners will remain in their homes – they will also: (1) increase the numbers of lower and moderate-income Americans excluded from the manufactured housing market and homeownership altogether; and (2) reduce the availability of affordable manufactured housing, contrary to the mandate and purposes of existing federal manufactured housing law. The failure to consider such ongoing impacts further demonstrates that DOE's proposed action is arbitrary , capricious and not otherwise in accordance with applicable law.

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[30] See, Note 14, supra and Attachment 1, hereto.

[31] See, e.g., "The Impact of Regulation on Investment and the U.S. Economy," The Mercatus Center, The George Mason University, at pp. 3-4. (" [I]nvestment may be temporarily withheld when there is uncertainty about the size and scope of new regulatory initiatives. This is particularly true for investments that cannot be easily reversed -- i.e., reselling capital for its purchase price. Investment in new capital is inevitably accompanied by the hiring of new labor. For firms that must rely on a constant source of financial capital -- i.e., smaller firms, one current source of uncertainty is how the new financial rules will affect their abilities to borrow. About 1/3 of small firms rely on regular borrowing to finance capital. *** Two types of uncertainty can affect decisions by firms to invest: (a) uncertainty about demand for their products demand uncertainty and (b) uncertainty about factor costs -- labor and capital – [i.e.,] factor uncertainty. Major regulations—such as those recently authorized regarding financial services, health care, or greenhouse gas rules—can affect both demand and factor uncertainty. *** [O]ne key type of factor uncertainty is whether firms will have access to credit in the future. Uncertainty about access to credit has a greater impact on firms, small firms in particular, that need continuous access to credit in order to finance investments."

[32] Nor was this ongoing regulatory cost factor considered or addressed in the initial DOE June 17, 2016 NOPR.

4. DOE'S COST ANALYSIS FAILS TO CONSIDER THE PROPOSED RULE'S DISPROPORTIONATE IMPACT ON SMALL BUSINESSES

While DOE acknowledges that its proposed rule would have a significant negative impact on the manufactured housing industry – an industry that has seen production contract by 75% since 1998,[33] with corresponding reductions in the number of producers – its cost analysis fails to fully or properly quantify the likely anti-competitive effects of its proposed rule and the resulting highly-negative impacts on industry small businesses and consumers.

DOE alleges in its August 26, 2021 SNPR that its proposed two-tier proposed rule would result in a decline in "industry net present value" of $276 million to $325 million, while its un-tiered so-called "alternative" proposal would result in a reduction of $340 million to 390 million.[34] This "calculation," however, using a government "regulatory impact" model with data inputs provided by DOE,[35]would necessarily be skewed significantly lower by DOE's reliance on unrealistically low IECC regulatory cost impacts -- as demonstrated above and in MHARR's September 15, 2021 MHCC comments -- as well as by DOE's failure to include significant additional regulatory cost elements (i.e., enforcement, testing and regulatory compliance costs and the costs of constantly more stringent IECC standards, as detailed above) in its SNPR cost analysis. Thus, for example, DOE's purchase price impact data under "Tier 2" indicates a consumer level "national" price increase of $3,914.00 for a single-section home and $5,289.00 for a double-section home. These amounts, however, are respectively, some 90% and 55% lower than the modified-case IECC 2021 cost increases (i.e., $7,436.00 and $8,197.00) estimated by MHARR based on the above-described HIRL IECC 2021 cost analysis. Based, again, on the NAHB market exclusion data, purchase price increases of this magnitude would exclude millions more potential purchases than would have been considered by DOE under its GRIM model. Again, therefore, that model would necessarily significantly under-estimate the total impact on manufactured housing industry businesses and, more specifically, the disproportionately negative impact that those cost increases would have on smaller industry businesses.[36]

Over time, moreover, such disproportionate price impacts will result in further consolidation within an industry that – since its major production decline began in 1998 -- has already seen a substantial reduction in the number of producing companies and an emerging concentration of the manufactured housing market in the hands of a few large corporate conglomerates.[37]Again, though, DOE's cost-benefit analysis fails to address, consider or account-

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[33] I.e., 2020 annual production of HUD Code homes was 94,390, as contrasted with 373,143 HUD Code homes produced in 1998, according to HUD data.

[34] See, 86 Federal Register, supra at p. 47807, col. 1.

[35] DOE alleges that its August 26, 2021 SNPR utilized a Government Regulatory Impact Model (GRIM) to assess the industry business impacts of its proposed rule. According to DOE, "the key GRIM inputs are: industry financial metrics, manufacturer production cost estimates, shipments forecasts, conversion costs and manufacturer markups." See, 86 Federal Register, supra at p. 47805, col.1. DOE fails to specify, however, where it obtained that underlying data, the initial source(s) of that underlying data, and what that raw data showed.

[36] See, U.S. Small Business Administration, "The Impact of Regulatory Costs on Small Firms," (Nicole V. Crain and W. Mark Crain) September 2010 at p. 8: "[Regulatory] costs per employee thus appear to be at least 36% higher in small firms than in medium-sized and large firms."

[37] See, "2015 Home Buyers' Outlook," The Grissim Guides to Manufactured Homes and Land ("[T]the MH industry contraction during the recession brought with it a lot of bankruptcies, closures, mergers and acquisitions. As a

for these negative impacts – and their related costs -- on consumers, the industry and the nation as a whole. This type of extreme negative economic and societal impact was correctly explained in comments previously submitted to DOE by the Mercatus Center of The George Mason University: "[T]his regulation will disproportionately burden small businesses and benefit large manufacturers. This regulation will become an income transfer scheme as small businesses go out of business competing with large manufacturers, giving large manufacturers access to a larger consumer base and increasing their income. This is an income transfer scheme that will produce unintended consequences, including causing an industry to be dominated by a few large firms." And, in fact, specific evidence presented by MHARR in its comments on the 2016 DOE proposed manufactured housing energy rule, detailed apparent coordination by DOE with large industry conglomerates regarding more stringent energy standards.[38]

DOE's August 26, 2021 SNPR, however, fails to – and, in fact, refuses -- to address this disproportionate impact issue and its collateral effects on competition, industry consolidation and consumer prices, stating: "Section 413 of EISA does not require consultation with the [Department of Justice] regarding potential anti-competitive effects of a rule, as would be required for an appliance standard rulemaking. As such, DOE did not consult with DOJ regarding potential anticompetitive impacts of the proposed rule."[39]This statement, however, conveniently mischaracterizes the issue raised by the expected disproportionate impact of the DOE proposed rule. That issue is not the proposed rule's "anticompetitive impact," per se, but rather, its ultimate impact on consumer prices within the manufactured housing market, which are rising, and would rise even further – and more rapidly as a matter of basic economics – with fewer independent manufacturers.

Insofar as none of these significant cost impacts and factors are considered by DOE in the cost analysis for the August 26, 2021 proposed rule, that rule is fatally deficient, unsupported by proper and sufficient evidence, and legally unsustainable. Moreover, insofar as DOE has the "affirmative burden of promulgating and explaining a non-arbitrary, non-capricious rule,"[40] DOE's failure to fully and accurately quantify the effect of its proposed rule on small industry manufacturers is, per se, a fatal defect that should invalidate the August 26, 2021 proposed rule.

C. THE $55,000 DEMARCATION BETWEEN DOE'S PROPOSED "TWO-TIER" STANDARDS IS ARBITRARY AND CAPRICIOUS

DOE's proposed "two-tier" energy standards system is based on a retail purchase price dividing line between the two tiers, with "Tier 1" comprising homes with a retail purchase price

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consequence the industry landscape today is markedly different than it was as recently as January 2008 when more than 60 companies nationally were building homes in 195 production facilities around the country. Currently, only 46 active corporations remain, and the number of factory production lines has dropped to 125 (a loss of 70). One upshot of this shake-out is that roughly 68% of the MH industry is now dominated by three major producers and their subsidiaries: Clayton Homes, Inc. (with a market share of 41%), Champion Home Builders, Inc. (15%) and Cavco Industries (12%)."

[38] See, MHARR 2016 DOE Comments, supra at pp. 16-17.

[39] See, 86 Federal Register, supra at p. 47807, col. 3.

[40] See, Small Refiner Lead Phase-Down Task Force v. Environmental Protection Agency, 705 F.2d 506 (D.C. Cir. 1983).

up to $55,000.00 and "Tier 2" comprised of manufactured homes with a purchase price in excess of $55,000.00. This proposed demarcation between the two "tiers," however, is arbitrary, capricious and not based in fact, and, indeed, is becoming more arbitrary by the day.

First, the $55,000.00 demarcation, as proposed, is not tied to any discernable relevant statistic, data or fact. While the "average" sales price of a single-section manufactured home was $53,200.00 in 2019 according to U.S. Census Bureau data,[41] that average price rose to $57,300.00 in 2020 and, at the same rate of growth, would be $61,712.00 today.[42] Thus, while DOE's $55,000.00 demarcation line, in 2019, would have left the "average" single-section manufactured home within its proposed (and supposedly less-costly) "Tier1" energy standards, that same demarcation line, with "average" price increases in both 2020 and 2021 (estimated), would place the "average" single-section home within the much more costly "Tier 2" standards. More specifically, while DOE, as noted above, estimates in its August 26, 2021 SNPR that the $55,000.00 demarcation point would place 25% of all manufactured homes within "Tier 1," the rate of increase of the "average" cost of a manufactured home in 2020 and 2021 would inevitably reduce that figure well below 25%[43] -- and likely below 20% -- with correspondingly more severe negative impacts on the manufactured housing market and home ownership in the United States.

Second, all manufactured housing is deemed "affordable housing" under federal law and is specifically protected as "affordable housing" under the 1974 Act as amended. Further, as shown by Consumer Financial Protection Bureau data, the overwhelming majority of manufactured housing is purchased by lower, moderate and fixed-income purchasers. Consequently, a rule that would reserve its only allegedly "affordable" treatment for less than 20% of the total market – a number that would inevitably be further eroded over time based on cost increases paid by manufacturers for construction materials, increased transportation costs and increases in the stringency of the IECC standards – would: (1) violate existing federal law; (2) devastate the manufactured housing market; (3) exclude significant additional numbers of Americans from the benefits of homeownership; and (4) unlawfully discriminate against manufactured housing and manufactured housing consumers.

As a result, DOE's proposed "two-tiered" standards system would not protect the affordability of manufactured housing or its availability to lower and moderate-income consumers as DOE maintains and is inherently arbitrary and capricious. Accordingly, DOE's August 26, 2021 proposed rule, which relies on this arbitrary demarcation, should be rejected by the MHCC. DOE, moreover, at a minimum, should either: (1) increase its "Tier 1" versus "Tier 2" demarcation line substantially; (2) select another legitimate, technically-practicable demarcation mechanism (other than purchase price) that does not exclude the overwhelming majority of the HUD Code market; or (3) develop an un-tiered proposed standard that would legitimately ensure the continuing purchase price affordability of all manufactured housing.

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[41] See, Attachment 5 to MHARR's September 15, 2021 MHCC comments.

[42] The $57,300.00 average sales price in 2020 represented a 7.7% increase over the 2019 average sales price of $53,200. A 7.7% increase over $57,000.00 yields an estimated 2021 average sales price of $61,712.00.

[43] I.e., if the reduction in number of homes with a purchase price below the $55,000.00 demarcation line mirrored the rate of increase in average purchase price (7.7%), then the proportion of homes under the $55,000.00 demarcation line would fall to 17.3% (25% - 7.7%).

D. THE PROPOSED STANDARDS ARE TECHNICALLY INFEASIBLE

In addition to the foregoing cost-related issues, there are aspects of the DOE proposed standards that have been flagged by MHARR manufacturers as being technically or practically infeasible and/or erroneous. These include, but are not limited to:

- Re-design of trusses, with corresponding cost increases;
- Increased heel heights resulting in increased shipping height of the home, with increased transportation costs;
- Changes to in-plant assembly procedures, with corresponding costs;
- Changes to other production processes, with corresponding costs;
- Changes in installation parameters, with corresponding costs.

All of these – and other -- issues will be further addressed in MHARR's third set of MHCC comments.

III. CONCLUSION

For all the foregoing reasons, as well as those set forth in MHARR's initial September 15, 2021 comments, and those that will be further delineated in MHARR's third and final set of MHCC comments, the MHCC should reject the proposed manufactured housing energy standards set forth in DOE's August 26, 2021 SNPR as being inappropriate for manufactured housing, excessively costly in violation of applicable law, destructive of the affordable manufactured housing market, not cost-justified, and fundamentally arbitrary, and should submit comments reflecting that rejection (and its bases) to DOE in advance of the existing (or any extended) comment deadline.

Sincerely,

Mark Weiss
President and CEO

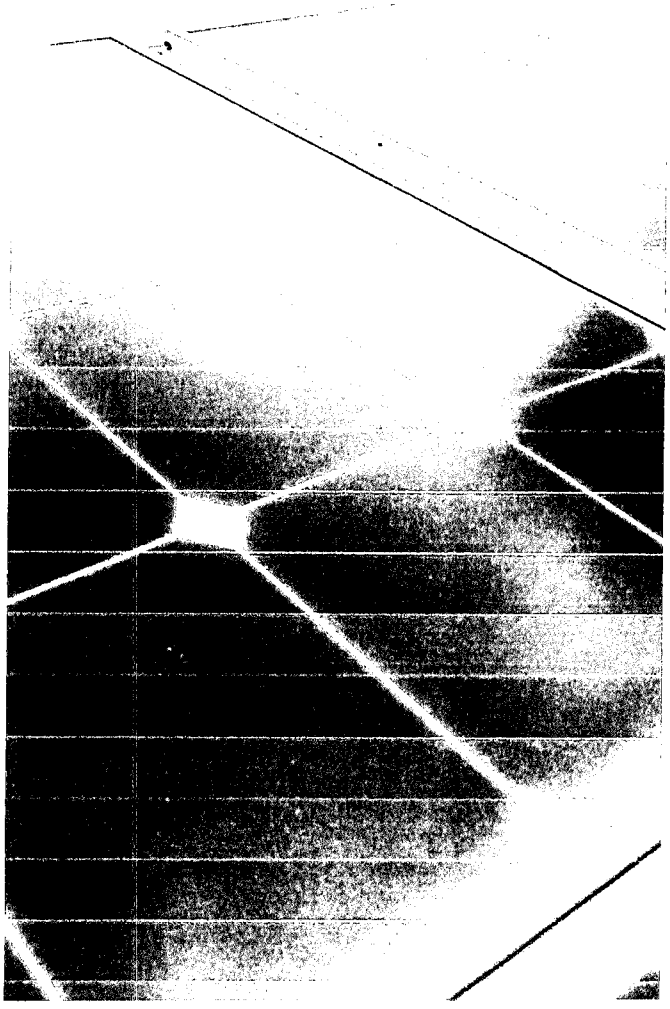
cc: Hon. Jennifer Granholm
Hon. Marcia Fudge
Hon. Shalanda Young (OMB)
HUD Code Industry Producers, retailers and Communities

ATTACHMENT 1

ICC INTERNATIONAL CODE COUNCIL®

Path Forward on Energy and Sustainability to Confront a Changing Climate

EXECUTIVE SUMMARY



INTERNATIONAL CODE COUNCIL®

Concern is growing in communities around the world about the impacts of a changing climate. Leaders are looking for strategies to support increased energy efficiency and reduced greenhouse gas (GHG) emissions to meet their policy goals. At the same time, consumers are seeking more energy efficient and sustainable homes.

Over the past year, the International Code Council has collected and assessed feedback from members and the public to inform a new framework for promoting energy efficiency. The Code Council will build on the technical solutions provided by the International Energy Conservation Code (IECC), International Residential Code (IRC), and International Green Construction Code (IgCC) to create a portfolio of advanced mitigation solutions to battle the impacts of our changing climate. This portfolio will provide a menu of options for jurisdictions, from a strong and increasing set of minimum requirements, to pathways to net zero energy and additional greenhouse gas reduction policies.

The IECC is central to this objective. It establishes a minimum set of requirements and serves as the basis for the formulation of additional tools that meet the policy needs of all levels of governments and the private sector entities that have set energy, GHG emissions and cost saving targets. To meet this objective, the development process for the IECC will use the Code Council's standards development procedures in order to allow for more in-depth scientific and economic deliberations, quicker progress to meeting public and private sector goals, and the development of a broader consensus that will support wider application and adoption.

The International Code Council has a long and respected history in administering a standards development process and is accredited by the American National Standards Institute (ANSI) as a standards developing organization (SDO) that adheres to ANSI's Essential Requirements for openness, balance, consensus and due process. Energy codes developed under the standards process are widely adopted and used across the United States. In fact, every state that adopts energy codes statewide—except two states with homegrown codes—has adopted an energy standard as a or the compliance path to meeting adopted energy codes.

The 2024 IECC will start from the content of the 2021 IECC, building on prior successes including an increase of efficiency requirements by about 40%, or an average of 8% a cycle from 2006 to 2021, allowing the IECC to remain a strong avenue for communities to reach their energy efficiency and sustainability goals globally. The scope and intent of the 2024 IECC and editions moving forward will be updated to reflect the following commitments:

- The IECC will continue to be updated on a three-year cycle and each edition will increase efficiency over the prior edition;
- The code will include pathways leading to the achievement of zero energy buildings presently and by 2030;
- The code may include non-mandatory appendices incorporating energy efficiency and greenhouse gas reduction resources including for electric vehicle charging, electrification and embodied carbon;
- The code's minimum efficiency requirements will be strengthened each edition based on a balancing test supported by energy efficiency advocates and the building industry and passed by both the U.S. House and Senate;
- The development committees will be informed by insight from a newly established Energy and Carbon Advisory Council made up of public and private sector leaders.

Governments continue to have the ultimate say on whether to adopt or amend model codes.

The IECC Development Committees (Residential and Commercial) will be appointed solely by the Code Council Board of Directors and will represent a variety of perspectives and building science expertise. The committees will include representatives from nine interest categories, including diverse representation within those categories. Recognizing the important role of governments in the adoption and use of the IECC, the framework ensures that government officials continue to have a leading voice. One third of committee membership and the voting committee chairs will represent the government regulatory category. Committee membership will be determined through an open nominations process with no seats reserved for organizations. Committee membership will represent a diversity of climate zones, organization sizes, businesses, and jurisdictions, and a range of experience in building types and energy efficiency strategies.

Committee appointments will strive to achieve an equitable and diverse committee membership that represents racial, gender and socio-economic diversity.

In addition to updates to the IECC, the Code Council will launch a suite of resources that provide communities with a menu of technical and policy resources, which integrate with the International Codes, to address their energy efficiency and GHG reduction goals. Many of these solutions would require the use of on-site renewable generation and energy storage. Specific solutions could address:

- Electric vehicle charging for all building types
- Electrification and decarbonization
- Zero energy and zero carbon
- Embodied carbon
- Grid interactivity/efficiency
- Performance standards for existing buildings
- Enhancing energy savings through water efficiency and reuse resource
- Integration of on-site renewable energy generation and energy storage to realize greenhouse gas reduction and resilience goals.

The Code Council remains committed to assisting communities in meeting their energy efficiency and greenhouse gas reduction priorities and in educating its members regarding the new process. This effort would be aided by the more than 9,000 departments, agencies, and jurisdictions who are Code Council members, the Code Council's nearly 400 state and local chapters, and a team of government relations staff liaisons that interface daily with state and local officials.

www.iccsafe.org/energy

ATTACHMENT 2

Status of State Energy Code Adoption - Residential

Residential Buildings

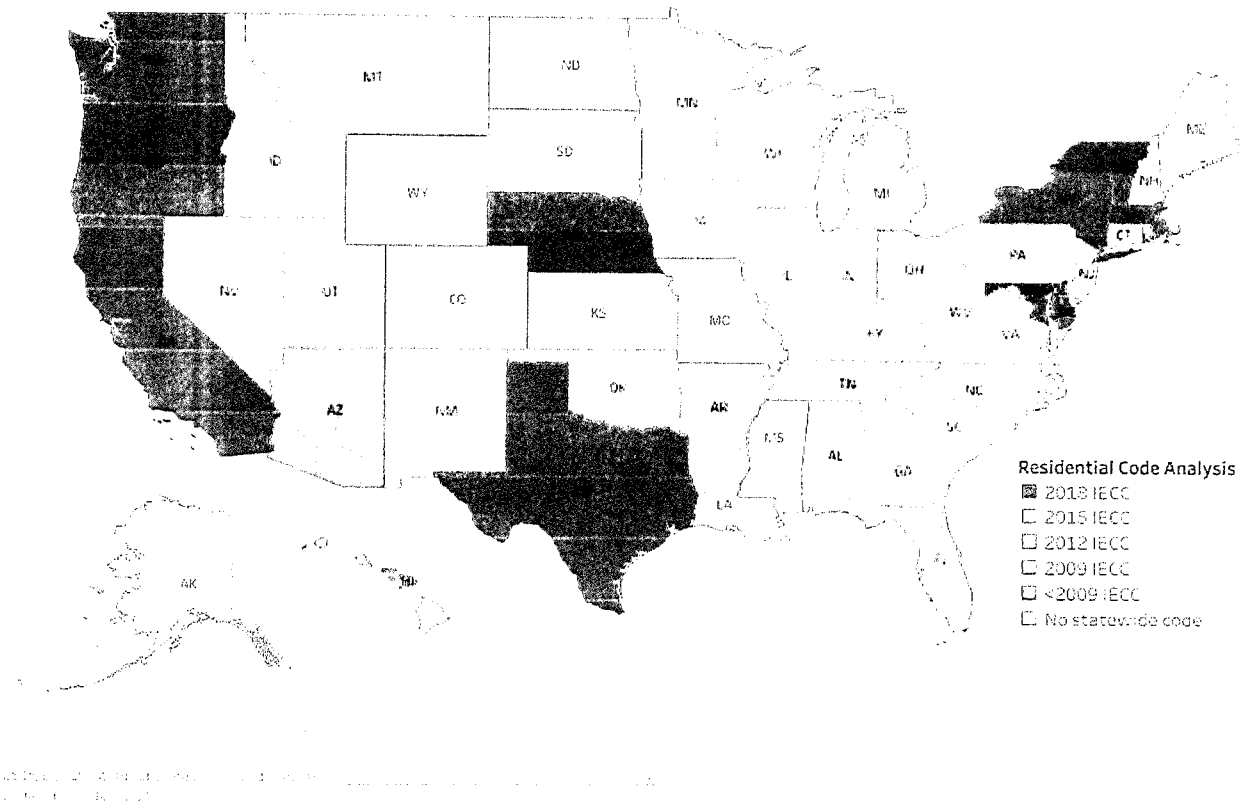


Table 1. Status of State Energy Code Adoption Map Summary - Residential

State	Current Code (as of 9/30/21)	State Map Legend (as of 9/30/21)

State	Current Code (as of 9/30/21)	State Map Legend (as of 9/30/21)
Alabama	2015 IECC with amendments	2009 IECC
Alaska	None statewide	No statewide code
Arizona*	Home rule	< 2009 IECC
Arkansas	2009 IECC with amendments	< 2009 IECC
California	2019 Bldg. Energy Efficiency Standards	2018 IECC
Colorado	Home rule	No statewide code
Connecticut	2015 IECC with amendments	2009 IECC
Delaware	2018 IECC	2018 IECC
District of Columbia	2015 IECC with amendments	2018 IECC
Florida	2018 IECC with amendments	2009 IECC
Georgia	2015 IECC with amendments	2009 IECC
Hawaii*	Home rule	< 2009 IECC
Idaho	2018 IECC with amendments	2009 IECC
Illinois	2018 IECC with amendments	2009 IECC
Indiana	2018 IECC with amendments	2009 IECC
Iowa	2012 IECC with amendments	2009 IECC
Kansas	Home rule	No statewide code
Kentucky	2009 IECC	2009 IECC
Louisiana	2009 IECC	2009 IECC
Maine	2015 IECC with amendments	2015 IECC
Maryland	2018 IECC	2018 IECC

State	Current Code (as of 9/30/21)	State Map Legend (as of 9/30/21)
Massachusetts	2018 IECC with amendments	2018 IECC
Michigan	2015 IECC with amendments	2009 IECC
Minnesota	2012 IECC with amendments	2009 IECC
Mississippi	None statewide	No statewide code
Missouri	Home rule	No statewide code
Montana	2018 IECC with amendments	2009 IECC
Nebraska	2018 IECC	2018 IECC
Nevada	2018 IECC with amendments	2009 IECC
New Hampshire	2015 IECC with amendments	2009 IECC
New Jersey	2018 IECC with amendments	2009 IECC
New Mexico	2018 IECC with amendments	2009 IECC
New York	2018 IECC with amendments	2018 IECC
North Carolina	2015 IECC with amendments	2009 IECC
North Dakota	Home rule	No statewide code
Ohio	2018 IECC with amendments	2009 IECC
Oklahoma	2009 IECC with amendments	2009 IECC
Oregon	2017 Oregon Residential Specialty Code	2018 IECC
Pennsylvania	2015 IECC with amendments	2009 IECC
Rhode Island	2015 IECC with amendments	2009 IECC
South Carolina	2009 IECC	2009 IECC
South Dakota	Home rule	No statewide code

State	Current Code (as of 9/30/21)	State Map Legend (as of 9/30/21)
Tennessee	2009 IECC with amendments	< 2009 IECC
Texas	2015 IECC	2018 IECC
Utah	2015 IECC with amendments	2009 IECC
Vermont	2018 IECC with amendments	2018 IECC
Virginia	2018 IECC with amendments	2009 IECC
Washington	2018 Washington State Energy Code	2018 IECC
West Virginia	2009 IECC	2009 IECC
Wisconsin	2009 IECC with amendments	2009 IECC
Wyoming	Home rule	No statewide code

*A review of the codes in place in jurisdictions across the state indicates that 86% (Hawaii) and 82% (Arizona) of the population is covered by codes at this level.

AVAILABLE DATA

The residential state-level results (https://www.energycodes.gov/sites/default/files/2021-09/StateLevelResidentialCodesEnergyUseIndex_FY2021Q4.xlsx) behind the adoption status maps are available.

LEARN MORE...

STATUS OF STATE ENERGY CODE ADOPTION (/STATUS)

STATUS OF STATE ENERGY CODE ADOPTION - COMMERCIAL (/STATUS/COMMERCIAL)

October 13, 2021

Manufactured Housing Consensus
Committee Office of Manufactured
Housing Programs U.S. Department of
Housing and Urban Development 451
7th Street SW, Room 9166
Washington, D.C. 20410

RE: Notice of a Federal Advisory Committee Meeting Manufactured Housing Consensus Committee (Docket No. FR-6270-N-02)

Dear distinguished members of MHCC,

Clayton Homes is pleased to provide comments regarding the Department of Energy (DOE) Supplemental notice of proposed rulemaking to establish Energy Efficiency Standards for Manufactured housing.

Clayton Homes and its subsidiaries make up a vertically integrated manufactured housing organization with 37 home building facilities, 339 company-owned model home retail centers, financial services operations that provide mortgage services for more than 400,000 customers, and an insurance company that protects over 100,000 families. In addition, our homes are sold through a network of independent retailers and manufactured home communities that total over 1,500.

Clayton believes that home energy cost can be a significant portion of a homeowners' total monthly housing cost and should be consider in the overall affordability of a home. We work to provide home buyers with an energy efficient home that offers the best overall value while balancing initial home cost and operational cost. Although the Federal Standard has served consumers well in providing a minimum standard which balances safety and energy consumption concerns with affordability, we encourage efforts to update energy standards appropriately with a mindfulness of the balance.

As a result of our commitment to provide the lowest combination of construction and operating costs for home buyers; nearly all our homes today are built above current minimum HUD standard energy requirements. Over 65% of our homes built today are either Energy Star certified or certified to provide a level of heating and cooling energy consumption that is at least 30% below a referenced dwelling unit constructed in accordance with the 2003 International Energy Conservation Code (IECC).

The following are standard in our homes and exceed HUD's minimum energy requirements that provide the most significant impact on the home's overall energy efficiency:

- EcoBee Programable thermostats.
- High efficiency furnaces with electronically controlled motors.
- Low E windows.
- Duct air tightness test is performed on all our homes in the factory to verify 5% maximum duct loss.
- All home thermal envelopes are sealed in accordance with Manufactured Housing Energy Star requirements.

Clayton urges the MHCC to call on the DOE to revise its proposed energy requirements to reflect a complete and accurate cost benefit analysis which includes cost of Energy Testing and enforcement.

In considering the proposed energy standards, DOE should take care to evaluate the cost effectiveness of any proposed changes. The cost-effective nature of the proposal can have a significant impact on the ability of a family to afford a home, including reducing the capacity of the industry to build homes. A proposal that results in families being excluded from homeownership because the industry is producing fewer homes and those homes costing significantly more is not a good result.

Based on current material cost and initial cost impact studies, the rule would increase the cost of a 28x68 two section home by about $610 in climate zone 2 and over $7,000 in climate zone 3 and these cost do not include cost of energy testing and compliance which could add an additional $1000. Studies from the Systems Building Research Alliance show that homeowners are unlikely to ever recover this upfront cost in energy savings and home resale price.

The proposed rule is inappropriate for the current Manufactured Housing industry as it does not take into consideration the construction methods, transportation demands and short on-site completion duration unique to manufactured housing.
Imposing an energy standard based on the 2021 IECC standards, without a thorough evaluation, will likely impact the affordability of manufactured homes, as well as the industry's ability to produce a sufficient number of homes to support the demand for affordable housing. Below are a few examples of these impacts:

- 2021 IECC contains several significant unnecessary costly requirements which add little value to homeowners. One example is that it requires all homes to have HVAC ducts and the whole home tested for air tightness, which many states have removed when adopting the IECC. Studies have shown that on-site energy testing is unnecessary and overly burdensome for manufactured housing which builds tight homes through the process of design and quality controls unique to factory building process. This was acknowledged by DOE in the new Manufactured Housing Energy Star requirements which remove such field test from Energy Star audit requirements. Manufactured Housing's unique short duration between a home arriving on the lot and homeowner occupancy makes timing of field testing unpractical. We encourage DOE to remove the mandatory energy field test

requirement and replace it with visual inspection requirements for whole house tightness testing. We encourage DOE to limit duct leakage test requirements to in factory system only and remove costly field test requirements.

- The current insulation shortage, which is projected to continue for a few more years, must also be considered. This rule would require Manufacturer Home's to have significantly more insulation and the demand for fiberglass insulation would overwhelm an already stressed market, resulting in significantly limiting the number of new home starts in America as well as drive up national building cost.

- Clayton builds IRC homes in every state to the energy codes adopted by the State and understand that the 2021 IECC, which the DOE rule has been based, has not been adopted by any States. Thirteen states have adopted parts of the 2018 IECC but nineteen States are on the 2012 IECC or an earlier version. Requiring manufactured housing to meet a higher and more costly standard than site build homes is contrary to the purpose of the HUD code of protecting the quality, durability, safety, and **affordability** of manufactured homes.

- Please see Appendix A for complete list of changes that we would like to see made to the proposed rule.

One of the tenets of the National Manufactured Home Construction and Safety Standards Act (NMHCSS Act) is the importance of ensuring that manufactured housing remains an affordable housing option for all consumers considering homeownership. The International Code Council (ICC) does not have a requirement to take into consideration cost or impact while writing model code such as the 2021 IECC. States and local authorities consider fitness of code for the State when considering code adoption. Therefore, it's important to note that the 2021 IECC code has not been adopted by any States and many States remove by State amendments numerous cost prohibitive sections of IECC while adopting. To simply apply the 2021 IECC without proper evaluation of the cost impact to homebuyers would potentially penalize manufactured homes which have a smaller footprint and consume less energy than site-built homes. Energy standards should be based on total energy use per household rather than per square foot of living spaces and should encourage the use of smaller homes.

- The HUD energy standards haven't been significantly updated since 1994 and we believe moving to the proposed 2021 IECC based standard is too big of a jump for the industry to absorb in one code cycle. ICC updates building codes such as the IECC in three-year cycles and States normally consider adoption on similar three to 5 year cycles. This regular Candance allows both building components and home builders to slowly adjust to increased requirements.

There are several aspects with the proposed rule that make sense including:

- Keeping the current three thermal zones contained within the Manufactured Home Construction and Safety Standards.
- The two-tiered approach effort to mitigate significant cost impact on affordable homes. We encourage DOE to keep affordability in mind for both tiers.
- Providing both a prescriptive insulation path and a Total Building U value path.

We believe that the best outcome for developing a better energy standard would be for the DOE to work with HUD and the Manufactured Housing Consensus Committee (MHCC) to evaluate the energy standard improvements that will add the most value in energy savings and account for the cost impact to consumers.

The proposal should also consider the extraordinary market we are in, where the best first step could be to improve the minimum standards that are currently in place that are workable in the current market environment, and then continue to evaluate additional improvements to the standards overtime.

Clayton Homes supports sensible conservation efforts which consider the best overall value for home buyers that balance initial home cost and operational cost. Overly burdensome regulations that increase the cost of a manufactured home and price many consumers out of homeownership is not the answer. Even modest home price increases will have a disproportionate impact on lower income communities, who face the most significant burden in obtaining affordable homeownership. Clayton encourages DOE to work with HUD and the MHCC on the development of energy standards that not only encourages innovation and conservation, but also eliminates regulatory barriers that impede consumer access to safe, affordable manufactured housing.

Best regards,

John Weldy, P.E.
Vice President of Engineering

Appendix A

Changes that we would like to see in the Proposed rule include:

- This is a significant rule change and as such, we recommend an implementation date of 3 years after publishing of final rule.

- Although we agree with keeping existing HUD climate zones; we encourage DOE to lower insulation package requirements in zone 3 to better align with HUD map. As an example, Virginia which is in HUD climate zone 3 is in climate zone 1 in the IECC and it's unfair to pentiles VA with the higher insulation requirements as North Dakota.

- Revising definition of Whole-house mechanical ventilation system in 460.1 to: "Exhaust system, supply system, or combination thereof that is designed to mechanically exchange indoor air with outdoor air when operating continuously or through a programmed intermittent schedule to satisfy the whole house ventilation rates." Proposed definition is from the 2021 IECC.

- Change the tier retail list price from $55,000 to $75,000 for a single section and $140,000 for a Multi-section home to better reflect today affordable housing market.

- In section 460.102 we recommend revising exterior wall insulation to R-11 and increasing ceiling insulation to R25 in tier 1 zone 1 & 2. Allowing use of R-11 would provide valuable flexibility in current restricted fiberglass insulation market.

- Revise 20+5 wall R values to 21 or 13+5. This is consistent with the 2015 IECC and would provide mfg. option to avoid continuous insulation sheathing which would reduce home rigidity which could cause transportation issues. Would rather see ceiling levels increased to equal same overall insulation levels.

- Change 460.102(a)(3) to "….. R-21 batt insulation and R-11 blanket…" because R-11 blanket is more readily available.

- Add from the 2021 IECC R402.3.3] 460.102(a)(6) & (7) as follows:
  - (6) [R402.3.3] Glazed fenestration exemption. Not greater than 15 square feet (1.4 m2) of glazed fenestration per dwelling unit shall be exempt from the U-factor and SHGC requirements in Section R402.1.2. This exemption shall not apply to the Total UA alternative in Section R402.1.5.

- (7) [R402.3.4] Opaque door exemption. One side-hinged opaque door assembly not greater than 24 square feet (2.22 m2) in area shall be exempt from the U-factor requirement in Section R402.1.2. R402.1.5.

- **Revise Table 460.102-5 & 6**
  - Tier 1:Change zone 1 total Uo to 0.098 for single and 0.096 for multi-sectional, zone 2 total Uo of 0.081 for singles and 0.079 for multi-sectional and the zone 3 total Uo of 0.076 for singles and 0.073 for multi-sectional.
  - Tier 2:Change zone 2 total Uo to 0.076 for single and 0.073 for multi-sectional and the zone 3 total Uo of 0.067 for singles and 0.064 for multi-sectional.

These energy levels better align with current Energy Star requirements and provide an aggressive first step in enhancing energy conservation in manufactured homes.

- Revise 460.104 by adding the following at the end of the sentence in Table 460.103.…over the top of the attic insulation where the insulation is restricted.

- Revise based on R403.3.6 of 2021 IECC as follows:
  1. Rough-in test: The total leakage shall be less than or equal to 4.0 cubic feet per minute (113.3 L/min) per 100 square feet (9.29 m2) of conditioned floor area where the air handler is installed at the time of the test. Where the air handler is not installed at the time of the test, the total leakage shall be less than or equal to 3.0 cubic feet per minute (85 L/min) per 100 square feet (9.29 m2) of conditioned floor area.
  2. Postconstruction test: Total leakage shall be less than or equal to 4.0 cubic feet per minute (113.3 L/min) per 100 square feet (9.29 m2) of conditioned floor area.
  3. Test for ducts within thermal envelope: Where all ducts and air handlers are located entirely within the building thermal envelope, total leakage shall be less than or equal to 8.0 cubic feet per minute (226.6 L/min) per 100 square feet (9.29 m2) of conditioned floor area.

- Revise §460.202 (b)(3). To following: Homeowners manual should include recommendation that homeowners program thermostat with a heating temperature set point no higher than 70 °F (21 °C) and a cooling temperature set point no lower than 78 °F (26 °C).

- Remove the following sentence from 460.203: Where service hot water systems are installed by the manufacturer, the manufacturer must ensure that any maintenance instructions received from the service hot water system manufacturer are provided with the manufactured home.
  - Typical water heater instructions do not include maintenance instructions and such when available are readily available on-line.

October 13, 2021

Manufactured Housing Consensus Committee
Office of Manufactured Housing Programs
U.S. Department of Housing and Urban Development
451 7th Street SW, Room 9166
Washington, D.C. 20410

RE: Notice of a Federal Advisory Committee Meeting Manufactured Housing Consensus Committee (Docket No. FR-6270-N-02)

Dear Sir/Madam:

The Manufactured Housing Institute (MHI) is pleased to provide feedback to the U.S. Department of Housing and Urban Development (HUD) and the Manufactured Housing Consensus Committee (MHCC) in response to the request for public comments in preparation for the MHCC's upcoming teleconference on October 20, 2021, about the Department of Energy's (DOE) supplemental notice of proposed rulemaking titled "Energy Conservation Program: Energy Conservation Standards for Manufactured Housing."

MHI is the only national trade association that represents every segment of the factory-built housing industry. Our members include home builders, suppliers, retail sellers, lenders, installers, community owners, community operators, and others who serve the industry, as well as 48 affiliated state organizations. In 2020, our industry produced nearly 95,000 homes, accounting for approximately nine percent of new single-family home starts. These homes are produced by 34 U.S. corporations in 138 plants located across the country. MHI's members are responsible for close to 85 percent of the manufactured homes produced each year.

To reiterate MHI's position from its previous two comment letters and remarks, the DOE's proposed rule is fundamentally flawed, both because it does not follow an accurate cost-benefit analysis as the statute requires and because it ignores the importance of HUD as the primary regulator of construction and safety standards for manufactured homes. As the MHCC concludes its final meeting on this proposed rulemaking, MHI strongly urges Committee members to continue to take the following issues and concerns into consideration.

Reliance on the International Energy Conservation Code

One of the tenets of the National Manufactured Housing Construction and Safety Standards Act (NMHCSS) is the importance of ensuring that manufactured housing remains an affordable housing option for all consumers considering homeownership. The Energy Independence and Security Act of 2007 (EISA) states "energy conservation standards established under this section shall be based on the most recent version of the International Energy Conservation Code (including supplements), **except in cases in which the Secretary finds that the code is not cost effective**, or a more stringent standard would be more cost-effective, based on the impact of the code on the purchase price of manufactured housing and

on total life-cycle construction and operating costs."[1] Thus, the reasoning behind requiring DOE to consider the unique aspects and construction techniques of the manufactured housing industry.[2]

The International Code Council (ICC) is a member-focused association that develops model building codes and standards that are used in the design and construction of safe, sustainable, affordable, and resilient structures.[3] The ICC's International Energy Conservation Code (IECC) is a baseline energy standard with guidelines for mechanical systems, lighting systems, service water heating systems, and building envelope, among other areas.

EISA directs DOE to establish energy conservation standards for manufactured housing based on the most recent version of the IECC (unless it is found to be not cost effective), which was published in January 2021. To date, no state has adopted the 2021 IECC standards and the vast majority of states are using amended versions of the 2009, 2012 or 2015 IECC, and eight states recognizes no uniform energy standard at all in their state's building code for site-built homes. While the IECC is respected in the construction industry, it was developed over many years for utilization in both site-built residential homes and commercial buildings and was never intended nor designed to be implemented in the manufactured housing sector. Given that the IECC essentially ignores all the construction aspects unique to manufactured housing, it is an inappropriate code for attempted enforcement upon the manufactured housing industry and could potentially cause factory closures, the loss of thousands of jobs, and an immediate affordable housing crisis for one of the largest sectors in the housing market. The most appropriate code to utilize to update energy standards for manufactured homes is the HUD Code.

Feasibility of DOE's Proposed Changes

If the DOE attempts to enforce the IECC, a code originally developed and intended for commercial and site-built residential buildings, to propose these changes, manufacturers will have to redesign all their current floor plans to accommodate the changes resulting in the possible elimination of some home features. Further, it raises potential issues with certain components and materials that are currently being used in the home production.

For example, the proposed rulemaking requires continuous insulation which is problematic due to the required changes in design, associated costs, and need for products that do not exist. The increase in unit width due to the addition of continuous foam will require a reduction in the structural floor width equal to the thickness of the insulation. This will require redesign of the chassis system, trusses, and retooling of fixtures and jigs within the plant. Any reduction in interior width due to increases in exterior width, will eliminate or require significant redesign of many single section homes that incorporate a bathroom with adjacent hallway that are already at the minimum widths permitted under the HUD Code. Furthermore, standard doors for manufactured homes are designed for overall wall thickness of 4 or 6 inches and increasing the thickness will require the use of extension jambs or development of new products to accommodate increased wall widths. All these changes will ultimately increase the cost of the home and the price the consumer pays for it. Further, all these changes will take time to implement.

Transportation Concerns

Several of the proposed changes in the rule appear to focus on changes to the building thermal systems which will affect the overall shipping height and width of a home. By increasing the truss heel height, increasing floor joist depth, and adding insulation outside of the studs, the overall shipping envelope will change. In some cases, this change could be significant. For example, the additional height

[1] 42 U.S.C. 17071(b)(1).
[2] *Id.* at 17071(b)(2)(A).
[3] International Code Council, https://www.iccsafe.org/about-icc/overview/about-international-code-council/ (accessed October 12, 2021)

could prevent shipping a home into an area of the country with low bridges resulting in consumers having to settle for a different style of home, or more than likely, being forced out of the housing market due to a lack of affordable housing. Further, an additional escort or pole car may be required to accompany the home that goes beyond maximum width or height, which could add thousands of dollars to the price of the home for the consumer.

Ownership Related Costs

MHI urges the MHCC to call on the DOE to revise its proposed energy requirements to reflect a complete and accurate cost benefit analysis which is required by the Energy Independence and Security Act of 2007 (EISA).

The DOE's proposal is based on improper calculations and methodologies including underestimating the current costs of homes and the costs of the new materials to construct them, and not considering the cost of testing procedures and compliance. Further, the DOE significantly underestimates the fact that the first buyer of an energy efficient manufactured home would likely never reap the economic benefit. Based on MHI's industry data, buyers usually sell their homes within seven to ten years of purchase. Consequently, as result of the DOE's proposal, homeowners will not realize incremental value for energy features that increase a home's purchase or sale price. Instead, savings, if any, could only be realized by subsequent homeowners.

At the efficiency levels proposed by the DOE in its recent rulemaking, MHI's survey of manufacturers found that it is unlikely that a buyer purchasing a new home and financing 90 percent of the purchase price would even recover these upfront costs at a future sale. Instead, the DOE's proposal would likely yield a negative return over the ownership period. While several reasons contribute to this, including purchase price and availability of financing options, the fact that homebuyers usually sell their homes within the first seven years of purchase is the most relevant.

Using the DOE's assumptions of cost and location as outlined in the Technical Support Document, which assumes a 30-year mortgage which is not the norm for manufactured housing, MHI conducted a cost-benefit analysis using more realistic financing options that are being utilized in the market today. Assuming a down-payment of 10 percent, an interest rate of nine percent – which is at the high end of today's mortgage rates - a loan term of 20 years, and a tenancy period of 10 years, MHI's cost-benefit analysis found that the DOE's proposal will add at a minimum almost $1,000 to the cost of a new single-section manufactured home and up to $5,500 to the cost of a multi-section home depending on location (See Appendix I). Such a price increase would be financially devasting for homebuyers looking to finance the purchase of a manufactured home.

It is important to note that the only place that MHI's analysis shows a savings is in Fairbanks, Alaska, where the savings is only $369 after ten years. In 2020, Alaska had only 64 homes shipped to the state and as of July 2021 only five homes been shipped there. Further, many of the locations selected by the DOE for its analysis are not locations where manufactured housing is prevalent.

Given these facts, any new energy conservation standard must avoid creating a scenario where the upfront increase to the purchase price of a home prices many consumers out of the market, even if those upfront costs could be amortized over the duration of the homeowner's tenancy and recouped over time.

Compliance, Enforcement and Testing

As MHI has previously stated, it is unnecessary for the DOE to develop a new enforcement mechanism because the HUD Code is an already-established enforcement mechanism that mandates a uniform standard for design, construction, and installation, including federal requirements for safety, durability, and energy efficiency. While MHI recognizes that the DOE has the authority to develop an

energy conservation standard for manufactured housing, it should be developed in coordination with HUD to ensure that any proposed rules are integrated into the HUD Code for enforcement. Failure to partner with HUD would result in complicated, overlapping requirements that will only increase manufacturing costs, hurting existing homeowners and prospective homebuyers. Further, the proposed rule does not include testing requirements for each of the systems being modified. Determining the impact of a system change without knowing the testing parameters is impossible. DOE must not propose a rule without including the required testing requirements, so any analysis can include the true impact.

MHI has included preliminary responses to the thirty questions posed by the DOE in the rulemaking that the Department is seeking comments on (Appendix II), as well as noted below additional issues the MHCC must consider as it continues to review the proposed rule including:

1. The DOE energy standards fail the EISA statutory requirement to use the IECC Code "except in cases in which the code is not cost effective." The result is manufactured housing will be less affordable, due to large increases in home sale prices and operating cost increases that exceed energy savings.

2. The $55,000 low-income price cap threshold for streamlined energy efficiency requirements should be eliminated (or significantly increased). Failure to do this would result in DOE failing to accomplish its stated goal of protecting low-income homebuyers from steep price increases resulting from the new standards.

3. Energy standards fail to "take into consideration the design and factory construction standards" of manufactured homes and ignore the primacy of manufactured housing construction standards established under the 2000 Manufactured Housing Improvement Act.

4. Energy standards were developed without complying in any meaningful way with the EISA statutory requirement to consult with HUD - resulting in standards that ignore the real-world impact on manufactured homeownership and differences between the IECC and HUD Code.

5. Energy standards ignore the large number of homebuyers that will no longer be able to buy a manufactured home, because they no longer qualify for an FHA, Fannie Mae, or Freddie Mac mortgage loan, due to the impact of increased mortgage payments on debt-to-income ratios.

While MHI and its members will always support sensible conservation efforts, overly burdensome regulations that even modestly increase the cost of a manufactured home will price many consumers out of homeownership. This increase will have a disproportionate impact on minority communities, who face the most significant burden in obtaining affordable homeownership and would be in direct contrast to the Administration's goal of achieving racial equity in homeownership. MHI stands ready to work with DOE, HUD and the MHCC on the development of realistic and achievable energy standards that not only encourages innovation and conservation, but also eliminates regulatory barriers that impede consumer access to safe, affordable manufactured housing.

Sincerely,

Lesli Gooch, Ph.D.
Chief Executive Officer

Appendix I – Cost Benefit Analysis

The tables below provide Life Cycle Cost results for the DOE proposed rule. The figures offer a glimpse of the benefits and costs for a homebuyer purchasing either a single or two section home. The inputs for location selection, average home cost, increase in home cost related to the energy investment and resultant monthly energy savings match DOE's assumptions contained in the Technical Support Document (TSD). The table sums the major costs and benefits as experienced by the buyer over a 10-year, average occupancy period to yield a net benefit (cost) including incremental mortgage payment, added down payment and monthly energy savings. A negative value indicates that the buyer can expect to lose money on the energy investment making the home less affordable. For example, a purchaser of a single section home in Phoenix, AZ, can on average expect to experience a net cost of nearly $4,900 over the 10-year period of occupancy. Other assumptions made in generating the tables are provided below. Note: all figures are expressed in current dollars. Further, it is assumed that the buyer does not realize an incremental price increase associated with the energy measures at the time of sale, an assumption that is based on a lack of evidence that energy features can demand a higher home price.

Assumptions	
Down payment	10%
Principal	90%
Mort. interest rate	9%
Loan term (yrs)	20
Occupancy term (yrs)	10
Principal recapture rate	0%

			Single Section Home									
HUD Standards Climate Zone	**Sample Locations**	**Average home cost (DOE)**	**Increase in home cost (DOE)**	**Percent increase in cost**	**Down payment**	**Inc. in mortgage**	**Inc. monthly mort. pay.**	**Energy savings ($/mth) (DOE)**	**Net Mthly. Savings/ Cost**	**Principal repayment**	**Net benefit (cost)**
1	Miami	$57,300	$2,574	**4.5%**	$257	$2,317	$21	$20	($1)	$1,646	**($2,010)**
1	Houston	$57,300	$2,574	**4.5%**	$257	$2,317	$21	$24	$3	$1,646	**($1,493)**
1	Atlanta	$57,300	$2,574	**4.5%**	$257	$2,317	$21	$29	$8	$1,646	**($891)**
1	Charleston	$57,300	$2,574	**4.5%**	$257	$2,317	$21	$26	$5	$1,646	**($1,340)**
1	Jackson	$57,300	$2,574	**4.5%**	$257	$2,317	$21	$28	$7	$1,646	**($1,048)**
1	Birmingham	$57,300	$2,574	**4.5%**	$257	$2,317	$21	$27	$7	$1,646	**($1,106)**
2	Phoenix	$57,300	$4,820	**8.4%**	$482	$4,338	$39	$28	($11)	$3,081	**($4,897)**
2	Memphis	$57,300	$4,820	**8.4%**	$482	$4,338	$39	$32	($7)	$3,081	**($4,432)**
2	El Paso	$57,300	$4,820	**8.4%**	$482	$4,338	$39	$30	($9)	$3,081	**($4,658)**
2	San Francisco	$57,300	$4,820	**8.4%**	$482	$4,338	$39	$23	($17)	$3,081	**($5,543)**
2	Albuquerque	$57,300	$4,820	**8.4%**	$482	$4,338	$39	$30	($9)	$3,081	**($4,666)**
3	Baltimore	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$33	($4)	$2,978	**($3,967)**
3	Salem	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$26	($12)	$2,978	**($4,892)**
3	Chicago	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$34	($4)	$2,978	**($3,930)**
3	Boise	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$28	($10)	$2,978	**($4,605)**
3	Burlington	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$35	($3)	$2,978	**($3,812)**
3	Helena	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$36	($2)	$2,978	**($3,686)**
3	Duluth	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$49	$11	$2,978	**($2,144)**
3	Fairbanks	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$69	$32	$2,978	**$369**

			Multi Section Home								
HUD Standards Climate Zone	**Sample Locations**	**Average home cost (DOE)**	**Increase in home cost (DOE)**	**Percent increase in cost**	**Down payment**	**Inc. in mortgage**	**Inc. monthly mort. pay.**	**Energy savings ($/mth) (DOE)**	**Net Mthly. Savings/ Cost**	**Principal repayment**	**Net benefit (cost)**
1	Miami	$108,500	$4,143	3.8%	$414	$3,729	$34	$33	($1)	$2,648	**($3,134)**
1	Houston	$108,500	$4,143	3.8%	$414	$3,729	$34	$40	$6	$2,648	**($2,313)**
1	Atlanta	$108,500	$4,143	3.8%	$414	$3,729	$34	$48	$15	$2,648	**($1,306)**
1	Charleston	$108,500	$4,143	3.8%	$414	$3,729	$34	$42	$8	$2,648	**($2,065)**
1	Jackson	$108,500	$4,143	3.8%	$414	$3,729	$34	$46	$12	$2,648	**($1,597)**
1	Birmingham	$108,500	$4,143	3.8%	$414	$3,729	$34	$45	$11	$2,648	**($1,696)**
2	Phoenix	$108,500	$6,167	5.7%	$617	$5,550	$50	$40	($10)	$3,942	**($5,714)**
2	Memphis	$108,500	$6,167	5.7%	$617	$5,550	$50	$45	($5)	$3,942	**($5,170)**
2	El Paso	$108,500	$6,167	5.7%	$617	$5,550	$50	$42	($8)	$3,942	**($5,496)**
2	San Francisco	$108,500	$6,167	5.7%	$617	$5,550	$50	$31	($19)	$3,942	**($6,835)**
2	Albuquerque	$108,500	$6,167	5.7%	$617	$5,550	$50	$42	($8)	$3,942	**($5,535)**
3	Baltimore	$108,500	$5,839	5.4%	$584	$5,255	$47	$45	($2)	$3,732	**($4,584)**
3	Salem	$108,500	$5,839	5.4%	$584	$5,255	$47	$34	($14)	$3,732	**($5,949)**
3	Chicago	$108,500	$5,839	5.4%	$584	$5,255	$47	$46	($2)	$3,732	**($4,502)**
3	Boise	$108,500	$5,839	5.4%	$584	$5,255	$47	$37	($10)	$3,732	**($5,508)**
3	Burlington	$108,500	$5,839	5.4%	$584	$5,255	$47	$47	($0)	$3,732	**($4,364)**
3	Helena	$108,500	$5,839	5.4%	$584	$5,255	$47	$48	$0	$3,732	**($4,271)**
3	Duluth	$108,500	$5,839	5.4%	$584	$5,255	$47	$66	$18	$3,732	**($2,105)**
3	Fairbanks	$108,500	$5,839	5.4%	$584	$5,255	$47	$94	$47	$3,732	**$1,292**

Appendix II - Issues on Which DOE Requests Comment

1. DOE invites comment on whether (1) the manufacturer's retail list price threshold for Tier 1 under the tiered proposal is appropriate, (2) the untiered proposal in this SNOPR is cost-effective, generally, and (3) the untiered proposal is cost-effective for low-income consumers.

Creating a dollar threshold for Tier 1 demonstrated a fundamental lack of understanding of the manufactured housing industry. Further, the threshold for Tier 1 is not appropriate. To begin with, manufacturers do not provide a suggested retail price for homes as prices can vary from location to location. Thus, it is up to the retailer to determine the prices of the homes they are selling. For example, under this structure, a manufacturer could have a home floor design approved for Tier 1 only, but when working with the retailer the consumer decides to upgrade some of features such as installing a granite countertop. Any upgrades at the time of purchase, could potentially move that home into Tier 2 which would be outside of the manufacturers control.

Moreover, the setting of $55,000 is arbitrary and relates affordable housing ONLY to the manufactured housing market. To determine if a home is affordable, it is necessary to consider the entire housing market. Manufactured homes at any price point provide a significant source of affordable housing – with the average price of a new manufactured home being $87,000 compared to $308,597 for a new site-built home not including land.[4]

2. DOE welcomes comment on approaches for testing, compliance and enforcement provisions for the proposed standards and alternative proposal. DOE also welcomes comments and information related to potential testing, compliance and enforcement under the current HUD inspection and enforcement process, and potential costs of testing, compliance and enforcement of the proposed standards and alternative proposal in this document.

MHI has significant concerns that testing was not included in this proposal, and finds it challenging to consider the costs and impacts of a number of the proposed changes without knowing what the testing protocols will be. All costs imposed by the proposed rule must be factored, and enforcement and testing are parts of that cost. For example, will the duct testing require every unit to be tested thus requiring each manufacturer to hire one individual to test the ducts in line? Additionally, each double wide will need to be tested on-site which will cost around $1,000 per unit, assuming the duct system passes the first time. What happens if a duct system fails the testing on-site? Additional costs will be incurred with bringing the duct system into compliance and then another site test will be required.

Furthermore, it is unnecessary for the DOE to develop a new enforcement mechanism because the HUD Code is an already-established enforcement mechanism that mandates a uniform standard for design, construction, and installation, including federal requirements for safety, durability, and energy efficiency. While MHI recognizes that the DOE has the authority to develop an energy conservation standard for manufactured housing, it should be developed in coordination with HUD to ensure that any proposed rules are integrated into the HUD Code for enforcement.

3. DOE requests comment on the use of a tiered approach to address affordability and PBP concerns from HUD, other stakeholders, and the policies outlined in Executive Order 13985. DOE also requests comment regarding whether the price point boundary between the proposed tiers is appropriate, and if not, at what price point should it be set and the basis for any alternative price points. DOE also requests comment on its assumptions regarding the use of high-priced loans (*e.g.,* chattel loans) by low-income purchasers, or other purchasers, of manufactured housing.

Manufactured housing is a critical component of the success of Executive Order 13985, officially titled "Advancing Racial Equity and Support for Underserved Communities." According to the Urban Institute, "the

[4] 2020 U.S. Census Bureau's Manufactured Housing Survey.

gap in the homeownership rate between black and white families in the U.S. is bigger today than it was when it was legal to refuse to sell someone a home because of the color of their skin." Addressing systemic barriers to minority homeownership is imperative and increasing the supply of quality affordable housing must be an integral part of the effort. This is where manufactured housing comes in. With the average cost of a new manufactured home itself around $87,000, it is not uncommon for the purchase of a manufactured home to be less expensive than the option of renting.[5] And unlike other affordable homeownership options, which are often aging housing stock in need of extensive improvements and rehabilitation, a family can attain homeownership in a brand-new home that has the latest innovations, energy efficient features, and modern floor plans and amenities. Any federal regulations that impact the affordability of housing could make it even harder for minority homeowners to access homeownership.

4. DOE also requests comment on alternate thresholds (besides price point) to consider for the tiered approach, including a size-based threshold (*e.g.,* square footage or whether a home is single- or multisection). DOE requests comment on the square footage and region versus sales price data provided in the notice (from MHS PUF 2019) and how that data (or more recent versions of that data) could be used to create either a size-based or region-based threshold instead. DOE further requests input on whether there should be single national threshold as proposed, or whether it should vary based on geography or other factors, and if so, what factors should be considered.

Thresholds must be established differently for different regions of the country because the features and amenities in an "affordable" home vary geographically. Further, the pricing for a manufactured home can differ greatly depending on the location of where the home will be sited. For example, below are the average prices of a manufactured home in several states across the country[6]:

- Arizona - $106,800
- California - $118,700
- Colorado - $88,200
- Florida - $89,200
- Texas - $88,200

Rather than price, MHI would urge the DOE to consider other thresholds such as square footage or a measure that differentiates based on location where the home will be sited. Further, from an approval and enforcement standpoint, it is not clear how designs of varying levels of affordability would be distinguished by production inspection primary inspection agencies (IPIAS) and design approval primary inspection agencies (DAPIAS).

5. DOE requests comment on using the AEO GDP deflator series to adjust the manufacturer's retail list price threshold for inflation. DOE requests comment on whether other time series, including those that account for regional variability, should be used to adjust manufacturer's retail list price.

While MHI does not believe a price threshold is at all appropriate, if used there absolutely needs to be an index to increase the price over time if a price tier is used. The proposed rule should establish the Federal agency tasked with providing the annually adjusted threshold values. Whether it is HUD or the DOE, a single adjusted value must be provided to ensure consistency across the industry.

6. DOE requests comment on whether a one-year lead time would be sufficient given potential constraints that compliance with the DOE standards may initially place on the HUD certification process, and whether a longer lead time (e.g., a three-year lead time) or some other alternative lead-time for this first set of standards (e.g., phased-in over three years, with one-year lead-times thereafter) should be provided.

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[5] 2020 U.S. Census Bureau's Manufactured Housing Survey.
[6] 2020 U.S. Census Bureau's Manufactured Housing Survey.

When DOE makes changes to appliance standards there is generally a 5-year compliance period. Given that the process for manufacturing homes is at least as complex as appliances, this same time period should apply. If the proposed rulemaking is finalized as written, implementing the changes would require manufacturing plants to do a complete overhaul of their systems and processes. Further, every home design currently being utilized – of which there are thousands – would need to be redesigned and reapproved, further slowing down the process.

7. DOE requests comment on its understanding of the definitional changes in the 2018 IECC and the 2021 IECC. DOE also requests comments on its changes to the proposed definitions as compared to those proposed in the June 2016 NOPR.

MHI recommends revising the definition of whole-house mechanical ventilation system to: "Exhaust system, supply system, or combination thereof that is designed to mechanically exchange indoor air with outdoor air when operating continuously or through a programmed intermittent schedule to satisfy the whole house ventilation rates." As currently proposed, the definition would include all exhaust fans including bath and range hoods – systems we do not believe are intended to be included. Further, MHI strongly encourages DOE to review the definition of "thermal distribution efficiency" and "renewal energy certificate."

8. DOE requests comment on incorporating by reference ACCA Manual J, ACCA Manual S, and "Overall U-Values and Heating/Cooling Loads–Manufactured Homes" by Conner and Taylor.

Incorporation of these manuals is an example of trying to use a site-built code for manufactured housing that just does not work as outlined below.

ACCA Manual J analysis requires knowledge of the orientation of the home with respect to the sun for cooling load analysis. Because the orientation of the home is often unknown until installed, the proposed rule must establish a default orientation, such as the front door is assumed to face south.

ACCA Manual S establishes sizing limits for heating and cooling equipment, these limits presume that thermal loads are established for a specific location and specific building orientation. The variation in design parameters within a single thermal zone exceeds the sizing limits of ACCA Manual S. The proposed rule must establish alternate criteria for using ACCA Manual S where the design parameters vary within a thermal zone.

Current equipment sizing methods are not based on Manual J or Manual S. The use of this software, as proposed, will add additional time and cost for each model plan submission.

The rule must establish a threshold for requiring a revised Manual J or Manual S analysis. For example, where a home model has options that affect the glazing area or insulation value, are distinct Manual J and Manual S analysis required for each possible option?

If equipment sizing is limited by Manual S, under the proposed rule homes can only be placed in their respective thermal zones because placing a home in a zone for which it was not designed would violate the sizing limits of Manual S. For example, under the current standard a Zone II home can be placed in Zone I, as Zone II is considered more restrictive. However, under the new standard, this common practice would not be permitted because equipment sized for Zone II would be oversized for Zone I and violate the proposed rule. This would restrict current sales practices in the industry especially for retailers located near the Zone boundaries.

9. DOE requests comment on basing the climate zones on the three HUD zones instead of the June 2016 NOPR-proposed four climate zones, or other configuration of climate zones. DOE further requests input on whether energy efficiency requirements should be based on smaller geographic areas than provided with the 3 or 4 zone model.

MHI supports utilizing the current HUD climate zones for the purpose of this rulemaking.

10. DOE requests comment on the Tier 1 energy conservation standards, which would be applicable to manufactured homes with a manufacturer's retail list price of $55,000 or less. DOE also requests comment on the proposed energy conservation standards based on the most recent version of the IECC for the Tier 2 and untiered standards and the consideration of R-21 sensitivity for exterior wall insulation for climate zones 2 and 3.

Per our response to Question 1, we do not support a tiered approach based on retail price.

11. DOE requests comment on the additional energy efficiency requirements from the 2021 IECC and whether they should apply to manufactured homes, including those that DOE has initially considered as not applicable to manufactured homes. If so, DOE requests comment on how these requirements would apply and the costs and savings associated with these requirements.

While the IECC is respected in the construction industry, it was introduced as a standard specific to commercial and site-built residential housing with no input from the manufactured housing industry. Given that the IECC essentially ignores all the construction aspects unique to manufactured housing, requiring the industry to comply with a building code that was developed without the benefit of our industry's knowledge or participation is not an appropriate solution. Thus, an integration process of individual evaluation and strategic merging of any increased energy standards would be a much more prudent approach rather than attempting a "broad scale, one size fits all" approach as is currently being suggested. For that to work, the most appropriate code to utilize to update energy standards for manufactured homes is the HUD Code.

12. DOE requests comment on the proposal to not require that exterior ceiling insulation must have uniform thickness or a uniform density.

MHI agrees that manufactured homes should NOT have to require uniform thickness of installation. Installing insulation with a nonuniform thickness is required to construct most manufactured homes due to shipping height restrictions and the need to minimize truss heel height. Below is further supporting information as to why MHI supports not requiring uniform thickness based on the DOE proposal.

- The loose fill spray applied ceiling insulation was assumed to be R-3.1 per inch in the DOE analysis. Therefore, as the required R-value for the ceiling insulation is increased the required depth will also increase.
- Due to shipping restrictions across the US, most manufacturers limit the truss heel height to allow the most conservative shipping heights.
- When the heel height is less than the depth of insulation required, a compressed area of insulation occurs at the eave areas. The deeper the required insulation, further the compressed area extends toward the center of the home.
- Because of the compressed area at the eave, the manufacturers typically increase the depth toward the center of the home to provide an average depth that meets the requirements.
- Another issue with the ceiling insulation is that approximately 30 percent of homes produced have a "vaulted" ceiling instead of "flat" ceiling as assumed in the DOE proposal. The insulation depths that are being proposed for Tier 2 prescriptive would eliminate the production of homes with vaulted ceilings unless the trusses are redesigned with higher heel heights or steeper exterior roof slopes. These changes will then increase the shipping height and require truss re-designs.
- The DOE proposal includes assumptions that heel heights will increase as the required depth of insulation increases to minimize the compressed area. The DOE document states that the truss heel height is assumed to be 2.5 for ceilings using less than or equal to R-22, 5.5 inches for insulation between R-22 and R-30, and 7.5 inches for over R-38. This increased heel height assumption will require the trusses to be re-designed and will increase shipping heights. Homes with increased shipping heights will be more costly to ship based on state-by-state restrictions.

13. DOE requests comment on the proposal not to limit the total area of glazed fenestration.

MHI agrees that the DOE should not limit the amount of glazed fenestration. The 2021 IECC already includes exemptions that must also be included in this proposed rule. Further, MHI recommends adding the following:

(6) [R402.3.3] Glazed fenestration exemption. Not greater than 15 square feet (1.4 m2) of glazed fenestration per dwelling unit shall be exempt from the U-factor and SHGC requirements in Section R402.1.2. This exemption shall not apply to the Total UA alternative in Section R402.1.5.

14. DOE requests comment on removing the proposed requirement that exterior floor insulation installed must maintain permanent contact with the underside of the rough floor decking.

MHI supports exempting manufactured housing from this requirement. In manufactured home construction, the floor insulation between the I-beams is inherently not in contact with the underside of the floor decking. This must be exempted to permit standard construction practices as outlined below.

The typical insulation used in the production environment is blanket style insulation that is installed between the bottom of the floor and the chassis frame which keeps the HVAC supply duct system inside the thermal boundary of the building. Changing this method of installation would effectively remove the HVAC supply duct system from inside the thermal boundary of the building and cause an increased heat gain and heat loss, effectively decreasing energy efficiency. This would be contradictory to the purpose and scope of the IECC. For this reason, most manufacturers do not currently install floor insulation between the floor joists that would be in contact with the underside of the floor decking. Therefore, production facilities are not set-up to efficiently install insulation that is contact with the underside of the floor decking. However, interior perimeter rim joist insulation is a common practice.

Installing insulation between the floor joists will also increase the production labor to install the insulation. This additional labor will add around 20 minutes of production time to each floor produced. For a plant producing 8 floors per day, the increased production time will be around 160 minutes per day. With 8 floors per day production, the line will have to move about every 50 mins. Therefore, the increased labor required will either slow production or require new additional labor resources. Whether production is reduced, or additional labor is required, the overall cost of the home will be increased, but these costs were not considered in the DOE analysis.

Further, the DOE analysis assumes that the floor joists are 2x6 with insulation up to and including R-22, and 2x8 floor joists insulated to R-30 and above. Currently 90 percent of floors produced use 2x6 floor joists. Therefore, the increased joists depth will add approximately a 33 percent material cost increase which will be around $200 per 14x76 floor. This 2" floor joist change will also increase the shipping height. This additional 2" only compounds to the issue discussed about the truss changes.

Additionally, placing more than R-11 blankets under the floor joists cannot be done without offsetting outriggers and providing blocking between joists. This is necessary because compressing more than R-11 insulation between an outrigger and a joist results in noticeable humps in the floor at each outrigger location.

15. DOE requests comment on the proposed updates to the installation of insulation criteria as it applies to manufactured homes construction only.

Having continuous insulation on the outside of the studs may become problematic for siding installation due to transportation. The siding fasteners would have to penetrate thru the continuous insulation which would pose an issue, especially for siding applications with more weight. Continuous insulation will increase the cost of manufacturing due to the need to use hand-driven nails, instead of pneumatically drive staples, to attach vinyl siding. Nails will need to be hand driven to prevent overdriving and buckling of vinyl siding.

Production facilities are not set-up to efficiently install continuous exterior insulation. This would require extensive upgrading of process, machinery and facilities to a point of which could potentially result in plant closures and loss of jobs. Installing continuous exterior insulation will increase the production labor required because this an additional process that is not currently considered in production. It will also be difficult to properly fasten this continuous exterior insulation. Special fasteners will be required and/or developed to maintain the current structure strength that current process provide. This could potentially require extensive research and development of new materials and process as well as increased production time to install.

Because the exterior installation will be time consuming, the floor production would be reduced by a half a floor. This reduced production would cost the manufacturer $27,500 (assuming $55,000 per floor.)

Another issue with the exterior insulation is that the siding will have to be fastened thru the insulation. This becomes problematic when a heavier exterior siding is installed. In this situation, the fasteners, that are installed thru the exterior insulation, will not support the siding during transportation. This situation would require some sort of additional support such as a ledger angel to properly support the siding. The additional costs for the ledger angle and the increased production costs do not appear to be included in the DOE analysis.

The exterior insulation requirement will also affect the overall shipping width, because currently the homes are designed to maximize the home square footage within the shipping width requirements. Because the widths are already maximized the space to accommodate the exterior sheathing would have to be taken from inside the home. This reduction in width inside the home, would severely impact floor plan designs as the exist. All homes would need to be re-engineered and re-approved at a substantial cost to the manufacturers. The exterior insulation requirement would eliminate all 12-wide production models due to space limitations in the hallways. Furthermore, standard doors for manufactured homes are designed for overall wall thicknesses of 4- or 6-inches and increasing the thickness will require the use of extension jambs or the development of new products to accommodate increased wall widths.

16. DOE requests comments on whether there are any of the 2021 IECC updates relevant to manufactured housing that should be considered as part of this rulemaking. Specifically, DOE requests comment on whether the 2021 IECC updates for installation criteria for access hatches and doors, baffles and shafts are applicable to manufactured housing and should be considered in this rulemaking.

While the IECC is respected in the construction industry, it was introduced as a standard specific to commercial and site-built residential housing with no input from the manufactured housing industry. Given that the IECC essentially ignores all the construction aspects unique to manufactured housing, requiring the industry to comply with a building code that was developed without the benefit of our industry's knowledge or participation is not an appropriate solution. For example, the baffle requirements included in the proposal will not work because the closest you can get to the rim rail is inside the face and not the outside edge. That simply will not work for manufactured homes.

17. DOE requests comment on the proposed updates to the air barrier criteria as it applies to manufactured homes construction only. Further, DOE requests comment whether the SNOPR proposal continues to be designed to achieve air leakage sealing requirements of 5 ACH.

Since the required testing of the air barrier are not included in the rule, it would be impossible to achieve this or any standard. Table 460.104 provides prescriptive criteria, but the testing criteria is not included. The rule must exempt holes that communicate between the interior and the belly of the house from the air barrier criteria. In addition, testing is required, and the costs of those tests must be included into the cost-benefit analysis.

18. DOE requests comments on whether there are any of the 2021 IECC updates relevant to manufactured housing that should be considered as part of this rulemaking. Specifically, DOE requests comment on whether the 2021 IECC updates for air barrier criteria for recessed lighting, narrow cavities and plumbing are applicable to manufactured housing and should be considered in this rulemaking. If so, DOE requests comment on whether the requirements would alter the 5 ACH designation.

Because the IECC essentially ignores all the construction aspects unique to manufactured housing, requiring the industry to comply with a building code that was developed without the benefit of our industry's knowledge or participation is not an appropriate solution. For example, if an electrical box or phone box is placed on exterior walls is an interior and exterior air barrier required? If there is an exterior air barrier, would electrical boxes need to be sealed? Further, holes in the floor, such as under bathtubs and showers, must be exempted from sealing to permit the installation of p-traps in 2x6 floor systems. These holes do not allow air intrusion from the exterior because the exterior floor air barrier is the bottom board and is not the floor itself. These are just a few examples why the most appropriate code to utilize to update energy standards for manufactured homes is the HUD Code.

19. DOE requests comment on the proposal to require that total air leakage of duct systems for all manufactured homes is to be less than or equal to 4 cfm per 100 square feet of conditioned floor area.

The proposed rule limits "total air leakage" of the duct system whereas current testing, such as that done for Energy Star homes, is based on air leakage to the exterior. Testing leakage to the outside requires the use of a second machine used simultaneously. This would be a more extensive and costly test with increased failure rates while providing little benefit in terms of energy savings. Where ducts are in the floor, and contained within the bottom board, they typically do not leak to the exterior and should be exempt. Again, since no testing requirements are included in this proposal, it is impossible to know the costs or procedures of achieving such levels.

20. DOE requests comment on DOE's interpretation of R403.1 and the proposed updates to the thermostat and controls requirements. In addition, DOE requests comments on whether there are any of the 2021 IECC updates relevant to manufactured housing that should be considered as part of this rulemaking.

MHI believes programmable thermostats should remain an option for the homebuyer.

21. DOE requests comment on DOE's interpretation of R403.5 and the proposed updates to the service hot water requirements. In addition, DOE requests comments on whether there are any of the 2021 IECC updates relevant to manufactured housing that should be considered as part of this rulemaking. Specifically, DOE requests comment on whether the circulating hot water system temperature limit should be included as a requirement.

Circulating hot water systems are not typically used in manufactured homes. Further, 24 CFR 3280 already has provisions for scald prevention that limit the temperature of hot water. Additional requirements would be redundant and unnecessary.

22. DOE requests comment on the proposal to include the 2021 IECC fan efficacy standard requirements. DOE requests comment on whether any of the fan efficacy requirements are not applicable to manufactured homes.

The applicability of the increased efficacy standards would be dependent upon the additional costs associated, and the return on investment of the increased mechanical ventilation requirements.

23. DOE requests comment on whether the HRV and ERV provisions under 2021 IECC for site-built homes are applicable to manufactured homes and whether they would be cost-effective. Specifically, DOE requests comment on costs for the HRV and ERV requirements as it applies to manufactured homes in all climate zones.

HRV's and ERV's would add significantly to the cost of manufactured homes and 24 CFR 3280 already contains provisions for providing fresh air within a manufactured home. HRV's and ERV's are products mainly promoted by those appliance manufacturers and have been found in many cases to increase moisture related problems and increased energy usage, specifically in the southern climates.

24. DOE requests comment on the above ventilation strategies, including (but not limited to) cost, performance, noise, and any other important attributes that DOE should consider, including those related to mitigation measures. While the alternate ventilation approaches are not integrated into the analysis presented as part of this proposal, DOE is giving serious consideration as to whether it should incorporate one or more of these options as part of its final rule based on any additional data and public comments it receives.

HRV's and ERV's would add significant construction costs. If implemented with the furnace, as most current ventilating systems are, significant redesign would be required to increase the size of the furnace compartment to accommodate the additional equipment and ductwork. Currently ventilation strategies in manufactured housing have proven to be efficient and effective for many years. In fact, the current IECC recognizes a process developed and commonly used by the manufactured housing industry as an accepted application in residential and commercial construction.

25. DOE requests comment on the cost-effectiveness and feasibility of requiring R-20+5 for the exterior wall insulation for climate zones 2 and 3 Tier 2/Untiered manufactured homes. DOE also requests comment on the sensitivity analysis for R-21 that would result in positive LCC savings for all cities.

The use of continuous insulation is problematic due to the required changes in design, associated costs, and need for products that don't exist. The increase in unit width due to the addition of continuous foam will require a reduction in the structural floor width equal to the thickness of the insulation. This will require redesign of the chassis system, trusses, and retooling of fixtures and jigs within the plant. Any reduction in interior width, due to increases in exterior width, will eliminate or require significant redesign of many single-wide models that incorporate a bathroom with adjacent hallway that are already at the minimum widths permitted under 24 CFR 3280. Furthermore, standard doors for manufactured homes are designed for overall wall thicknesses of 4- or 6-inches and increasing the thickness will require the use of extension jambs or the development of new products to accommodate increased wall widths. Permitting the use of R-21 only in lieu of R20+5 is necessary.

26. DOE requests comment on the inputs to the conversion cost estimates.

Because the threshold cost is updated annually and because it is assumed that the list price must be updated, the cost to update model plans would be a reoccurring annual cost rather than a one-time cost. This must also be revised so that cost is not a consideration for Tier 2 homes. As currently proposed, the retail price must be determined for all homes to determine if it is above or under the threshold. The Tier 2 definition should not have a threshold price. Instead, a Tier 2 home should be defined as "A manufactured home that is not qualified as a Tier 1 home."

27. DOE requests comment on the shipment breakdown per tier and using a substitution effect of 20 percent on shipments to account for the shift in homes sold to the lower tiered standard. DOE requests comment on whether it should use a different substitution effect value for this analysis – and if so, why. (Please provide data in support of an alternative substitution effect value.)

Currently, very few homes are produced at the Tier 1 level of under $55,000. It is unlikely that additional homes will be manufactured at that level. Instead, MHI expects an overall reduction in the manufacturing and purchase of manufactured homes across the board.

28. DOE requests comment on the calculation of deadweight loss presented above and the extent to which there are market failures in the no-standards case.

Deadweight loss will increase as a result of this proposal, as many potential consumers will be prices out of purchasing a manufactured home.

29. DOE requests comment on the number of manufacturers of manufactured housing producing home covered by this rulemaking.

As of September 2021, there are 138 plants and 34 corporations producing manufactured homes in the country. As a result of this proposed rulemaking, all manufacturers will be negatively impacted.

30. DOE requests comment on the cost to update model plans and the number of model plans to update as a result of the proposed rule; on the types of equipment and capital expenditures that would be necessitated by the proposal; and the total cost of updating product offerings and manufacturing facilities. DOE requests comment on how these values would differ for small manufacturers. DOE requests comment on its estimate of average annual revenues for small manufacturers of manufactured housing.

Because the threshold cost is updated annually and because it is assumed that the list price must be updated, the cost to update model plans would be a reoccurring annual cost rather than a one-time cost. This must also be revised so that cost is not a consideration for Tier 2 homes. As currently proposed, the retail price must be determined for all homes to determine if it is above or under the threshold. The Tier 2 definition should not have a threshold price. Instead, a Tier 2 home should be defined as "A manufactured home that is not qualified as a Tier 1 home."

The DOE analysis assumes the use of 2x8 floor joists in floors with R-30 insulation. Most floors are constructed with 2x6 framing. Insulation thicknesses that exceed 5.5-inches cannot reasonably be assumed in HUD home construction. Based on the amount of the price change in Zone III homes it does not appear that the DOE cost analysis considers the cost of changing 2x6's to 2x8's. Additionally, placing more than R-11 blankets under the floor joists cannot be done without offsetting outriggers and providing blocking between joists. This is necessary because compressing more than R-11 insulation between an outrigger and a joist results in noticeable humps in the floor at each outrigger location. Based on the amount of the price change in Zone III homes, it does not appear that the DOE cost analysis considers the cost of adding blocking between joists.

Further, the DOE cost increases only accounted for the cost of additional material and not the additional labor costs or the additional overhead and profit that would be associated with the higher home cost.

November 10, 2021

The Honorable Jennifer M. Granholm
Secretary
U.S. Department of Energy
1000 Independence Ave. SW
Washington, DC 20585

Re: Energy Conservation Program: Energy Conservation Standards for Manufactured Housing (EERE-2009-BT-BC-0021)

Dear Secretary Granholm,

The Manufactured Housing Institute (MHI) is pleased to provide comments to the Department of Energy (DOE) in response to the supplemental notice of proposed rulemaking titled "Energy Conservation Program: Energy Conservation Standards for Manufactured Housing." While we appreciate DOE listening to the feedback it has received and providing updated data and analysis, as well as extending the comment deadline, the proposed rule is still not workable for the manufactured housing industry and homebuyers seeking affordable homeownership.

MHI is the only national trade association that represents every segment of the factory-built housing industry. Our members include home builders, suppliers, retail sellers, lenders, installers, community owners, community operators, and others who serve the industry, as well as 48 affiliated state organizations. In 2020, our industry produced nearly 95,000 homes, accounting for approximately nine percent of new single-family home starts. These homes are produced by 33 U.S. corporations in 138 plants located across the country. MHI's members are responsible for close to 85 percent of the manufactured homes produced each year.

To be clear, MHI and its members have always supported energy conservation efforts and other reasonable environmental protection initiatives, and we will continue to do so. Not only are new factory-built homes as efficient as their site-built counterparts, but in 2020, more than 30 percent of new manufactured homes were built to meet or exceed Energy Star standards. Further, today's manufactured homes already offer many energy efficient options. Just like site-built homes, manufactured homes are constructed and fitted with energy efficient features that are tailored to the climate demands of the region in which each home will be sited.

Today's manufactured homes already consume significantly less energy than site-built homes. According to the U.S. Energy Information Administration (EIA) "most energy end-uses are correlated with the size of the home. As square footage increases, the burden on heating and cooling equipment rises, lighting requirements increase, and the likelihood that the household uses more than one refrigerator increases. Square footage typically stays fixed over the life of a home and it is a characteristic that is expensive, even impractical to alter to reduce energy consumption."[1] According to the U.S. Census Bureau, the median size of a completed single-family house in 2020 was 2,261 square feet, while the median size of a manufactured home was 1,338 square feet. The significant difference is size correlates with a significant reduction in energy usage. A study of residential energy consumption showed that manufactured homes consume the least energy of all types of homes, at 59.8 million BTUs per household, compared to 94.6 million BTUs for single family

[1] https://www.eia.gov/consumption/residential/reports/2009/square-footage.php

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detached homes and 70 million BTUs for townhomes[2].

Further, the controlled environment of the factory-built process not only offers consumers unmatched quality and affordability due to technological advancements and other advantages, but the industry is a pioneer in the development of processes that value efficiency and reduce waste. Our in-factory home builder members are constantly developing new initiatives and technologies, such as comprehensive recycling programs, to reduce waste. The factory-built process utilizes exact dimensions and measurements for most building materials, eliminating waste. Today's modern manufacturing plants are so efficient that nearly everything is reused or recycled such as cardboard, plastic, carpet padding, vinyl siding, scrap wood and much more.

The proposal provided by the DOE will add costs to manufactured homes, which are currently the most affordable, unsubsidized homeownership option for American families. Any increase in construction costs, even modest increases in response to a new energy conservation standard, could jeopardize homeownership for hundreds of thousands of Americans at time when there is an affordable housing shortage in the country. As currently drafted, the proposed rule would:

- Contradict the objectives of the Administration's January Executive Order on "Advancing Racial Equity and Support for Underserved Communities" and undermine the Administration's September initiative to "Increase Affordable Housing Supply."

- Significantly raise the cost of new manufactured homes by an average of $3,914 to $5,200 for most new manufactured homes with an estimated cost increase of over $7,000 for a multi-section home located in climate zone 3 – without including the costs of energy testing or compliance (Tier 2 Standard) – thereby exacerbating homeownership affordability challenges in the wake of the recent escalation of home prices.

- Fail the statutory requirement of being cost effective, by increasing the cost of owning a new manufactured home by more than claimed energy savings.

Thus, MHI makes the following comments and recommendations regarding the proposed rule:

1. The proposed energy standards fail the Energy Independence and Security Act of 2007 (EISA) statutory requirement to use the International Energy Conservation Code (IECC) "except in cases in which the code is not cost effective or a more stringent standard would be more effective, based on the impact of the code on the purchase price of manufactured housing and on total life-cycle construction and operation costs." The result is manufactured housing will be less affordable, due to large increases in home sale prices and operating cost increases that exceed energy savings.

2. The $55,000 or $63,000 low-income price cap threshold for streamlined energy efficiency requirements should be eliminated or significantly increased to at least $110,260. Further, if it proceeds with a tiered approach. the DOE must seriously consider, as it is doing in its updated data and analysis, an alternative approach such as square footage or sections Not doing this would result in DOE failing to accomplish its stated goal of protecting low-income homebuyers from steep price increases resulting from the new standards.

3. The proposed energy standards are inappropriate for the manufactured housing industry as they do not take into consideration the current construction methods, transportation demands and short on-site completion duration unique to manufactured housing. Further, they do not include testing requirements or compliance and enforcement provisions.

[2] ce1.1.xlsx (eia.gov)

4. The proposed energy standards were developed without complying in any meaningful way with the EISA statutory requirement to consult with HUD - resulting in proposed standards that ignore the construction aspects unique to manufactured housing or the negative impact on homebuyer affordability. Further, DOE ignored the primacy of manufactured housing construction standards established under the 2000 Manufactured Housing Improvement Act.

5. The proposed energy standards ignore the large number of homebuyers that will no longer be able to buy a manufactured home, because they no longer qualify for an FHA, GSE, or non-agency mortgage loan, due to the impact of increased mortgage payments on debt-to-income ratios.

Detailed below is a summary of MHI's recommendations, along with several Appendixes that explain in more detail our concerns as follows:

- Appendix I – MHI's Cost Benefit Analysis
- Appendix II – MHI's Comments on the DOE Rule's Proposed Changes by Section
- Appendix III – MHI's Responses to Issues on Which the DOE Requests Comment

SUMMARY OF MHI'S RECOMMENDATIONS

1) The DOE Proposed Rule Fails Statutory Requirement Not to Use IECC Code When Not Cost Effective

One of the tenets of the National Manufactured Home Construction and Safety Standards Act (NMHCSS Act) is the importance of ensuring that manufactured housing remains an affordable housing option for all consumers considering homeownership. It also states that energy conservation standards for manufactured homes must "ensure the lowest total construction and operating costs" and be cost-effective. Echoing that language, EISA requires that "energy conservation standards established under this section shall be based on the most recent version of the International Energy Conservation Code (including supplements), except in cases in which the Secretary finds that the code is not cost effective, or a more stringent standard would be more cost effective, based on the impact of the code on the purchase price of manufactured housing and on total life-cycle construction and operating costs."

Increasing the costs of manufactured homes could jeopardize homeownership for millions of Americans at a time when there is an affordable housing shortage. This increased will have a disproportionate impact on minority communities, who face the most significant burden in obtaining affordable homeownership. This would be in direct contract to the Administration's goal of achieving racial equity in homeownership.

Use of the IECC is Not Appropriate

While the IECC is respected in the construction industry, it was developed over many years for utilization in both site-built residential homes and commercial buildings. Although EISA directs the DOE to establish energy conservation standards for manufactured housing based on the most recent version of the IECC (unless it is found to be not cost effective) to date, no state has adopted the 2021 IECC standards and the vast majority of states are using amended versions of the 2009, 2012 or 2015 IECC, with 19 states using the 2021 IECC or an earlier version as their state's energy code for site-built homes.

The IECC was never intended nor designed to be implemented in the manufactured housing sector. Given that the IECC essentially ignores all the construction aspects unique to manufactured housing, it is an inappropriate code for attempted enforcement upon the manufactured housing industry and could potentially cause factory closures, the loss of thousands of jobs, and an immediate affordable housing crisis for one of the largest sectors in the housing market. Because the IECC was not designed for manufactured housing, it is NOT a cost-effective standard, which is why its use does not result in a cost-effective change to energy standards.

First, the higher home cost associated with the proposed standards will make manufactured housing far more expensive excluding potential buyers and reducing total manufactured housing sales, the latter hurting

the industry and contributing to the lack of affordable housing. Second, if households are fortunate enough to qualify for a home that meets the new standards, the home they get will be more, not less, expensive to own. This is all but guaranteed by the method DOE used in conducting the Life Cycle Cost (LCC) analysis which demonstrates why the IECC not an appropriate building code for manufactured homes.

DOE Proposal Uses Incorrect Calculations and Methodologies

DOE's own analysis shows the proposal will increase costs for buyers without reciprocal energy savings, and many households will simply be priced out of homeownership due to this proposal. One of the major inputs to a LCC analysis is estimated cost savings. As noted in DOE's Technical Support Document, using sample homes (single- and multi-section), DOE estimated energy savings by comparing homes, in select locations, built to the current, relatively easy to meet HUD energy standards with homes meeting the IECC. As expected, there is a huge difference in energy use (and estimated energy costs) between these benchmarks. The large savings suggests that a whole lot of investment in energy measures can be justified, particularly if the savings are accumulated over 30 years which is an artificial construct. If, conversely, DOE had started with a baseline less than the current HUD standards (e.g., zero insulation, leaky building, etc.) a 30-year LCC would show enough savings to justify building such an energy efficient home. But that is because energy improvements have diminishing returns and today's manufactured homes are already energy efficient.

Every step in making homes more energy efficient costs more and saves less. Most of the savings comes from the first few measures to improve performance. For example, adding R-5 insulation to a wall that is R-10 saves more energy than adding the same amount of insulation to a wall that is already R-20, but costs the same). If you are aiming to optimize investment (i.e., find the lowest combination of construction and operating costs) the proper way to do the analysis is by examining each incremental improvement in efficiency, individually. Each improvement in performance must be cost justified and stand on its own. Once an energy measure begins to result in negative returns, you stop adding any additional measures. DOE did not do this in its analysis, even though the Department developed and promotes a Building Energy Optimization Tool that uses this incremental approach to find the optimum investment. By combining all the energy measures together into a single figure, the slim benefits of adding the last, least cost-efficient measures, is subsumed in and masked by the benefits of adding the first, most cost-effective measures. Even based on a 30-year perspective, the optimum investment, representing the minimum total of construction and operating cost, is less stringent than the 2021 IECC 2021.

Further, the DOE's proposal is based on improper calculations and methodologies including underestimating the current costs of homes and the costs of the new materials to construct them, and not considering the cost of testing procedures and compliance. The DOE also significantly underestimates the fact that the first buyer of an energy efficient manufactured home would likely never reap the economic benefit. Based on MHI's industry data, buyers usually sell their homes within seven to ten years of purchase, and it is unlikely that a manufactured homebuyer financing the purchase of a new manufactured home would even recover these upfront costs at a future sale. Consequently, as result of the DOE's proposal, homeowners will not realize incremental value for energy features that increase a home's purchase or sale price.

At the efficiency levels proposed by the DOE in its recent rulemaking, MHI's survey of manufacturers found that it is unlikely that a buyer purchasing a new home and financing 90 percent of the purchase price would even recover these upfront costs at a future sale. Instead, the DOE's proposal would likely yield a negative return over the ownership period. While several reasons contribute to this, including purchase price and availability of financing options, the fact that homebuyers usually sell their homes within the first seven years of purchase is the most relevant.

Using the DOE's assumptions of cost and location as outlined in the Technical Support Document, which assumes a 30-year mortgage which is not the norm for manufactured housing, MHI conducted a cost-benefit analysis using more realistic financing options that are being utilized in the market today. Assuming a down-payment of 10 percent, an interest rate of nine percent – which is at the high end of today's mortgage rates – a loan term of 20 years, and a tenancy period of 10 years, MHI's cost-benefit analysis found that the

DOE's proposal will add at a minimum almost $1,000 to the cost of a new single-section manufactured home and up to $5,500 to the cost of a multi-section home depending on location (See Appendix I). Such a price increase would be financially devasting for homebuyers looking to finance the purchase of a manufactured home.

It is important to note that only place that MHI's analysis shows a savings is in Fairbanks, Alaska, where the savings is only $369 after ten years. In 2020, Alaska had only 64 homes shipped to the state and as of July 2021 only five homes been shipped there. Further, the locations selected by the DOE for its analysis are not locations where manufactured housing is prevalent.

Given these facts, any new energy conservation standard must avoid creating a scenario where the upfront increase to the purchase price of a home prices many consumers out of the market, even if those upfront costs could be amortized over the duration of the homeowner's tenancy and recouped over time.

2) <u>The DOE Proposal Failed to Accomplish its Stated Goal of Protecting Low-Income Homebuyers from Steep Price Increases</u>

Using a tiered system based on price shows a fundamental lack of understanding of the factory-built process. There is no manufacturer's suggested retail price for manufactured homes. Home price is determined by the retailer based on the home features selected by the consumer. The approval for floor design and layout with respect to Code requirements are made regardless of those selections, and long before the consumer has made them. Requiring approval of every floorplan AFTER consumer choices are made determining the price, would mean each and every individual house would have to be approved separately – adding astronomical costs to the process and slowing down the line so as to remove all efficiencies. If a tiered system based on price is used, the price point in Tier 1 must be significantly increased to better reflect the costs of today's manufactured homes.

According to National Association of Homebuilders' data, new home buyers have an average income of $101,811. In contrast, the median annual household income of a manufactured home buyer is only $33,000. Manufactured homes are clearly more affordable, serving homebuyers with much lower incomes.

The proposed rule creates two tiers, based on whether the manufacturer's retail list price is below $55,000 (or $63,000) or not. The rule estimates that the new energy requirements will raise prices in Tier 1 by an average of $663 for a single-section unit and $839 for a multi-section unit. The rule estimates that the average price increases for homes in Tier 2 are more than six times higher - $3,914 for a single-section unit and $5,289 for a multi-section unit.

In the section "Development of the Current Proposal," the rule states that Tier 1 was established to protect "low-income buyers." However, the $55,000 or $63,000 threshold is arbitrary, and it excludes significant numbers of low income manufactured homebuyers, using HUD metrics. The result is that DOE completely failed in their stated goal of shielding low-income homebuyers from price increases.

The HUD national median income for a 4-person family is $79,900. HUD defines a "low-income" family as a family making 80 percent or less of median income which would be $63,920. Further, HUD defines a "very low-income family" as a family making 50 percent or less of median income which would be $39,950.

Additionally, HUD defines housing for lower income families as "affordable" when the family pays no more than 30 percent of their income for housing. However, in practice, that ratio is much higher for most families. Nevertheless, consider a new home at $110,260 – more than twice DOE's proposed Tier 2 threshold. Assuming an 8 percent mortgage rate on a typical 15-year manufactured home, the monthly cost for mortgage, property tax, and rent would be $1,236. Thus, a low-income family could buy a $110,260 manufactured home and only pay 23.6 percent of their income for housing – well below the HUD standard for being "affordable."

Second, consider a "very low-income family" at the top of that income range. On a $110,260 home, a very low-income family would pay 34 percent of their income for rent. This is only slightly above HUD's ideal

benchmark of 30 percent. Moreover, it is well below FHA's 43 percent Debt to Income (DTI) requirement for a mortgage.

Thus, DOE's arbitrary $55,000 or $63,000 cutoff – whose stated purpose is to protect low-income families – does not protect significant numbers of low-income families – or even significant numbers of very low-income families.

MHI's analysis for using $110,260 as the cutoff price for Tier 1 is based on an extensive rulemaking conducted by the Consumer Financial Protection Bureau (CFPB) on is Qualified Mortgage (QM) rule. The CFPB selected this $110,260 threshold to give loans below this level more protections including more flexibility on permissible points and fees. While this is not a perfect analogy, MHI is using this metric to illustrate how arbitrary and unreasonably low the $55,000 or $63,000 Tier 1 level is.

MHI requests that the Tier 1 threshold be raised to at least $110,260, and potentially higher, based on a more detailed analysis along the lines of what we presented just above.

3) <u>The DOE Proposal Fails to Consider the Design and Construction Standards of Today's Manufactured Homes and Does Not Include Testing and Compliance Requirements</u>

Manufactured housing is the only form of housing regulated by a federal building code. Unlike site-built homes, which are subject to different state and local regulations, manufactured homes are built to one uniform federal code, the Manufactured Home Construction and Safety Standards Act of 1974 (i.e., the HUD Code). The HUD Code's single regulatory framework for home design and construction includes standards for health, safety, energy efficiency, and durability.

DOE's proposed rule seeks to use the IECC to make changes related to the building thermal envelope; air sealing; installation of insulation; duct sealing; heating, ventilation, and air conditioning (HVAC); service hot water systems; mechanical ventilation fan efficacy; and heating and cooling equipment sizing for manufactured homes. As proposed, many of these changes conflict with current HUD Code requirements and no direction is given as to how the two differing standards should be integrated which will result in complicated, overlapping requirements that will only increase manufacturing costs, hurting existing homeowners and prospective homebuyers.

The proposed changes to the manufactured housing energy conservation standards contain requirements that raise potential issues with certain components and materials currently being used in the production of today's manufactured homes. Below are just a few examples of how the proposed changes conflict with current manufacturing processes.

<u>Insulation</u>

Manufacturers are currently using R-11 for most of the insulation which is predominantly used in the walls and floors for Zones 1 and 2. Further, manufacturers typically prefer to use two layers of R-11 if they need more insulation in the floors. However, the current proposed changes do not use R-11 but rather the lowest insulation value used is R-13. Therefore, this may cause a supply issue for the manufacturers that have ramped up to supply large quantities of R-11. The same supply issue will be present for R-20 and R-19, which is currently not used in large quantities. Further, it will be difficult to source a material to use as the R-5 continuous exterior insulation that will meet the requirements of the proposed changes as well as the current HUD code. Section 3280.504 has requirements for the perm rating of the exterior wall assemblies. The perm ratings of the rigid foam may also lead to redundant vapor barriers and stud cavities that may not breath properly. This is a potential area where the proposed changes and the current HUD code may have a conflict.

<u>Duct Systems</u>

Section 460.104 of the proposed changes states that duct system register boots that penetrate the thermal envelope of the air barrier must be sealed to the subfloor. However, in manufactured homes with the heat ducts installed in the belly of the home, there is no need to seal the duct registers and boots to the sub-

floor because they are installed within the thermal envelope. The Table 406.103 states that access hatches, panels, and doors between conditioned space and unconditioned space must be insulated to a level equivalent to the insulation of the surrounding surface. However, this requirement does not seem to be consistent with the discussion around exterior doors in the earlier section of the proposed standards.

Section 460.201 also states that total duct leakage must be limited to four cubic feet per minute. However, with homes where the duct system is installed in the belly, any duct leakage that may occur is still within the thermal envelope of the home. Further, the required testing for the duct leakage limitation is also unknown at this time and therefore has not been included in the DOE cost analysis.

Thermostats

Section 460.202 states that any thermostat installed by the manufacturer must be programmable. It has been the observation, that many of the current homeowners do not use these thermostats correctly or have them replaced with a simpler version. Based on current observations, the programmable thermostat is not perceived as "providing value" to the current consumer and should not be mandated.

ACCA Manual S and ACCA Manual J

Section 460.205 states that heating and cooling equipment shall be sized using the ACCA Manual S and the ACCA Manual J. ACCA Manual J analysis requires knowledge of the orientation of the home with respect to the sun for cooling load analysis. Because the orientation of the home is often unknown until installed, the proposed rule must establish a default orientation. ACCA Manual S establishes sizing limits for heating and cooling equipment, these limits presume that thermal loads are established for a specific location and specific building orientation. The variation in design parameters within a single thermal zone exceeds the sizing limits of ACCA Manual S. The proposed rule must establish alternate criteria for using ACCA Manual S where the design parameters vary within a thermal zone.

Transportation challenges

Several of the proposed changes in the rule focus on changes to the building thermal systems which will affect the overall shipping height and width of a home. By increasing the truss heel height, increasing floor joist depth, and adding insulation outside of the studs, the overall shipping envelope will change. In some cases, this change could be significant. For example, the additional height could prevent shipping a home into an area of the country with low bridges resulting in consumers having to settle for a different style of home, or more than likely, being forced out of the housing market due to a lack of affordable housing. Further, an additional escort or pole car may be required to accompany the home that goes beyond maximum width or height, which could add thousands of dollars to the price of the home for the consumer.

Current Construction Requirements and Climate Zones

As described in DOE's rulemaking, the proposed climate zones were consistent with the climate zones currently used in the HUD Code. Because the new and existing climate zones remained consistent, MHI was able to compare the current construction requirements and future construction requirements. While performing the thermal analysis of the prototypical homes that were presented in the Technical Support Document, MHI observed several issues in the four different categories as outlined below:

- **Tier I Prescriptive Requirements**
  Based on the calculations that MHI performed, it appears that the Tier I prescriptive requirements represent a modest upgrade to the current HUD Code requirements and would require only minor changes from homes currently being constructed today. H

- **Tier 2 (Untiered) Prescriptive Requirements**
  The Tier II requirements represent significant changes over the current HUD Code and will be more of a challenge to implement in a cost-effective manner.

Tier 2, Zone 1
Table III.8 lists the exterior ceiling insulation as R-30. Due to the thicker insulation in the ceiling, the proposed code states that a 5.5" truss heel height would be required. This change in the truss profile will affect the overall shipping height of the home unless other conciliatory changes are made.

Tier 2, Zone 2
Table III.8 lists the exterior ceiling insulation as R-30., which is the same issue as Zone I. Further, Table III.8 lists the exterior wall insulation as R-20+5, which represents R-20 in the walls and a continuous R-5 on the exterior of the studs. The requirement of R-20 in the exterior wall will force the sidewall to 2x6 construction resulting in the following:

- The installation of the exterior insulation will be more costly for the manufacturers to install. The overall cost of the home will be higher from the increased material costs, but also the increased labor costs.
- The exterior insulation will also require most plants to re-work the production stations to allow time for this installation.
- The exterior insulation will also create an additional problem for fastening the exterior finish siding. The siding would now have to be fastened thru the exterior insulation, and currently there are no approved fasteners to penetrate thru the 1" exterior insulation. These fasteners would also to support the siding during transportation.
- Windows and doors will need to be installed on framed extensions to pack out nailing surfaces to the thickness of the continuous R5 insulation
- Continuous flashing may be required at the bottom edge of the rigid insulation layer to protect from exposure to weather and infestation
- The extra thickness of insulation on the exterior wall would either increase the shipping width or decrease the habitable space on the interior. For houses currently designed to maximize the legal shipping width, there is no additional width available on the exterior. Therefore, the space for the exterior insulation on these homes would have to be taken from the interior of the home.

Table III.8 also lists the exterior floor insulation as R-19. Currently, most manufacturer's use a blanket insulation for the floors. However, the lack of availability of R-19 in the blanket style could cause issues for this requirement or force further production changes to accommodate other styles of insulation.

Tier 2, Zone 3
Table III.8 lists the exterior ceiling insulation as R-38. This depth of insulation will be difficult to achieve on lower sloped roofs and cathedral style truss profiles. This insulation requirement could cause some home options to become unavailable for the consumer.

Further, Table III.8 lists the exterior wall insulation as R-20+5 which is the same issue we expressed concerns about above in Tier II Zone 2.

Table III.8 also lists the exterior floor insulation to be R-30. According to the Technical Support Document, the floor joist will need to be 2x8 when any insulation equal to or over R-30 is used. This change will be more costly than just the insulation if the entire floor system must go to 2x8. This increased joist depth would also further impact the shipping the issue by making the home 2" taller. The availability of R-30 insulation in a blanket style may be an issue in meeting this requirement or force further production changes to accommodate other styles of insulation.

- **Tier 1 Performance Requirements**
  Based on the calculations that MHI performed, it appears that the Tier I performance requirements also represent a modest upgrade to the current HUD Code requirements and would require only minor changes from homes currently being constructed today.

- **Tier 2 (Untiered) Performance Requirements**

  The Tier II requirements represent significant changes over the current HUD Code and will be more of a challenge to implement in a cost-effective manner. These values represent a significant change from the current HUD Code and will require many changes to the current home construction. Because this part of the changes is listed as "performance," there are multiple pathways to try and achieve the listed overall U-factor.

  Tier 2, Zone 1

  The overall U-factor listed in Table III.12 is 0.086 for single- and 0.082 for multi-section homes. Based on the calculations MHI performed on prototypical homes, the proposed Zone 1 requirements can be met with upgraded insulation and upgraded windows.

  Tier 2, Zone 2

  The overall U-factor listed in Table III.12 is 0.062 for single- and 0.063 for multi-section homes. Based on the calculations MHI performed on the prototypical homes, the proposed Zone 2 requirements would require upgraded insulation, 2x6 wall construction, upgraded windows, and taller truss heel. MHI also found that this overall U-factor requirement was more difficult to meet as the homes became smaller.

  Tier 2, Zone 3

  The overall U-factor listed in Table III.12 is 0.053 for singles and 0.052 for multi-section. Based on the calculations MHI performed on the proto-typical homes, we were not able to satisfy the overall U-factor requirements using common options that are available to most manufacturers. Further, MHI found this became even more difficult to achieve as the homes became smaller. Upgrading insulation, 2x6 exterior walls, deeper trusses, deeper floor joists, and upgraded windows did not lower the overall U-factor enough to meet the value in the Table III.12. For the calculations that MHI performed, we did not evaluate the addition of continuous exterior insulation due to the installation and transportation issues involved with this product.

Compliance, Enforcement and Testing

Testing requirements for each of the systems being modified in the proposal are not included and must be addressed before any rule is published. Determining the impact of a system change without knowing the testing parameters is impossible, especially in response to specific metrics like "§460.201 Duct system." For example, the proposed rule requires testing of air handlers and filter boxes. However, manufactured homes often utilize uncased evaporator coils (a-coils) that prevent the air handler from being readily tested. Oftentimes, it is necessary to temporarily remove the air handler in order to test the duct system for leakage due to the difficulty sealing the air handler.

For multi-sectional units where ductwork is installed on-site, the rule does not establish enforcement procedures for testing. More specifically, what qualifications are required for those performing the testing? Can installers certify their own work? What training is required for installer personnel performing this work? How are the test results documented? Is the installer responsible for any remedial work that may be required after the testing is performed?

If testing is required to be performed by a third-party or in cases where the installer is not capable of performing the testing, the additional cost of testing could $600 or more. For Tier 1 homes this nearly doubles the cost increase for single wide construction and increases the installed cost by more than 50-percent for double wide homes. This cost was not considered in the DOE purchase price increase analysis performed. DOE must not propose a rule without including the required testing requirements, so any analysis can include the true impact.

Further, the proposed rule does not include compliance and enforcement provisions which DOE says it will address at a later date. MHI believes it is unnecessary for the DOE to develop a new

enforcement mechanism with any proposed manufactured housing energy conservation standard because the HUD Code is an already-established enforcement mechanism that mandates a uniform standard for design, construction, and installation, including federal requirements for safety, durability, and energy efficiency. Failure to partner with HUD would result in complicated, overlapping requirements that will only increase manufacturing costs, hurting existing homeowners and prospective homebuyers.

4) <u>The DOE Proposal Fails to Comply with the Statutory Requirement to Consult with HUD</u>

Because the DOE has no real expertise, knowledge, or understanding of housing and home financing, EISA required the Department to consult with HUD in developing these new energy requirements. However, to our knowledge, DOE has made no discernible effort to consult with HUD, and by extension FHA and the Manufactured Housing Consensus Committee (MHCC), in any meaningful way. While DOE provided detailed justifications for the new energy requirements in the narrative for the proposed rule, the Department offered no evidence that it utilized any of HUD's housing expertise that could have led to a more informed rulemaking.

This is not an insignificant failure. This lack of consultation with HUD shows up in several critical areas that reflect a complete failure to consider the realities of buying and owning a manufactured home. First, the establishment of an artificially low $55,000 (or $63,000 Tier 1 for low-income families completely ignores the reality that much higher home prices are affordable to "low-income families" (as defined by HUD) – and even HUD-defined "very low-income families" qualify for a loan twice as large. The use of a three percent discount rate is wildly inappropriate for chattel manufactured homes, which lack access to federal agency mortgage loans, and is measurably lower than actual mortgage and other price-related increased costs of real property manufactured home loans. This fatally undermines DOE's contention that the new requirements result in net savings to homeowners and results in a real-world impact that punctures any DOE contention that it complied with EISA's statutory cost effectiveness requirement. Further, failure to consult with FHA completely ignores the meaningful percentage of homebuyers that will no longer qualify for an FHA, Fannie Mae, Freddie Mac, or non-agency mortgage loan because of significantly increased home prices that even DOE acknowledges in the proposed rule will price consumers out of the housing market. Additionally, DOE's failure to consult with HUD also ignores the primacy of the HUD Code with respect to safety and construction standards.

The NMHCSS Act states "the Federal manufactured home construction and safety standards established by HUD shall include preemptive energy conservation standards."[1] Further, EISA mandates that the DOE must consult with HUD, which may seek further counsel from the MHCC, when it comes to developing energy conservation standards for manufactured housing.[2] Additionally, any updated energy conservation standard that the DOE proposes should take into consideration the unique design and factory construction techniques specific to manufactured housing.[3]

Because of these mandates, the DOE must first consult with HUD and the MHCC to assess the economic impact that a new energy conservation standard will have on manufactured housing homeownership. The DOE and HUD should then work together to develop the standard, as well as an efficient and practical implementation strategy that HUD will enforce.

Similar, to the 2016 proposed rule, the DOE did not work with HUD or the MHCC before it drafted its proposed rule. Further, the MHCC was only given a preview of a small portion of the proposed rule approximately two months before it was published, which raised many concerns amongst its members and the public to both the affordability and feasibility of what was presented. Because DOE did not work with HUD on these proposed changes, the proposed rulemaking is resulting in complicated, overlapping requirements that will increase manufacturing costs, hurting existing homeowners and prospective homebuyers.

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[1] 42 U.S.C. § 5403(g)(1).
[2] *Id.* at 17071(a)(2)(B).
[3] *Id.* at1 7071(b)(2)(A).

5) The DOE Proposal Does Not Consider How These Changes Will Make Homebuyers Unable to Obtain Financing

EISA requires the energy standards be based on the IECC Code "except in cases in which the code is not cost effective or a more stringent standard would be more effective, based on the impact of the code on the purchase price of manufactured housing and on total life-cycle construction and operation costs."

Thus, the statute explicitly requires that the cost effectiveness standard be based on the impact on the purchase price. Yet, there is no consideration in the entire narrative of the proposed rule that any consideration was given to the impact of price increases, which the rule acknowledges range from $3,914 to $5,289 for most homes in Tier 2, on a potential homebuyer's ability to buy a home in the first place. Put simply, all the pages and pages of theoretical savings in the rule are meaningless if the price increase causes the homebuyer to no longer qualify for a mortgage loan, because they no longer meet Debt to Income (DTI) underwriting requirements.

An increased home purchase price will result in a proportionate increase in the debt burden. FHA's customary DTI requirement is 43 percent. Therefore, any homebuyer at the edge of this 43 percent DTI requirement will no longer qualify for an FHA loan because of the higher price caused by the new energy standards. And, for example, a homebuyer at a 41 percent DTI ratio that would have more easily qualified for a loan, will now be just over the permitted DTI.

Additionally, the proposed rule includes no real consideration of the impact of the increased down payment that will result from the new energy requirements. Based on the average home price increases ranging from $3,914 to $5,200 that the rule projects for Tier 2 homes, and based on an assumption that a homebuyer must make a down payment of 10%, the energy requirements will raise down payment requirements on new manufactured homes by an average of from $391 to $520. For the low- and moderate-income homebuyers that makes up the bulk of the manufactured home purchase market, this is a not insignificant amount.

Further, the analysis on the impact of the rule is fundamentally marred by a discount rate ranging of three percent to seven percent for computation of future projected energy savings. The impact of significantly understating the discount rate is that it significantly overstates the net savings to the manufactured homebuyer. Higher home prices (e.g., ranging on average from $3,914 to $5,200) for most manufactured homes that are in Tier 2 directly translates into higher mortgage amounts and higher property taxes related to the increased home purchase price.

Mortgage rates on personal property (chattel loans), where the manufactured home is not permanently attached to land, comprise 78 percent of new manufactured home purchases. These loans are currently in the nine percent range, and mortgage rates on real estate loans, where the manufactured home is attached to the land, are in the range of four percent. Assuming a one percent property tax rate on the higher cost, DOE should have used a much higher discount rate, of around ten percent for personal property/chattel loans. This result in that DOE significantly overestimating the homebuyer benefits from the new energy requirements.

While it is difficult to quantify this the percentage of individuals that will no longer qualify for a mortgage loan because of the higher purchase price resulting from the new energy standards, it will clearly result in some percentage of previously eligible homebuyers that will no longer be able to buy a home. It is disturbing that the DOE narrative on the rule did not even consider this factor in assessing compliance with the requirement to deviate from using the IECC based on whether standards are cost effective with respect to impact on purchase price.

Conclusion

While MHI and its members will always support sensible conservation efforts, the overly burdensome regulations proposed by DOE will price many consumers out of homeownership. This increase will have a disproportionate impact on minority communities, who face the most significant burden in obtaining affordable homeownership and would be in direct contrast to the Administration's goal of achieving racial equity in

homeownership. It also contradicts the Administration's goal of increasing manufactured housing development in order to address the lack of affordable housing supply.

Further, the proposed rule demonstrates a profound lack of understanding of the factory-built process for constructing manufactured homes and a lack of knowledge about the existing HUD Code standards. It also lacks information about testing and enforcement, which makes any true cost analysis challenging and incomplete. All costs imposed by the proposed rule must be factored, and enforcement and testing are parts of that cost. Finally, the proposal has a fundamental misunderstanding of housing affordability and the fact that most manufactured homes are currently affordable for even low-income individuals.

MHI stands ready to work with DOE and HUD on the development of realistic and achievable energy standards that not only encourages innovation and conservation, but also eliminates regulatory barriers that impede consumer access to safe, affordable manufactured housing.

Sincerely,

Lesli Gooch, Ph.D.
Chief Executive Officer

Appendix I – Cost Benefit Analysis

The tables below provide Life Cycle Cost results for the DOE proposed rule. The figures offer a glimpseof the benefits and costs for a homebuyer purchasing either a single or two section home. The inputs forlocation selection, average home cost, increase in home cost related to the energy investment and resultantmonthly energy savings match DOE's assumptions contained in the Technical Support Document (TSD).The table sums the major costs and benefits as experienced by the buyer over a 10-year, average occupancyperiod to yield a net benefit (cost) including incremental mortgage payment, added down payment and monthly energy savings. A negative value indicates that the buyer can expect to lose money on the energyinvestment making the home less affordable. For example, a purchaser of a single section home in Phoenix,AZ, can on average expect to experience a net cost of nearly $4,900 over the 10-year period of occupancy.Other assumptions made in generating the tables are provided below. Note: all figures are expressed in current dollars. Further, it is assumed that the buyer does not realize an incremental price increase associated with the energy measures at the time of sale, an assumption that is based on a lack of evidencethat energy features can demand a higher home price.

Assumptions

Down payment	10%
Principal	90%
Mort. interest rate	9%
Loan term (yrs)	20
Occupancy term (yrs)	10
Principal recapture rate	0%

			Single Section Home									
HUD Standards Climate Zone	**Sample Locations**	**Average home cost (DOE)**	**Increase in home cost (DOE)**	**Percent increase in cost**	**Down payment**	**Inc. in mortgage**	**Inc. monthly mort. pay.**	**Energy savings ($/mth) (DOE)**	**Net Mthly. Savings/ Cost**	**Principal repayment**	**Net benefit (cost)**
1	Miami	$57,300	$2,574	**4.5%**	$257	$2,317	$21	$20	($1)	$1,646	**($2,010)**
1	Houston	$57,300	$2,574	**4.5%**	$257	$2,317	$21	$24	$3	$1,646	**($1,493)**
1	Atlanta	$57,300	$2,574	**4.5%**	$257	$2,317	$21	$29	$8	$1,646	**($891)**
1	Charleston	$57,300	$2,574	**4.5%**	$257	$2,317	$21	$26	$5	$1,646	**($1,340)**
1	Jackson	$57,300	$2,574	**4.5%**	$257	$2,317	$21	$28	$7	$1,646	**($1,048)**
1	Birmingham	$57,300	$2,574	**4.5%**	$257	$2,317	$21	$27	$7	$1,646	**($1,106)**
2	Phoenix	$57,300	$4,820	**8.4%**	$482	$4,338	$39	$28	($11)	$3,081	**($4,897)**
2	Memphis	$57,300	$4,820	**8.4%**	$482	$4,338	$39	$32	($7)	$3,081	**($4,432)**
2	El Paso	$57,300	$4,820	**8.4%**	$482	$4,338	$39	$30	($9)	$3,081	**($4,658)**
2	San Francisco	$57,300	$4,820	**8.4%**	$482	$4,338	$39	$23	($17)	$3,081	**($5,543)**
2	Albuquerque	$57,300	$4,820	**8.4%**	$482	$4,338	$39	$30	($9)	$3,081	**($4,666)**
3	Baltimore	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$33	($4)	$2,978	**($3,967)**
3	Salem	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$26	($12)	$2,978	**($4,892)**
3	Chicago	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$34	($4)	$2,978	**($3,930)**
3	Boise	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$28	($10)	$2,978	**($4,605)**
3	Burlington	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$35	($3)	$2,978	**($3,812)**
3	Helena	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$36	($2)	$2,978	**($3,686)**
3	Duluth	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$49	$11	$2,978	**($2,144)**
3	Fairbanks	$57,300	$4,659	**8.1%**	$466	$4,193	$38	$69	$32	$2,978	**$369**

			Multi Section Home								
HUD Standards Climate Zone	**Sample Locations**	**Average home cost (DOE)**	**Increase in home cost (DOE)**	**Percent increase in cost**	**Down payment**	**Inc. in mortgage**	**Inc. monthly mort. pay.**	**Energy savings ($/mth) (DOE)**	**Net Mthly. Savings/ Cost**	**Principal repayment**	**Net benefit (cost)**
1	Miami	$108,500	$4,143	3.8%	$414	$3,729	$34	$33	($1)	$2,648	**($3,134)**
1	Houston	$108,500	$4,143	3.8%	$414	$3,729	$34	$40	$6	$2,648	**($2,313)**
1	Atlanta	$108,500	$4,143	3.8%	$414	$3,729	$34	$48	$15	$2,648	**($1,306)**
1	Charleston	$108,500	$4,143	3.8%	$414	$3,729	$34	$42	$8	$2,648	**($2,065)**
1	Jackson	$108,500	$4,143	3.8%	$414	$3,729	$34	$46	$12	$2,648	**($1,597)**
1	Birmingham	$108,500	$4,143	3.8%	$414	$3,729	$34	$45	$11	$2,648	**($1,696)**
2	Phoenix	$108,500	$6,167	5.7%	$617	$5,550	$50	$40	($10)	$3,942	**($5,714)**
2	Memphis	$108,500	$6,167	5.7%	$617	$5,550	$50	$45	($5)	$3,942	**($5,170)**
2	El Paso	$108,500	$6,167	5.7%	$617	$5,550	$50	$42	($8)	$3,942	**($5,496)**
2	San Francisco	$108,500	$6,167	5.7%	$617	$5,550	$50	$31	($19)	$3,942	**($6,835)**
2	Albuquerque	$108,500	$6,167	5.7%	$617	$5,550	$50	$42	($8)	$3,942	**($5,535)**
3	Baltimore	$108,500	$5,839	5.4%	$584	$5,255	$47	$45	($2)	$3,732	**($4,584)**
3	Salem	$108,500	$5,839	5.4%	$584	$5,255	$47	$34	($14)	$3,732	**($5,949)**
3	Chicago	$108,500	$5,839	5.4%	$584	$5,255	$47	$46	($2)	$3,732	**($4,502)**
3	Boise	$108,500	$5,839	5.4%	$584	$5,255	$47	$37	($10)	$3,732	**($5,508)**
3	Burlington	$108,500	$5,839	5.4%	$584	$5,255	$47	$47	($0)	$3,732	**($4,364)**
3	Helena	$108,500	$5,839	5.4%	$584	$5,255	$47	$48	$0	$3,732	**($4,271)**
3	Duluth	$108,500	$5,839	5.4%	$584	$5,255	$47	$66	$18	$3,732	**($2,105)**
3	Fairbanks	$108,500	$5,839	5.4%	$584	$5,255	$47	$94	$47	$3,732	**$1,292**

Appendix II – MHI's Comments on the DOE Rule's Proposed Changes by Section

Subpart A – General

§ 460.1 Scope.

MHI Comments:
MHI has no comments to this section.

§ 460.2 Definitions.

MHI Comments:
Revise the following definition to include the addition of the underlined text to read as follows:

"Whole-house mechanical ventilation system" – Exhaust system, supply system, or combination thereof that is designed to mechanically exchange indoor air with outdoor air when operating continuously or through a programmed intermittent schedule to satisfy the whole house ventilation rates.

As currently proposed in the rule, this definition would include all exhaust fans, including bath fans and range hoods, which are systems MHI does not believe should be included. Note, the suggested change has been copied from the 2021 IECC.

§ 460.3 Materials incorporated by reference.

MHI Comments:
Incorporation of ACCA Manual J and ACCA Manual S are examples of trying to use a site-built code for manufactured housing that just does not work. See "§460.205 Equipment sizing" for more detailed information.

§ 460.4(a) Energy conservation standards.

MHI Comments:
The application of the Annual Energy Outlook (AEO) to the adjustment of home price needs to be standardized and established in the rule for the purposes of enforcement. The proposed rule must establish trigger points for reevaluating the "price" of a home. For example, would Tier 1 models need to be "limited approvals" that expire after a period of time? Or, would it be based on a percentage increase in price? Further, the proposed rule must establish the monitoring mechanisms to be used by production inspection primary inspection agencies (IPIAS) and design approval primary inspection agencies (DAPIAS) for the purposes of prompting manufacturers to resubmit updated information for Tier 1 homes.

§ 460.4(b) and (c) Energy conservation standards.

MHI Comments:
Using a tiered system based on price shows a fundamental lack of understanding of the factory-built process and should be eliminated. There is no manufacturer's suggested retail price for manufactured homes. The use of "price" is unworkable from an enforcement standpoint as a standardized method for pricing does not exist and it would not be possible for a DAPIA to evaluate whether a price is reasonable or "correct." The methods used by manufactures to establish pricing constitute trade "secrets" and dissemination of pricing information in the form of Tier 1 and/or Tier 2 model plans would potentially lead to inappropriate price-fixing or price manipulation among manufacturers in violation of federal (including Sherman Act, Clayton Act, Federal Trade Commission Act, and

Robinson-Patman Act) and state antitrust/competition laws.

Further, the use of price as a threshold is overly simplistic and fails to account for regional variations in average housing cost and construction methods. For example, an "affordable" home in the southeastern US is much less expensive and constructed differently than a home of relative affordability in the northeast and/or west. At a minimum, a distinct Tier 1 price point should be established for each thermal zone. Moreover, manufacturers do not set a "retail list price", so that measure is not applicable.

From an enforcement standpoint the regulation does not establish how the "price" would be conveyed to the enforcement bodies, such as the IPIA and/or DAPIA. Because the price of a home depends on options, such as interior finishes (e.g., board and batten verses finished drywall), each Tier 1 model plan submission would need to specifically define the finish attributes required to meet the Tier 1 price limit. Moreover, models that exist in both tiers, due to available options, would need to be submitted for review and approval in both "Tier 1" and "Tier 2."

If a tiered system based on price is used, the price point in Tier 1 must be significantly increased to at least $110,260 to better reflect the costs of today's manufactured homes.

Subpart B – Building Thermal Envelope

§ 460.101 Climate zones.

MHI Comments:
MHI appreciates DOE's use of the HUD Code zones to match manufacturing practices more appropriately. However, as written the proposed rule would require a home in southern Virginia, which would be in climate zone 3 under the IECC, to meet the same requirements as a home located in Fairbanks, Alaska, which would be located in climate zone 8 using the IECC. MHI encourages the DOE to lower proposed thermal envelopment requirements within zone 3 to align with IECC climate zone 3 requirements more closely

§ 460.102 Building thermal envelope requirements.

MHI Comments:
MHI recommends deleting the following sentence and reference wherever it appears in this section: "Adapted from section R402 of the 2021 IECC."

Additionally, the R-20 wall insulation listed in Tier 2 for Zones 2 and 3 may not be readily available in roll form, as typically used in production. Having a continuous insulation on the outside of the studs may become problematic for siding installation due to transportation. The siding fasteners would have to penetrate through the continuous insulation which would pose an issue, especially for siding applications with more weight. MHI recommend revising exterior wall insulation to R-11 and increasing ceiling insulation to R-25 in Tier 1 for Zones 1 and 2. Allowing for R-11 would provide valuable flexibility in the current restricted fiberglass insulation market.

MHI also recommends revising 20+5 wall R values to 21 or 13+5. This is consistent with the 2015 IECC and would provide manufacturing options to avoid continuous insulation sheathing which would reduce home rigidity which could cause transportation issues.

In addition, MHI recommends adding the following language to this section:

- [R402.3.3] Glazed fenestration exemption. Not greater than 15 square feet (1.4 m2) of glazed fenestration per dwelling unit shall be exempt from the U-factor and SHGC requirements in

Section R402.1.2. This exemption shall not apply to the Total UA alternative in Section R402.1.5.

- [R402.3.4] Opaque door exemption. One side-hinged opaque door assembly not greater than 24 square feet (2.22 m2) in area shall be exempt from the U-factor requirement in Section R402.1.2. This exemption shall not apply to the Total UA alternative in Section R402.1.5.

For "Table 460.102-5 – Tier I Building Thermal Envelope Performance Requirements," MHI recommends the following changes:

Change Zone 1 total Uo to 0.098 for single and 0.096 for multi-sectional, Zone 2 total Uo to 0.081 for single and 0.079 for multi-sectional, and the Zone 3 total Uo to 0.076 for singles and 0.073 for multi-sectional.

For "Table 460.102-6 – Tier 2 Building Thermal Envelope Performance Requirements," MHI recommends the following changes:

Change Zone 2 total Uo to 0.076 for single and 0.073 for multi-sectional and the Zone 3 total Uo to 0.067 for single and 0.064 for multi-sectional.

These energy levels better align with current Energy Star requirements and provide an aggressive first step in enhancing energy conservation in manufactured homes. Further, these changes will reduce the pay off period and provide better value to homeowners.

MHI also recommends deleting the following sentence wherever it appears in this section: "Adapted from section R402 of the 2021 IECC."

§ 460.103 Installation of Insulation

MHI Comments:
The following strikethrough text should be deleted from this section:

"Insulating materials must be installed according to the insulation manufacturer's installation instructions and the requirements set forth in Table 460.103 of this section.~~, which is adapted from section R402 of the 2021 IECC~~."

In Table 460.103 the instructions should clarify the location where baffles are required by adding the following underlined text:

Component	Installation Requirements
Baffles	Baffles must be constructed using a solid material, maintain an opening equal or greater than the size of the vents, and extend over the top of the attic insulation <u>where insulation is restrained from full depth in order to maintain 1 inch minimum air space between insulation and roof decking.</u>

In Table 460.103 instructions for "eave vents" should be deleted. This requirement is not within the 2021 IECC nor does it provide insulation installation instructions. Furthermore, it should be acceptable to use nonpermeable insulation adjacent to ventilated soffits as long as required free air path is maintained.

§ 460.104 Building thermal envelope air leakage.

MHI Comments:
The following strikethrough text should be deleted from this section:

"Manufactured homes must be sealed against air leakage at all joints, seams, and penetrations associated with the building thermal envelope in accordance with the component manufacturer's installation instructions and the requirements set forth in Table 460.104 of this section. Sealing methods between dissimilar materials must allow for differential expansion, contraction and mechanical vibration, and must establish a continuous air barrier upon installation of all opaque components of the building thermal envelope. All gaps and penetrations in the exterior ceiling, exterior floor, and exterior walls, including ducts, flue shafts, plumbing, piping, electrical wiring, utility penetrations, bathroom and kitchen exhaust fans, recessed lighting fixtures adjacent to unconditioned space, and light tubes adjacent to unconditioned space, must be sealed with caulk, foam, gasket or other suitable material. ~~The air barrier installation criteria is adapted from section R402 of the 2021 IECC~~."

Table 460.104 should revise the "rim joists criteria" by deleting the following words. Mud sill plates are not typically used in manufactured housing and, if used, would be installed on-site by others outside the scope of this rule.

Component	Air Barrier Criteria
Rim joists	The air barrier must enclose the rim joists. The junctions of the rim board ~~to the sill plate and the rim board~~ and the subfloor must be air sealed.

In Table 460.104 the component "Shower or tub adjacent to exterior wall" should be deleted or clarified to apply only when interior wall surface is used as an air barrier. Exterior sheathing or house wrap products are often used as home air barrier and these products are not installed between shower walls.

Subpart C – HVAC, Service Hot Water, and Equipment Sizing

§460.201 Duct systems.

MHI Comments:
The following underlined text and strikethrough text must be made to the following section:

"Each manufactured home equipped with a duct system, which may include air handlers and filter boxes, must <u>have supply ducts</u> be sealed to limit total air leakage to less than or equal to four (4) cubic feet per minute per 100 square feet of conditioned floor area. Building framing cavities must not be used as ducts or plenums when directly connected to mechanical systems. <u>Multi-section homes may have each home section isolated and tested separately.</u> ~~The duct total air leakage requirements are adapted from section R403 of the 2021 IECC."~~

MHI also has significant concerns that testing was not included in this proposal and these concerns are demonstrated in this section which requires testing of air handlers and filter boxes. However, manufactured homes often utilize uncased evaporator coils (a-coils) that prevent the air handler from being readily tested. Oftentimes, it is necessary to temporarily remove the air handler in order to test the duct system for leakage due to the difficulty sealing the air handler.

For multi-sectional units where ductwork is installed on-site, the rule does not establish enforcement procedures for testing. More specifically, what qualifications are required for those performing the

testing? Can installers certify their own work? What training is required for installer personnel performing this work? How are the test results documented? Is the installer responsible for any remedial work that may be required after the testing is performed?

If testing is required to be performed by a third-party or in cases where the installer is not capable of performing the testing, the additional cost of testing could $600 or more. For Tier 1 homes this nearly doubles the cost increase for single wide construction and increases the installed cost by more than 50-percent for double wide homes. This cost was not considered in the DOE purchase price increase analysis performed. DOE must not propose a rule without including the required testing requirements, so any analysis can include the true impact.

MHI recommends revising this section based on R403.3.6 of the 2021 IECC as follows:

- Rough-in test: The total leakage shall be less than or equal to 4.0 cubic feet per minute (113.3 L/min) per 100 square feet (9.29 m2) of conditioned floor area where the air handler is installed at the time of the test. Where the air handler is not installed at the time of the test, the total leakage shall be less than or equal to 3.0 cubic feet per minute (85 L/min) per 100 square feet (9.29 m2) of conditioned floor area.
- Postconstruction test: Total leakage shall be less than or equal to 4.0 cubic feet per minute (113.3 L/min) per 100 square feet (9.29 m2) of conditioned floor area.
- Test for ducts within thermal envelope: Where all ducts and air handlers are located entirely within the building thermal envelope, total leakage shall be less than or equal to 8.0 cubic feet per minute (226.6 L/min) per 100 square feet (9.29 m2) of conditioned floor area.

§460.202 Thermostats and controls.

MHI Comments:
MHI recommends deleting the following sentence and reference wherever it appears in this section: "Adapted from section R403 of the 2021 IECC."

MHI also recommends revising §460.202 (b)(3) to the following:

Homeowner manuals should include recommendation that homeowners program thermostat with a heating temperature set point no higher than 70 °F (21 °C) and a cooling temperature set point no lower than 78 °F (26 °C).

§ 460.203 Service hot water.

MHI Comments:
MHI recommends deleting the strikethrough text from "section (a)" as typical water heater instructions do not include maintenance instructions and such when available are readily available on-line. Further, this information is already accommodated in 24 CFR Part 3280.

"(a) Service hot water systems installed by the manufacturer must be installed according to the service hot water manufacturer's installation instructions. ~~Where service hot water systems are installed by the manufacturer, the manufacturer must ensure that any maintenance instructions received from the service hot water system manufacturer are provided with the manufactured home. The service hot water requirements are adapted from section R403 of the 2021 IECC~~."

§460.204 Mechanical ventilation fan efficacy.

MHI Comments:
MHI recommends deleting the following sentence and reference wherever it appears in this section: "Adapted from section R403 of the 2021 IECC."

As referenced in § 460.2 Definitions, the definition of "whole-house mechanical ventilation system" must be revised to include the addition of the underlined text as shown below. Further, this section must clarify it does not apply to bath fans and range hoods.

"Whole-house mechanical ventilation system" – Exhaust system, supply system, or combination thereof that is designed to mechanically exchange indoor air with outdoor air when operating continuously or through a programmed intermittent schedule <u>to satisfy the whole house ventilation rates</u>.

§460.205 Equipment sizing.

<u>MHI Comments:</u>
Incorporation of these manuals is an example of trying to use a site-built code for manufactured housing that just does not work as outlined below.

The design parameters provided in ACCA Manual J are location specific rather than based on zones in the proposed rule. The proposed rule must provide the required design parameters to perform an ACCA Manual J analysis within the context of the three thermal zones in the proposed rule.

ACCA Manual J analysis requires knowledge of the orientation of the home with respect to the sun for cooling load analysis. Because the orientation of the home is often unknown until installed, the proposed rule must establish a default orientation, such as the front door is assumed to face south.

ACCA Manual S establishes sizing limits for heating and cooling equipment, these limits presume that thermal loads are established for a specific location and specific building orientation. The variation in design parameters within a single thermal zone exceeds the sizing limits of ACCA Manual S. The proposed rule must establish alternate criteria for using ACCA Manual S where the design parameters vary within a thermal zone.

Current equipment sizing methods are not based on Manual J or Manual S. The use of this software, as proposed, will add additional time and cost for each model plan submission.

The rule must establish a threshold for requiring a revised Manual J or Manual S analysis. For example, where a home model has options that affect the glazing area or insulation value, are distinct Manual J and Manual S analysis required for each possible option?

If equipment sizing is limited by Manual S, homes can only be placed in their respective thermal zones under the proposed rule because placing a home in a zone for which it was not designed would violate the sizing limits of Manual S. For example, under the current standard a Zone II home can be placed in Zone I, as Zone II is considered more restrictive. However, under the new standard, this common practice would not be permitted because equipment sized for Zone II would be oversized for Zone I and would violate the proposed rule. This would restrict current sales practices in the industry especially for retailers located near the Zone boundaries.

Appendix III – MHI's Responses to Issues on Which the DOE Requests Comment

1. DOE invites comment on whether (1) the manufacturer's retail list price threshold for Tier 1 under the tiered proposal is appropriate, (2) the untiered proposal in this SNOPR is cost-effective, generally, and (3) the untiered proposal is cost-effective for low-income consumers.

Using a tiered system based on price shows a fundamental lack of understanding of the factory-built process. There is no manufacturer's suggested retail price for manufactured homes. Home price is determined by the retailer based on the home features selected by the consumer. The approval for floor design and layout with respect to Code requirements are made regardless of those selections, and long before the consumer has made them. Requiring approval of every floorplan AFTER consumer choices are made determining the price, would mean each and every individual house would have to be approved separately – adding astronomical costs to the process and slowing down the line so as to remove all efficiencies.

Moreover, the setting of either $55,000 or $63,000 is arbitrary and relates affordable housing ONLY to the manufactured housing market. To determine if a home is affordable, it is necessary to consider the entire housing market. Manufactured homes at any price point provide a significant source of affordable housing – with the average price of a new manufactured home being $87,000 compared to $308,597 for a new site-built home not including land.[4]

2. DOE welcomes comment on approaches for testing, compliance and enforcement provisions for the proposed standards and alternative proposal. DOE also welcomes comments and information related to potential testing, compliance and enforcement under the current HUD inspection and enforcement process, and potential costs of testing, compliance and enforcement of the proposed standards and alternative proposal in this document.

MHI has significant concerns that testing was not included in this proposal, and finds it challenging to consider the costs and impacts of a number of the proposed changes without knowing what the testing protocols will be. All costs imposed by the proposed rule must be factored, and enforcement and testing are parts of that cost. For example, will the duct testing require every unit to be tested thus requiring each manufacturer to hire one individual to test the ducts in line? Additionally, each double wide will need to be tested on-site which will cost around $1,000 per unit, assuming the duct system passes the first time. What happens if a duct system fails the testing on-site? Additional costs will be incurred with bringing the duct system into compliance and then another site test will be required.

Furthermore, it is unnecessary for the DOE to develop a new enforcement mechanism because the HUD Code is an already-established enforcement mechanism that mandates a uniform standard for design, construction, and installation, including federal requirements for safety, durability, and energy efficiency. While MHI recognizes that the DOE has the authority to develop an energy conservation standard for manufactured housing, it should be developed in coordination with HUD to ensure that any proposed rules are integrated into the HUD Code for enforcement.

3. DOE requests comment on the use of a tiered approach to address affordability and PBP concerns from HUD, other stakeholders, and the policies outlined in Executive Order 13985. DOE also requests comment regarding whether the price point boundary between the proposed tiers is appropriate, and if not, at what price point should it be set and the basis for any alternative price points. DOE also requests comment on its assumptions regarding the use of high-priced loans (*e.g.,* chattel loans) by low-income purchasers, or other purchasers, of manufactured housing.

Manufactured housing is a critical component of the success of Executive Order 13985, officially titled "Advancing Racial Equity and Support for Underserved Communities." According to the Urban Institute, "the

[4] 2020 U.S. Census Bureau's Manufactured Housing Survey.

gap in the homeownership rate between black and white families in the U.S. is bigger today than it was when it was legal to refuse to sell someone a home because of the color of their skin." Addressing systemic barriers to minority homeownership is imperative and increasing the supply of quality affordable housing must be an integral part of the effort. This is where manufactured housing comes in. With the average cost of a new manufactured home itself being around $87,000, it is common for the purchase of a manufactured home to be a less expensive option than renting.[5] Unlike other affordable homeownership options, which are often aging housing stock in need of extensive improvements and rehabilitation, a family can attain homeownership in a brand-new home that has the latest innovations, energy efficient features, and modern floor plans and amenities. Any federal regulations that impact the affordability of housing could make it even harder for minority homeowners to access homeownership.

4. DOE also requests comment on alternate thresholds (besides price point) to consider for the tiered approach, including a size-based threshold (*e.g.,* square footage or whether a home is single- or multisection). DOE requests comment on the square footage and region versus sales price data provided in the notice (from MHS PUF 2019) and how that data (or more recent versions of that data) could be used to create either a size-based or region-based threshold instead. DOE further requests input on whether there should be single national threshold as proposed, or whether it should vary based on geography or other factors, and if so, what factors should be considered.

Thresholds must be established differently for different regions of the country because the features and amenities in an "affordable" home vary geographically. Further, the pricing for a manufactured home can differ greatly depending on the location of where the home will be sited. For example, below are the average prices of a manufactured home in several states across the country[6]:

- Florida - $89,200
- California - $118,700
- Texas - $88,200
- Arizona - $106,800
- Colorado - $88,200

Further, from an approval and enforcement standpoint, it is not clear how designs of varying levels of affordability would be distinguished by production inspection primary inspection agencies (IPIAS) and design approval primary inspection agencies (DAPIAS).

5. DOE requests comment on using the AEO GDP deflator series to adjust the manufacturer's retail list price threshold for inflation. DOE requests comment on whether other time series, including those that account for regional variability, should be used to adjust manufacturer's retail list price.

While MHI does not believe a price threshold is at all appropriate, if used there absolutely needs to be an index to increase the price over time if a price tier is used. The proposed rule should establish the Federal agency tasked with providing the annually adjusted threshold values. Whether it is HUD or the DOE, a single adjusted value must be provided to ensure consistency across the industry.

6. DOE requests comment on whether a one-year lead time would be sufficient given potential constraints that compliance with the DOE standards may initially place on the HUD certification process, and whether a longer lead time (e.g., a three-year lead time) or some other alternative lead-time for this first set of standards (e.g., phased-in over three years, with one-year lead-times thereafter) should be provided.

[5] 2020 U.S. Census Bureau's Manufactured Housing Survey.
[6] 2020 U.S. Census Bureau's Manufactured Housing Survey.

When DOE makes changes to appliance standards there is generally a five-year compliance period. Given that the process for manufacturing homes is at least as complex as appliances, the same time period should apply. If the proposed rulemaking is finalized as written, implementing the changes would require manufacturing plants to completely overhaul their systems and processes. Further, every home design currently being utilized – of which there are thousands – would need to be redesigned and reapproved, further slowing down the process.

7. DOE requests comment on its understanding of the definitional changes in the 2018 IECC and the 2021 IECC. DOE also requests comments on its changes to the proposed definitions as compared to those proposed in the June 2016 NOPR.

MHI recommends revising the definition of whole-house mechanical ventilation system to: "Exhaust system, supply system, or combination thereof that is designed to mechanically exchange indoor air with outdoor air when operating continuously or through a programmed intermittent schedule to satisfy the whole house ventilation rates." As currently proposed, the definition would include all exhaust fans including bath and range hoods – systems we do not believe are intended to be included.

8. DOE requests comment on incorporating by reference ACCA Manual J, ACCA Manual S, and "Overall U-Values and Heating/Cooling Loads–Manufactured Homes" by Conner and Taylor.

Incorporation of these manuals is an example of trying to use a site-built code for manufactured housing that just does not work as outlined below.

ACCA Manual J analysis requires knowledge of the orientation of the home with respect to the sun for cooling load analysis. Because the orientation of the home is often unknown until installed, the proposed rule must establish a default orientation, such as the front door is assumed to face south.

ACCA Manual S establishes sizing limits for heating and cooling equipment, these limits presume that thermal loads are established for a specific location and specific building orientation. The variation in design parameters within a single thermal zone exceeds the sizing limits of ACCA Manual S. The proposed rule must establish alternate criteria for using ACCA Manual S where the design parameters vary within a thermal zone.

Current equipment sizing methods are not based on Manual J or Manual S. The use of this software, as proposed, will add additional time and cost for each model plan submission.

The rule must establish a threshold for requiring a revised Manual J or Manual S analysis. For example, where a home model has options that affect the glazing area or insulation value, are distinct Manual J and Manual S analysis required for each possible option?

If equipment sizing is limited by Manual S, under the proposed rule homes can only be placed in their respective thermal zones because placing a home in a zone for which it was not designed would violate the sizing limits of Manual S. For example, under the current standard a Zone II home can be placed in Zone I, as Zone II is considered more restrictive. However, under the new standard, this common practice would not be permitted because equipment sized for Zone II would be oversized for Zone I and violate the proposed rule. This would restrict current sales practices in the industry especially for retailers located near the Zone boundaries.

9. DOE requests comment on basing the climate zones on the three HUD zones instead of the June 2016 NOPR-proposed four climate zones, or other configuration of climate zones. DOE further requests input on whether energy efficiency requirements should be based on smaller geographic areas than provided with the 3 or 4 zone model.

MHI supports utilizing the current HUD climate zones for the purpose of this rulemaking. However, as written the proposed rule would require a home in southern Virginia, which would be in climate zone 3 under the

IECC, to meet the same requirements as a home located in Fairbanks, Alaska, which would be located in climate zone 8 using the IECC. MHI encourages the DOE to lower proposed thermal envelopment requirements within zone 3 to align with IECC climate zone 3 requirements more closely

10. DOE requests comment on the Tier 1 energy conservation standards, which would be applicable to manufactured homes with a manufacturer's retail list price of $55,000 or less. DOE also requests comment on the proposed energy conservation standards based on the most recent version of the IECC for the Tier 2 and untiered standards and the consideration of R-21 sensitivity for exterior wall insulation for climate zones 2 and 3.

Per our response to Question 1, MHI does not support a tiered approach based on retail price.

11. DOE requests comment on the additional energy efficiency requirements from the 2021 IECC and whether they should apply to manufactured homes, including those that DOE has initially considered as not applicable to manufactured homes. If so, DOE requests comment on how these requirements would apply and the costs and savings associated with these requirements.

While the IECC is respected in the construction industry, it was introduced as a standard specific to commercial and site-built residential housing with no input from the manufactured housing industry. Given that the IECC essentially ignores all the construction aspects unique to manufactured housing, requiring the industry to comply with a building code that was developed without the benefit of our industry's knowledge or participation is not an appropriate solution. Thus, an integration process of individual evaluation and strategic merging of any increased energy standards would be a much more prudent approach rather than attempting a "broad scale, one size fits all" approach as is currently being suggested. For that to work, the most appropriate code to utilize to update energy standards for manufactured homes is the HUD Code.

12. DOE requests comment on the proposal to not require that exterior ceiling insulation must have uniform thickness or a uniform density.

MHI agrees that manufactured homes should NOT have to require uniform thickness of installation. Installing insulation with a nonuniform thickness is required to construct most manufactured homes due to shipping height restrictions and the need to minimize truss heel height. Below is further supporting information as to why MHI supports not requiring uniform thickness based on the DOE proposal.

- The loose fill spray applied ceiling insulation was assumed to be R-3.1 per inch in the DOE analysis. Therefore, as the required R-value for the ceiling insulation is increased the required depth will also increase.
- Due to shipping restrictions across the US, most manufacturers limit the truss heel height to allow the most conservative shipping heights.
- When the heel height is less than the depth of insulation required, a compressed area of insulation occurs at the eave areas. The deeper the required insulation, the further the compressed area extends toward the center of the home.
- Because of the compressed area at the eave, the manufacturers typically increase the depth toward the center of the home to provide an average depth that meets the requirements.
- Approximately 30 percent of homes produced have a "vaulted" ceiling instead of "flat" ceiling as assumed in the DOE proposal. The insulation depths that are being proposed for Tier 2 prescriptive would eliminate the production of homes with vaulted ceilings unless the trusses are redesigned with higher heel heights or steeper exterior roof slopes. These changes will then increase the shipping height and require truss re-designs.
- The DOE proposal includes assumptions that heel heights will increase as the required depth of insulation increases to minimize the compressed area. The DOE document states that the truss heel

height is assumed to be 2.5 inches for ceilings using less than or equal to R-22, 5.5 inches for insulation between R-22 and R-30, and 7.5 inches for over R-38. This increased heel height assumption will require the trusses to be re-designed and will increase shipping heights. Homes with increased shipping heights will be more costly to ship based on state-by-state restrictions.

13. DOE requests comment on the proposal not to limit the total area of glazed fenestration.

MHI agrees that the DOE should not limit the amount of glazed fenestration. The 2021 IECC already includes exemptions that must also be included in this proposed rule. Further, MHI recommends adding the following:

(6) [R402.3.3] Glazed fenestration exemption. Not greater than 15 square feet (1.4 m2) of glazed fenestration per dwelling unit shall be exempt from the U-factor and SHGC requirements in Section R402.1.2. This exemption shall not apply to the Total UA alternative in Section R402.1.5.

14. DOE requests comment on removing the proposed requirement that exterior floor insulation installed must maintain permanent contact with the underside of the rough floor decking.

MHI supports exempting manufactured housing from this requirement. In manufactured home construction, the floor insulation between the I-beams is inherently not in contact with the underside of the floor decking. This must be exempted to permit standard construction practices as outlined below.

The typical insulation used in the production environment is blanket style insulation that is installed between the bottom of the floor and the chassis frame which keeps the HVAC supply duct system inside the thermal boundary of the building. Changing this method of installation would effectively remove the HVAC supply duct system from inside the thermal boundary of the building and would cause an increased heat gain and heat loss, effectively decreasing energy efficiency. This would be contradictory to the purpose and scope of the IECC. For this reason, most manufacturers do not currently install floor insulation between the floor joists that would be in contact with the underside of the floor decking. Therefore, production facilities are not set-up to efficiently install insulation that is contact with the underside of the floor decking. However, interior perimeter rim joist insulation is a common practice.

Installing insulation between the floor joists will also increase the production labor to install the insulation. This additional labor will add around 20 minutes of production time to each floor produced. For a plant producing eight floors per day, the increased production time will be around 160 minutes per day. At that rate of production, the line will have to move about every 50 minutes. Therefore, the increased labor required will either slow production or require new additional labor resources. Whether production is reduced, or additional labor is required, the overall cost of the home will be increased, but these costs were not considered in the DOE analysis.

Further, the DOE analysis assumes that the floor joists are 2x6 with insulation up to and including R-22, and 2x8 floor joists insulated to R-30 and above. Currently, 90 percent of floors produced use 2x6 floor joists. Therefore, the increased joists depth will add approximately a 33 percent material cost increase which will be around $200 per 14x76 floor. This 2" floor joist change will also increase the shipping height. This additional 2 inches only compounds to the issue discussed about the truss changes.

15. DOE requests comment on the proposed updates to the installation of insulation criteria as it applies to manufactured homes construction only.

In Table 460.103 the instructions should clarify the location where baffles are required by adding the following underlined text:

Component	Installation Requirements
Baffles	Baffles must be constructed using a solid material,

	maintain an opening equal or greater than the size of the vents, and extend over the top of the attic insulation where insulation is restrained from full depth in order to maintain 1 inch minimum air space between insulation and roof decking.

In Table 460.103 instructions for "eave vents" should be deleted. This requirement is not within the 2021 IECC nor does it provide insulation installation instructions. Furthermore, it should be acceptable to use nonpermeable insulation adjacent to ventilated soffits as long as required free air path is maintained.

16. DOE requests comments on whether there are any of the 2021 IECC updates relevant to manufactured housing that should be considered as part of this rulemaking. Specifically, DOE requests comment on whether the 2021 IECC updates for installation criteria for access hatches and doors, baffles and shafts are applicable to manufactured housing and should be considered in this rulemaking.

While the IECC is respected in the construction industry, it was introduced as a standard specific to commercial and site-built residential housing with no input from the manufactured housing industry. Given that the IECC essentially ignores all the construction aspects unique to manufactured housing, requiring the industry to comply with a building code that was developed without the benefit of our industry's knowledge or participation is not an appropriate solution. For example, the baffle requirements included in the proposal will not work because the closest you can get to the rim rail is inside the face and not the outside edge. That simply will not work for manufactured homes.

17. DOE requests comment on the proposed updates to the air barrier criteria as it applies to manufactured homes construction only. Further, DOE requests comment whether the SNOPR proposal continues to be designed to achieve air leakage sealing requirements of 5 ACH.

There is substantial evidence that the prescriptive building thermal envelope air leakage standards incorporated within the rule are adequate to ensure homes achieve an air leakage rate of 5ACH. MHI believes that whole house air leakage testing unnecessary.

18. DOE requests comments on whether there are any of the 2021 IECC updates relevant to manufactured housing that should be considered as part of this rulemaking. Specifically, DOE requests comment on whether the 2021 IECC updates for air barrier criteria for recessed lighting, narrow cavities and plumbing are applicable to manufactured housing and should be considered in this rulemaking. If so, DOE requests comment on whether the requirements would alter the 5 ACH designation.

MHI does not believe that recessed lighting housing needs specification on air leakage rates as these fixtures are usually IC rate and significantly airtight. Further, MHI does not believe that additional information needs to be added to the proposed rule for narrow cavities as any such activities are rae in manufactured housing and when they do occur, they generally do not disrupt the air barrier and are insulated or gasketed. Finally, MHI does not believe that additional information needs to be added to the proposed rule for wiring and plumbing as most often these utilities are routing in the floor systems within the thermal envelope and larger vent piping is already caulked and sealed.

However, because the IECC essentially ignores all the construction aspects unique to manufactured housing, requiring the industry to comply with a building code that was developed without the benefit of our industry's knowledge or participation is not an appropriate solution. This is a perfect example of why the IECC is not the appropriate building code for manufactured housing. Further, holes in the floor, such

as under bathtubs and showers, must be exempted from sealing to permit the installation of p-traps in 2x6 floor systems. These holes do not allow air intrusion from the exterior because the exterior floor air barrier is the bottom board and is not the floor itself. These are just a few examples why the most appropriate code to utilize to update energy standards for manufactured homes is the HUD Code. MHI does not believe any additional information needs to be added to the proposed rule to address recessed lighting, narrow cavities, and plumbing.

19. DOE requests comment on the proposal to require that total air leakage of duct systems for all manufactured homes is to be less than or equal to 4 cfm per 100 square feet of conditioned floor area.

The proposed rule limits "total air leakage" of the duct system whereas current testing, such as that done for Energy Star homes, is based on air leakage to the exterior. Testing leakage to the outside requires the use of a second machine used simultaneously. This would be a more extensive and costly test with increased failure rates while providing little benefit in terms of energy savings. Where ducts are in the floor, and contained within the bottom board, they typically do not leak to the exterior and should be exempt. Again, since no testing requirements are included in this proposal, it is impossible to know the costs or procedures of achieving such levels.

Although MHI supports efforts to limit duct leakage, we believe such tests should be limited to testing of duct systems in the factory only, where such test provides the best value to consumers. MHI encourages the DOE to clarify the testing requirements to encourage effective use of current processes to ensure supply duct systems maintain a leakage of less than 4 cfm per 100 square feet of conditioned floor area as installed and tested within the building facility.

20. DOE requests comment on DOE's interpretation of R403.1 and the proposed updates to the thermostat and controls requirements. In addition, DOE requests comments on whether there are any of the 2021 IECC updates relevant to manufactured housing that should be considered as part of this rulemaking.

MHI believes programmable thermostats should remain an option for the homebuyer. Programmable thermostats do not come preset as indicated within 460.202(b)(3) and requiring home manufacturers to program thermostats as proposed prior to the home being installed and powered would be overly burdensome, ineffective and unnecessary. Homeowners should be advised to program their thermostats. Pre-program requirements should be part of regulation requirements on thermostat manufacturers if deemed appropriate rather than on home manufacturers.

21. DOE requests comment on DOE's interpretation of R403.5 and the proposed updates to the service hot water requirements. In addition, DOE requests comments on whether there are any of the 2021 IECC updates relevant to manufactured housing that should be considered as part of this rulemaking. Specifically, DOE requests comment on whether the circulating hot water system temperature limit should be included as a requirement.

Circulating hot water systems are not typically used in manufactured homes. Further, 24 CFR 3280 already has provisions for scald prevention that limit the temperature of hot water. Additional requirements would be redundant and unnecessary.

22. DOE requests comment on the proposal to include the 2021 IECC fan efficacy standard requirements. DOE requests comment on whether any of the fan efficacy requirements are not applicable to manufactured homes.

The applicability of the increased efficacy standards would be dependent upon the additional costs associated, and the return on investment of the increased mechanical ventilation requirements, which the DOE did not take into account. Furthermore, the definition of "whole house fan" should be revised to align with the

definition within the 2021 IECC which limits the fan efficacy requirements to fan used for "whole house ventilation" purposes rather than spot ventilation.

23. DOE requests comment on whether the HRV and ERV provisions under 2021 IECC for site-built homes are applicable to manufactured homes and whether they would be cost-effective. Specifically, DOE requests comment on costs for the HRV and ERV requirements as it applies to manufactured homes in all climate zones.

HRV's and ERV's would add significantly to the cost of manufactured homes and 24 CFR 3280 already contains provisions for providing fresh air within a manufactured home. HRV's and ERV's are products mainly promoted by those appliance manufacturers and have been found in many cases to increase moisture related problems and increased energy usage, specifically in the southern climates.

24. DOE requests comment on the above ventilation strategies, including (but not limited to) cost, performance, noise, and any other important attributes that DOE should consider, including those related to mitigation measures. While the alternate ventilation approaches are not integrated into the analysis presented as part of this proposal, DOE is giving serious consideration as to whether it should incorporate one or more of these options as part of its final rule based on any additional data and public comments it receives.

HRV's and ERV's would add significant construction costs. If implemented with the furnace, as most current ventilating systems are, significant redesign would be required to increase the size of the furnace compartment to accommodate the additional equipment and ductwork. Currently ventilation strategies in manufactured housing have proven to be efficient and effective for many years. In fact, the current IECC recognizes a process developed and commonly used by the manufactured housing industry as an accepted application in residential and commercial construction.

25. DOE requests comment on the cost-effectiveness and feasibility of requiring R-20+5 for the exterior wall insulation for climate zones 2 and 3 Tier 2/Untiered manufactured homes. DOE also requests comment on the sensitivity analysis for R-21 that would result in positive LCC savings for all cities.

The use of continuous insulation is problematic due to the required changes in design, associated costs, and need for products that don't exist. The increase in unit width due to the addition of continuous foam will require a reduction in the structural floor width equal to the thickness of the insulation. This will require redesign of the chassis system, trusses, and retooling of fixtures and jigs within the plant. Any reduction in interior width, due to increases in exterior width, will eliminate or require significant redesign of many single-wide models that incorporate a bathroom with adjacent hallway that are already at the minimum widths permitted under 24 CFR 3280. Furthermore, standard doors for manufactured homes are designed for overall wall thicknesses of 4- or 6-inches and increasing the thickness will require the use of extension jambs or the development of new products to accommodate increased wall widths. Permitting the use of R-21 only in lieu of R-20+5 is necessary.

26. DOE requests comment on the inputs to the conversion cost estimates.

Because the threshold cost is updated annually and because it is assumed that the list price must be updated, the cost to update model plans would be a reoccurring annual cost rather than a one-time cost. This must also be revised so that cost is not a consideration for Tier 2 homes. As currently proposed, the retail price must be determined for all homes to determine if it is above or under the threshold. The Tier 2 definition should not have a threshold price. Instead, a Tier 2 home should be defined as "A manufactured home that is not qualified as a Tier 1 home."

27. DOE requests comment on the shipment breakdown per tier and using a substitution effect of 20 percent on shipments to account for the shift in homes sold to the lower tiered standard. DOE requests comment on whether it should use a different substitution effect value for this analysis – and if so, why. (Please provide data in support of an alternative substitution effect value.)

Currently, very few homes are produced at the Tier 1 level of under $55,000. It is unlikely that additional homes will be manufactured at that level. Instead, MHI expects an overall reduction in the manufacturing and purchase of manufactured homes across the board.

28. DOE requests comment on the calculation of deadweight loss presented above and the extent to which there are market failures in the no-standards case.

Deadweight loss will increase as a result of this proposal, as many potential consumers will be priced out of purchasing a manufactured home.

29. DOE requests comment on the number of manufacturers of manufactured housing producing home covered by this rulemaking.

As of September 2021, there are 138 plants and 33 corporations producing manufactured homes in the country. As a result of this proposed rulemaking, all manufacturers will be negatively impacted.

30. DOE requests comment on the cost to update model plans and the number of model plans to update as a result of the proposed rule; on the types of equipment and capital expenditures that would be necessitated by the proposal; and the total cost of updating product offerings and manufacturing facilities. DOE requests comment on how these values would differ for small manufacturers. DOE requests comment on its estimate of average annual revenues for small manufacturers of manufactured housing.

Because the threshold cost is updated annually and because it is assumed that the list price must be updated, the cost to update model plans would be a reoccurring annual cost rather than a one-time cost. This must also be revised so that cost is not a consideration for Tier 2 homes. As currently proposed, the retail price must be determined for all homes to determine if it is above or under the threshold. The Tier 2 definition should not have a threshold price. Instead, a Tier 2 home should be defined as "A manufactured home that is not qualified as a Tier 1 home."

Manufactured Housing Association for Regulatory Reform

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November 12, 2021

VIA FEDERAL EXPRESS AND ELECTRONIC SUBMISSION

Manufactured Housing Consensus Committee
C/O Home Innovation Research Labs
Administering Organization
400 Prince George's Boulevard
Upper Marlboro, Maryland 20774

Re: Proposed Energy Conservation Standards for Manufactured Housing

Dear Members of the Manufactured Housing Consensus Committee:

The following supplemental comments are submitted on behalf of the members of the Manufactured Housing Association for Regulatory Reform (MHARR).

In light of the October 26, 2021 publication of a Notice of Data Availability (NODA) by the U.S. Department of Energy (DOE) in connection with its August 26, 2021 Supplemental Notice of Proposed Rulemaking (SNPR) regarding manufactured housing energy conservation standards, and the concurrent extension of the deadline for written comments on the SNPR (as specifically requested by MHARR) and the NODA until November 26, 2021, MHARR urges the MHCC to specifically consider and address the following points and issues relating to the original SNPR and NODA, and to submit its own supplemental comments to DOE in advance of the extended deadline. MHARR will submit supplemental comments pertaining to these issues to DOE following the MHCC's November 19, 2021 meeting.

As MHARR emphasized in its initial comments on this matter, filed October 25, 2021, the proposed manufactured housing energy standards published by DOE in the August 26, 2021 SNPR are fatally defective on multiple grounds, including but not limited to: (1) their extreme impact on the purchase price of manufactured housing contrary to applicable law; (2) their inevitable exclusion of millions of lower and moderate-income Americans from the manufactured housing market (and from homeownership altogether) contrary to applicable law; (3) their failure to provide any benefit(s) whatsoever to those excluded from the market by such price increases contrary to applicable law; (4) their failure to provide any corresponding benefit to those remaining in the market at such higher price levels contrary to applicable law; (5) their inapplicability to manufactured housing due to the fundamental nature of the International Energy Conservation Code (IECC); (6) their inapplicability to manufactured housing based on the discriminatory and "manipulated" IECC 2021 voting process; and (7) the arbitrary and capricious nature of the proposed standards in relation to manufactured housing, contrary to applicable law; among other

things. Significantly, none of these fatal defects are cured by the NODA and data contained therein. Indeed, the NODA data and supposed "analysis," only exacerbate and underscore the fundamental defects inherent in the SNPR and this entire docket.

Accordingly, and consistent with the points set forth and examined in its October 25, 2021 initial comments in this matter, MHARR urges the MHCC, at its November 19, 2021 meeting, to consider and address the following points:

1. The NODA addresses data related to the manufacturer retail list price threshold separating its supposed "Tier1" standards from its "Tier 2" standards. While the NODA suggests that $63,000.00 would be a more appropriate threshold than the $55,000 demarcation set forth in its August 26, 2021 SNPR, it does not specifically state that DOE is proposing to change the demarcation in its proposed rule from $55,000 to $63,000, or to any amount different from that initially proposed. As a result, the NODA, at a minimum, is vague and ambiguous. Moreover, even if the NODA is somehow intended by DOE to change the proposed Tier 1/Tier 2 threshold, the $63,000 figure calculated by DOE would still subject the vast majority of manufactured homes to excessive and destructively costly Tier 2 energy mandates in violation of federal law, which recognizes and protects all manufactured homes as "affordable" housing. Consequently, the NODA continues to ignore the most fundamental, basic and fatal flaw of DOE's proposed rule.

2. The NODA continues to ignore May 2021 data from the Consumer Financial Protection Bureau (CFPB) showing that substantially increased purchase prices for manufactured homes resulting from the proposed rule, would further undermine the availability of manufactured home purchase loans specifically for minority populations. Among other things, the CFPB report shows that minority communities rely heavily on chattel or personal property loans and are already subject to disproportionately high rejection levels at current price points. Quite obviously, those already disproportionately high rejection levels would be further exacerbated by higher home prices resulting from the proposed standards.

3. The NODA, among other things, projects declining inflation going forward. If correct, this projection could arguably limit the future impact of purchase price increases resulting from the energy conservation measures mandated by the DOE proposed standard. The NODA projection, however, conflicts with all available current evidence, which shows that the rate of inflation is increasing exponentially and shows no sign of abating. A higher – and sustained – level of inflation would compound and exacerbate projected purchase price increases, resulting in even higher levels of exclusion from the mainstream HUD Code market and from homeownership than have been calculated and considered by DOE.

4. The SNPR and NODA drastically understate the purchase price impact of the proposed rule. As MHARR has previously noted in comments to the MHCC and DOE, the potential purchase price impact of specific provisions of the 2021 IECC was estimated in a June 2021 report by Home Innovation Research Labs (HIRL). While these prices are estimated based on a site-built reference house with 2,500 square feet of conditioned area, they can be re-calculated for the smaller average size of manufactured homes. As MHARR will

point out in its supplemental NODA comments, however, the HIRL figures are necessarily incomplete and partial in that (aside from not reflecting the cost of testing, enforcement and regulatory compliance) they represent only the marginal purchase price impact of moving from the 2018 IECC to the 2021 IECC, and not the total cost of moving, in one massive leap – as would manufactured housing under the proposed rule -- from absolutely no IECC-based standards to 2021 IECC-based standards that according to the International Code Council (ICC) itself, are only 10% below net-zero energy levels.[1]

5. The MHCC should consider and comment on the role and impact of intentional federal anti-American energy policies such as the cancellation of pipelines and oil exploration permits on federal lands on the skyrocketing cost of nearly all existing energy sources (including oil, natural gas and electricity), which costs are then cited as the ostensible basis for DOE's excessive proposed energy standards. Put differently, the MHCC should consider that the alleged need for DOE's proposed standard, i.e., supposedly high and increasing "life-cycle" energy costs for manufactured homes are being driven, in substantial part, by intentional federal government policies designed to curb the use of fossil fuels by purposely increasing their cost. For those same intentional, policy-driven cost increases to then be used to legitimate "energy conservation" mandates for manufactured homes, with massive resulting purchase price increases borne disproportionately by those least able to afford a home of their own, is not only unconscionable and disingenuous, but fundamentally immoral and unlawful, and should be resoundingly rejected by the MHCC representing all stakeholders in the manufactured housing market.

Based on the foregoing, MHARR calls on the MHCC to supplement its previous comments to HUD and DOE regarding this matter to incorporate the above matters.

MHARR thanks the MHCC for its thorough and thoughtful consideration of the DOE proposed energy standards and urges the MHCC to remain fully-engaged in this critical rulemaking.

Sincerely,

Mark Weiss
President and CEO

[1] Such massive purchase price increases, moreover, as MHARR noted in its October 25, 2021 DOE comments, would be further compounded by the fact that loan payments for manufactured homes are already artificially inflated and unnecessarily onerous because of: (1) the failure of mortgage giants Fannie Mae and Freddie Mac to securitize or provide a secondary market for the vast majority of manufactured homes financed as personal property notwithstanding the affirmative mandate of the statutory Duty to Serve Underserved Markets (DTS); and (2) baseless restrictions on lender participation in the Federal Housing Administration's Title I manufactured home program due to the "10-10" rule adopted and still maintained by the Government National Mortgage Association.

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Appendix C: MHCC Comments on Energy Conservation Program - Energy Conservation Standards for Manufactured Housing

September 23, October 8, October 20, & November 19, 2021
MHCC Meeting

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MHCC Comments on Energy Conservation Program – Energy Conservation Standards for Manufactured Housing

GENERAL COMMENTS

- The MHCC agrees that the energy efficiency requirements need to be updated but believes the updates should be done incrementally.
- The MHCC believes that HUD, not DOE, is the appropriate enforcement body for manufactured housing, but in any event, it will take more than one year to develop an enforcement program for the new DOE standards. An enforcement agency other than HUD would create additional costs and program development.
- The MHCC believes that the proposal in its current state is flawed and should not be implemented as proposed, due to its lack of proper/accurate cost benefit analysis, consideration for manufactured home construction methods, transportation constraints, and testing/enforcement criteria.
- The tiered approach has inequality ramifications that lower income home buyers should have homes with the same level of energy efficiency.
- The NODA failed to address any of the MHCC's issues with the SNOPR as described in the MHCC's comments included in this document.
    - The way DOE has based tiers and defined affordable housing as the 70th percentile of a single section home is fundamentally flawed, discriminatory, and impossible to implement.
    - The MHCC believes that the standard should be based on the lowest total construction and operating cost to the consumer. This is to be based on an accurate cost benefit analysis, which the DOE's current approach does not offer as they didn't consider the impact of the building elements in an incremental fashion.
    - All manufactured housing is based on affordability, so any attempt to set a pricing tier to segregate based on affordability would undermine the intent and purpose of manufactured housing.

MHCC RESPONSES TO DOE QUESTIONS

Each question below includes the topic and the location of relevant information in the SNOPR.

Question 1 - Manufacturers Retail List Thresholds – 47746-47748 and 47758-47759:

DOE Question: DOE invites comment on whether (1) the manufacturer's retail list price threshold for Tier 1 under the tiered proposal is appropriate, (2) the untiered proposal in this SNOPR is cost-effective, generally, and (3) the untiered proposal is cost-effective for low-income consumers.

MHCC Comments:

(1) No, it is not appropriate. There is no standardized "manufacturer's retail list price", this is not a term or methodology that is used or exists in the manufactured housing industry. The idea that we are going to approve a design for either tier, without a proper cost associated with the design doesn't work. The retail cost of the unit is not determined during the design phase. The manufacturer's retail list price threshold does not appropriately consider regional differences in cost. The way DOE has based tiers and defined affordable housing as the 70th percentile of a single section home is fundamentally flawed, discriminatory, and impossible to implement.
(2) No, the untiered proposal as proposed is not cost-effective generally. For example, wall assemblies in thermal zones 2 and 3 are neither cost effective or feasible for manufactured housing as detailed in MHCC comments to Question 25.
(3) No, the untiered proposal as proposed is not cost-effective for low-income consumers.

Question 2 - Impact of Testing, Compliance, and Enforcement - 47754, 47756-47757, and 47764:

DOE Question: DOE welcomes comment on approaches for testing, compliance and enforcement provisions for the proposed standards and alternative proposal. DOE also welcomes comments and information related to potential testing, compliance and enforcement under the current HUD inspection and enforcement process, and potential costs of testing, compliance and enforcement of the proposed standards and alternative proposal in this document.

MHCC Comments:

All costs imposed by the proposed regulations must be factored into the cost/benefit analysis, and DOE has disregarded any potential costs for testing, compliance, and enforcement. Enforcement, testing, compliance, etc., is part of

those costs, and could be significant. Furthermore, if any workload associated with enforcement, testing, or compliance would result as a responsibility of HUD or DOE, resources consistent with that workload must be considered. The MHCC believes that keeping compliance and enforcement with this proposed rulemaking would be best handled by HUD. Any additional cost burdens created by enforcement, testing, and compliance will be passed on to the purchaser.

Question 3 - Tiered/Untiered Approach, Price Point for Tiers, and Chattel Loans - 47754, 47756-47757, and 47764:

DOE Question: DOE requests comment on the use of a tiered approach to address affordability and PBP concerns from HUD, other stakeholders, and the policies outlined in Executive Order 13985. DOE also requests comment regarding whether the price point boundary between the proposed tiers is appropriate, and if not, at what price point should it be set and the basis for any alternative price points. DOE also requests comment on its assumptions regarding the use of high-priced loans (e.g., chattel loans) by low-income purchasers, or other purchasers, of manufactured housing.

MHCC Comments:

MHCC does not believe a tiered approach based on manufacturer's retail list price is appropriate. However, If DOE moves forward with a tiered approach, the MHCC believes that single- or multi-section would be the most appropriate metric. The goal is to revise the standards to get the most energy efficient elements that are cost justified. The MHCC recognizes that a tiered system potentially poses an equality concern. Data used by DOE should be as current as possible.

Question 4 - Alternative Size-based and Region Thresholds & Auspicated Data - 47761:

DOE Question: DOE also requests comment on alternate thresholds (besides price point) to consider for the tiered approach, including a size-based threshold (e.g., square footage or whether a home is single- or multi-section). DOE requests comment on the square footage and region versus sales price data provided in the notice (from MHS PUF 2019) and how that data (or more recent versions of that data) could be used to create either a size-based or region-based threshold instead. DOE further requests input on whether there should be single national threshold as proposed, or whether it should vary based on geography or other factors, and if so, what factors should be considered.

MHCC Comments:

MHCC does not believe a tiered approach based on manufacturer's retail list price is appropriate. However, If DOE moves forward with a tiered approach, the

MHCC believes that single- or multi-section would be the most appropriate metric. Using the sections of a home to define the threshold would be less complicated to implement and will properly reflect the possible disproportion with calculating U values. Using manufacturer's retail list price as a basis for thresholds could lead to situations where, for a single model, multiple plan sets may need to be generated leading to multiple plan review and approvals.

Question 5 - Annual Energy Overlook (AEO) Gross Domestic Product (GDP) Inflation – 47761:

DOE Question: DOE requests comment on using the AEO GDP deflator series to adjust the manufacturer's retail list price threshold for inflation. DOE requests comment on whether other time series, including those that account for regional variability, should be used to adjust manufacturer's retail list price.

MHCC Comments:

MHCC does not believe a tiered approach based on manufacturer's retail list price is appropriate and therefore the method for calculating potential inflation is irrelevant.

Question 6 - DOE Standards Implementation Lead Time – 47766:

DOE Question: DOE requests comment on whether a one-year lead time would be sufficient given potential constraints that compliance with the DOE standards may initially place on the HUD certification process, and whether a longer lead time (e.g., a three-year lead time) or some other alternative lead-time for this first set of standards (e.g., phased-in over three years, with one-year lead-times thereafter) should be provided.

MHCC Comments:

The MHCC believes that a one-year lead time would not be sufficient. Major changes to the manufacturer's process, facilities, home designs, and supply chains would be required to comply with the DOE standards. A more realistic time frame for implementation would be a minimum of 5 years.

Question 7 - IECC Definition Proposals – 47766-47768:

DOE Question: DOE requests comment on its understanding of the definitional changes in the 2018 IECC and the 2021 IECC. DOE also requests comments on its changes to the proposed definitions as compared to those proposed in the June 2016 NOPR.

MHCC Comments:

The MHCC has not identified any conflicts with the proposed definitions under this proposed rule.

Question 8 - Incorporation by Reference, Heating/Cooling Sizing/Loads – 47768-47769:

DOE Question: DOE requests comment on incorporating by reference ACCA Manual J, ACCA Manual S, and "Overall U-Values and Heating/Cooling Loads–Manufactured Homes" by Conner and Taylor.

MHCC Comments:

Both Manual J and Manual S consider the orientation and site-specific weather for the home, which is unknown at the time of construction of Manufactured Homes. The adoption of these standards will have a significant cost impact on the home, including the potential of increasing approval time, or frequency of approval. Incorporating these references will complicate the manufacturing process but also increase the overall cost of the units.

Question 9 - HUD (3) Climate Zones vs. Other Climate Zone Options – 47769-47771:

DOE Question: DOE requests comment on basing the climate zones on the three HUD zones instead of the June 2016 NOPR-proposed four climate zones, or other configuration of climate zones. DOE further requests input on whether energy efficiency requirements should be based on smaller geographic areas than provided with the 3 or 4 zone model.

MHCC Comments:

The MHCC strongly supports using the current HUD climate zones for the purpose of this standard.

Question 10 - Tier 1 Energy Conservation Standards, Exterior Wall Insulation – 47773-47774:

DOE Question: DOE requests comment on the Tier 1 energy conservation standards, which would be applicable to manufactured homes with a manufacturer's retail list price of $55,000 or less. DOE also requests comment on the proposed energy conservation standards based on the most recent version of the IECC for the Tier 2 and untiered standards and the consideration of R-21 sensitivity for exterior wall insulation for climate zones 2 and 3.

MHCC Comments:

MHCC does not believe a tiered approach based on manufacturer's retail list price is appropriate. However, If DOE moves forward with a tiered approach, the MHCC believes that single- or multi-section would be the most appropriate metric.

Question 11 - Additional Energy Efficiency Requirements, Cost-savings of the Proposal – 47773-47774:

DOE Question: DOE requests comment on the additional energy efficiency requirements from the 2021 IECC and whether they should apply to manufactured homes, including those that DOE has initially considered as not applicable to manufactured homes. If so, DOE requests comment on how these requirements would apply and the costs and savings associated with these requirements.

MHCC Comments: The MHCC believes that the energy efficiency requirements from the 2021 IECC, as currently proposed, are not the appropriate resource to be used in updating Manufactured Housing energy requirements as the 2021 IECC wasn't developed or intended for Manufactured Housing.

Question 12 - Thickness/Density Exterior Ceiling Insulation – 47759, 47778:

DOE Question: DOE requests comment on the proposal to not require that exterior ceiling insulation must have uniform thickness or a uniform density.

MHCC Comments: As it applies to manufactured housing, the MHCC agrees that providing exception to the exterior ceiling insulation thickness/density requirements is necessary to ensure effective insulation techniques for the manufactured housing industry. The ability to average the R value in the attic is critical to maintaining existing designs and shipping constraints.

Manufactured housing redesign is required (ex. reducing ceiling height or modifying truss designs) and would impact the ability for the Manufactured Housing industry to provide innovative designs and the features consumer's desire. As an example of many additional costs not considered by DOE, the manufactured industry uses many different truss designs and getting a truss tested and approved for use in the HUD standard could cost upwards of $2500 per design.

Any modifications to the heel height, which would directly affect overall shipping height, would create additional cost and transportation issues that were not considered by DOE in this proposal. Any increase in the shipping height of a home would lead to additional costs such as rerouting units, pilot vehicles, and/or redesign of units.

Question 13 - Glazed Fenestration Limitations – 47778:

DOE Question: DOE requests comment on the proposal not to limit the total area of glazed fenestration.

MHCC Comments: The MHCC agrees that DOE should not limit the glazed fenestration ratio as applied to the prescriptive approach; allowing for flexibility in manufactured housing design and manufacturing methods. MHCC understands that the limit to the total area of glazed fenestration does not apply to the performance approach as this is considered through calculation.

To the extent that DOE bases its requirements on the 2021 IECC, the MHCC believes that fenestration exemptions that exist in the 2021 IECC must also be included.

Question 14 - Roof Floor Decking Insulation Contact – 47779-47780:

DOE Question: DOE requests comment on removing the proposed requirement that exterior floor insulation installed must maintain permanent contact with the underside of the rough floor decking.

MHCC Comments: The MHCC supports DOE removing the requirement that exterior floor insulation installed must maintain permanent contact with the underside of the rough floor decking. It's very important that the manufactured housing industry are exempt from this requirement. It allows manufactured housing to keep the supply duct work, floor framing, and plumbing within the thermal barrier of the house.

Question 15 - IECC Insulation Requirements as it Relates to MH – 47780-47781

DOE Question: DOE requests comment on the proposed updates to the installation of insulation criteria as it applies to manufactured homes construction only.

MHCC Comments: The MHCC has reviewed Table III.13 and does not recommend adding any additional information to the proposed rule. MHCC suggests that language in Table 460.103 regarding baffles be revised to state the following:

Baffles	*Baffles, when used in conjunction with eave venting, must be constructed using a solid material, maintain an opening equal to or greater than the size of the vents, and extend over top of the attic insulation.*

MHCC suggest that language in Table 460.103 regarding eave vents be removed, it does not appear to be listed in Table R402.4.1.1 of the 2021 IECC and is not relevant to Manufactured Housing.

~~*Eave vents*~~	~~*Air-permeable insulations in vented attics within the building thermal envelope must be installed adjacent to eave vents.*~~

Question 16 – Access Hatched/Doors and Other Considerations – 47780-47781:

DOE Question: DOE requests comments on whether there are any of the 2021 IECC updates relevant to manufactured housing that should be considered as part of this rulemaking. Specifically, DOE requests comment on whether the 2021 IECC updates for installation criteria for access hatches and doors, baffles and shafts are applicable to manufactured housing and should be considered in this rulemaking.

MHCC Comments: MHCC does not recommend adding any additional information related to installation of insulation to the proposed rule. MHCC does suggest that "doors" be deleted from Table 460.103 under "Access hatches, panels and Doors". Doors are commonly used for exterior access of utility and water heater rooms in certain regions of the country. They are specified by the U-factor requirements already established in section 460.102.

Access hatches~~,~~ and panels~~, and doors~~	Access hatches~~,~~ and panels~~, and doors~~ between conditioned space and unconditioned space must be insulated to a level equivalent to the insulation of the surrounding surface, must provide access to all equipment that prevents damaging or compressing the insulation, and must provide a wood-framed or equivalent baffle or retainer when loose fill insulation is installed within an exterior ceiling assembly to retain the insulation both on the access hatch~~,~~ or panel~~, or door~~ and within the building thermal envelope.

Question 17 - Air Barrier Criteria, Air Leakage – 47781:

DOE Question: DOE requests comment on the proposed updates to the air barrier criteria as it applies to manufactured homes construction only. Further, DOE requests comment whether the SNOPR proposal continues to be designed to achieve air leakage sealing requirements of 5 ACH.

MHCC Comments: In the absence of building leakage testing criteria, it is unrealistic for the MHCC to provide proper feedback. There are current requirements and terminology in the proposed rule that do not apply to manufactured homes. There are several sections in proposed rule that would need to be reworded to appropriately apply to the varying types of manufactured houses.

Question 18 - Air Barrier Criteria, Recessed Lighting, Narrow Cavities, and Plumbing – 47781:

DOE Question: DOE requests comments on whether there are any of the 2021 IECC updates relevant to manufactured housing that should be considered as part of this rulemaking. Specifically, DOE requests comment on whether the 2021 IECC updates for air barrier criteria for recessed lighting, narrow cavities and plumbing are applicable to manufactured housing and should be considered in this rulemaking. If so, DOE requests comment on whether the requirements would alter the 5 ACH designation.

MHCC Comments:

The MHCC does not find any additional 2021 IECC updates that would be relevant to manufactured housing. Furthermore, the MHCC feels that the option to provide an air barrier behind junction boxes or seal around the Junction boxes should remain as written in table 460.104. MHCC also feels that the rim joist criteria in Table 460.104 should be revised to remove references to sill plates as this is not a typical assembly in manufactured housing.

Recessed Lighting: MHCC does not feel that recessed lighting housings needs specification on air leakage rates as these fixtures are usually IC rated and significantly airtight especially when considering that they are buried in attic insulation and will be sealed at the ceiling penetration. MHCC does not feel that this will have a significant impact to the 5 ACH design performance goal.

Narrow cavities: MHCC does not feel that additional information needs to be added to the proposed rule for narrow cavities as any such activities are rare in manufactured housing and when they do occur, generally do not disrupt the air barrier and are insulated or gasketed. MHCC does not feel that this will have a significant impact to the 5 ACH design performance goal.

Plumbing: MHCC does not feel that additional information needs to be added to the proposed rule for wiring and plumbing as most often these utilities are routed in the floor systems within the thermal envelope and larger vent piping is already caulked and sealed. MHCC does not feel that this will have a significant impact to the 5 ACH design performance goal.

Question 19 - Duct System Air Leakage – 47784-47785:

DOE Question: DOE requests comment on the proposal to require that total air leakage of duct systems for all manufactured homes is to be less than or equal to 4 cfm per 100 square feet of conditioned floor area.

MHCC Comments: The MHCC believes that total duct leakage is not an appropriate test for a manufactured home because the majority of duct work in manufactured homes are within the thermal barrier.

Question 20 - Thermostat Control Requirements – 47785-47786:

DOE Question: DOE requests comment on DOE's interpretation of R403.1 and the proposed updates to the thermostat and controls requirements. In addition, DOE requests comments on whether there are any of the 2021 IECC updates relevant to manufactured housing that should be considered as part of this rulemaking.

MHCC Comments: The MHCC believes that programable thermostats and other technically advanced thermostats should remain an option for a homeowner. MHCC is aware of the potential energy savings provided by properly used programable thermostats, however the savings are dependent on proper user operation.

Question 21 - Hot Water Service and Temperature Limits – 47786:

DOE Question: DOE requests comment on DOE's interpretation of R403.5 and the proposed updates to the service hot water requirements. In addition, DOE requests comments on whether there are any of the 2021 IECC updates relevant to manufactured housing that should be considered as part of this rulemaking. Specifically, DOE requests comment on whether the circulating hot water system temperature limit should be included as a requirement.

MHCC Comments: Circulating hot water systems are not typically used in manufactured homes.

Question 22 - Fan Efficacy Standards – 47786:

DOE Question: DOE requests comment on the proposal to include the 2021 IECC fan efficacy standard requirements. DOE requests comment on whether any of the fan efficacy requirements are not applicable to manufactured homes.

MHCC Comments: The MHCC believes that the applicability of the increased efficacy standards would be dependent upon the additional costs associated and return of investment of the increased mechanical ventilation requirements.

Question 23 - Heat and Energy Recovery Ventilators (HRV/ERV respectively) – 47786-47787:

DOE Question: DOE requests comment on whether the HRV and ERV provisions under 2021 IECC for site-built homes are applicable to manufactured homes and whether they would be cost-effective. Specifically, DOE requests comment on costs for the HRV and ERV requirements as it applies to manufactured homes in all climate zones.

MHCC Comments: The MHCC believes that HRV and ERV systems are not cost effective for manufactured housing and have proven to be problematic in certain climate zones. Furthermore, the referenced study relied upon (Taylor, Zachary T. Residential Heat Recovery Ventilation. United States) is only based upon standards as they would apply to site-built or "typical residential dwelling units".

Question 24 - Ventilation Strategies *Not included in the Proposal* – 47787:

DOE Question: DOE requests comment on the above ventilation strategies, including (but not limited to) cost, performance, noise, and any other important attributes that DOE should consider, including those related to mitigation measures. While the alternate ventilation approaches are not integrated into the analysis presented as part of this proposal, DOE is giving serious consideration as to whether it should incorporate one or more of these options as part of its final rule based on any additional data and public comments it receives.

MHCC Comments: The mitigation measures for ventilation strategies are addressed in the Manufactured Home Construction and Safety Standards in section 3280.103(b)(1). Therefore, MHCC agrees with not including alternative ventilation strategies.

Question 25 - Exterior Wall Insulation Zones 2 & 3, Sensitivity Analysis – 47802-47803:

DOE Question: DOE requests comment on the cost-effectiveness and feasibility of requiring R-20+5 for the exterior wall insulation for climate zone 2 and 3 Tier 2/Untiered manufactured homes. DOE also requests comment on the sensitivity analysis for R-21 that would result in positive LCC savings for all cities.

MHCC Comments: An R 20+5 exterior wall insulation is neither cost effective or feasible for manufactured housing. Calculations of the R 20+5 in all thermal zones has been shown to provide minimal energy savings, often as little as 3% (when compared to R19 cavity insulation) which inhibits any benefits.

From a production perspective, implementing continuous exterior wall insulation would require extensive upgrading of processes, machinery, and facilities to a point of which could potentially result in significantly increased pricing, diminished supply, potential plant closures and loss of jobs. This process would negatively impact throughput rates of manufacturers and as a result, significantly increase overall costs. MHCC believes that the DOE cost/benefit analysis did not properly address these concerns.

Question 26 - Conversion Cost Estimates – 47805-47806:

DOE Question: DOE requests comment on the inputs to the conversion cost estimates.

MHCC Comments: The MHCC believes it is critical to include the cost associated with testing, compliance, and enforcement which are key elements necessary to implement the proposed regulations yet are not included. The overall costs that are required to modify design, production, and assembly are not properly taken into account. Most manufacturing facilities have dozens of truss designs which would need to be redesigned, tested, and approved. As an example of many additional costs not considered by DOE, the manufactured industry uses many different truss designs and getting a truss tested and approved for use in the HUD standard could cost upwards of $2500 per design. Considering how many truss designs are used by manufacturers, this one additional cost would exceed DOE's overall estimated product conversion cost. Other examples of added cost which would potentially surpass DOE's estimated product conversion cost would be plan review/approval and product/material storage.

Although these costs are initially burdened by the manufacturer, they will inevitably be passed on to the consumer and the overall cost of the unit.

Question 27 - Shipment Cost Breakdown – 47808-47809:

DOE Question: DOE requests comment on the shipment breakdown per tier and using a substitution effect of 20 percent on shipments to account for the shift in homes sold to the lower tiered standard. DOE requests comment on whether it should use a different substitution effect value for this analysis – and if so, why. (Please provide data in support of an alternative substitution effect value.)

MHCC Comments: MHCC does not believe a tiered approach based on manufacturer's retail list price is appropriate therefore any shipments assumptions based on a tiered approach are invalid.

The MHCC believes in order to comply with the proposed rule overall shipments will decrease dramatically as consumers move to more affordable forms of shelter such as vehicles or structures not intended to be used as permanent dwelling units. (ex. RVs or park trailer/model that do not comply with HUD standard and must instead comply with NFPA 1192 and ANSI A119.5 respectively). It is the MHCC's belief that best practice is to try and keep people in manufactured homes that comply with the HUD standard which are safer, designed/built for year-round living, and more energy efficient.

Question 28 - Calculations of Loss (Deadweight) – 47813:

DOE Question: DOE requests comment on the calculation of deadweight loss presented above and the extent to which there are market failures in the no-standards case.

MHCC Comments: The MHCC believes that deadweight loss would be significantly higher than DOE's estimate as many potential consumers will be priced out of the market. For example, NAHB published a study in 2021(NAHB Priced-Out Estimates for 2021), estimating that a $1,000 increase in the median new home price ($346,757) would price 153,967 households out of the market. The MHCC believes that an increase of $1,000 would have a more significant impact on manufactured housing.

Question 29 - Number of MH Manufacturers Producing Homes – 47826:

DOE Question: DOE requests comment on the number of manufacturers of manufactured housing producing home covered by this rulemaking.

MHCC Comments: As of September 2021, there are 138 plants and 33 corporations producing manufactured homes in the country. As a result of this proposed rulemaking, all manufacturers will be negatively impacted.

Question 30 - Cost to Update Model Plans – 47807-47808, 478250-47826:

DOE Question: DOE requests comment on the cost to update model plans and the number of model plans to update as a result of the proposed rule; on the types of equipment and capital expenditures that would be necessitated by the proposal; and the total cost of updating product offerings and manufacturing facilities. DOE requests comment on how these values would differ for small manufacturers. DOE requests comment on its estimate of average annual revenues for small manufacturers of manufactured housing.

MHCC Comments: Smaller manufacturers may not always have the ability to make these changes in house and must rely on external experts which results in higher costs. The MHCC believes that the estimated engineering and third-party review time of 3 hours is too conservative and estimates that the actual time required would be 10-12 hours. As an example of changes needed; each model plan must be revised for physical space impacts, evaluated through calculation for compliance to new thermal envelope requirements, analyzed for structural load path impacts, evaluated for procurement and material changes, and a third-party plan review and approval. One large manufacturer on the MHCC has upwards of 3,000 model plans while data received from a single facility manufacturer estimates 300 model plans.

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Appendix D: MHCC AFFORDABILITY PRESENTATION

September 23, October 8, October 20, & November 19, 2021
MHCC Meeting

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MHCC Affordability Presentation

DOE Proposed Rule – October 20, 2021

Affordability

- According to the Aspen Institute, HUD's Housing Cost Burden is the longest-established and most widely used metric to determine unaffordability.
  - HUD defines spending more than **30 percent of income** on housing costs as cost-burdened.
  - Spending more than 50 percent of income on housing costs is considered severely cost-burdened.
- Manufactured housing is often considered a source of Naturally Occurring Affordable Housing (NOAH) defined as unsubsidized housing that meets the affordability standard for **households making 60-80 percent of AMI**.

U.S. Affordable Housing Stock

- Low Income Housing Tax Credit.
  - o Used for household incomes below 60 percent AMI.
    - affordability periods that range from **30 years** for rental new construction.
    - According to Enterprise Community Partners, 33 states require or encourage developers seeking these projects to follow the Enterprise Green Communities Criteria.
    - All residential units must certify ENERGY STAR.

U.S. Affordable Housing Stock

- HOME Program.
  - o are used for household incomes below 80 percent AMI.
    - affordability periods that range up to **20 years for new construction**.
    - Requires EE to current IECC standards.
- FHA Underwriting for MH.
  - o 29% monthly Income.
  - o 31% FHA Energy-Efficient Mortgage.
  - o Freddie also stretches ratios for energy efficiency.

Life Cycle Costs Considerations

- HUD's affordability compliance requirements **for new housing production are up to 30 years.**
- Energy savings should not be calculated based on a simple payback for the first home buyer, but also subsequent purchasers who will benefit over the 40-year life expectancy of the home.
- According to the National Association of Realtors, as of 2018**, the median duration of homeownership in the U.S. is 13 years**. Compared to previous years, homeowners opt to spend more time holding onto their residences. Median tenure has increased by three years since 2008.
- According to the Manufactured Housing Institute, 62 percent of all residents anticipate living in their homes **for more than ten years**, and 38 percent do not expect to sell their homes.

2020 Census Income

2020 Census Income	Income	Federal Low-Income Housing Definitions
100% Median Income	$67,521	National Median
80% Median Income	$54,017	Low Income
60% Median Income	$40,513	Multifamily Tax Subsidy Income Limit
50% Median Income	$33,761	Very low income

Source: Income in 2020 dollars, adjusted using the CPI-U-RS. Households as of March of the following year. Information on confidentiality protection, sampling error, non sampling error, and definitions is available at <https://www2.census.gov/programs-surveys/cps/techdocs/cpsmar21.pdf>
Income as defined by HUD Guidance: https://www.huduser.gov/portal/datasets/il/il21/HUD-sec8-FY21.pdf

2020 Manufactured Homeowners & Renters Income

2020 Urban Institute Study	Median Household Income	Federal Low-Income Housing Definitions
Manufactured homeowners[3]	$ 38,087	Multifamily Tax Subsidy Income Limit
Manufactured home renters[3]	$ 28,280	Very low income

Source: 2013-18 American Community Survey - Urban Institute, https://www.urban.org/urban-wire/22-million-renters-and-owners-manufactured-homes-are-mostly-left-out-pandemic-assistance

Monthly Housing Costs

2020 Urban Institute Study	Monthly Housing Cost
Manufactured homeowners[4]	$ 505
Manufactured home renters[5]	$ 670
Non-manufactured homeowners[6]	$ 1,168
Non-manufactured renters[6]	$ 1,079

4. For owners includes loan payments, lot rental payments, utilities, insurance, and property taxes; Source: 2013-18 American Community Survey - Urban Institute

5. For renters includes rental payments and utilities; Source: 2013-18 American Community Survey - Urban Institute

6. Source: 2013-18 American Community Survey - Urban Institute

Chattel Loans

Chattel Loan	
Loan Amount	$70,731
Interest Rate	8.60%
Term (20-23 years)	20
Payment (Principal & Interest Only)	$618

Source: Pricing Assumptions from CFPB: Manufactured Housing Finance: New Insights from the Home Mortgage Disclosure Act Data May 2021

Chattel Loan including Energy Costs	
Incremental Energy Increase for Single-Section	3,914
Chattel Loan Amount	70,731
Increased Mortgage Loan Amount for Energy	74,645
PITI, plus utilities with savings, loan includes increased energy costs	856

Source: DOE National Average, CFPB 2020 Median Loan Values, Taxes, Insurance and utilities, Next Step data: Assumption chattel for single-section home.

Chattel Loan Affordability

Chattel Affordability Analysis based on 30% Income

Chattel Loan Payment & Utilities, including cost for energy upgrade	$ 856
Income needed to afford loan	$ 34,240
60% of National Median Income	$ 40,513

Mortgage Loans

Mortgage Loan	
Loan Amount	$127,200
Interest Rate	4.90%
Term (30 years)	30
Payment (Principal & Interest only)	$ 675

Source: Pricing Assumptions from CFPB: Manufactured Housing Finance: New Insights from the Home Mortgage Disclosure Act Data May 2021

Mortgage Loan including Energy Costs	
Incremental Energy Increase for Multi-Section	$ 5,289
Mortgage Loan Amount	$ 127,200
Increased Mortgage Loan Amount for Energy	$ 132,489
PITI, plus utilities with savings, loan includes increased energy costs	$ 1,010

Source: DOE National Average, CFPB 2020 Median Loan Values, Taxes, Insurance and utilities, Next Step data: Assumption mortgage for multi-section home.

Mortgage Loan Affordability

Mortgage Affordability Analysis based on 30% Income

Mortgage Loan Payment & Utilities, including cost for Energy upgrade	$	1,010
Income Needed to Afford Loan	$	40,400
60% of National Median Income	$	40,513

Thank You

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