

HEARING OFFICER'S REPORT

TO: The Honorable Shawn M. Garvin
Cabinet Secretary, Dept. of Natural Resources and Environmental Control

FROM: Theresa Newman, Regulatory Specialist, Office of the Secretary,
Dept. of Natural Resources and Environmental Control

RE: **Proposed Regulation Amendments to 7 DE Admin. Code 2101:**
Regulations for State Energy Conservation Code

DATE: March 20, 2020

I. BACKGROUND AND PROCEDURAL HISTORY:

A public hearing was held on Tuesday, December 3, 2019, at 6:00 p.m. at the Department of Natural Resources and Environmental Control (“DNREC,” “Department”), 89 Kings Highway, Dover, Delaware to receive comment on proposed amendments to 7 DE Admin. Code 2101: *Regulations for State Energy Conservation Code* (“Amendments”). Pursuant to 16 Del.C. §7602, *Delaware’s Energy Conservation Code Act*, the Department is required to adopt the most recent and/ or highest available version of the International Energy Conservation Code (“IECC”), and the latest American Society of Heating, Refrigerating and Air-Conditioning Engineers/Illuminating Engineering Society of North America (“ASHRAE”) energy standard, as determined by the Department on a triennial basis. In addition, the regulations must also set out procedures for certification of compliance with these codes and standards to be utilized by the respective local governments.

On May 1, 2014, Delaware implemented the 2012 IECC (with Delaware-specific amendments) for residential buildings and ASHRAE 90.1-2010 for commercial and high-rise residential structures. The Delaware-specific amendments to the 2012 IECC, were intended to give builders additional time to learn the more stringent energy efficiency requirements, adapt their construction techniques and materials, and take an initially

conservative approach that reduced the risk of the code update resulting in negative cost impacts on housing prices, despite the overall cost-effectiveness of the 2012 code.

In 2017 the Division of Climate, Coastal, & Energy's (DCCE) convened the Delaware Energy Code Coalition ("Coalition") to begin the triennial review of the available energy conservation codes and evaluate the impacts of adopting a newer version of the IECC and ASHRAE standards. The Coalition met eleven times between March 2017 and January 2019 to review the 2015 and 2018 version of the IECC standards, as well as the 90.1-2013 and 90.1-2016 ASHRAE standard. During that time, the DCCE collected input through the Coalition, gathering stakeholders proposed revisions, opinions, and potential impacts to the updated version of the energy codes, as marked into the record (see Department Exhibit #3). To address the concerns of stakeholders, the Department acquired technical assistance from the U.S. Department of Energy's Pacific Northwest National Lab, Northeast Energy Efficiency Partnerships, and Optimal Energy, Inc., to provide additional technical support in response to stakeholder concerns.

The Department considered the analysis of a technical consultant (see Department Exhibit #4) that provided the economic study of improved residential air sealing requirements by using the amount of Air Changes per Hour ("ACH"). ACH is the unit used to measure the ventilation rate or air leakage rate for a house. It is calculated during a blower door test and is defined as the number of times the air volume in a house changes per hour when the home has been depressurized to negative 50 pascals of pressure compared to the outside air pressure. Higher ACH limits allow for leakier homes that require more energy to heat and cool.

The analysis revealed that a reduction from 5 ACH (Delaware-amended 2012 IECC) to 3 ACH (2018 IECC) represents a 40% reduction in air leakage. Applying this air leakage reduction to the energy costs associated with air leakage yields an annual energy cost savings of \$68, assuming increased construction costs of \$150-\$225. The cost of improving air sealing requirements will come with simple paybacks of 2.2 to 3.3 years and benefit-cost-ratios ("BCR") ranging from 3.8 to 5.7. It should be noted that an

energy efficiency measure with BCR over 1.0 is considered cost-effective as the relative benefits outweigh the costs associated with the improvement, as such the measure is expected to deliver a positive return on investment to the property owner.

At the conclusion of the aforementioned meetings, pursuant to 16 *Del.C.* §7602, the Department is proposing to adopt by reference the 2018 IECC and ASHRAE 90.1-2016, in their entirety. Anticipated benefits of adopting the current versions of the IECC and ASHRAE include increasing building sector energy efficiency, energy cost savings for building owners and occupants, increased occupant comfort, and reduced emissions in Delaware. Likewise, the Department expects modest increased cost with adoption of the proposed amendments; however, the increases are to be offset by the benefits accrued to the owners.

Additionally, the 2018 IECC is already the most flexible version of the code developed to-date. This is in part due to changes to the Energy Rating Index (ERI) compliance pathway which does not exist in the current version of the Delaware energy code and will be a new option for Delaware builders. The ERI will add a new compliance option for homebuilders in addition to the prescriptive and performance pathways already present in the 2012 IECC. With guidance from the Coalition, the DCCE also finds that the 2018 IECC and ASHRAE 90.1-2016 versions will help the Department to meet the goals of Governor Carney's U.S. Climate Alliance commitment to reduce the State's greenhouse gas emissions 26 to 28 percent from 2005 levels by 2025.

The Department has the statutory basis and legal authority to act with regard to the proposed amendments to 16 *Del.C.* §7602, Delaware's *Energy Conservation Code Act*. The Department published its initial proposed Amendments in the November 1, 2019 *Delaware Register of Regulations*. Thereafter, the public hearing regarding this matter was held on December 3, 2019. There were nine (9) members of the public in attendance. Pursuant to Delaware law, the hearing record ("Record") remained open for fifteen (15) additional days subsequent to the date of the public hearing for receipt of

public comment. The Record formally closed with regard to public comment at close of business on December 18, 2019, with thirteen (13) additional comments received (including one (1) comment previously received and marked as an exhibit during the public hearing) by the Department during the post-hearing phase of this regulatory promulgation.

After the record closed, the Department's Division of Climate, Coastal, and Energy staff prepared a Technical Response Memorandum ("TRM"), attached hereto as Appendix "B", at the request of this Hearing Officer.

It should be noted that all notification and noticing requirements concerning this matter were met by the Department as required by law.

II. SUMMARY OF THE PUBLIC HEARING RECORD:

The Record consists of the following documents: (1) a verbatim transcript; (2) seventeen (17) documents introduced by Department staff at the public hearing held on December 3, 2019, and marked by this Hearing Officer at the time of the hearing accordingly as Department Exhibits 1-17; and (3) a Technical Response Memorandum ("TRM"). The Department's person primarily responsible for the drafting and overall promulgation of the proposed Amendments, Jessica Quinn, Planner IV, Division of Climate, Coastal, & Energy, developed the Record with the relevant documents in the Department's files.

As stated previously, a TRM was provided by the Department's expert staff. The TRM responded to twenty-three written comments received, that of which nineteen comments were in support of the Department's proposed revisions to 7 DE Admin. Code 2101. The supporting comments received, highlighted that the adoption by reference of ASHRAE 90.1-2016 and 2018 IECC in their entirety will have numerous benefits including increased energy efficiency, reduced energy costs for Delaware building

occupants and owners, reduced greenhouse gas emissions and air pollution, and improved building safety and resilience.

Multiple comments also highlighted stakeholders' opposition to the amendments that the Department considered during the development of the proposed regulation, but ultimately chose to exclude from the proposed Amendments. Most notably, the amendments to the residential provisions of the 2018 IECC that the Department considered would weaken the air sealing requirements on smaller homes by allowing up to 5 ACH instead of enforcing the 3 ACH limit in the model code.

The Department's DCCE is prepared to provide the local code enforcement officials, builders, and design professionals with training following promulgation of these regulations to assist the stakeholders in obtaining the technical assistance needed during the transition period to adapt to the new codes.

The Department does not believe that the technical comments warrant a substantive change to the proposed regulations and recommended that the Secretary adopt the proposed amendments as the final amendments to 7 DE Admin. Code 2101. Accordingly, the Department's proposed Amendments are attached hereto as Appendix "A" for the Secretary's review.

I find that the DCCE's TRM offers a detailed review of the proposed Amendments, identifies all the concerns raised by the public, and responds to the concerns in a balanced manner, accurately reflecting the information contained in the Record. Thus, the aforementioned TRM is attached hereto as Appendix B and expressly incorporated herein as such.

The Department's presiding hearing officer, Theresa L. Newman, prepared a Hearing Officer's Report dated March 20, 2020 (Report). The Report recommends certain findings and the adoption of the proposed Amendments, as attached to the Report as Appendix A and expressly incorporated herein as such.

III. RECOMMENDED FINDINGS AND CONCLUSIONS:

Based on the Record developed, I find and conclude that the Department has provided appropriate reasoning regarding the need for the proposed amendments to 7 DE Admin. Code 2101: *Regulations for State Energy Conservation Code*, specifically, to adopt by reference the 2018 IECC and ASHRAE 90.1-2016 in their entirety. Accordingly, I recommend promulgation of the same, in the customary manner provided by law.

Further, I recommend the Secretary adopt the following findings and conclusions:

1. The Department has the statutory basis and legal authority to act with regard to this proposed regulatory promulgation, pursuant to 16 *Del.C.* §7602.
2. The Department has jurisdiction under its statutory authority, pursuant to 7 *Del.C.* Chapter 60, to issue an Order adopting these proposed Amendments as final;
3. The Department provided adequate public notice of the initial proposed Amendments and all proceedings in a manner required by the law and regulations, and provided the public with an adequate opportunity to comment on the same, including at the time of the public hearing held on December 3, 2019, and during the 15 days subsequent to the hearing (through December 18 , 2019), before making any final decision;
4. Promulgation of the proposed Amendments to 7 DE Admin. Code 2101, *Regulations for State Energy Conservation Code* will enable the Department to adopt by reference the 2018 IECC and ASHRAE 90.1-2016 in their entirety, pursuant to 16 *Del.C.* §7602, *Delaware's Energy Conservation Code Act*;
5. The Department has reviewed the proposed Amendments in the light of the Regulatory Flexibility Act, consistent with 29 *Del.C.* Ch. 104, and believes the same

to be lawful, feasible and desirable, and the recommendations as proposed should be applicable to all Delaware citizens equally;

6. The Department's proposed regulatory Amendments, as initially published in the November 1, 2019 *Delaware Register of Regulations*, and as set forth in Appendix "A" hereto, are adequately supported, are not arbitrary or capricious, and are consistent with the applicable laws and regulations. Consequently, they should be approved as final regulatory Amendments, which shall go into effect ten days after their publication in the next available issue of the *Delaware Register of Regulations*; and

7. The Department shall submit the proposed Amendments as final regulatory amendments to the *Delaware Register of Regulations* for publication in its next available issue and provide such other notice as the law and regulation require, and the Department determines is appropriate.



Theresa Newman
Public Hearing Officer

DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

DIVISION OF CLIMATE, COASTAL, & ENERGY

Statutory Authority: 16 Delaware Code, Section 7602 (16 Del.C. §7602)

7 DE Admin. Code 2101

PROPOSED

REGISTER NOTICE

SAN# 2019-04

2101 Regulations for State Energy Conservation Code

1. TITLE OF THE REGULATIONS:

7 DE Admin. Code 2101 *Regulations for State Energy Conservation Code*

2. BRIEF SYNOPSIS OF THE SUBJECT, SUBSTANCE, AND ISSUES:

Delaware's Energy Conservation Code Act (16 Del.C. §7602) requires DNREC to adopt the most recent and/or highest available version of the International Energy Conservation Code (IECC), and the latest American Society of Heating, Refrigerating and Air-Conditioning Engineers/Illuminating Engineering Society of North America (ASHRAE/IESNA) energy standard. The regulations must also set out procedures for certification of compliance with these codes and standards to be utilized by the respective local governments. The Energy Conservation Code Act instructs DNREC to review the state energy codes triennially for potential updates to adopt newer versions of the IECC and ASHRAE energy code standards.

Since May 1, 2014, Delaware has required the 2012 IECC for residential buildings and ASHRAE 90.1-2010 for commercial and high-rise residential structures. In 2017, the Department convened the Delaware Energy Code Coalition to begin the triennial review of the available energy conservation codes and evaluate the impacts of adopting a newer version of the IECC and ASHRAE standards. The Coalition met eleven times between March 2017 and January 2019 to review newer versions of the IECC and ASHRAE standards. The Department, in consultation with the Codes Coalition, considered the 2015 and 2018 versions of the IECC standards and ASHRAE 90.1-2013 and ASHRAE 90.1-2016. The Department collected input through the Delaware Energy Code Coalition to inform the proposed draft regulations.

The Department is proposing to adopt by reference the 2018 IECC and ASHRAE 90.1-2016 in their entirety. The modest increased cost of the more stringent energy conservation codes is offset by the benefits accrued to the building owners and occupants over the life of the building. Adopting the current version of the IECC and ASHRAE energy conservation codes will increase building sector energy efficiency, bring energy cost savings for building owners and occupants, increase occupant comfort, and reduce emissions in Delaware.

3. POSSIBLE TERMS OF THE AGENCY ACTION:

None

4. STATUTORY BASIS OR LEGAL AUTHORITY TO ACT:

Delaware Energy Conservation Code Act pursuant to 16 Del.C. §7602.

5. OTHER REGULATIONS THAT MAY BE AFFECTED BY THE PROPOSAL:

None

6. NOTICE OF PUBLIC COMMENT:

Persons wishing to comment on the proposed amendments to 7 DE Admin. Code 2101 *Regulations for State Energy Conservation Code* may do so either orally or in written form at the public hearing on Tuesday, December 3, 2019 beginning at 6:00 PM in the DNREC Auditorium at 89 Kings Highway, Dover, DE 19901. In lieu of attending the public hearing, written comments may be submitted to the Hearing Officer via either email to DNRECHearingComments@delaware.gov, or via USPS to the DNREC Hearing Officer, 89 Kings Highway, Dover, DE 19901. The Department will accept public comment through the close of business on Wednesday, December 18, 2019.

7. PREPARED BY:

Jessica Quinn

Email: Jessica.Quinn@delaware.gov

Ph: 302-735-3485

2101 Regulations for State Energy Conservation Code

1.0 Purpose and Statutory Authority

- 1.1 The purpose of these regulations is to provide the Department of Natural Resources and Environmental Control's determination of the most recent and/or highest available version of the International Energy Conservation Code and the latest ASHRAE/IESNA standard. The goal of establishing these regulations is to provide a statewide building energy conservation code.
- 1.2 These regulations provide rules of practice and procedures for certification of compliance with these codes and standards to be utilized by the respective local governments.
- 1.3 ~~Delaware Code Title 16 Section 7602~~ 16 Del.C. §7602 provides the authority for adopting ~~Delaware Energy Conservation Code~~ the State Energy Conservation Code. These regulations are promulgated under the authority of 16 Del.C. §7602.

2.0 Definitions

For purposes of these regulations, the following words and phrases shall have the meanings set forth below.

"**ASHRAE**" means the ANSI/ASHRAE/IES Standard ~~90.1-2010~~ 90.1-2016: Energy Standard for Buildings except Low-Rise Residential Buildings published by the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

"**Department**" means the Department of Natural Resources and Environmental Control, the Division of Energy and Climate Climate, Coastal, & Energy or the Delaware Energy Office, as appropriate.

"**DET verifier**" means a certified Duct and Envelope Tightness verifier. A certified DET verifier shall be a certified Home Energy Rating Systems (HERS) rater, or be a certified Home Performance with ENERGY STAR contractor, or be a Building Performance Institute (BPI) Heating Professional to perform duct tightness testing or a BPI Building Analyst or Envelope Professional to perform building tightness testing, or successfully complete a course that is approved by the Department of Natural Resources and Environmental Control.

"**IECC**" means the 2018 International Energy Conservation Code published by the International Code Council, Inc.

3.0 Incorporation by Reference

- 3.1 The ~~2012~~ 2018 International Energy Conservation Code (IECC), published by the International Code Council, Inc., is hereby adopted and incorporated by reference ~~with revisions~~ as the Delaware Residential Building Energy Conservation Code and is an enforceable part of the Delaware Building Codes. ~~The revisions to the 2012 IECC code are stated in Section 4.0 of these regulations.~~
- 3.2 The American Society of Heating, Refrigerating and Air-Conditioning Engineers Standards (ASHRAE) ~~90.1-2010~~ 90.1-2016: Energy Standard for Buildings except Low-Rise Residential Buildings and ~~Commercial Provisions~~ the commercial provisions of the ~~2012~~ 2018 International Energy Conservation Code are hereby adopted and incorporated by reference in their entirety as the Delaware Commercial Building Energy Conservation Code and is an enforceable part of the Delaware Building Codes.

4.0 Revisions to the 2012 IECC

- 4.1 ~~The following additions, insertions, deletions, and other changes are hereby made to the 2012 International Energy Conservation Code.~~
 - 4.1.1 ~~R403.2.2 amend to add: Supply duct tightness shall be verified by either of the following:~~
 1. ~~Post construction test: Total leakage less than or equal to 6 cfm (160.0/min) per square foot (0.29 m²) of conditioned floor area when tested at the pressure differential of 0.1 inches w.g. (25 Pa)....~~
 2. ~~Rough-in test: Total leakage less than or equal to 6 cfm (160.0/min) per square foot (0.29 m²) of conditioned floor area when tested at the pressure differential of 0.1 inches w.g. (25 Pa) (remainder unchanged - If the air handler is not installed.... ≤ 4 cfm....)~~
 - 4.1.2 ~~R403.4.2: amend list to:~~
 1. ~~Piping larger than 3/4 inch nominal diameter.~~
 2. ~~Piping serving more than one dwelling unit.~~
 3. ~~Piping located outside the conditioned space.~~
 4. ~~Piping from the water heater to a distribution manifold.~~
 5. ~~Piping located under a floor slab.~~
 6. ~~Buried piping.~~
 7. ~~Supply and return piping in recirculation systems.~~
- ~~Delete Table R403.4.2 without substitution.~~

4.1.3 R402.4.1.2:

Exception: A building or dwelling unit with 2,000 ft² or less of conditioned floor area (CFA) may satisfy R402.4.1.2 if it:

(1) is tested to have an air leakage rate no greater than:

5 ACH 50 for homes with < 1,500 ft² of CFA, or

4 ACH 50 for homes with 1,500 — 2,000 ft² of CFA.)

4.1.4 R403.2.3 Building framing cavities shall not be used as ducts or plenums.

Exception: Returns run exclusively through conditioned space.

4.1.5 R403.5 The building shall be provided with ventilation that meets the requirements of the *International Residential Code (IRC)* or *International Mechanical Code (IMC)*, as applicable, or with other approved means of ventilation. Outdoor air intakes shall have automatic or gravity dampers that close when the ventilation system is not operating. Required ventilation rates shall also include adequate provisions for fuel-fired appliance, stove and fireplace makeup air supply; kitchen, bath, clothes dryer, and central vacuum exhausts; and other makeup air system supplies and/or exhausts as required in either the IRC or IMC.

(remainder of section unchanged)

5.04.0 Implementation and Enforcement

5.14.1 All buildings must meet all requirements of the applicable referenced code six months after date of promulgation.

5.24.2 All projects may utilize the new applicable reference codes at any time after the date of promulgation, provided such choice is stated on the construction documents.

4.3 Procedures for certification of compliance and standards to be utilized by respective local governments are those specified in the IECC at Chapter 1 ("Scope and Administration") and in the ASHRAE at Chapter 4 ("Administration and Enforcement") as enforceable parts of the Delaware Building Codes pursuant to subsections 3.1 and 3.2 herein.

6.05.0 Certified duct and envelope tightness (DET) verifier.

Testing for duct and building envelope tightness shall be conducted by a certified DET verifier.

17 DE Reg. 1086 (05/01/14)

23 DE Reg. 363 (11/01/19) (Prop.)



STATE OF DELAWARE
**DEPARTMENT OF NATURAL RESOURCES AND
 ENVIRONMENTAL CONTROL**
 DIVISION OF CLIMATE, COASTAL & ENERGY
 STATE STREET COMMONS
 100 W. WATER STREET, SUITE 10B
 DOVER, DELAWARE 19904

**EFFICIENT &
 RENEWABLE ENERGY**

PHONE
 (302) 735-3489

Technical Response Memorandum

To: Theresa Newman, Hearing Officer

Through: Robert Underwood, Program Administrator *RU 2-25-20*

Through: Cheryl Gmuer, Program Manager II *CG 2-25-20*

From: Jessica C. Quinn, Planner IV *JC 02/25/20*

Date: February 24, 2020

Re: Department's response to comments received on the proposed amendments to 7
 Del. Admin. Code 2101 – State Energy Conservation Code

You presided over a public hearing on Thursday, December 3, 2019 beginning at 6:00 PM in the Auditorium at the Richardson and Robbins Building, 89 Kings Highway, Dover. The subject of the public hearing was a proposed revision to 7 DE Admin. Code 2101 – State Energy Conservation Code Regulations. The Department heard verbal comments, memorialized verbatim in the public hearing transcript, from the following individuals:

Date	Name	Organization
December 3, 2019	Thomas Marston	Private Citizen
December 3, 2019	Laura Baker	Responsible Energy Codes Alliance
December 3, 2019	BJ Carey	Private Citizen
December 3, 2019	Joe Green	Private Citizen
December 3, 2019	Bahareh van Boekhold	Delaware Committee of Green Building United

The Department received written comments from the following individuals and organizations:

Date Received	Name	Organization
November 12, 2019	Carmen Marinelli	Schell Brothers
November 21, 2019	Michael Ivanovich	AMCA International
November 22, 2019	Josh Young	American Chemistry Council
November 28, 2019	John E. Mateyko, R.A.	Net Zero Carbon Delaware 2040
December 2, 2019	Darren Port	Northeast Energy Efficiency Partnerships (NEEP)
December 3, 2019	Eric Lacey	Responsible Energy Codes Alliance
December 3, 2019	Sara C. Yerkes	International Code Council
December 3, 2019	Karen Forrest	Private Citizen
December 3, 2019	Exhibit: Marston #1	Written comment submitted at Public Hearing
December 3, 2019	Exhibit: Baker #1	Written comment submitted at Public Hearing
December 3, 2019	Delaware Community of Green Building United Steering Committee	Green Building United
December 3, 2019	Reid Rowlands	World Class Supply
December 4, 2019	Joseph G. Charma, PE	Private Citizen
December 10, 2019	Azra Pirestani	Private Citizen
December 10, 2019	Gholamreza Sedigh Haghighat	Private Citizen
December 10, 2019	Setareh Gilanpour	Private Citizen
December 10, 2019	Amir Reza Sedigh Haghighat	Private Citizen
December 10, 2019	Fatemeh Sedigh Haghighat	Private Citizen
December 11, 2019	Haleh Davoudi	Private Citizen
December 17, 2019	Justin Koscher	Polyisocyanurate Insulation Manufacturing Association (PIMA)
December 17, 2019	Bahareh van Boekhold	Delaware Community of Green Building United
December 18, 2019	Patrick Coleman	New Ecology
December 18, 2019	Mark Gandy	Builders and Remodelers Association of Delaware

This technical response memorandum (TRM) provides a summary of the comments received and the Division of Climate, Coastal, & Energy's (DCCE) response to assist in the completion of the Hearing Officer's Report to the Secretary of the Department of Natural Resources and Environmental Control (Department). This memorandum groups the comments and concerns submitted to the Department into different topic areas. Each comment received is included verbatim as an attachment. The public hearing transcript detailing comments presented at the public hearing is also attached to this memorandum.

I. Comments received in support of the proposal

Nineteen out of twenty-three written comments received were in support of the Department's proposed revisions to 7 Del. Admin. Code 2101. The supporting comments highlighted that the adoption by reference of American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 90.1-2016 and 2018 International Energy Conservation Code (IECC) in their entirety will have numerous benefits including increased energy efficiency, reduced energy costs for Delaware building occupants and owners; reduced greenhouse gas emissions and air pollution, and improved building safety and resilience. The comments documented many benefits of the proposed regulations, including the following excerpt from a comment from the Northeast Energy Efficiency Partnerships (NEEP): "Both the 2018 IECC and ASHRAE 90.1-2016 will increase the state's building efficiency through more efficient windows, a tighter building envelope, increased lighting efficiency, and better testing protocols. The inclusion of the latest building technologies and materials in code promotes state energy and green job growth. Various code compliance path options provide maximum flexibility for builders. Additionally, the codes clarify and refine numerous technical and administrative provisions making compliance simpler for state and local code officials to administer."

Multiple comments also highlighted stakeholders' opposition to the amendments that the Department considered during the development of the proposed regulation, but ultimately chose to exclude from the proposed revisions to 7 Del. Admin. Code 2101 as published in the November 1, 2019 *Delaware Register of Regulations*. Most notably, the amendments to the residential provisions of the 2018 IECC that the Department considered would weaken the air sealing requirements on smaller homes by allowing up to 5 air changes per hour (ACH) instead of enforcing the 3 ACH limit in the model code. ACH is the unit used to measure the ventilation rate or air leakage rate for a house. It is calculated during a blower door test and is defined as the number of times the air volume in a house changes per hour when the home has been depressurized to negative 50 pascals of pressure compared to the outside air pressure. Higher ACH limits allow for leakier homes that require more energy to heat and cool.

Multiple commenters referenced their support for unamended adoption of the 2018 IECC and spoke of their concerns about introducing weakening amendments to the proposed regulation. One commenter noted the following: "Amending the code - particularly with weakening code provisions - has detrimental consequences. Weakening the code makes the code less cost-effective to implement, disrupts potential valuation savings, causes confusion in the real estate market and among design professionals, and reduces the code's overall power to act as a driver toward further energy efficiency, carbon reduction, and market transformation." Commenters spoke of confidence that increased air sealing to the 3 ACH requirement will be both attainable and beneficial in Delaware with the right education and training; especially given the success that surrounding states have had with the implementation of the more stringent air sealing requirements.

Department Response:

The DCCE appreciates the time the commenters devoted to reviewing the proposed regulation and sharing their comments and feedback with the Department. The DCCE concurs with these commenters concerns about weakening the air sealing requirements of the IECC or amending the code. Introducing language to the proposed regulations that

weakens the 2018 IECC will run counter to the state's climate policy goals given Governor Carney's U.S. Climate Alliance commitment reduce the state's greenhouse gas emissions 26 to 28 percent from 2005 levels by 2025. In addition, weakening the code will prevent Delawareans from fully realizing the health and safety, energy-use reduction, and cost-saving benefits of the energy conservation codes.

II. Comments received requesting amendments to Section R402.4.1.2 of 2018 IECC by weakening the air sealing requirements for smaller homes

Comments were submitted requesting the Department update the proposed regulation by adding an amendment to the residential provisions of the 2018 IECC which would allow homes smaller than 2,000 square feet to meet reduced blower door testing requirements. A blower door is a diagnostic tool used to measure the air tightness of a building or home. The comments propose allowing 4 ACH for homes between 2,000 – 1,500 square feet, and 5 ACH for homes under 1,500 square feet, instead of the 3 ACH limit present in the 2018 IECC. These commenters express concern that the more stringent 3 ACH will make homes less affordable. One commenter stated "The smaller the home, the more challenging it is to pass under 3 ACH. This allowance helps tremendously with smaller built homes... The cost to make smaller homes tighter is much higher than larger homes due to the reduced volume. This would certainly hurt the ability to make homes affordable."

Department Response:

The DCCE did not find substantial evidence that implementing the 2018 IECC with the 3 ACH air sealing requirement would be overly prohibitive to the Delaware home building industry. Assessments^{1 2} of the 2018 IECC have concluded that the code passes cost-effectiveness tests, including cost-effectiveness studies completed by the U.S. Department of Energy's (DOE) Pacific Northwest National Lab (PNNL). Additional technical analyses^{3 4} were completed by Optimal Energy, Inc. at the direction of the DCCE. The lifetime benefits of improved air sealing greatly outweigh the upfront, one-time cost during construction of \$150-\$225 per home. The DCCE analysis revealed that the cost of improving air sealing requirements from 5 ACH to 3 ACH come with simple paybacks of 2.2 to 3.3 years and benefit-cost-ratios (BCRs) ranging from 3.8 to 5.7⁵. An

¹ "Preliminary Energy Costs and Savings Estimates: 2018 IECC Residential Requirements." PNNL-28650, Z.T. Taylor, April 2019, Pacific Northwest National Laboratory.

² https://www.energycodes.gov/sites/default/files/documents/2018_IECC_PreliminaryDetermination_CostAnalysis.pdf

³ "Final Determination Regarding Energy Efficiency Improvements in the 2018 International Energy Conservation Code (IECC)" Federal Register, Vol. 84, No. 237, Tuesday, December 10, 2019, [EERE-2018-BT-DET-0014], Pages 67,435-67,437. <https://www.govinfo.gov/content/pkg/FR-2019-12-10/pdf/2019-26550.pdf>

⁴ Exhibit 4 - Memorandum from [Matt Socks, Optimal Energy, Inc](#) (Department technical consultant) to Robert Underwood, DNREC DCCE, dated March 20, 2019 analyzing the cost and energy impacts associated with adopting the 2018 IECC without weakening the air tightness requirements in the Code.

⁵ Memorandum from Matt Socks, Optimal Energy, Inc to Jessica Quinn DNREC DCCE, dated November 14, 2019, with the subject line "Delaware Energy Code Adoption Support," analyzes cost impacts, energy savings, payback period, and provides an examination of the cost-effectiveness of the 2018 IECC for different types/classes of homes.

⁶ Exhibit 4 - Memorandum from [Matt Socks, Optimal Energy, Inc](#) (Department technical consultant) to Robert Underwood, DNREC DCCE, dated March 20, 2019 analyzing the cost and energy impacts associated with adopting the 2018 IECC without weakening the air tightness requirements in the Code.

energy efficiency measure with BCR over 1.0 is considered cost-effective as the relative benefits outweigh the costs associated with the improvement, as such the measure is expected to deliver a positive return on investment to the property owner.

A 2013 Pacific Northwest National Laboratory (PNNL) study⁶ estimated that the incremental cost of meeting the air sealing requirements of 2012 IECC relative to 2009 IECC was \$0.20 per square foot of home floor area. This equates to a total cost of \$300 for a 1,500 square foot home. The testing option of 2009 IECC (R402.4.2.1) requires less than 7 ACH when tested with a blower door at a pressure of 50 Pa (ACH50). 2012 IECC (R402.4.1.2) requires less than 3 ACH50 for Climate Zones 3 through 8. All of Delaware is within Climate Zone 4. Therefore, the estimated cost to reduce air leakage by 4 ACH50 in a 1,500 square foot home is \$300. Since Delaware's current energy code requires less than 5 ACH50, this estimate overstates the cost of improving from Delaware's current code to 2018 IECC (again, essentially equivalent to 2012 IECC with respect to air sealing requirements). To adjust for this, improved air sealing costs are assumed to scale linearly with ACH50 reductions. This approximation is likely valid until very low air leakage rates are reached. Therefore, the estimated costs to meet the air sealing requirements of 2018 IECC relative to Delaware's current code are \$150 for a 1,500 square foot home.

A 2012 study from the National Association of Homebuilders (NAHB)⁷ estimated that the incremental cost of meeting the air sealing requirements of 2012 IECC for Climate Zones 3 through 8 (Delaware is in Zone 4) relative to 2006 IECC was \$0.41 per square foot of home floor area. The same study estimated that the costs to meet 2012 IECC for Climate Zones 1 and 2 relative to 2006 IECC were \$0.26 per square foot. This is convenient as the testing requirement for 2012 IECC for Climate Zones 1 and 2 is 5 ACH50. Therefore, the difference in these two cost estimates is the equivalent of going from a 5 ACH50 requirement to a 3 ACH50, which is exactly the change from going from Delaware's current code to 2018 IECC. This cost is \$0.15 per square foot or \$225 for a 1,500 square foot home.

In summary, the cost estimates from these sources are in close agreement and range from \$150 to \$225 per home. Relative to the median home price in Delaware⁸, this represents less than a 0.1% increase—this increase is not enough to discourage a potential homebuyer.

The homeowner economics for this increased cost is also favorable according to the DCCE analysis. The air leakage in homes built to 5 ACH, allowed for smaller homes under Delaware's current energy code, is responsible for \$171 in heating and cooling

⁶ Pacific Northwest National Laboratory. "Cost-Effectiveness Analysis of the 2009 and 2012 IECC Residential Provisions – Technical Support Document." PNNL-22068, April 2013.

https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-22068.pdf

⁷ National Association of Home Builders (NAHB) Research Center. 2012 IECC Cost Effectiveness Analysis. <https://www.nahb.org/-/media/NAHB/advocacy/docs/top-priorities/codes/codes-and-research/2012-iecc-cost-effectiveness-analysis.PDF>

⁸ Delaware's median home price in 2019 was \$238,200. Source: <https://www.zillow.com/de/home-values/>

energy costs.⁹ A reduction from 5 ACH (current Delaware code) to 3 ACH50 (2018 IECC) represents a 40% reduction in air leakage. Applying this air leakage reduction to the energy costs associated with air leakage yields an annual energy cost savings of \$68. Assuming increased construction costs of \$150-\$225 and an annual energy cost savings of \$68, the economics of improved air sealing requirements were estimated by the DCCE technical consultant. The consultant estimated the simple payback ranges from 2.2 to 3.3 depending on the cost assumption used.

During its analysis, the DCCE identified a variety of additional reasons that the Department can be confident that 3 ACH will be attainable in Delaware homes (including those under 2,000 square feet). First, many states in the Mid-Atlantic and Northeast region (New Jersey, Washington DC, New York, Connecticut, Vermont, West Virginia, and Massachusetts) have enforced a residential energy code with 3 ACH for multiple code cycles or years. Building homes that meet the 3 ACH limit is not appreciably more difficult or costly in Delaware than these surrounding states.

Furthermore, the International Code Council (ICC) uses a long-standing, industry-inclusive process for reviewing and developing each iteration of the IECC. The committee that develops the IECC is comprised of a range of individuals including government code officials, building owners, design professionals, insurance companies, private inspection agencies, academics, builders, contractors, manufacturers, and distributors. This ICC code development process has retained the 3 ACH limit for three consecutive code cycles. If the 3 ACH requirement was truly unattainable or cost-prohibitive in smaller homes, builders and industry experts had ample opportunity to appeal to the ICC for relaxed air sealing standards for smaller homes during the lengthy IECC development, review, and voting process for the 2012, 2015, and 2018 editions of the code. The homebuilding industry certainly has an influence on the IECC development process and has successfully negotiated many provisions in the code. Notably, in an October 2019 exposé in *The New York Times*, the ICC was accused of granting homebuilders' an outsized influence over the IECC development process that has allowed the industry to regularly block or slow changes to the codes that would increase energy efficiency standards or increase resilience to natural disasters¹⁰.

The Delaware-specific amendment to the 2012 IECC air sealing requirements that the Department adopted along with several other code-weakening amendments was negotiated with the home building industry as a compromise in 2014 because the Department recognized the substantial variety and number of changes present in the 2012 IECC relative to the 2009 IECC.¹¹ At the time, the Department recognized that the Delaware building industry would have to significantly adapt many of its residential

⁹ Exhibit 4 - Memorandum from [Matt Socks, Optimal Energy, Inc](#) (Department technical consultant) to Robert Underwood, DNREC DCCE, dated March 20, 2019 analyzing the cost and energy impacts associated with adopting the 2018 IECC without weakening the air tightness requirements in the Code.

¹⁰ Flavelle, Christopher, "Secret Deal Helped Housing Industry Stop Tougher Rules on Climate Change," *The New York Times*. <https://www.nytimes.com/2019/10/26/climate/building-codes-secret-deal.html>

¹¹ U.S. Department of Energy. "Updating State Residential Building Energy Efficiency Codes" Federal Register, Vol. 77, No. 96, Thursday, May 17, 2019, [EERE-2011-BT-DET-0057], Pages 29,322-29,331. <https://www.govinfo.gov/content/pkg/FR-2012-05-17/pdf/2012-12000.pdf>

building design and construction practices following the 2012 IECC adoption. The 2012 IECC required an aggressive improvement in energy efficiency performance of approximately 24 percent for energy spent for heating, cooling, water heating, and lighting relative to the 2009 IECC^{12 13}. The Delaware-specific amendments to the 2012 IECC were intended to give builders additional time to learn the more stringent energy efficiency requirements, adapt their construction techniques and materials, and take an initially conservative approach that reduced the risk of the code update resulting in negative cost impacts on housing prices, despite the overall cost-effectiveness of the 2012 code. The amendments were not intended to be permanent modifications to the code in every code cycle. It is important to note that the changes in the 2018 IECC are not nearly as drastic as previous adoptions – for one, the U.S. DOE final determinations regarding the 2018¹⁴ and 2015¹⁵ editions of the IECC indicate that updating from the 2012 to 2018 IECC will only require an increase in residential energy efficiency of approximately 3 percent.

Additionally, the 2018 IECC is already the most flexible version of the code developed to-date. This is in part due to changes to the Energy Rating Index (ERI) compliance pathway which does not exist in the current version of the Delaware energy code and will be a new option for Delaware builders. The ERI will add a new compliance option for homebuilders in addition to the prescriptive and performance pathways already present in the 2012 IECC.

Delaware's residential building industry was faced with much greater challenges during the transition from the 2009 IECC to the 2012 IECC. The 2012 IECC code cycle (implemented in Delaware in 2014) required significant changes to insulation, building envelope, duct tightness, windows, and lighting efficiency when compared to the 2009 IECC requirements. The updates in the 2018 IECC are comparatively modest and introduce additional flexibility for homebuilders to meet code requirements through the Energy Rating Index Pathway.

Given (1) the number of states in the region enforcing the 3 ACH limit in their energy codes; (2) the length of time that the 3 ACH limit has been required in the IECC (since the 2012 IECC); (3) the improvements seen in the homebuilding industry around air sealing techniques; and (4) the short payback period associated with the increased air sealing requirements, the DCCE is confident that the baseline 2018 IECC air sealing requirement is attainable in Delaware without introducing a code-weakening amendment.

¹² U.S. Department of Energy, EERE Building Technologies Program. "National Energy and Cost Savings for New and Single- and Multifamily Homes: A Comparison of the 2006, 2009, and 2012 Editions of the IECC."

<https://www.energycodes.gov/sites/default/files/documents/NationalResidentialCostEffectiveness.pdf>

¹³ Pacific Northwest National Lab. "Impacts of Model Building Energy Codes," October 2016.

https://www.energycodes.gov/sites/default/files/documents/Impacts_Of_Model_Energy_Codes.pdf

¹⁴ "Final Determination Regarding Energy Efficiency Improvements in the 2018 International Energy Conservation Code (IECC)," Federal Register, Vol. 84, No. 237, Tuesday, December 10, 2019, [EERE-2018-BT-DET-0014], Pages 67,435-67,437. <https://www.govinfo.gov/content/pkg/FR-2019-12-10/pdf/2019-26550.pdf>

¹⁵ "Determination Regarding Energy Efficiency Improvements in the 2015 International Energy Conservation Code (IECC)," Federal Register, Vol. 80, No. 112, Thursday, June 11, 2015, [EERE-2014-BT-DET-0030], Pages 33,250-33,263. <https://www.govinfo.gov/content/pkg/FR-2015-06-11/pdf/2015-14297.pdf>

The DCCE has carefully considered this proposal, with technical input and expertise provided by NEEP, U.S. DOE, and the Department's technical consultant. **The DCCE opposes this amendment to the proposed regulations.**

III. Comment received requesting an amendment to hot water pipe insulation requirements

The Builders and Remodelers Association of Delaware (BRAD) submitted a comment requesting an amendment to the residential provisions of the 2018 IECC which would reduce the hot water pipe insulation requirements in the model energy code by only requiring insulation on hot water pipes that are over ¾" in diameter. The comment contends that this requirement would be low cost for manifold systems but is burdensome for traditional tee and branch plumbing systems where the entire ¾" main hot line would be required to be insulated, increasing costs to consumers.

Department Response:

IECC 2018 R403.5.3 requires that "[p]iping ¾ inch and larger in nominal diameter" must be insulated to a minimum of R-3. The comment from BRAD contends that this requirement would significantly increase costs to the consumer where a "trunk-and-branch" plumbing layout is used. While hard data is sparse, several plumbers have indicated that trunk-and-branch systems are still very common in new homes. It is difficult to estimate the average construction cost impact of this code provision, but a reasonable range can be estimated using data from an investigation of costs associated with changes to the 2015 International Residential Code¹⁶. This study estimates that the total length of ¾" hot water pipe in a home ranges from 15 to 35 ft. depending on the characteristics of the home. Using the cost per linear foot of pipe insulation (including material and labor) of \$3.25/ft. from the Home Innovation Research Labs study yields a total cost ranging from \$49-\$114 per home. While not negligible, such a cost impact represents less than 0.01% of the typical cost of a new home in Delaware.

It should also be noted that the pipe insulation requirement for ¾" and larger hot water pipes was added to the code precisely because of the energy lost in large diameter pipe in trunk-and-branch systems. While the added insulation requirements do come at a small cost, that cost must be weighed against the energy benefits. **As such, the DCCE is not recommending the Department accept the proposed amendment due to the benefits to the homeowner, the ease of installation, and the modest cost of hot water pipe insulation.**

IV. Comment received requesting an amendment to use framing cavities as ducts

The BRAD organization submitted a comment requesting an amendment to Section R403.3.5 of the 2018 IECC to allow for panned ducts in the thermal envelope. The commenter stated "the

¹⁶ Home Innovation Research Labs. December 2014. "Estimated Costs of the 2015 IRC Code Changes." Prepared for the National Association of Home Builders.
<https://www.homeinnovation.com/~media/Files/Reports/Estimated%20Costs%20of%20The%202015%20IRC%20Code%20Changes.pdf>

cost of switching to 1-panned return systems will vary significantly as it will require homes to be designed with a location for a central return instead of using an available cavity to direct the return air. We propose an amendment that would allow for panned ducts within the thermal envelope. By keeping it within the thermal envelope we negate energy lost by using the framing cavities, this will allow home builders the flexibility to design homes in the most efficient manner.”

Department Response:

This proposed amendment to the 2018 IECC would affect the duct tightness of heating and cooling systems. The DCCE considered this amendment during discussions with the Delaware Energy Code Coalition and throughout the regulatory development process but believes the convenience this amendment would provide to the home building industry during construction does not outweigh the increased energy burden the homeowner will face during the life of the home. After receiving the formal comments submitted by BRAD, the DCCE commissioned its technical consultant to provide additional evaluation of the feasibility of this amendment and the costs and energy impacts associated with this new code requirement. DCCE concluded that this amendment is not advisable and gathered the following data to support this decision.

First, Section R403.3.5 of the 2018 IECC states the following “[b]uilding framing cavities shall not be used as ducts or plenums,” so the amendment proposed by BRAD to switch to 1-panned return systems would not be possible as the 2018 IECC prohibits the practice of panning entirely.

Second, this code requirement while this part of the code would be new to Delaware with the adoption of the 2018 IECC, it is not a new or untested measure in the IECC. The IECC has prohibited panned return systems for three consecutive code cycles (since the release of the 2012 IECC). In 2014, the Department amended the equivalent section of the 2012 IECC (Section R403.2.3) to allow building framing cavities to be used as ducts or plenums, if the returns run exclusively through conditioned space. This amendment, in addition to several other Delaware-specific amendments to 2012 IECC, was adopted in 2014 as a compromise with the home building industry. At the time, the Department recognized the substantial variety and number of changes present in the 2012 IECC relative to the 2009 IECC¹⁷ that the Delaware building industry would have to adapt to following the adoption of the more stringent code.

The 2012 IECC required an aggressive improvement in energy efficiency performance of over 20 percent for energy spent for heating, cooling, water heating, and lighting relative to the 2009 IECC¹⁸. The Delaware-specific amendments to the 2012 IECC were intended to give builders additional time to learn the more stringent energy efficiency

¹⁷ U.S. Department of Energy. “Updating State Residential Building Energy Efficiency Codes” Federal Register, Vol. 77, No. 96, Thursday, May 17, 2019, [EERE-2011-BT-DET-0057], Pages 29,322-29,331.
<https://www.govinfo.gov/content/pkg/FR-2012-05-17/pdf/2012-12000.pdf>

¹⁸ U.S. Department of Energy, EERE Building Technologies Program. “National Energy and Cost Savings for New and Single- and Multifamily Homes: A Comparison of the 2006, 2009, and 2012 Editions of the IECC.”
<https://www.energycodes.gov/sites/default/files/documents/NationalResidentialCostEffectiveness.pdf>

requirements, adapt their construction techniques and materials, and take an initially conservative approach that reduced the risk of the code update resulting in negative cost impacts on housing prices, despite the overall cost-effectiveness of the 2012 code. The amendments were not intended to be permanent modifications to the code in every code cycle.

Furthermore, the changes in the 2018 IECC are not nearly as drastic – for one, the U.S. DOE final determinations regarding the 2018¹⁹ and 2015²⁰ editions of the IECC indicate that updating from the 2012 to 2018 IECC will only require an increase in residential energy efficiency of approximately 3 percent.

The DCCE charged the Department’s technical consultant with the task of developing an estimate of the average cost impacts of enforcing the IECC restriction on using building cavities as ducts or plenums. While this average cannot be calculated with certainty because HVAC distribution system design will vary widely depending on the specific characteristics of a home (e.g., direct return for each room vs. a central return, home square footage and number of stories, and foundation type). When this code change was first introduced and accepted into IECC 2012, the cost implications were described as follows: “The code change proposal may increase or decrease the cost of construction depending on the builder’s choices with regard to duct system design, construction and location compared to previous expenses involved with framing, enclosing, and sealing building cavities as part of the duct system.”²¹

Given the assignment of developing an estimate of the cost implications of using a central return duct instead of panned joists, the Department’s technical consultant developed a scenario that captures a reasonable estimate of the costs that will be seen in many Delaware houses. This scenario assumes a typical central return strategy in a 1,750 ft² single story home with a basement. By adopting the assumptions developed by the National Renewable Energy Laboratory for the 2014 Building America House Simulation Protocols, an estimated total return duct surface area of 175 ft² is used in this scenario.²² Assuming 26 gauge galvanized steel ductwork, construction costs would be approximately \$700 according to pricing from the 2020 Residential Costs with RSMeans Data.²³ However, when the alternative costs of properly sealing and isolating a building

¹⁹ “Final Determination Regarding Energy Efficiency Improvements in the 2018 International Energy Conservation Code (IECC),” Federal Register, Vol. 84, No. 237, Tuesday, December 10, 2019, [EERE–2018–BT–DET–0014], Pages 67,435–67,437. <https://www.govinfo.gov/content/pkg/FR-2019-12-10/pdf/2019-26550.pdf>

²⁰ “Determination Regarding Energy Efficiency Improvements in the 2015 International Energy Conservation Code (IECC),” Federal Register, Vol. 80, No. 112, Thursday, June 11, 2015, [EERE–2014–BT–DET–0030], Pages 33,250–33,263. <https://www.govinfo.gov/content/pkg/FR-2015-06-11/pdf/2015-14297.pdf>

²¹ International Code Council. 2009. International Code Council 2009/2010 Code Development Cycle, Proposed Changes to the 2009 Editions of the International Energy Conservation Code. <https://cdn-web.iccsafe.org/wp-content/uploads/IECC1.pdf> (pp. EC262–EC263)

²² Wilson, E., et al. March 2014. 2014 Building America House Simulation Protocols. National Renewable Energy Laboratory. Technical Report NREL/TP-5500-60988. <https://www.nrel.gov/docs/fy14osti/60988.pdf>. According to Table 7 on p.12, return duct surface area in a one-story home may be estimated as 0.05 x Number of ducted return registers x Finished floor area.

²³ Gordian. 2020. Residential Costs with RSMeans data.

cavity from the thermal envelope and panning a joist, the incremental costs of complying with the new code provision are expected to be minimal.

Considering the costs of the new code provision without also assessing the benefits would be short-sighted. The comments from BRAD suggest that there is no energy loss when using building cavities as ducts if those spaces are located within the thermal envelope of the home. This is not accurate. Building cavities were never intended to be used as ducts and are notoriously difficult to seal properly. While IECC 2018 includes mandatory sealing practices for all ducts (see “R403.3.2 Sealing” in IECC 2018), duct leakage testing requirements are waived where ducts and air handlers are located entirely within the building thermal envelope (see “R403.3.3 Duct testing” in IECC 2018). Therefore, allowing the use of building cavities as ducts could lead to excessive, untested leakage in air distribution systems, and since a building’s interstitial spaces are connected, there is no guarantee that ductwork utilizing building cavities is truly within the thermal envelope.

The change in question is not new. The provision to disallow building cavities to be used as ducts and plenums was first introduced in IECC 2012. While some states have introduced amendments to the residential energy code to weaken or eliminate this change, many leaders in energy efficiency have adopted it. These states include Maryland, New Jersey, New York, Massachusetts, and Connecticut.

Finally, using building cavities as ducts has been well-documented as an inefficient and outdated building practice. A few notable articles referenced during this process include analyses from the International Association of Certified Home Inspectors (InterNACHI)²⁴, Building Science²⁵, and Energy Vanguard.²⁶ **The DCCE opposes this amendment to the proposed regulations.**

V. Comments received from Air Movement and Control Association International, Inc. regarding Fan Energy Index metrics

A comment was submitted by the Air Movement and Control Association (AMCA) requesting the Department amend the proposed regulation to include revisions to the 2018 IECC to change the Fan Efficiency Grade (FEG) metric found in section C403.8.3 of the 2018 IECC with a new metric, the Fan Energy Index (FEI). This comment states that the new FEI metric has replaced the FEG in AHSHRAE 90.1-2019, ASHRAE 189.1-2020, and the current draft of the 2021 edition of the IECC. The commenter proposes to amend the regulation to adopt the FEI instead of waiting until the next code adoption cycle when AHSHRAE 90.1-2019 and 2021 IECC will be formally considered by the Department.

24 InterNACHI, “Building Cavities Used as Supply or Return Ducts”: <https://www.nachi.org/building-cavities-supply-return-ducts.htm>

25 Building Science, “What’s Wrong With This Practice? Using Unsealed Wall Cavities or Panned Floor Joists as Return Plenum”: <https://www.buildingscience.com/documents/information-sheets/information-sheet-wrong-using-unsealed-wall-cavities-or-panned-floor-joists-as-return-plenum>

26 Energy Vanguard, “Perhaps the Worst HVAC Duct Idea Ever — The Panned Joist Return”: <https://www.energyvanguard.com/blog/43723/Perhaps-the-Worst-HVAC-Duct-Idea-Ever-The-Panned-Joist-Return>

Department Response:

Delaware Code (16 Del.C. §7602) directs the Department to undertake a triennial review of the most recent and/or highest available version of the IECC, and the latest ASHRAE energy standard for potential updates to the State Energy Code. The Department initiated its triennial review of the IECC and ASHRAE in January 2017. During this code cycle, the 2015 and 2018 versions of the IECC standards and ASHRAE 90.1-2013 and ASHRAE 90.1-2016 were the highest and/or latest version of the IECC and ASHRAE available at the time. The 2021 IECC (which has not been finalized by the International Code Council as of January 2020) and the ASHRAE 90.1-2019 were unavailable during the majority of this review cycle; as such, provisions included in these editions are beyond the scope of this regulatory action. **The 2021 IECC and ASHRAE 90.1-2019, including new FEI standards will be considered in the next code adoption cycle. The DCCE opposes the adoption of the amendment submitted by the AMCA under this code adoption cycle.**

VI. Comments regarding the process used by the Department to develop the proposed regulation

Comments were made stating that the code adoption process and stakeholder engagement utilized by the Department during this regulatory development process “completely disregarded” the input, concerns, and feedback submitted by stakeholders in the Delaware Energy Code Coalition.

Department Response:

To initiate this code adoption cycle and the formal regulatory development process, the DCCE met with stakeholders through meetings of the Delaware Energy Code Coalition eleven times between March 2017 and January 2019 to review newer versions of the IECC and ASHRAE standards. The DCCE, in consultation with the Code Coalition, considered the 2015 and 2018 versions of the IECC standards and ASHRAE 90.1-2013 and ASHRAE 90.1-2016. The DCCE collected input through the Delaware Energy Code Coalition and used it throughout the regulatory development process.

The DCCE acknowledges that stakeholder members of the Delaware Energy Code Coalition contributed a significant number of hours to the discussion and evaluation of the IECC code and ASHRAE standard during this code adoption cycle; however, the DCCE objects to the assertion that the input from the Coalition members was completely disregarded. The concerns raised at Coalition meetings, particularly those of the homebuilders in Delaware, were vetted at length by the DCCE.

Over the course of the past two years, the DCCE considered all three proposed amendments and obtained additional technical assistance as detailed in the Department responses to comment topic areas I-III outlined in this TRM. The DCCE paid special attention to the stakeholders’ concerns regarding the difficulty smaller homes could have meeting the 3 ACH requirement in the IECC. The DCCE investigated the energy savings, construction costs, and payback period associated with the more stringent air sealing requirements in the 2018 IECC model code. Due to the concerns raised by the homebuilders and the Department’s desire to minimize the negative impacts to the

Delaware home building industry, the DCCE commissioned Optimal Energy, Inc. multiple times to provide additional technical analyses on the 2018 IECC and the stakeholders concerns. The U.S. Department of Energy's Pacific Northwest National Lab and the Northeast Energy Efficiency Partnerships (NEEP) were also engaged to provide additional technical support in response to stakeholder concerns. While the DCCE ultimately recommended unamended adoption of the 2018 IECC in the proposed regulations, the amendments proposed by the stakeholders were not automatically or thoughtlessly discarded.

The comments and feedback provided by the stakeholders throughout this process has also been used to identify the areas where the Department will prioritize allocation of training and resources for the homebuilders, design professionals, and code enforcement officials during the transition to the new energy code.

VII. Comments submitted regarding ASHRAE 90.1-2016 and the commercial provisions of 2018 IECC

All comments pertaining to the commercial energy conservation code were supportive of the proposed unamended adoption of the ASHRAE 90.1-2016 standard and the commercial provisions of the 2018 IECC.

Department Response:

Seeing as all comments received were in support of adopting ASHRAE 90.1-2016 and the commercial provisions of the 2018 IECC, the DCCE recommends that the Department proceed with finalizing the commercial code regulation as proposed.

VIII. Conclusion and final recommendation

The DCCE is prepared to provide the local code enforcement officials, builders, and design professionals with training following promulgation of these regulations to assist the stakeholders in obtaining the technical assistance needed during the transition period to adapt to the new codes. The DCCE appreciates the thoughtful comments submitted by the stakeholders and interested parties. Having considered the written comments and the public comments entered into the record at the public hearing, DCCE recommends that the Department finalize the regulations as proposed.