

m DEPARTMENT OF
LABOR AND INDUSTRY
Construction Codes Advisory Council (CCAC)

2018 International Model Codes Review

A report to the Construction Codes Advisory Council

Includes recommendations of Technical Advisory Groups and public comments received from May 15, 2018 to June 1, 2018

June 14, 2018

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Technical Advisory Group review of the 2018 International Model Building Codes

Introduction

The Minnesota Legislature requires the Commissioner of the Department of Labor and Industry to review the International Model Building Codes every six years for their potential adoption as amended for use in Minnesota, beginning with the 2018 edition of the model codes.¹ The Commissioner must consult with the Construction Codes Advisory Council (CCAC).² The CCAC reviews the new model codes and will provide recommendations for their adoption along with recommended revisions to current Minnesota Rules³ to the Commissioner. To facilitate their review of the model codes, the CCAC appointed 9 Technical Advisory Groups (TAGs) and their members to review the 2015 and 2018 International Model Building Codes (I-codes), compare them to the current Minnesota rules, which largely adopt the 2012 I-codes as amended for use in Minnesota, and report their findings.

Each TAG conducted open meetings to allow the public to attend and participate in the review and discussion about changes in the 2015 and the 2018 I-codes. As a result, TAG members and the public identified concerns and drafted code change proposals to address those concerns. The TAG members and the public also discussed and identified any significant issues raised by those proposals.

Many of these code change proposals were editorial, such as renumbering Minnesota rule parts to align with the 2018 I-codes or deleting code sections from Minnesota rules that are no longer necessary because the 2018 I-codes have adopted similar language. These types of changes recommended by TAG members do not present meaningful or substantive changes to the provisions of the 2018 I-codes or current Minnesota rules.

This report highlights some of the more significant changes in the 2018 I-codes and those code change proposals that TAG members recommend to the CCAC. In addition, the department solicited comments from stakeholders and interested parties from the period of May 15, 2018 to June 1, 2018. These comments are included in this report.

The appendixes include a list of the TAGs and their membership and public comments the department received about the code change proposals and adoption of the 2018 model I-codes.

- Appendix A lists the TAGs, their members and the organizations they represent.
- Appendix B lists the public comments the department has received about the code change proposals and adoption of the 2018 model I-codes.

¹ See [Minnesota Statutes Section 326B.106](#).

² See [Minnesota Statutes Section 326B.106, subdivision 1](#).

³ See [Minnesota Statutes Section 326B.07](#).

Building Code Administration (Chapter 1300)

Building Code Administration TAG members met four times to review Minnesota Rules chapter 1300, which contains the administrative provisions of the Minnesota State Building Code. TAG members received nine code change proposals. The Building Code Administration TAG members were in agreement to recommend to the CCAC the following significant code change proposal as an amendment to Minnesota Rules chapter 1300.

Recommended code changes

1. Amend existing Minnesota Rules, parts 1300.0070 and 1300.0120, to add a definition of electrical substation facilities and to exempt substation facilities from the requirement to obtain a permit and inspection by a building official for substation foundations and fencing and equipment enclosures within electric substations that are affixed with an Interstate Industrialized Building Commission (IIBC) label. Local units of government have inconsistently enforced permitting and inspection requirements for electrical substations. The code change will promote uniform enforcement and is consistent with existing exemptions from permitting requirements for public utility towers and poles.

Other code changes TAG members did not agree to recommend

1. Amend existing Minnesota Rules, chapter 1300, to move the provision that allows a municipality to establish fees for permits that are commensurate with services provided by a municipal Department of Building Safety from Minnesota Rules, part 1300.0160 Fees, to Minnesota Rules, part 1300.0090, which establishes municipal Departments of Building Safety. The proposed change would also require the building official to determine fees in addition to the existing requirement that municipalities do so.
 - The proposal was intended to mitigate issues related to municipalities failing to use fees generated by permits to fund Departments of Building Safety and not consulting with the building official prior to determining fees. However, building officials do not have the statutory authority to establish fees for permits and moving the fee provision will not clarify the intended use of permit fees.

Commercial Building Code (Chapter 1305)

The Commercial Building Code TAG members met seven times to review the 2018 International Building Code (IBC) and Minnesota Rules chapter 1305, which adopts the 2012 IBC with amendments. TAG members received 64 code change proposals. The Commercial Building Code TAG members were in agreement that the 2018 IBC should be adopted and recommend the following significant code change proposals as amendments to modify the 2018 IBC.

Recommended code changes

1. Modify section 423.3 of the 2018 IBC to identify specific counties where tornado winds may exceed 250 mph rather than relying on the ICC-500 map that does not clearly identify landmarks and boundaries.
 - The 2018 IBC requires Group E occupancies located in areas where tornado winds may exceed 250 mph to have a storm shelter. This is a new requirement that includes all K-12 schools. This will increase the cost of construction for Group E occupancies, yet it will improve safety.
2. Modify section 503.1.4.1 of the 2018 IBC to add exceptions that allow walls more than 48 inches in height above an occupied roof when the occupied roof qualifies as a story or there is access to a standpipe. Allowing taller walls will provide more wind cover on occupied roofs without compromising safety.
3. Amend existing Minnesota Rules, part 1305.0603, to modify IBC code section 603.1 to increase the allowable wood construction above a roof deck in Type I and Type II construction from 24 inches to 48 inches. Increasing the allowance to 48 inches will provide for significantly easier installation of certain roof systems.
4. Modify section 706.1 of the 2018 IBC to retain the 2012 IBC provision that allows each portion of a building separated by one or more fire walls to be considered a separate building. The 2018 IBC eliminated this provision, which effects how the number of control areas in a building is determined and where an automatic sprinkler system is required.
5. Modify section 1904 of the 2018 IBC to require bonded reinforcing and pre-stressed steel in concrete to be epoxy coated or hot dipped galvanized where it is not protected by an impermeable barrier and is located in Exposure Class F3 or Exposure Class C2. This provision is not included in the recognized standards for concrete design and construction and is necessary for safe construction.
 - The Structural Tag members were in agreement to recommend this code change proposal.
6. Modify section 3111 of the 2018 IBC so rooftop solar panel installation requirements are based on the roof slope, rather than building occupancy. TAG members also agreed to modify other provisions in this section, including the criteria for roof access points, incorporating requirements listed in the fire code for access pathways and rapid shut-down equipment.

Significant changes to the 2018 IBC

The 2018 IBC added section 428 that allows laboratory suites instead of control areas in higher education laboratories. The change increases the number of laboratory suites allowed for each floor and permits them to be on higher floors of the building. Higher education laboratory suites may also have a higher percentage of the maximum allowable quantities of hazardous materials. A two-hour fire barrier is required for horizontal fire separation between laboratory suites, which provides more fire protection than is required for control areas. TAG members were in agreement that section 428 should not be modified.

Public comments on recommended code changes (numbers correspond to “Recommended Code Changes” section)

2018 IBC Section 1904

5. Submitted by Tate Halvorson, Quality Control, McGough: Cathodic protection of the reinforcing steel should be an option in addition to the impermeable barrier.

Other code changes TAG members did not agree to recommend

1. Modify section 1209 of the 2018 IBC to clarify privacy requirements where toilet fixtures are located in toilet rooms not separated by sex, to require single user/family assisted bathing and changing areas except where bathing and changing areas are separated by sex, and to establish privacy requirements for changing areas.
2. Modify section 2902 of the 2018 IBC to revise toilet facilities and fixture requirements based upon separation by sex, add requirements for baby changing stations and eliminate the bathing fixture requirement for daycare facilities.
3. Modify section 2902.2 of the 2018 IBC to require all single-use toilet facilities and family or assisted use toilet facilities to not be separated by sex.

Commentary on code changes TAG members did not agree to recommend

Although proposals numbered 1, 2, and 3 identify areas that are not addressed by the 2018 IBC, the conditions are not unique to Minnesota.

Public comments on 2018 I-Code

2018 IBC Section 1023.5

1. Submitted by Tate Halvorson, Quality Control, McGough: For the 2015 adoption, I was a proponent for deleting the exception for penetrations of up to 100 sq. inches in any 100 sq. ft. because of the

importance of stair enclosures. I consider stair enclosures to be the last line of defense and do not like seeing them look like Swiss cheese. If the exception cannot be deleted, I would suggest the following:

"Membrane penetrations for life safety and security fixtures shall be permitted..... " the remainder to stay the same.

Code change proposals not reviewed by TAG members

The department continued to receive code change proposals after TAG members had completed their meetings and review of the I-codes. TAG members were unable to review and discuss these code change proposals and consequently cannot provide a recommendation to the CCAC. The following code change proposals suggest significant changes to 2018 I-code provisions or a current Minnesota Rule provision.

1. Modify section 308.5.1 of the 2018 IBC to change the age threshold for child day-care facilities from 30 months or less to 36 months or less. Currently MDH sets the threshold for child day-care facilities at 36 months of age and there are conflicts between the state building code and MDH requirements. Changing the threshold to three years of age or less will create consistency among Minnesota state agency requirements and reduce overall construction and remodeling costs.
 - Department staff do not recommend this change because the Minnesota Department of Human Services age threshold for child day facilities is 33 months of age. Changing the occupancy classification threshold from 30 months to 36 months would result in many day-care facilities currently classified as Group E occupancies to be reclassified as Group I-4 occupancies.
2. Modify the requirements related to the evacuation of hazardous vapors and gases from laboratories using fume hood systems. The code change proposal specifically proposes changes to the 2018 IBC sections and Minnesota rule part described below:
 - a. Modify section 713.4 of the 2018 IBC to add an exception to allow shaft enclosures used for hazardous fume hood exhaust systems serving only one control area or one higher education laboratory suite to be rated according to the control area separation requirement, higher education laboratory suite separation requirement, or shaft rating requirement. This allows a shaft used for hazardous exhaust to extend from a sub-basement higher education laboratory through the sixth story of a building and have one-hour fire resistance rated construction.
 - Department staff do not recommend this change because it potentially allows for significant safety reductions without being offset by additional safety measures. This change would allow a shaft used for hazardous exhaust to extend from a sub-basement higher education laboratory through the sixth story of a building and have one-hour fire resistance rated construction instead of two-hour fire protection.

- b. Modify section 713.11 of the 2018 IBC to allow shafts that originate from a single control area or higher education laboratory suite to not be enclosed at the bottom of the building, provided the duct penetration into the shafts is draft stopped around the perimeter.
 - Department staff recommend this change because it is consistent with other exceptions for shaft protection in the 2018 IBC.
- c. Amend Minnesota Rules, part 1305.0717, to modify 2018 IBC section 717.5.3 to exempt manifolded hazardous fume hood exhaust systems from the fire damper requirement where the manifolded hazardous fume hood exhaust systems originate in the same control area or higher education laboratory suite. Additionally, laboratory ventilation systems are not required to be installed in compliance with chapters one to four, seven, and eight of the NFPA 45.
 - Department staff support the exemption from the fire damper requirement for manifolded hazardous fume hood exhaust systems that originate in the same control area or higher education laboratory suite. However, department staff do not support the exemption from NFPA 45 requirements for Laboratory Unit Hazard Classification, Explosion Hazard Protection, and Laboratory Ventilating Systems and Hood Requirements.
- d. Modify section 1510.1.1 of the 2018 IBC to expand area limitations on rooftop penthouses used for mechanical systems in conjunction with laboratory exhaust systems from one-third to two-thirds of the area of the supporting roof deck.
 - Department staff recommend the change that expands the allowable area for non-occupied penthouse space above the roof.

Public comments on code changes not reviewed by TAG members

2018 IBC Section 1510.1.1

2d. Submitted by Clayton Talbot, Plans Examiner, University of Minnesota Building Code Department: The UMN Building Code Department has historically approved the penthouse size increase for research lab buildings as an Alternate Means and Methods request with the additional conditions:

- Penthouse greater than 1/3 would require the floor area to be fully sprinklered.
- There must be a minimum of two exits serving the penthouse:
 - Spaced a minimum 1/3 the diagonal distance apart.
 - Stair enclosure must extend to the penthouse (The enclosure extension is an additional story when determining the fire-resistance of the stair enclosure).

Commercial Building Code and Fire Code Compatibility (Chapters 1305 and 7511)

Commercial Building Code and Fire Code Compatibility TAG members met six times to review the 2018 IBC for compatibility with the 2018 International Fire Code (IFC). TAG members also reviewed Minnesota Rules chapter 1305, which adopts the 2012 IBC with amendments and Minnesota Rules chapter 7511, which adopts the 2012 IFC with amendments. The Commercial Building Code and Fire Code Compatibility TAG members were in agreement that the 2018 IBC should be adopted and recommend the following significant code change proposals as amendments to modify the 2018 IBC to ensure its compatibility with the proposed modifications to the 2018 IFC.

Recommended code changes

1. Modify section 706.3 of the 2018 IBC to allow fire-retardant-treated wood to be used as framing materials within the fire walls of Type III and Type IV construction where the fire resistance rating is two-hours or less. Currently, combustible materials are not allowed in fire walls of Type III and Type IV construction even though the remainder of the interior framing can be made of wood. As a result, the interior frame shrinks, but the fire wall does not. This creates difficulties for builders and designers.
2. Modify section 806.2 of the 2018 IBC to increase the amount of allowable combustible materials for interior finishes from 10 percent to 20 percent of the wall or ceiling area. The exception for ceiling suspended combustible fabric partitions in Groups B and M occupancies is expanded to include Groups A and E occupancies. These changes will allow schools and school gymnasiums to meet the interior finishes requirements.
3. Modify section 903.2.9 of the 2018 IBC to add an exception from automatic sprinkler system requirements for Group S-1 occupancies used to store upholstered furniture and mattresses when the building is one-story and all the storage spaces can be accessed directly from the exterior.
4. Modify section 907.2.3 of the 2018 IBC to allow Group E occupancies protected throughout with an automatic sprinkler system or fire alarm system with corridor smoke detection to have manual fire alarm boxes located only in the main office and custodial areas. This will improve school security by preventing active shooters from drawing out victims by activating a manual alarm box in an unsecured location.
5. Modify Exception # 1 of 2018 IBC section 2603.5.5 to exempt all one-story buildings from vertical and lateral fire propagation testing requirements for foam plastics used in exterior wall assemblies. Section 2603.5.5 requires wall assemblies to be tested in accordance with NFPA 285, which is expensive and specific to the assembly. Lateral fire propagation is a minor concern for one-story buildings and exempting all one-story buildings from the testing requirements will reduce construction costs while maintaining building durability and safety.

6. Modify section 2603.5.5 of the 2018 IBC to add an exception that allows foam plastics to be used in wall assemblies on buildings up to four stories in height where the building has an automatic sprinkler system required by NFPA 13, the wall assembly containing foam plastic does not exceed 40 feet above the finished grade, the foam thickness is not more than 4 inches, and the foam is covered with a foil face if there is an air space of more than 1 inch. Additionally, the building must have a fire access apparatus road that allows emergency responders access to the wall assembly. Foams plastics are an economical option for insulation and allowing their use will decrease building costs while maintaining building durability and safety.

Public comments on recommended code changes (numbers correspond to “Recommended Code Changes” section)

2018 IBC Section 2603.5.5

5. Submitted by Justin Koscher, President, Polyisocyanurate Insulation Manufacturers Association (PIMA):
The Polyisocyanurate Insulation Manufacturers Association (PIMA) appreciates the Commercial Building Code and Fire Code Compatibility TAG’s recognition that foam plastic insulation provides an economical and safe solution for insulating homes and buildings. However, PIMA is concerned with the proposed modifications to section 2603.5.5 of the 2018 IBC that would weaken the requirements for assemblies that must meet the NFPA 285 test standard. While we agree that fire sprinklers have a strong track record of success in significantly reducing the risk of interior fires spreading beyond the room or floor of origin. Real world experience demonstrates that building fires do originate from other sources. These experiences together with years of technical expertise have been used to inform the development of the IBC. Therefore, PIMA recommends that Minnesota retain and enforce the 2018 IBC requirements in Chapter 26 for the use of foam plastics on building exteriors.
5. Submitted by Clayton Talbot, Plans Examiner, University of Minnesota Building Code Department:
Question: Why is the state of Minnesota going out on a limb and not taking this to the ICC at national level. The reason statement is very subjective and has little context:
 - a. Downplays non-combustible types of construction by allowing non-tested foam plastic wall assemblies – “A material is noncombustible if it meets the criteria for noncombustible based on the standard ASTM, Test Methods for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.”- <https://cdn-web.iccsafe.org/wp-content/uploads/External-Wall-Systems-Article.pdf>
 - b. Provides no supporting science or data regarding risk and spread of fire from the exterior.
 - c. Assumes that fire sprinklers alone will stop/prevent the vertical propagation of fire.
 - d. Alludes that there is a cost saving (no supporting facts).
 - e. Assumes that the number of 1-4 story present a minimum risk to the spread and risk fire responders and the ability to fight a fire.
 - b. Alludes that insurance underwriters are on board with this amendment. There have been several other recent news articles, which highlight the tragedy/loss when this standard has not been adhered too. NFPA 285 may not be the perfect standard for all building sizes, but it is what we have today. Furthermore FM Global recently published a white paper that analyzes the

NFPA 285 and recommends that Approval Standard 4880 (<https://www.fmglobal.com/insights-and-impacts/2017/grenfell-tower-white-paper>) is more in line for the standard for evaluating the External Cladding Assembly.

Instead of amending these code sections, DOLI needs to help with:

- Educating the MN Regulatory Profession on what NFPA 285 entails and seek uniform enforcement.
- Seeking input from the insurance underwriter, asking if they would support the amendments.
- Asking that AHJs to support the current non-amended 2018 IBC; recognizing that NFPA 285 standard must be strictly adhered too and not accept Engineering Judgements (EJs). This will create uniformity for:
 - Minnesota abiding to the code process at the adopted at the National Level.
 - Testing of wall cladding systems for both fire and energy compliance
 - Designing/specifying wall cladding system.
 - Consistent enforcement: plan review and field inspections.
 - Creating a more even playing field for Contractors bidding.

Additional Commentary: At the University, we have found that most of the EJs submitted were rubber-stamp by engineers practice outside for their discipline/level of expertise.

The UMN continuously seeks to evaluate their building assets from a risk assessment standpoint; presently consulting with FM Global (FMG). One project in particular that FMG shows a particular concern with is the re-cladding of an 75-year-old one story 85,000 sf. ft., non-sprinkler rec-sports building that construction resembles Type IV. FMG has expressed that any new wall panel system for this particular project should comply with code; i.e. the provisions of NFPA 285 standard.

You may hear arguments from some Architects that this code section if not amended creates a hardship in designing/specifying a cost competitive wall systems which are both energy efficient and can meet the NFPA 285 testing standard. This kind of argument only illustrates the need for research and development for new code compliant products, which meet a recognize standard for both the fire resistance as pertaining to types of construction/building size and can meet the energy code requirements/building durability.

5. Submitted by David Mann, Director, Foam Sheathing Committee, American Chemistry Council: The Commercial Building Code and Fire Compatibility TAG included recommendations to modify the IBC with regards to fire testing of foam plastics: to modify Exception # 1 of 2018 IBC section 2603.5.5 to exempt all one-story buildings from vertical and lateral fire propagation testing requirements for foam plastics used in exterior wall assemblies and to modify section 2603.5.5 of the 2018 IBC to add an exception that allows foam plastics to be used in wall assemblies on buildings up to four stories in height where the building has an automatic sprinkler system required by NFPA 13, the wall assembly containing foam plastic does not exceed 40 feet above the finished grade, the foam thickness is not more than 4 inches, and the foam is covered with a foil face if there is an air space of more than 1 inch.

The Foam Sheathing Committee expresses our appreciation for their interest in promoting cost-effective and safe use of foam sheathing, but we are concerned that this could weaken fire performance relative to the IBC requirements in Chapter 26 for use of foam plastics on building exteriors. While fire sprinklers have great success in significantly lowering risk of interior fires progressing to and spreading on the exterior of buildings (the cause of a vast majority of exterior fires per NFPA statistics), interior fires are not the only originating source for exterior fires (e.g., fireworks, a parked vehicle fire, a trash bin or combustible landscaping ignited by discarded cigarette, etc.). While these other risk factors could be managed, they are not addressed in the proposed changes. Until such a time that fire risk and performance data is available to fully justify the proposed change to Chapter 26 requirements for use of foam plastics on exterior of buildings, the FSC prefers, as a matter of prudence, the retention and enforcement of current IBC requirements in Chapter 26.

5. Submitted by Jesse Beitel, Jensen Hughes: I recommend not accepting the proposed modification to Section 2693.5.5 of the 2018 IBC. A similar Code proposal was proposed previously in the 2012 revision cycle of the IBC. While that proposal addressed any height buildings, the reasons the Committee gave for denial are:

"The committee felt the proposal was less restrictive than the current code without justification....Lastly, no data has been provided showing the benefit of a sprinkler system in reducing the effect of fire on the exterior of the building."

These reasons are applicable to walls 40 ft. or less. By accepting this proposed modification, the exact exterior wall construction that was on the Grenfell Towers would be allowed on a four story building with an unlimited floor area. By keeping the requirement for any height wall, the use of the foam plastic would require NFPA 285 testing and thus the wall system used on the Grenfell Towers would not be allowed.

Even with the additional proposed items of thickness of foam plastic and fire department access, a fire on the exterior of the wall (dumpster, trash) could be to the top of the building and potentially have broken into the building by the time the Fire Department can control the fire.

5. Submitted by Jesse Beitel, Jensen Hughes: It is my recommendation that single story buildings of Type I, II, III, or IV construction that contain foam plastic insulation in their exterior wall, NOT be exempted from the requirements of NFPA 285. This requirement was part of the original 1988 Code change package. This requirement addressed the exterior walls on very tall, (50 - 60 ft. or greater) with large floor areas used as storage or processing facilities. Fires have occurred in these types of facilities and the foam plastic insulation can contribute to flame spread within the core that will lead to fire propagation within plastic core or joints that open due to heat, etc. While this exemption may address smaller, low rise construction, the exemption will also apply to the larger building that have a potential for loss of life and high property loss.

Other code changes TAG members did not agree to recommend

1. Modify section 412.3.6 of the 2018 IBC to extend the exception from foam-based fire suppression system requirements for Group II hangers used to store transient aircraft for 90 days or less to all Group II hangers used for the storage of private aircraft.
 - Longer-term storage of aircraft does not pose any additional hazards. However, it does increase the potential that maintenance will be improperly performed in a Group II storage hanger and increase fire risks. Additionally, Minnesota Rules, part 1300.0110, subpart 12, grants building officials the discretion to allow longer-term storage of aircraft at airports that demonstrate strict enforcement policies.
2. Modify section 414.2 of the 2018 IBC to expand the control area exception for higher education laboratories to research and development laboratories in Group B occupancies and hospital laboratories in Group I-2 occupancies.
 - The proposed change could allow potentially dangerous research and development laboratories to exist at higher stories in buildings and have greater quantities of hazardous materials.
3. Modify Table 504.4 of the 2018 IBC to keep the 2012 IBC provisions that allow buildings with Type IV construction in Group S-2 occupancies to have up to five stories in buildings without an automatic sprinkler system or up to six stories in buildings with an automatic sprinkler system. The 2018 IBC allows construction of up to four stories for buildings without an automatic sprinkler system and up to five stories in buildings with an automatic sprinkler system.
 - The reduction in allowable stories was made in the 2015 IBC and is included in the 2018 IBC. TAG members agreed the change in the number of allowable stories was a deliberate decision by the International Code Council and not an error. Additionally, increasing the number of allowable stories would not address conditions unique to Minnesota.
4. Modify Table 506.2 of the 2018 IBC to increase the allowable area factor in Type II construction in Group I-3 occupancies from 45,000 square feet to 60,000 square feet for one-story buildings equipped with an automatic sprinkler system.
 - The reduction in allowable area was made in the 2015 IBC and is included in the 2018 IBC. TAG members agreed the reduction was a deliberate decision by the ICC and not an error. Increasing the allowable area would not address conditions unique to Minnesota.

Elevators and Related Devices Code (Chapter 1307)

Elevators and Related Devices Code TAG members met twice to review chapter 30 of the 2018 IBC and recent versions of the American Society of Mechanical Engineers (ASME) standards that Minnesota Rules chapter 1307 has adopted by reference. TAG members did not receive any code change proposals and its review focused on the following new requirements.

1. Inclusion of ANSI MH29.1 *Safety Requirements for Industrial Scissor Lifts* as a referenced standard in chapter 30 of the IBC. ANSI MH29.1 is a new referenced standard in the IBC and was added at the request of the scissor lift industry to have a uniform standard for the inspection of industrial scissor lifts.
2. Chapter 30 of the IBC improves elevator safety by requiring elevators to be equipped with an emergency communication system for the deaf, hard of hearing and speech impaired. The emergency communication systems must be a visual, text-based and video-based interactive system.

The Elevators and Related Devices Code TAG members were in agreement that chapter 30 of the 2018 IBC should be adopted along with the latest versions of the previously adopted ASME standards. TAG members agreed to keep the current amendments to Minnesota Rules chapter 1307 without changes.

Residential Code (Chapter 1309)

Residential Building Code TAG members met five times to review the 2018 International Residential Code (IRC) and Minnesota Rules chapter 1309, which adopts the 2012 IRC with amendments. TAG members received 38 code change proposals. The Residential Building Code TAG members were in agreement that the 2018 IRC should be adopted and recommend the following significant code change proposals as amendments:

Recommended code changes

1. Amend existing Minnesota Rules, part 1309.0010, subpart 2, to also adopt appendix Q of the 2018 IRC. Appendix Q defines tiny houses as dwelling units having a floor area of 400 square feet or less. Appendix Q requires tiny houses to be constructed to code provisions, but with allowances for lofts, access to lofts, headroom, guards, and emergency escape and rescue openings. Tiny houses have become a popular option because they are more affordable and have less environmental impact.
2. Amend existing Minnesota Rules, part 1309.0202, to add a definition for “transient use” to clarify that single- and two-family dwellings and townhouses constructed for transient use are required to have a state license and must be constructed as Group R occupancies in compliance with Minnesota Rules chapter 1305.
3. Modify section R310.6 of the 2018 IRC to exempt new sleeping rooms added to existing basements that are undergoing alterations or repairs from emergency escape and rescue opening requirements where the basement and first floor are equipped with an NFPA 13D automatic fire sprinkler system or an automatic fire sprinkler system that meets the requirements of section P2904 of the 2018 IRC.⁴
4. Modify section R314 of the 2018 IRC to exempt existing dwellings undergoing alteration and repair from the requirement to install interconnected battery-powered smoke alarms, interconnected hard-wired smoke alarms or hard-wired smoke alarms. This is consistent with the 2018 IRC requirements for carbon monoxide alarms. Smoke alarms and carbon monoxide alarms that are interconnected and hard-wired will only be required in existing dwellings undergoing alterations or repairs if the interior wall or ceiling finishes are removed.
 - Consistent requirements for smoke alarms and carbon monoxide alarms will promote uniform enforcement.
 - Allowing battery-powered smoke and carbon monoxide alarms that are not interconnected will reduce costs for homeowners making improvements to their property.
5. Amend existing Minnesota Rules, part 1309.0402, to modify 2018 IRC Table R402.2 by adding a footnote to clarify that concrete with a compressive strength of 5,000 psi is not required for the post footing of

⁴ R310.6 of the 2018 IRC does not require emergency escape openings where there are alterations or repairs to existing basements that do not add new sleeping rooms. This is consistent with the department’s division opinion #2008-02. See https://www.dli.mn.gov/ccld/PDF/bc_opinion_division_2008_02_egress.pdf.

decks and porches, wood foundations, slab-on-grade foundation walls, and footings for floating slabs. The proposal maintains the current Minnesota amendment that requires concrete to have a compressive strength of 5,000 psi where used for footings of concrete or masonry block foundation walls that enclose basements or crawl spaces. Concrete with a compressive strength of 5,000 psi for foundation walls prevents capillary moisture from entering basements or crawl spaces.

- The Structural TAG received a code change proposal to eliminate the current Minnesota requirement that footings be constructed with concrete having a compressive strength of 5,000 psi. The Structural TAG members supported the proposal because concrete having a compressive strength of 5,000 psi is not structurally necessary and may not improve foundation durability. However, the structural TAG group did not evaluate the proposal based upon the need to prevent capillary moisture transport.
6. Amend existing Minnesota Rules, part 1309.0401, to delete Tables R404.1.1 (5), R404.1.1(6) and R404.1.1(7), and eliminate the prescriptive requirements for cantilevered foundation walls up to seven feet tall and retaining up to seven feet of unbalanced fill. Section R404.1 of the 2018 IRC is modified to add prescriptive requirements for lookout basements that have cantilevered foundation walls with unbalanced fill.
 - The Structural TAG members support this proposal.

Public comments on recommended code changes (numbers correspond to “Recommended Code Changes” section)

2018 IRC Section R202

2. Submitted by Stephen Ubl, Building Official, City of St. Paul: Transient: (definition) the change of definition, while may have good intentions, I believe it will cause more problems than resolutions. I like the direction this might be going but this change is not of substance we can use in today's code and real estate industry.
2. Submitted by Angie Wiese, Fire Safety Manager, City of St. Paul: Transient use: is this intended to only apply to new construction? If not, there is going to be an issue with the AirBnB/VRBO industry. There are thousands of homes in MN that were built to the IRC that are now being used in a transient nature.

2018 IRC Section R314

4. Submitted by Nick Erickson, Regulatory Affairs Manager, Housing First Minnesota: Housing First Minnesota's remodeler members were pleased with the ability to use wireless interconnected smoke detectors in lighter remodeling projects when hardwired devices would add significant cost to the projects.⁵

⁵ See [Appendix B](#) for the public comments submitted by Housing First.

Other code changes TAG members did not agree to recommend

1. Amend Minnesota Rules, part 1309.0313, to modify 2018 IRC section R313 to require all new one- and two-family dwellings and all new townhouses to have automatic fire sprinkler systems installed. One- and two-family dwellings and townhouses with attached garages would also be required to have sprinkler heads in the attached garage. The code change proposal deletes the existing automatic sprinkler system requirement for covered patios, covered decks, covered porches, and similar structures.
 - Although some TAG members acknowledged the benefit of property protection and reduced insurance premiums for installing fire sprinklers in these types of buildings, there was no support by TAG members for amending the code to make this a requirement. Two main reasons were discussed.
 - Installing automatic fire sprinkler systems in all one- and two-family dwellings and townhouses will increase costs for builders and homebuyers without a correlating demonstrated need
 - Legislation passed in 2017 directed the commissioner of Labor and Industry to amend Minnesota Rules to establish that one- and two-family dwellings and two-unit townhouses are not required to have installed automatic fire sprinkler systems. Rulemaking occurred. See MR part 1309.0313.
2. Amend Minnesota Rules, part 1309.0310, to modify 2018 IRC section R310.1.5 to require subsequent window replacements to be located within the original rough framed opening or original window frame opening in order to prevent the opening size from being reduced due to multiple replacements of the same window.⁶

Public comments on code changes TAG members did not agree to recommend (numbers correspond to “Other Code Changes TAG members did not agree to recommend” section)

2018 IRC Section R313

1. Submitted by Stephen Ubl, Building Official, City of St. Paul: At what point do we take "our heads out of the sand" and act on the fact that most fire deaths are in residential occupancies?!?!?!? I rest my case!
1. Submitted by Angie Wiese, Fire Safety Manager, City of St. Paul: Minnesota Fire Association Coalition (MNFAC) submitted a proposal for residential fire sprinklers which was not addressed in the published summary. There is a wealth of information supporting the adoption of the International Residential Code section R313, as published, with very minor modifications to account for Minnesota weather conditions. This supporting documentation accompanied the proposal. We have yet to see a reason

⁶ TAG members were in agreement to recommend a code change proposal that deletes [Minnesota Rules, part 1309.0310, R310.1.5 Replacement Windows](#), because the 2018 IRC has adopted the same language making the current amendment unnecessary.

why Minnesota is unique when it comes to adopting this nationally vetted standard of care. We ask that the CCAC revisit this proposal for inclusion in the adoption of MN Rule 1309.

1. Submitted by Jack Nyberg, Building Official, City of Moorhead: I still believe it is a mistake and should be decided by contractor or homeowner whether their own one or two family dwelling should be provided with sprinklers. We have seen from bills proposed by legislature and input from home buildings/owners that the cost benefit ratio isn't what everyone believes this should be. The TAG comments at the bottom of this section clearly defines that only 2 states and the District of Columbia out of the entire United states ore the only ones that are requiring new one and two family dwellings to be provided with fire suppression. I would urge all parties take a very strong second look at this before allowing this code to be adopted.
1. Submitted by Nick Erickson, Regulatory Affairs Manager, Housing First: Housing First Minnesota was pleased to see that the amendments made during the technical review of the 2018 International Residential Code (IRC) were evaluated with affordability, safety and durability in mind.

Most notably for our builder members was the Residential TAG's decision not to accept the Minnesota Fire Association Coalition's proposal to mandate sprinklers in all new single-family and two-family homes, reaffirming the *BATC v. DLI* ruling and a 2017 directive from the Minnesota Legislature. As demonstrated in our letter to the Residential Building Code TAG Chair and noted by Housing First Minnesota's staff and TAG appointee during the TAG meetings, new homes built in Minnesota today are the safest and most fire resistant in the state's history. This is due to the various fire protection measures in the state's building codes today.⁷

Public comments on Minnesota Rules, Chapter 1309

Minnesota Rules, part 1309.0312

1. Submitted by Dennis Quittschreiber, Dynamic Homes: Minimum height of 36" from finished floor to window opening before fall protection is needed should read 24" per IRC. This is a lot of added expense to windows which should not be needed.
 - The 2012 IRC set the window sill height dimension at 24 inches while the 2012 IBC set this dimension at 36 inches. These window sill height dimensions were subsequently coordinated in Minnesota Rule at 36 inches to provide consistent enforcement. The Department determined that the 36 inches provided increased life safety to more occupants, especially children.

⁷ See [Appendix B](#) for the public comments submitted by Housing First.

Existing Building Code (Chapter 1311)

The Existing Building Code TAG members met six times to review the 2018 International Existing Building Code (IEBC) and Minnesota Rules chapter 1311, which adopts the 2012 IEBC with amendments. TAG members received 18 code change proposals. The Existing Building Code TAG members recommend adopting the 2018 IEBC with the following significant proposed code changes.

Recommended code changes

1. Amend existing Minnesota Rules, part 1311.0407, subpart 2, to modify Table 407.1 to include more occupancy group classifications and relative hazard risk levels. The table assesses relative hazard risks with various occupancy classifications. A footnote is also added to the table to clarify that IRC occupancies are only included to determine relative hazard level when residential structures are converted to non-residential uses. The table is useful for building officials when determining if a design that presents a change of occupancy will also present a change in relative hazard level.
2. Modify section 1106.1 of the 2018 IEBC to identify specific counties where tornado winds may exceed 250 mph, rather than relying on the ICC-500 map that does not clearly identify landmarks and boundaries.
 - The 2018 IEBC requires additions to existing Group E occupancies located in areas where shelter design wind speed for tornados is 250 mph to have a storm shelter that may accommodate the occupant capacity for the addition. This is a new requirement that includes all K-12 schools. This will increase the cost of construction for additions to Group E occupancies, yet will improve safety.

Other code changes TAG members did not agree to recommend

1. Modify sections 809 and 904 of the 2018 IEBC to change the automatic sprinkler system requirements for building work areas undergoing level 2 or level 3 alterations. Below is an overview about the proposed changes:
 - Modify section 803 of the 2018 IEBC to require an automatic sprinkler system to be installed where work areas of buildings are 1) undergoing level 2 alterations, 2) listed in table 903.2.11.6 of the 2018 IBC, and 3) have exits or corridors shared by more than one tenant or serving an occupant load greater than 30. An automatic sprinkler system is not required if sufficient municipal water supply is unavailable without the installation of a new fire pump.
 - Modify section 904 of the 2018 IEBC to require an automatic sprinkler system to be installed where buildings are undergoing level 3 alternations with work areas that are more than 50 percent of the floor area, have Groups A, B, E, F-1, H, I, M, R-1, R-2, R-4, or S-1 occupancies, have exits or corridors shared by more than one tenant or serving an occupant load greater than 30, and where the IBC requires the work area to have an automatic sprinkler system. If there is insufficient municipal water supply for the installation of an automatic sprinkler system, then an automatic smoke detection system may be installed instead.

- Modify section 904 of the 2018 IEBC to require windowless stories undergoing level 3 alterations to install automatic sprinkler systems in work areas where the IBC requires automatic sprinkler systems to be installed and there is sufficient municipal water supply for an automatic sprinkler system.

The TAG members do not recommend this code change proposal because the new 2018 provision was submitted to the ICC Code Committee during the development of the 2018 IEBC and approved through the ICC process, with modifications. The code change proposal submitted to the TAG reverses the new 2018 provision as modified by the ICC. TAG members unanimously agreed the code change proposal did not address any conditions that are unique to Minnesota.

Energy Code (Chapters 1322 and 1323)

The Energy Code TAG members met six times to review the 2018 IECC provisions for residential and commercial building energy efficiency and Minnesota Rules chapters 1322 and 1323, which adopts the 2012 IECC with amendments. TAG members received 17 code change proposals. The Energy Code TAG members were in agreement that the 2018 IECC provisions for commercial buildings should be adopted with amendments. Some TAG members support adopting the 2018 IECC residential provisions and some TAG members did not support adopting the 2018 IECC residential provisions.

TAG members also reviewed code change proposals to amend specific provisions of the current Minnesota Residential Energy Code. Members reviewed three code change proposals with different suggestions for modifying insulation requirements for above-grade walls in residential dwellings. TAG members did not agree to recommend any of the proposals. They also did not agree on other proposals that identify areas of concern with the foundation slip sheet requirement and the performance option of the current Minnesota Residential Energy Code.

With each new edition of the IECC, the United States Department of Energy (DOE) is required to issue a determination as to whether the updated edition will improve energy efficiency in residential buildings.⁸ The Department will not make a decision to adopt the 2018 IECC provisions for residential building energy efficiency until the notice of the determination is published in the Federal Register.

TAG member concerns related to retaining the 2012 IECC residential provisions and not adopting the 2018 IECC residential provisions

1. Residential construction may fall behind in terms of methods, technology and materials used to improve energy efficiency.
2. There may be inconsistencies for code users if other 2018 I-codes affecting residential construction are adopted and the 2018 IECC residential provisions are not adopted.

TAG member concerns related to adoption of the 2018 IECC residential provisions⁹

1. The 2018 IECC when compared to the 2012 IECC might not provide significant energy or cost savings.
 - The DOE compared the 2015 IECC and 2012 IECC for energy and cost savings. Their evaluation determined an average household in Minnesota constructed to the specifications of the 2015 IECC rather than the 2012 IECC would have an average cost savings of \$118.92 over 30 years.¹⁰

⁸ See [United States Code, title 42, section 6833](#).

⁹ The Commissioner may not adopt any of the model energy code's residential provisions until a study is performed that addresses, at a minimum, "air quality, building durability, moisture, enforcement, enforceability cost benefit, and liability." Moreover, an affirmative recommendation by the Construction Codes Advisory Council is also required. See [Minnesota Statute Section 326B.118](#).

¹⁰ Vrushali V. Mendon, et al., "Cost-Effectiveness Analysis of the Residential Provisions of the 2015 IECC for Minnesota," United States Department of Energy (2016), <https://www.osti.gov/servlets/purl/1343205>.

- The DOE has not yet completed an evaluation comparing the 2018 IECC residential provisions to the 2015 IECC residential provisions as applied to an average household in Minnesota constructed to the specifications of the model code. The energy and cost savings are anticipated to be similar to those of the 2015 IECC.
 - In contrast, the DOE determined that a home in Minnesota, built to the specifications of the 2012 IECC residential provisions, provided homeowners an average of \$9,873 in cost savings over 30 years when compared to the 2006 IECC residential provisions that had been previously adopted by Minnesota Rules chapter 1322.¹¹
2. The 2018 IECC residential provisions require foundations to have R-15 continuous insulation, which will increase the costs of constructing new homes. The current Minnesota amendments to the 2012 IECC include an exception that allows R-10 insulation to be used.¹²

Public comments on adoption of the 2018 IECC commercial provisions

1. Submitted by David Mann, Director, Foam Sheathing Committee, American Chemistry Council: The FSC supports the Energy Code TAG recommendation to adopt the 2018 IECC provisions for commercial buildings. This important update will not only benefit owners and occupants of buildings, but will also benefit the communities that support the building products industry. With these updates, manufacturers are better able to target uniform efficiency requirements, leading to economies of scale and reduced costs for builders. We urge you to take forward this recommendation.¹³
2. Submitted by Eric Lacey, Chairman, Responsible Energy Codes Alliance (RECA): RECA supports the adoption of the 2018 *IECC* without weakening amendment for commercial buildings in Minnesota. We participated in several of the meetings of the Energy TAG in person or over the phone and submitted code change proposals that would bring Minnesota closer to the 2018 *IECC*. We strongly agree with the recommendation of the Energy TAG to adopt the 2018 *IECC* commercial provisions.¹⁴

Public comments on adoption of the 2018 IECC residential provisions

1. Submitted by Patrick H. Huelman, Cold Climate Housing Coordinator & Associate Professor, University of Minnesota: Thank you for this opportunity to provide input into the code adoption process. Specifically, I am writing to ask the Department of Labor and Industry (DOLI) to reassess their initial decision to not adopt the 2018 International Energy Conservation Code (IECC) into the Minnesota Residential Energy Code. I have several reasons that I believe the MN Residential Energy Code should be updated and

¹¹ Robert G. Lucas, et al., “Minnesota Energy and Cost Savings for New Single- and Multifamily Homes: 2009 and 2012 IECC as Compared to the Minnesota Residential Energy Code,” United States Department of Energy (2016): <https://www.osti.gov/servlets/purl/1043121>.

¹² See [Minnesota Rule 1322.0402, subpart 3, code section R402.2.8](#).

¹³ See [Appendix B](#) for the public comments submitted by the Foam Sheathing Committee of the American Chemistry Council.

¹⁴ See [Appendix B](#) for the public comments submitted by RECA.

incorporate the 2018 IECC as the new base code. However, I do understand and support the need for local revisions, additions, and amendments.

- a. Due to our climate, energy supply, and the market demand, Minnesota has always been a leader in energy-efficient and high-quality home construction. I see absolutely no reason why our state and its building industry would not be able to meet or exceed the floor set by the current national model energy code (2018 IECC). Furthermore, I think Minnesotans deserve the revisions and improvements that have been made since the 2012 IECC -- bearing in mind that not all elements of the 2012 IECC were adopted in the 2015 MN Residential Energy Code.
 - b. The housing industry and its practices and materials are no longer locally driven. Instead, they are heavily influenced by national trends, manufacturers, and the model codes. In addition, a large fraction of our homes are built by national home builders trying to achieve consistent and replicable solutions in multiple markets. Therefore, it would seem to be advantageous for Minnesota to be consistent with the latest national model codes, including the 2018 IECC.
 - c. A healthy housing market includes a range of home performance levels beyond code minimum. It is important to support market leaders who are moving beyond code minimums. Almost all national voluntary "above-code" programs are built off of the national model energy codes. These programs are a key support platform for these market leaders and innovators. If a state is not consistent with the national codes, it provides more confusion, additional hurdles, and possibly a bigger leap for those builders to participate in these market-driven programs.
 - d. Perhaps most importantly, the adoption process will provide an opportunity to include new provisions and flexibility for builders and potentially fix some critical "glitches" in the current code. For instance, there have been reoccurring issues with the below grade applications for insulation and moisture protection (combined interior/exterior systems, drainage, slip sheet, etc.). There have been similar concerns with ventilation system compliance (role of exhaust fans in systems with ERV/HRV, dampers and cold weather requirements for ERV/HRV, etc.). Last, continuous exterior insulation is key strategy to reduce wetting and promote drying to facilitate more durable, robust, and resilient wall systems. While the current code doesn't eliminate its use, there has been considerable confusion about its application. The IECC 2018 provides internal consistency and guidance for wall types using continuous exterior insulation that will properly implement the four key control layers (thermal, water, air, and vapor).
2. Submitted by Russ Landry, PE, Senior Mechanical Engineer, Center for Energy and Environment and Ben Rabe, CEM, Senior Policy Associate, Fresh Energy: As members of the Energy Code Technical Advisory Group, we would like to add some additional insight to the discussion around updating the Residential Energy Code. We maintain that the description outlined in the report does not fully capture the benefits of updating the 2018 IECC residential provisions, does not fully reflect the advisory group's discussion around this issue, and does not encompass the group's support for updating this portion of the code.

First, we want to thank the Department of Labor and Industry's Codes Construction Codes and Licensing Division staff for engaging us in this process, and Don Sivigny for leading discussions on the energy code.

Appendix A of the Model Codes Review explains the division within the TAG and the Department's cost-benefit analysis of the residential energy code. The report accurately notes that, "[s]ome TAG members support adopting the 2018 IECC residential provisions and some TAG members did not support adopting the 2018 IECC residential provisions" (p. 11). While this is true, we think it's worth emphasizing that half of TAG members recommended updating the residential energy code.

We thank the department for including two reasons for updating to the IECC residential provision in its report:

- Residential construction may fall behind in terms of methods, technology and materials used to improve energy efficiency
- There may be inconsistencies for code users if other 2018 I-codes affecting residential construction are adopted and the 2018 IECC residential provisions are not adopted.

We entirely agree with these arguments, however the group discussed additional advantages to updating the building code and specifically to adopting the IECC 2018 residential provisions:

- Cost effectiveness of the energy updating and the long-term benefits for homeowners.
 - Updating the energy code pays for itself countless times over the life of a home.
- Minnesota is statutorily required to update codes on a 6-year cycle.
 - Not updating the residential energy code would put Minnesota 12 years behind other states.
- Energy codes helps meet state energy goals.
 - More efficient codes will help Minnesota meet the statutory goal to reduce greenhouse gas emissions by 80 percent by 2050 from 2005 levels.
- The 2018 IECC offers flexible compliance options for the Energy Rating Index (ERI) pathway.
 - This outlines the option for a HERS rating to be used to meet the energy code. (Although there was discussion about possible amendments to this option to increase the stringency so that it is more in line with current industry standards in Minnesota.)

In addition, the cost-benefit analysis in the Department's report uses an inaccurate baseline. National model codes have not substantially increased in energy efficiency in the last two cycles (from 2012 IECC to 2015 to 2018 IECC). As the Council is aware, Minnesota's current energy code is based on the IECC 2012 model code. However, Minnesota weakened some provisions of the 2012 IECC in the previous code adoption process; for example, insulation requirements for above-grade walls. Therefore, updates to Minnesota's current residential code would provide additional energy savings that are not included in the Department's analysis.

The Midwest Energy Efficiency Alliance (MEEA) completed their own analysis of the benefits of updating the residential energy code. They found the average Minnesota homeowner could expect to use 6% less

energy and reduce annual operating costs by around \$128 and \$140 in climate zones 6 and 7, respectively, when compared to the current residential energy code. These energy and cost savings will continue for the life of a building, meaning 50 to 100 years of savings. Therefore, first-costs during initial construction should not be the only consideration when examining cost impacts. Using incremental construction costs from the current code to the full 2018 IECC, a homeowner with a 30-year mortgage will realize a positive cash flow of 4-5 years, and a life-cycle cost savings of between \$700 and \$900, depending on the specific climate zone.

Thank you for the opportunity to submit these comments. We feel strongly that the Construction Codes Advisory Council should be aware of our concerns before moving forward with the code adoption process. Furthermore, we strongly urge the Council to include the 2018 IECC residential codes provisions in the 2020 Minnesota Code update.

3. Submitted by Nicole Westfall, Building Policy Associate, Midwest Energy Efficiency Alliance (MEEA): Thank you for the opportunity to comment on the proposed adoption of the 2018 International Energy Conservation Code (IECC). The Midwest Energy Efficiency Alliance (MEEA) is a member-based non-profit organization that promotes cost-effective energy efficiency policies in the Midwest. We have been part of previous code adoption cycles in Minnesota and participated in all Energy Technical Advisory Group (TAG) meetings this year.

MEEA agrees with the Energy TAG and the MN Department of Labor and Industry (DLI) in their recommendation to adopt the 2018 IECC as the statewide commercial energy code. This is a vital step to ensure commercial buildings are constructed with the most up-to-date building methods and technologies which lock in long-term improvements to building efficiency, comfort, air quality, and resilience.

However, we do not think the report published by MN DLI fully captures the viewpoint of the Energy TAG, nor highlights the many benefits granted to Minnesota residents by updating the residential energy code to the 2018 IECC.

The report accurately identified two main benefits associated with an update. These include:

- Residential construction may fall behind in terms of methods, technology and materials used to improve energy efficiency.
- There may be inconsistencies for code users if other 2018 I-codes affecting residential construction are adopted and the 2018 IECC residential provisions are not adopted.

However, there are numerous other benefits that were completely omitted from, or not accurately presented in, the report. These benefits, and reasons why MEEA supports Minnesota's adoption of the 2018 IECC for residential buildings are as follows:

- a. Updating Minnesota's residential energy code to the 2018 IECC will provide significant energy and cost savings for homeowners and renters

- b. Updating to current energy codes helps create more resilient homes, and gives Minnesota the opportunity to maintain its position as a leader in energy efficiency, which is especially important given codes are updated on a 6-year cycle;
 - c. Energy codes serve as a critical consumer protection by locking in energy and financial savings for decades to come;
 - d. Updating energy codes spurs the local economy as jobs in construction trades and manufacturing advance; and
 - e. Adopting the 2018 IECC will provide more flexibility for residential builders in terms of compliance.¹⁵
4. Submitted by Ben Passer, J.D., Esq., Senior Policy Associate, Energy Access and Equity, Fresh Energy: On behalf of Fresh Energy, I submit the attached legal analysis regarding the Department of Labor and Industry's review and adoption of the Residential Energy Code. As discussed in the attached public comments, the Commissioner of Labor and Industry is directed by Minnesota Statutes to review the new model building codes, and adopt those model building codes as amended for use in Minnesota, every six years beginning with the 2018 edition.¹⁶
5. Submitted by Nick Erickson, Regulatory Affairs Manager, Housing First Minnesota: New homes built in Minnesota today are the most energy efficient in the history of our state. After a 30 percent increase in efficiency and a cost increase of more than \$7,000 per home following the adoption of the current energy code, construction experts rightfully wonder not only if the projected negatable increase in energy efficiency is worth the added costs, and also whether the 2018 IECC appropriately balances the shared goals of energy efficiency, durability, and affordability.

In a letter to the Energy Code TAG Chair in March 2018, Housing First Minnesota asked the Department not to adopt the 2018 IECC and instead reaffirm the existing Minnesota Residential Energy Code. With the recommendation that the existing Minnesota Residential Energy Code be retained, Housing First Minnesota has fulfilled our promise to begin development of the tools needed for our industry to better utilize the performance path that exists in the Minnesota Residential Energy Code today. Housing First Minnesota looks forward to reviewing this information with the Department so that local building officials will begin to incorporate performance-based alternatives to the prescriptive method predominately employed today.¹⁷

6. Submitted by Eric Lacey, Chairman, RECA: The most straightforward path for Minnesota, and the most effective way to reap the full range of benefits from the latest model energy code, is to adopt the 2018 IECC with no weakening amendments. We would strongly prefer this approach. However, if the

¹⁵ See [Appendix B](#) for the public comments submitted by MEEA.

¹⁶ See [Appendix B](#) for the public comments submitted by Fresh Energy.

¹⁷ See [Appendix B](#) for the public comments submitted by Housing First.

Department is not prepared to adopt all of the provisions of the code at this time, we recommend using the 2018 *IECC* as the starting point, and then deferring action on the few items where concerns raised in the Energy TAG process may justify additional study. For those issues, the Department could establish a study process and timeline with a plan to reconsider these issues as amendments to the code thereafter. As explained above, this may be the only opportunity for the next several years to update the provisions of the residential energy code, and it makes sense to update the residential energy provisions along with all of the other I-codes recommended by the various TAGs.

Code changes TAG members did not agree to recommend

1. TAG members received three code change proposals to amend existing Minn. R. part 1322.0402, subpart 1, to change the insulation requirements for above-grade walls in residential buildings in Table R402.1.1. Currently, southern Minnesota builders have the option of using R13+5 continuous and cavity insulation or R-20 cavity insulation for the wall assembly. The northern portion of the state is required to use R-21 cavity insulation. TAG members did not reach an agreement to recommend any of the following proposals:
 - a. A code change proposal was to adopt the 2018 IECC provisions for above-grade walls, which eliminates the option of using only cavity insulation and requires cavity and continuous insulation of R20+5 or R13+10 for residential buildings throughout the state.¹⁸
 - Continuous insulation is an effective way to reduce building energy use by preventing thermal bridging through framing components.
 - Builders might lack familiarity with continuous insulation and the proper installation of this type of insulation and its flashings. Flashing systems are required to be installed in the windows, doors and other openings. Improper installation of flashing systems can result in water and moisture infiltration into wall assemblies, which negatively affects building durability.
 - Energy savings do not offset the increased cost of materials, window jam extensions, and additional flashing.
 - b. A code change proposal was to allow builders in northern Minnesota to have the option of using R13+5 continuous and cavity insulation for above-grade walls.
 - c. A code change proposal was to allow an R-23 cavity only insulation option for northern and southern Minnesota.
 - The R-23 insulation is more expensive than the R-21 insulation that is currently required and may not provide sufficient energy savings for the additional cost
2. Amend Minnesota Rules, part 1322.0402, subpart 2, to modify code section R402.1.1.3 to eliminate separate requirements for exterior non-draining foundation insulation. This eliminates the requirement for a 6-mil polyethylene slip sheet to cover the entire exterior of the foundation surface. The slip sheet

¹⁸ A study must be performed before any part of the model code is adopted. See [Minnesota Statutes, section 326B.118](#).

is not required by the I-codes, but a study performed prior to the adoption of the 2012 IECC residential provisions determined that a slip sheet is necessary due to Minnesota's freezing and thawing conditions that can cause structural damage to the foundation wall.¹⁹ The slip sheet is a waterproof barrier that prevents exterior water from entering the foundation insulation and freezing. It also prevents soil from freezing to the foundation exterior insulation.

3. Amend Minnesota Rules, chapter 1322, to adopt section R406 of the 2018 IECC that establishes the criteria for compliance when an Energy Rating Index (ERI) analysis is performed.²⁰ Section R406 provides a uniform performance option for determining if a residential building is compliant with energy efficiency requirements. Below are specific areas of concern related to the adoption of section R406.
 - A performance option allows flexibility in how a structure meets energy efficiency requirements by allowing the builder to make tradeoffs in energy conservation methods.
 - Section R406 is tailored towards the *Home Energy Rating System* (HERS) Index rather than allowing other ERIs to be used to determine compliance.
 - Section R405 of the 2012 IECC as adopted by Minnesota Rules chapter 1322 already allows the use of a simulated performance alternative (option) that recognizes computer modeling and software tools to determine compliance.

Public comments regarding code changes TAG members did not agree to (numbers correspond to "Code Changes TAG members did not agree to" section)

2018 IECC Sections R402.1.1.2 and R402.1.1.3

1. Submitted by David Mann, Director, Foam Sheathing Committee, American Chemistry Council: The Appendix to the TAG Review notes that builders might lack familiarity with continuous insulation and the proper installation of this type of insulation and its flashings. However, builders in Minnesota already have this option in Climate Zone 6. The proposed cavity insulation and continuous insulation option is very constructible with various product options, including multi-functional sheathing materials that can help simplify construction. The 2018 IRC and earlier editions provide guidance for practical matters such as cladding attachments to support constructability and compliance. In addition,

¹⁹ Prior to Minnesota's adoption of the 2012 IECC with amendments, Dr. Louise Goldberg from the University of Minnesota performed the study required by Minn. Stat. § 326B.118. For the results and conclusions of Dr. Goldberg's research see, http://www.dli.mn.gov/CCLD/rm/PDF/1309_pub_energy.pdf.

TAG members were presented with research that disputed that Minnesota's freezing and thawing conditions necessitated a slip sheet covering the exterior of non-draining foundation insulation. For this research see, Jay Crandell, et al., "Frost-Protected Shallow Foundations Phase II - Final Report," United States Department of Housing and Urban Development, (June 1994), <https://www.huduser.gov/Publications/PDF/frost.pdf>. Jay H. Crandell, "Below-Ground Performance of Rigid Polystyrene Foam Insulation: Review of Effective Thermal Resistivity Values Used In ASCE Standard 32-01 – Design and Construction of Frost-Protected Shallow Foundations," *Journal of Cold Regions Engineering* 24, no. 2 (2010): <https://ascelibrary.org/doi/10.1061/%28ASCE%29CR.1943-5495.0000012>.

²⁰ A study must be performed before any part of the model code is adopted. See [Minnesota Statutes, section 326B.118](#).

manufacturers provide installation instructions for appropriate use and various third-party resources also are available to supplement and support code compliance with best-practices for construction (e.g., www.continuousinsulation.org).

These resources provide a variety of actionable and code-compliant solutions to optimize moisture control of assemblies, integrate various wall functions and components, and equip builders and designers with conventional or more advanced options for resilient, energy efficient performance. Thus, as with many forms of construction (including conventional framing, advanced wood framing, SIPs panels, ICF forms, etc.) there are significant resources available to support not just one but many reasonable solutions or options for use of continuous insulation or other equivalent insulation approaches.

While the 2018 IECC provides many options to builders in Minnesota, the current Minnesota residential energy code prescriptive path does not provide an option for continuous insulation in Climate Zone 7 in Table R402.1.1. Currently, it only provides the option in Climate Zone 6. Minnesota should adopt the 2018 IECC continuous insulation requirements of R20+5 or R13+10 for above-grade framed walls in Climate Zones 6 and 7.

Preferred Solution for Table R402.1.1:

Zone: 6

Walls: 20+5/13+10

Zone 7

Walls: 20+5/13+10

If Minnesota is unable to adopt the full 2018 IECC or its continuous insulation requirements, the preferred solution for reasons stated above, ensuring the availability of continuous insulation as an option in both Climate Zones 6 and 7 is a small but important step to modernizing the code with needed flexibility. It will ensure the availability of competitive equivalent options for builders to use throughout the state and not just in Climate Zone 6.

The FSC proposes to add an option of R13+5 to the current R-21 requirement. The current R-21 cavity insulation option limits cavity insulation materials that can be used to comply for 2x6 construction. For example, insulation materials such as open cell spray polyurethane foam can achieve an R-20 within the limits of the cavity depth but not R-21. R13+5 is thermally equivalent to R21 (see Attachment 1) so the code does not get any weaker or more stringent. Adding an option for continuous insulation does not preclude other equivalent solutions, it rather enhances the ease-of-use and achievability of the code. Because it is only an additional option, there are no cost increases, only potential savings.

Alternative Solution for Table R402.1.1:

Zone: 6

Walls: R20 or R13+5

Zone: 7

Walls: R21 or 13+5

2. Submitted by David Mann, Director, Foam Sheathing Committee, American Chemistry Council: Minnesota has a unique provisions in Section R402.1.1 of the state energy code for foundations. Of specific concern, Section R402.1.1.3 requires that “exterior nondraining foundation insulation... 4. be covered with a 6-mil polyethylene slip sheet over the entire exterior surface.”

The Appendix to the TAG Review notes that “a study performed prior to the adoption of the 2012 IECC residential provisions determined that a slip sheet is necessary due to Minnesota’s freezing and thawing conditions that can cause structural damage to the foundation wall. The slip sheet is a waterproof barrier that prevents exterior water from entering the foundation insulation and freezing. It also prevents soil from freezing to the foundation exterior insulation.”

This requirement is not found in any other state, local, or national model building code in the U.S. or Canada (where freezing and thawing is also a concern). This specific clause also is inconsistent with long-standing successful experience with the application of foam plastic insulations on the exterior of foundations and, therefore, conflicts with industry practice and manufacturer installation instructions. It also is inconsistent with foundation insulation requirements as stated in the code-referenced American Society of Civil Engineers (ASCE) Standard 32 which addresses the use of these same types of insulation for long-term frost-protection of foundations. Furthermore, the requirements in ASCE 32 are based on a long history of experience and standard practices in the Scandinavia (e.g., Norway, Sweden, and Finland).

As documented in an ASCE Journal of Cold Regions Engineering peer-reviewed article, numerous independent sources of actual in-field data indicate that these insulation materials perform adequately on foundations and other moist below-grade applications without the requirement of a 6-mil poly slip sheet over the exterior surface as required in the Minnesota state energy code. Therefore, we strongly recommend that this clause be removed from the code.

One efficient way to implement the above recommendation would be to delete Section R402.1.1.3 in its entirety and change the title of Section R402.1.1.2 to read: “Exterior draining foundation insulation requirements.” This approach would solve the above-described problem while retaining useful and practical requirements appropriate.

Accessibility Code (Chapter 1341)

The Accessibility Code TAG members met four times to review chapter 11 of the 2018 IBC, section 305 of the 2018 IEBC, and Minnesota Rules chapter 1341. TAG members received six code change proposals. The Accessibility Code TAG members were in agreement to recommend adoption of chapter 11 of the 2018 IBC and section 305 of the 2018 IEBC, with the following significant code change proposals recommended as amendments.

Recommended code changes

1. Modify section 1103.2.8 of the 2018 IBC to eliminate a new exemption from accessibility requirements for raised or lowered areas in places of religious worship that are used for the performance of religious ceremonies and are less than 300 square feet in area and located seven inches or more above or below the finished floor.²¹ The exemption may be interpreted overly broadly to exempt raised and lowered areas that are used primarily by clergy, but that are also used by the congregation and the public and should therefore meet accessibility requirements. Additionally, section 1103.2.2 of the 2018 IBC already provides an exemption for employee work areas that are less than 300 square feet in area and located seven inches or more above or below the finished floor.
2. Amend existing Minnesota Rules, part 1341.0011, subpart 6, to modify code section 1107.5.2 to increase the required percentage of accessible sleeping rooms in Group I-2 nursing homes from 10 percent to 50 percent. This is consistent with the 2018 IBC requirement that 50 percent of sleeping rooms be accessible in Group I-2 nursing homes. This proposal will increase building costs, but addresses a need identified by the Minnesota Department of Health (MDH) for more accessible sleeping rooms.
3. Amend existing Minnesota Rules, part 1341.011, subpart 6, to modify 2018 IBC code section 1107.6.2.2 to clarify a current Minnesota rule requirement that for Group R-2 occupancies, other than apartment houses, monasteries, and convents, only one accessible bedroom in a dwelling or sleeping unit may be counted towards the number of required accessible bedrooms. Dwelling units with an accessible bedroom must have accessible common areas.

²¹ The federal Americans with Disabilities Act of 1990 excludes religious organizations and entities from accessibility requirements. See [United State Code, title 42, section 12187](#).

Mechanical and Fuel Gas Code (Chapter 1346)

The Mechanical and Fuel Gas Code TAG members met six times to review the 2018 International Mechanical Code (IMC), 2018 International Fuel Gas Code (IFGC), and Minnesota Rules chapter 1346, which adopts the 2012 IMC and 2012 IFGC with amendments. TAG members received 18 code change proposals. The Mechanical and Fuel Gas Code TAG members support adoption of the 2018 IMC and 2018 IFGC with the following significant code change proposals as amendments:

Recommended code changes

1. Modify section 303.3.1 of the 2018 IFGC to allow direct-vent gas fireplaces and decorative appliances to be installed inside smoke compartments containing dwelling units and sleeping rooms in Group I-1 and I-2, Condition 2 occupancies. This change is consistent with MDH and Minnesota State Fire Marshal (SFM) requirements for Group I-1 and I-2, Condition 2 occupancies.
2. Amend existing Minnesota Rules, part 1346.0050, to delete sections 506, 507, 508, and 509 of the 2018 IMC and adopt the 2018 edition of NFPA 96 *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations* and the 2016 edition of ASHRAE 154 *Standard for Ventilation in Commercial Cooking* by reference. NFPA 96 and ASHRAE 154 have clearer requirements for ventilation and fire protection of commercial kitchens than the IMC. They are also consistent with the SFM requirements for commercial kitchens.
3. Modify section 306 of the 2018 IFGC and section 304.11 of the 2018 IMC to provide a courtesy reference to Occupational Safety and Health Act (OSHA) requirements for roof guards.
4. Amend existing Minnesota Rules, part 1346.0401, subpart 1, to modify code sections 401.1 and 401.2 of the 2018 IMC to require the ventilation in residential dwellings to meet the requirements of Minnesota Rules chapter 1322 or ASHRAE 62.2 *Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings*.
5. Modify section 604.3 of the 2018 IMC to add an exception to allow medium density polyurethane spray foam to cover duct construction without a thermal or ignition barrier. The ducts must be located in the floor assembly over the unconditioned space of IRC 1, 2 or 3 dwellings.
6. Amend existing Minnesota Rules chapter 1346 to require battery-powered or hard-wired carbon monoxide alarms to be installed in rooms with fuel burning appliances that produce carbon monoxide and are used to control environmental conditions.

Public comments on recommended code changes (numbers correspond to “Recommended Code Changes” section)

2018 IMC Section 604.3

5. Submitted by Stephen Ubl, Building Official, City of St. Paul: Too much ambiguity on this issue. Unconditioned space, conditioned space and semi-conditioned space air barrier/condensation. Additionally, specifications should be attached/standards to follow. . . .
5. Submitted by Angie Wiese, Fire Safety Manager, City of St. Paul: I would like to see the exact language because the summary published does not specify if the "medium density" insulation has to meet any testing standards. I would also like to see if it specifies what "unconditioned space" is. For instance, a tuck under garage is often unconditioned space but having insulation which does not meet flammability specifications in this space could be a hazard to the occupants above.

Carbon Monoxide Alarms

6. Submitted by Angie Wiese, fire safety manager, City of St. Paul: There was a statement in the published summary to modify the rules of 1346 to include a provision to "require battery-powered or hard-wired carbon monoxide alarms to be installed in rooms with fuel burning appliances that produce carbon monoxide and are used to control environmental conditions." I am concerned that this is not limited to the areas covered by the fire code and/or building, residential, or other areas of the mechanical code. I am also concerned that there may be no justification for these alarms and that there may not be sound direction to how they are to be installed (with a system, stand alone, tied to the appliance, who is notified, etc.).

Appendix A – Membership of TAGs

The CCAC appointed ten TAGs and their members to review the 2015 and 2018 International Model Building Codes (I-codes), compare them to the current Minnesota rules, which largely adopt the 2012 I-codes as amended for use in Minnesota. The members of the TAG were appointed to represent associations with experience with each of the model codes. Below is a list of TAG members and the organizations they represent.

Building Code Administration TAG

TAG representation	Member	Employer	Association
DLI staff	Scott McKown	DLI	Construction Codes and Licensing Division (CCLD)
	Doug Nord	DLI	CCLD
Municipal building official	Tom Bakken	City of Hastings	Association of Minnesota Building Officials (AMBO)
	James Williamette	City of St. Paul	AMBO
Residential building industry	Mike Swanson	JMS Custom Homes	Builders Association of the Twin Cities (BATC)
	Kurt Welker	Welker Custom Homes	Builders Association of Minnesota (BAMN)
Local unit of government	Jennifer DeJournett	Three Rivers Park District	CCAC
	Pamela Whitmore	League of MN Cities ("LMC")	LMC

Commercial Building Code TAG

TAG representation	Member	Employer	Association
DLI staff	Greg Metz	DLI	CCLD
	Scott McKown	DLI	CCLD
Municipal building official	Jerry Norman	City of Rochester	AMBO
Municipal fire code official	Ben Foster	City of Minneapolis	Fire Marshals Association of Minnesota (FMAM)
Licensed architect	Gerhard Guth	HGA Architects, Inc.	American Institute of Architects Minnesota (MNAIA)/CCAC

Commercial Building Code and Fire Code Compatibility TAG

TAG representation	Member	Employer	Association
DLI staff	Greg Metz	DLI	CCLD
	Scott McKown	DLI	CCLD
Municipal building official	Jerry Norman	City of Rochester	AMBO
	Scott Anderson	City of Minneapolis	AMBO
Municipal fire code official	Angie Wiese	City of St. Paul	FMAM
State Fire Marshal	Forrest Williams	State Fire Marshal Office	
Licensed architect	David Leschak	David Leschak Architects	MNAIA

Elevators and Related Devices Code TAG

TAG representation	Member	Employer	Association
DLI staff	Bill Reinke	DLI	CCLD
	Tim Warren	DLI	CCLD
Municipal building official	David Fisher	City of Edina	AMBO
Municipal elevator inspector	John Roche	City of St. Paul	
Municipal fire code official	Chris Fuller	City of St. Anthony	FMAM
Commercial building owners and managers	Tom Erdman	Zeller Realty	Building Owners and Managers Association (BOMA)

Residential Code TAG

TAG representation	Member	Employer	Association
DLI staff	Richard Lockrem	DLI	CCLD
	Paul Swett	DLI	CCLD
Municipal building official	Jerry Backlund	City of Hastings	AMBO
Residential building industry	Mike Paradise	Bigelow Homes, LLC	BAMN/CCAC
	Brent Nygaard	Lennar	BATC
Affordable housing advocate	Curt Bennett	Greater Metropolitan Housing Corporation	

Existing Building Code TAG

TAG representation	Member	Employer	Association
DLI staff	Mike Bunnell	DLI	CCLD
	Greg Metz	DLI	CCLD
Municipal building official	Steve Ubl	City of St. Paul	AMBO
Licensed architect	Vincent DiGiorno	Krech, O'Brien, Mueller & Associates Architects	MNAIA
Municipal fire code official	Michael Post	City of St. Cloud	FMAM
Commercial building owners and managers	Tom Erdman	Zeller Realty	BOMA

Energy Code TAG

TAG representation	Member	Employer	Association
DLI staff	Don Sivigny	DLI	CCLD
	Chris Meier	DLI	CCLD
Municipal building official	Ann Jacklitch	City of Maple Grove	AMBO
Residential building industry	Ed VonThoma	Building Knowledge	BAMN
	Ross Anderson	The Energy Network	BATC
Commercial building industry	John Smith	Michaud Cooley Erickson	American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE)
Energy conservation association	Russ Landry	Center for Energy and Environment	
	Ben Rabe	Fresh Energy	

Accessibility Code TAG

TAG representation	Member	Employer	Association
DLI staff	Karen Gridley	DLI	CCLD
	Ryan Rehn	DLI	CCLD
Municipal building official	Lee Gladitsch	City of St. Cloud	
Licensed architect	Gerhard Guth	HGA Architects, Inc.	MNAIA/CCAC
State council on disability	Margot Imdieke Cross	State Council on Disability	
Commercial building owners and managers	Jason Nerison	Zeller Realty	BOMA

Mechanical and Fuel Gas Code TAG

TAG representation	Member	Employer	Association
DLI staff	Chris Meier (lead)	DLI	CCLD
	Don Sivigny	DLI	CCLD
Municipal building official	John Rued	City of Monticello	
Municipal mechanical inspector	Joseph Strohmeier	City of Minneapolis	Minnesota Association of Plumbing and Mechanical Officials (MAPMO)
	Jared Ellingson	University of Minnesota	MAPMO
Mechanical contractor	Todd Landon	Spriggs Plumbing, Heating & Process Piping	MMCA
Licensed engineer	John Smith	Michaud Cooley Erickson	ASHRAE

Structural TAG

TAG representation	Member	Employer	Association
DLI staff	Dan Kelsey	DLI	CCLD
	Scott Erickson	DLI	CCLD
Municipal building official	Kyle Dimler	City of Hutchinson	AMBO
Municipal structural plans examiner	Randy Johnson	City of Rochester	AMBO
Residential building industry	Craig Oswell	Oswell Engineering and Consulting, LLC	BAMN
	Mike Barden	Pulte Group	BATC
Licensed engineer	Ron LaMere	BKBM Engineers	Minnesota Structural Engineering Association (MNSEA)

Appendix B – Public Comments on I-Codes and Code Change Proposals

The department received several public comments regarding the code change proposals and the proposed adoption of the 2018 International Model Codes. These public comments are included below.



MEMORANDUM

To: Minnesota Department of Labor & Industry
From: Nick Erickson, Regulatory Affairs Manager, Housing First Minnesota
Subject: Technical Advisory Group Review of the 2018 International Model Codes
Date: May 31, 2018

I am writing on behalf of Housing First Minnesota to offer comments on the Department of Labor & Industry's Technical Advisory Group (TAG) review of the 2018 International Model Codes report titled "2018 International Model Code Review" (Report).

By way of background, Housing First Minnesota represents more than 1,300 member firms engaged in all phases of the home building, land development and remodeling industries in Minnesota, including contractors, sub-contractors, land developers and suppliers. Housing First Minnesota also runs the state's largest energy efficient new construction program, Minnesota's Green Path.

Our comments regarding the TAG review of the 2018 International Model Codes and the Report resulting from this review are centered around Housing First Minnesota's long-held belief that Minnesota's housing regulations should balance safety, durability, and energy efficiency with housing affordability.

COMMENTS ON TAG PROCESS AND REPORT

Housing First Minnesota would like to first thank the Department's staff and the appointees to the various TAGs for the significant investment of time each of them put into the TAG process. We feel reviewing the different international model codes in separate meetings comprised of subject matter experts allowed for each proposed change to be viewed with the whole home in mind, and it also limited the influence of product manufacturers seeking to mandate their products in code.

Residential Building Energy Code

New homes built in Minnesota today are the most energy efficient in the history of our state. After a 30 percent increase in efficiency and a cost increase of more than \$7,000 per home following the adoption of the current energy code, construction experts rightfully wonder not only if the projected negatable increase in energy efficiency is worth the added costs, and also whether the 2018 IECC appropriately balances the shared goals of energy efficiency, durability, and affordability.

In a letter to the Energy Code TAG Chair in March 2018, Housing First Minnesota asked the Department not to adopt the 2018 IECC and instead reaffirm the existing Minnesota Residential Energy Code. With the recommendation that the existing Minnesota Residential Energy Code be retained, Housing First Minnesota has fulfilled our promise to begin development of the tools needed for our industry to better utilize the performance path that exists in the Minnesota Residential Energy Code today. Housing First Minnesota looks forward to reviewing this information with the Department so that local building

officials will begin to incorporate performance-based alternatives to the prescriptive method predominantly employed today.

Residential Building Code

Housing First Minnesota was pleased to see that the amendments made during the technical review of the 2018 International Residential Code (IRC) were evaluated with affordability, safety and durability in mind.

Most notably for our builder members was the Residential TAG's decision not to accept the Minnesota Fire Association Coalition's proposal to mandate sprinklers in all new single-family and two-family homes, reaffirming the *BATC v. DLI* ruling and a 2017 directive from the Minnesota Legislature. As demonstrated in our letter to the Residential Building Code TAG Chair and noted by Housing First Minnesota's staff and TAG appointee during the TAG meetings, new homes built in Minnesota today are the safest and most fire resistant in the state's history. This is due to the various fire protection measures in the state's building codes today.

Housing First Minnesota's remodeler members were pleased with the ability to use wireless interconnected smoke detectors in lighter remodeling projects when hardwired devices would add significant cost to the projects.

CONCLUSION

As stated during the TAG meetings and in our comments submitted to the Department in March 2018, the 2018 Minnesota Building Codes must balance safety, durability, energy efficiency with housing affordability. Retaining Minnesota's current residential energy code and adoption of the 2018 IRC, without the costly sprinkler mandate, and consideration of additional amendments that do not add to the cost of housing are all recommendations Housing First Minnesota advocated for during the TAG review. We believe the direction taken by the Department, as outlined in the Report, is the right direction for Minnesota's homeowners, for the state's housing market and for Minnesota's economy.

Please contact me directly with any questions you have regarding our comments.

RECA Comments on MN Adoption of 2018 IECC (Residential)

The Responsible Energy Codes Alliance (RECA) submits the following comments on the Energy TAG's recently concluded review of the 2018 *IECC* residential energy provisions, and in response to the Department's request for feedback on its May 15 document, the *2018 International Model Codes Review*. RECA is a broad coalition of product and equipment manufacturers, trade associations, building science experts, and energy efficiency advocates. A list of our members can be found on our website, www.reca-codes.com. Our mission is to promote the adoption of the latest model energy codes without substantive weakening amendments, and to help states and cities achieve the benefits their citizens have come to expect from modern building energy codes, such as ensuring occupant comfort and welfare through all weather conditions, saving energy and energy costs and reducing harm to the environment, to name a few.

RECA supports the adoption of the 2018 IECC without weakening amendments for residential buildings in Minnesota. We participated in several of the meetings of the Energy TAG in person and over the phone, and we submitted code change proposals that would help bring Minnesota closer to the 2018 *IECC*.

We recognize that there was not unanimity among the Energy TAG members regarding whether to adopt the full 2018 *IECC* for residential buildings. However, based on the Energy TAG discussions in which we participated, we believe that the vast majority of the changes between the 2012 and 2018 *IECC* were non-controversial, and we urge the Department to adopt as much of the 2018 *IECC* as possible.

If the Department is inclined to adopt something less than the full code, we suggest starting with the 2018 *IECC*, and then identifying and deferring action on any specific provisions that truly deserve additional study or amendment. We do not recommend completely bypassing any residential energy code update this cycle, simply because of disagreements over a small handful of issues. Minnesota citizens deserve to live in residential buildings that meet or exceed the latest national model energy codes, and there may not be another opportunity to update the residential energy code for several years.

In our comments below, we first explain why the 2018 *IECC* makes sense for Minnesota, then address a few of the concerns raised in the May 15 *Review*, and then recommend a path forward for updating Minnesota's residential energy code.

Support for Full Adoption of 2018 IECC

A full adoption of the 2018 *IECC* for residential construction would provide the biggest boost of cost-effective energy savings for Minnesota's homeowners. Minnesota's current residential energy code reflects much of the 2012 *IECC*. However, because of a handful of weakening amendments adopted in the previous update, Minnesota has not captured the full energy and cost savings of the 2012 *IECC*. For example, Minnesota did not adopt the full insulation requirements for above-grade or below-grade walls contained in the 2012 *IECC*. As a result, it should be noted that the U.S. DOE study referenced in the *Review* does not identify the

full amount of potential energy and cost savings from an update, because the study does not compare Minnesota's current energy code to the 2015 *IECC*, but rather uses the 2012 *IECC* instead of the current Minnesota code as its baseline for the comparison.¹ Thus, the energy and cost savings will be significantly higher if Minnesota eliminates these weakening amendments and adopts the 2012 *IECC* or a more recent version with no weakening amendments.

In addition to capturing energy savings left on the table in the previous update, the 2018 *IECC* contains several other provisions that Minnesota does not currently have, which could be beneficial to homeowners and homebuilders. For example:

- The 2015 *IECC* introduced a new compliance option, the Energy Rating Index (ERI) with unprecedented flexibility for builders and key protections for homeowners. The ERI compliance path was further refined and improved in the 2018 *IECC* and we support the 2018 version as the best approach.
- The 2018 *IECC* also includes a new alternative for burying ducts in attic insulation, potentially saving builders and homeowners energy and construction costs.
- The latest *IECC* includes moderate improvements in efficiency that had widespread support from homebuilders and energy efficiency advocates, such as reducing fenestration U-factors to 0.30 and increasing high-efficacy lighting from 75% to 90%.
- The 2018 *IECC* will bring Minnesota into alignment with U.S. DOE's free compliance software, REScheck, along with other software compliance and training materials available.

While these are only a few of the specific benefits of adopting the latest model energy code, we believe the benefits of the 2018 *IECC* extend not only to homeowners who live in these homes and will ultimately pay utility bills over the 70 to 100 year expected life, but also to builders who seek simplicity and consistency in building codes, as well as the state's building code officials who must administer these codes.

Response to Two Concerns Raised in May 15 Review

The May 15 *Review* lists only a handful of concerns raised about both the 2018 *IECC* and some of the proposals submitted to the Energy TAG. As we explained above, the vast majority of the changes in the 2018 *IECC* were not controversial (and in fact enjoy broad support among stakeholders), and most of the conversation focused on a small handful of provisions. If the Department does not ultimately recommend full adoption of the 2018 *IECC*, we believe a reasonable option would be to move forward with all of the non-controversial provisions and set aside the few provisions that raised concerns for a reasonable period of additional review or study. The following are comments on specific issues raised in the *Review*.

- **Energy Rating Index.** From the May 15 *Review*, it appears there is some confusion about this compliance path. Minnesota currently allows builders to comply with the residential energy code via the simulated performance alternative of the 2012 *IECC*ⁱⁱ, but it does not have an energy rating-based compliance option like the ERI. The ERI is broader in scope than the performance path because an energy rating incorporates efficiency for heating, cooling, and water heating equipment, as well as lighting and

appliances. This provides additional flexibility not available in Minnesota's current performance path. The ERI also contains key trade-off backstops and mandatory items that will help ensure that homes built to the ERI will have a reasonably efficient thermal building envelope, among other things. This compliance path has received broad support from a wide range of stakeholders around the country and has been implemented in over a dozen states. The May 15 *Review* lists several "specific areas of concern" about the ERI, but none of these concerns adequately explain why the ERI should not be adopted as published in the 2018 *IECC*, given the potential benefits from and broad support for this compliance option.

- **Wall insulation.** The wood-frame wall insulation requirements of the 2012 *IECC* are R-20+5 or 13+10 (or equivalent U-factors) for all climate zones in Minnesota. In fact, these same R-values appear in the 2015 and 2018 *IECC* as well. Minnesota did not adopt these requirements in the past review, but rather adopted R-20 or 13+5 for climate zone 6, and R-21 for climate zone 7. This amendment creates several problems for Minnesota:
 - Walls are under-insulated for Minnesota's varied weather conditions.
 - Retroactively adding insulation to walls is far more expensive than correctly insulating them at construction.
 - There is no R-value alternative in climate zone 7 for cavity insulation plus foam sheathing, as there is in climate zone 6.
 - Because of amendments to the wall insulation U-factors, DOE's free REScheck software does not determine compliance with the Minnesota code.
 - Homeowners are less comfortable, and spend more money to heat and cool their homes than if the walls were insulated to full 2012/15/18 *IECC* levels.

For these reasons, we strongly recommend adopting the full R-20+5 or 13+10 requirement for wall insulation (and equivalent U-factors). However, even if Minnesota does not adopt these R-values, we recommend two things:

- Add an R-13+5 option to climate zone 7 to maintain consistency with climate zone 6. This would give builders an additional means of demonstrating compliance.
- Adopt the unamended U-factor requirements from the 2018 *IECC*. This would give homebuilders and code officials the additional benefit of being able to use DOE's REScheck compliance software. Several other states have taken this approach because it allows builders to seamlessly use the most common compliance software.

Recommendation for the Path Forward in Minnesota

The most straightforward path for Minnesota, and the most effective way to reap the full range of benefits from the latest model energy code, is to adopt the 2018 *IECC* with no weakening amendments. We would strongly prefer this approach. However, if the Department is not prepared to adopt all of the provisions of the code at this time, we recommend using the 2018 *IECC* as the starting point, and then deferring action on the few items where concerns raised in the Energy TAG process may justify additional study. For those issues, the Department could

appliances. This provides additional flexibility not available in Minnesota's current performance path. The ERI also contains key trade-off backstops and mandatory items that will help ensure that homes built to the ERI will have a reasonably efficient thermal building envelope, among other things. This compliance path has received broad support from a wide range of stakeholders around the country and has been implemented in over a dozen states. The May 15 *Review* lists several "specific areas of concern" about the ERI, but none of these concerns adequately explain why the ERI should not be adopted as published in the 2018 *IECC*, given the potential benefits from and broad support for this compliance option.

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The most straightforward path for Minnesota, and the most effective way to reap the full range of benefits from the latest model energy code, is to adopt the 2018 *IECC* with no weakening amendments. We would strongly prefer this approach. However, if the Department is not prepared to adopt all of the provisions of the code at this time, we recommend using the 2018 *IECC* as the starting point, and then deferring action on the few items where concerns raised in the Energy TAG process may justify additional study. For those issues, the Department could

establish a study process and timeline with a plan to reconsider these issues as amendments to the code thereafter. As explained above, this may be the only opportunity for the next several years to update the provisions of the residential energy code, and it makes sense to update the residential energy provisions along with all of the other I-codes recommended by the various TAGs.

We appreciate the opportunity to directly participate in the TAG process and we offer our assistance and experience in energy code adoption and implementation as you work to maximize building energy efficiency. We hope that you will not hesitate to draw on RECA's support and willingness to help. Please contact me at (202) 339-6366 if you have any questions or would like to discuss how RECA can be of assistance.

Sincerely,

Eric Lacey, RECA Chairman

ⁱ See U.S. Department of Energy, *Cost-Effectiveness Analysis of the Residential Provisions of the 2015 IECC for Minnesota* (Feb. 2016).

ⁱⁱ See Minn. R. 1322.0010 (2015). Our understanding is that because Minnesota adopted the 2012 IECC for residential construction unless otherwise amended by rule, IECC section R405, the simulated performance alternative, was adopted by reference as a compliance option.



June 1, 2018

Construction Codes Advisory Council
Minnesota Department of Labor and Industry
443 Lafayette Road North, St. Paul, MN 55155

Via Email: CCACComments.DLI@state.mn.us

Re: Valuable Updates for the Minnesota Energy Code

The Foam Sheathing Committee of the American Chemistry Council (ACC) thanks the Minnesota Construction Codes Advisory Council and its Energy Code Technical Advisory Group for its leadership role in promoting building energy efficiency. The Foam Sheathing Committee (FSC) is a Self-Funded subgroup of the Plastics Division of the American Chemistry Council ("ACC") with member companies: Atlas Roofing, Dow, GAF, Hunter Panels, Johns Manville, Kingspan Insulation, Owens Corning, and RMAX.

Support for TAG Recommendation on Commercial Energy Code

The FSC supports the Energy Code TAG recommendation to adopt the 2018 IECC provisions for commercial buildings. This important update will not only benefit owners and occupants of buildings, but will also benefit the communities that support the building products industry. With these updates, manufacturers are better able to target uniform efficiency requirements, leading to economies of scale and reduced costs for builders. We urge you to take forward this recommendation.

Comments on TAG Recommendations on Residential Energy Code

The report to the CCAC on May 15, 2018 summarizing TAG recommendations included a brief appendix on the Residential Energy Code that reviews these proposals. The American Chemistry Council, FSC technical staff, and several of our member companies were active participants in the Energy TAG meetings. Additionally, the FSC submitted three residential energy code proposals to the TAG.

We would like to take this opportunity to present our response to the TAG recommendations and refresh the CCAC on these issues. Comments regarding specific code proposals will also be provided in the CCAC form.

Response to Concerns with Adopting the 2018 IECC

Appendix A notes that the DOE evaluation determined an average household in Minnesota constructed to the specifications of the 2015 IECC rather than the 2012 IECC would have an average cost savings of \$118.92 over 30 years. This is somewhat



misleading as the savings are “per-dwelling-unit impact” not average household, and the same report states that for climate zone 6A the Simple Payback Period for the 2015 IECC Compared to the 2012 IECC is 1.3 years. That is a rapid and reasonable payback period that also provides the general public benefits of reduced energy use. We urge the CCAC to dismiss this concern.

Response to Concerns with Code Proposals Addressing Above Grade Walls

The Appendix notes that builders might lack familiarity with continuous insulation and the proper installation of this type of insulation and its flashings. However, builders in Minnesota already have this option in Climate Zone 6. The proposed cavity insulation and continuous insulation option is very constructible with various product options, including multi-functional sheathing materials that can help simplify construction. The 2018 IRC and earlier editions provide guidance for practical matters such as cladding attachments to support constructability and compliance. In addition, manufacturers provide installation instructions for appropriate use and various third-party resources also are available to supplement and support code compliance with best-practices for construction (e.g., www.continuousinsulation.org).

These resources provide a variety of actionable and code-compliant solutions to optimize moisture control of assemblies, integrate various wall functions and components, and equip builders and designers with conventional or more advanced options for resilient, energy efficient performance. Thus, as with many forms of construction (including conventional framing, advanced wood framing, SIPs panels, ICF forms, etc.) there are significant resources available to support not just one but many reasonable solutions or options for use of continuous insulation or other equivalent insulation approaches.

While the 2018 IECC provides many options to builders in Minnesota, the current Minnesota residential energy code prescriptive path does not provide an option for continuous insulation in Climate Zone 7 in Table R402.1.1. Currently, it only provides the option in Climate Zone 6. Minnesota should adopt the 2018 IECC continuous insulation requirements of R20+5 or R13+10 for above-grade framed walls in Climate Zones 6 and 7.

Preferred Solution for Table R402.1.1:

<u>Zone</u>	<u>Walls</u>
6	R20 or R13+5 <u>20+5/13+10</u>
7	R24 <u>20+5/13+10</u>



If Minnesota is unable to adopt the full 2018 IECC or its continuous insulation requirements, the preferred solution for reasons stated above, ensuring the availability of continuous insulation as an option in both Climate Zones 6 and 7 is a small but important step to modernizing the code with needed flexibility. It will ensure the availability of competitive equivalent options for builders to use throughout the state and not just in Climate Zone 6.

The FSC proposes to add an option of R13+5 to the current R-21 requirement. The current R-21 cavity insulation option limits cavity insulation materials that can be used to comply for 2x6 construction. For example, insulation materials such as open cell spray polyurethane foam can achieve an R-20 within the limits of the cavity depth but not R-21. R13+5 is thermally equivalent to R21 (see Attachment 1) so the code does not get any weaker or more stringent. Adding an option for continuous insulation does not preclude other equivalent solutions, it rather enhances the ease-of-use and achievability of the code. Because it is only an additional option, there are no cost increases, only potential savings.

Alternative Solution for Table R402.1.1:

<u>Zone</u>	<u>Walls</u>
6	R20 or R13+5
7	R21 or 13+5

Response to Other Proposals: To Minnesota Rules, part 1322.0402, subpart 2, to modify code section R402.1.1.3 (Exterior Nondraining Foundation Insulation Requirements)

Minnesota has a unique provisions in Section R402.1.1 of the state energy code for foundations. Of specific concern, Section R402.1.1.3 requires that “exterior nondraining foundation insulation... 4. be covered with a 6-mil polyethylene slip sheet over the entire exterior surface.”

The Appendix notes that “a study performed prior to the adoption of the 2012 IECC residential provisions determined that a slip sheet is necessary due to Minnesota’s freezing and thawing conditions that can cause structural damage to the foundation wall. The slip sheet is a waterproof barrier that prevents exterior water from entering the foundation insulation and freezing. It also prevents soil from freezing to the foundation exterior insulation.”



This requirement is not found in any other state, local, or national model building code in the U.S. or Canada (where freezing and thawing is also a concern). This specific clause also is inconsistent with long-standing successful experience with the application of foam plastic insulations on the exterior of foundations and, therefore, conflicts with industry practice and manufacturer installation instructions. It also is inconsistent with foundation insulation requirements as stated in the code-referenced American Society of Civil Engineers (ASCE) Standard 32 which addresses the use of these same types of insulation for long-term frost-protection of foundations. Furthermore, the requirements in ASCE 32 are based on a long history of experience and standard practices in the Scandinavia (e.g., Norway, Sweden, and Finland).

As documented in an *ASCE Journal of Cold Regions Engineering* peer-reviewed article¹, numerous independent sources of actual in-field data indicate that these insulation materials perform adequately on foundations and other moist below-grade applications without the requirement of a 6-mil poly slip sheet over the exterior surface as required in the Minnesota state energy code. Therefore, we strongly recommend that this clause be removed from the code.

One efficient way to implement the above recommendation would be to delete Section R402.1.1.3 in its entirety and change the title of Section R402.1.1.2 to read: “Exterior ~~draining~~ foundation insulation requirements.” This approach would solve the above-described problem while retaining useful and practical requirements appropriate for all exterior foundation insulation applications and materials.

We hope these comments are helpful as Minnesota considers revisions to the state energy code.

Comments on TAG Recommendations on Commercial Building Code and Fire Compatibility

The Commercial Building Code and Fire Compatibility TAG included recommendations to modify the IBC with regards to fire testing of foam plastics: to modify Exception # 1 of 2018 IBC section 2603.5.5 to exempt all one-story buildings from vertical and lateral fire propagation testing requirements for foam plastics used in exterior wall assemblies and to modify section 2603.5.5 of the 2018 IBC to add an exception that allows foam plastics to be used in wall assemblies on buildings up to four stories in height where the building has an automatic sprinkler system required by NFPA 13, the wall assembly containing foam plastic does not exceed 40 feet above the finished

¹ Crandell, J.H., Below-Ground Performance of Rigid Polystyrene Foam Insulation: Review of Effective Thermal Resistivity Values Used in ASCE Standard 32-01 – Design and Construction of Frost-Protected Shallow Foundations, *Journal of Cold Regions Engineering*, Vol. 24, No. 2, June 1, 2010.



grade, the foam thickness is not more than 4 inches, and the foam is covered with a foil face if there is an air space of more than 1 inch.

The Foam Sheathing Committee expresses our appreciation for their interest in promoting cost-effective and safe use of foam sheathing, but we are concerned that this could weaken fire performance relative to the IBC requirements in Chapter 26 for use of foam plastics on building exteriors. While fire sprinklers have great success in significantly lowering risk of interior fires progressing to and spreading on the exterior of buildings (the cause of a vast majority of exterior fires per NFPA statistics), interior fires are not the only originating source for exterior fires (e.g., fireworks, a parked vehicle fire, a trash bin or combustible landscaping ignited by discarded cigarette, etc.). While these other risk factors could be managed, they are not addressed in the proposed changes. Until such a time that fire risk and performance data is available to fully justify the proposed change to Chapter 26 requirements for use of foam plastics on exterior of buildings, the FSC prefers, as a matter of prudence, the retention and enforcement of current IBC requirements in Chapter 26.

Sincerely,

David H. Mann
Director, Foam Sheathing Committee
David.Mann@americanchemistry.com
700 2nd Street, NE | Washington, DC 20002
O: (202) 680-0459

Climate Zone 7 Wall Insulation Equivalency Comparison for Minnesota Residential Energy Code						
Wall Thermal Resistance by Component	2x4 Wall R-13 + R-5ci			2x6 Wall R-21		
	R-value Studs	R-value Cavity	Assembly Value	R-value Studs	R-value Cavity	Assembly Value
Wall - Outside Winter Air Film	0.17			0.17		
Siding - Vinyl	0.6			0.6		
Continuous Insulation	5			0		
OSB - 7/16"	0.62			0.62		
SPF Stud/Cavity Insulation	4.375	13		6.875	21	
1/2" Drywall	0.45			0.45		
Inside Air Film	0.68			0.68		
Studs at 16" o.c.	25%	75%		25%	75%	
Total Wall Effective R-value	11.90	20.52	17.4	9.40	23.52	17.1
Total Wall U-factor	0.084	0.049	0.058	0.106	0.043	0.058
CONCLUSION: R13+5ci 2x4 wall assembly is equivalent to a R21 2x6 wall assembly.						
NOTE: The parallel path method and parameters for analysis are consistent with those used in the IECC-Residential and IRC Chapter 11.						



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June 1, 2018

Minnesota Construction Codes Advisory Council
443 Lafayette Road N.
St. Paul, MN 55155

Re: Comments regarding the full adoption of the unamended 2018 International Energy Conservation Code (IECC) as the statewide energy code in Minnesota

Dear Members of the Construction Codes Advisory Council,

Thank you for the opportunity to comment on the proposed adoption of the 2018 International Energy Conservation Code (IECC). The Midwest Energy Efficiency Alliance (MEEA) is a member-based non-profit organization that promotes cost-effective energy efficiency policies in the Midwest. We have been part of previous code adoption cycles in Minnesota and participated in all Energy Technical Advisory Group (TAG) meetings this year.

MEEA agrees with the Energy TAG and the MN Department of Labor and Industry (DLI) in their recommendation to adopt the 2018 IECC as the statewide commercial energy code. This is a vital step to ensure commercial buildings are constructed with the most up-to-date building methods and technologies which lock in long-term improvements to building efficiency, comfort, air quality, and resilience.

However, we do not think the report published by MN DLI fully captures the viewpoint of the Energy TAG, nor highlights the many benefits granted to Minnesota residents by updating the residential energy code to the 2018 IECC.

The report accurately identified two main benefits associated with an update. These include:

- Residential construction may fall behind in terms of methods, technology and materials used to improve energy efficiency.
- There may be inconsistencies for code users if other 2018 I-codes affecting residential construction are adopted and the 2018 IECC residential provisions are not adopted.

However, there are numerous other benefits that were completely omitted from, or not accurately presented in, the report. These benefits, and reasons why MEEA supports Minnesota's adoption of the 2018 IECC for residential buildings are as follows:

1. **Updating Minnesota's residential energy code to the 2018 IECC will provide significant energy and cost savings for homeowners and renters**
2. **Updating to current energy codes helps create more resilient homes, and gives Minnesota the opportunity to maintain its position as a leader in energy efficiency, which is especially important given codes are updated on a 6-year cycle;**
3. **Energy codes serve as a critical consumer protection by locking in energy and financial savings for decades to come;**

MEEA Comments to the Minnesota Construction Codes Advisory Council // May 2018 1



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4. **Updating energy codes spurs the local economy as jobs in construction trades and manufacturing advance; and**
 5. **Adopting the 2018 IECC will provide more flexibility for residential builders in terms of compliance.**
-
1. **Updating Minnesota's residential energy code to the 2018 IECC will provide significant energy and cost savings for homeowners and renters.**

While it is true that the national baseline residential codes have not substantially increased in energy efficiency in the last two cycles (from 2012 IECC to 2015 to 2018 IECC), the DOE analysis referenced in the report does not consider Minnesota's current state-specific amendments to the energy code. Given that Minnesota weakened critical provisions of the 2012 IECC (specifically insulation levels in the basement and above grade walls), additional energy savings are available beyond the energy efficiency increases in the national model codes.

According to a MEEA analysis, the average homeowner in Minnesota could expect to use 6% less energy and reduce annual operating costs by around \$128 and \$140 in CZ 6 and 7, respectively, when compared to the current residential energy code. These energy and cost savings will continue for the life of a building, which can extend 50 – 100 years or more.¹ For this reason, first-costs during initial construction should not be the only consideration when analyzing cost impacts. When using incremental construction costs from the current code to the full 2018 IECC,² a homeowner with a 30-year mortgage will realize a positive cash flow between 4 - 5 years, and a life-cycle cost savings of between \$700 - \$900 depending on climate zone.³

2. **Updating to current energy codes gives Minnesota the opportunity to meet its climate goals and maintain its position as a leader in energy efficiency, which is especially important given codes are updated on a 6-year cycle.**

Energy codes help Minnesota meet its established energy efficiency and climate-related goals. The Next Generation Energy Act of 2007 calls for a 30 percent greenhouse gas (ghg) reduction by 2025, and 80 percent by 2050. Since the formation of this act, Minnesota has already fallen behind in its goals; by 2014 it had only achieved a 4% reduction (from 2005 to 2015) when a 15 percent reduction was required to stay on pace.⁴ Minnesota's 2016 Climate Solutions and

¹ Based on MEEA analysis: Using RBM/Rate to analyze the DOE model home with a heated basement.

² MEEA used construction costs from RSMeans Data, local department stores and DOE 2015 IECC Cost Effectiveness analysis. For a 2400 sq. ft. 2 story home with a heated basement. MEEA found incremental cost increase to be \$2036 per home. See attachment on incremental costs.

³ Based on DOE's life-cycle cost analysis described in the source above.

⁴ The Climate Solutions and Economic Opportunities (CSEO) is a project by the Environmental Quality Board (EQB). The EQB consists of a Governor's representative, nine state agency heads and five citizen members. Report - https://www.eqb.state.mn.us/sites/default/files/documents/CSEO_EQB.pdf



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Economic Opportunities (CSEO) report identified the implementation of strong energy codes as a necessity in meeting the state's GHG reduction goals.

Since 2009, residential energy codes have saved Minnesota over 7 million MMBtu in energy and over 700,000 metric tons of CO₂e. According to a US DOE analysis, Minnesota could save 7.85 Million Metric Tons (MMT) in avoided CO₂ emissions by consistently updating their energy codes from 2010-2030.⁵ Because of the six-year code adoption cycle,⁶ Minnesota will not likely realize the full potential of these projected energy savings, making it even more important to adopt strong energy codes when the opportunity arises.

The 2018 IECC is a cost-effective way to gradually increase the level of efficiency and guide building practices to keep up with improvements being adopted by competing states throughout the region. Adopting the full 2018 IECC would keep Minnesota among other states in the Midwest that are considering the 2018 IECC, including Illinois, Indiana, and Ohio.

3. Updating energy codes spurs the local economy as homeowners will have more disposable income to invest, and new codes support jobs in construction trades and the manufacturing sector.

The energy efficiency sector currently supports more than 49,361 jobs in Minnesota alone, making it the largest sector for energy employment in the state. Of these jobs, almost 60% are in the construction sector and 11% in building-related energy-efficient manufactured products.⁷ Adopting the most recent energy codes will continue to support these sectors and spur investment into the local energy economy.

Additionally, by updating to the 2018 IECC, MEEA estimates that Minnesota residents would collectively save about \$2 million and 177,000 MMBtus in the first year, equivalent to the energy used annually by over 1,200 homes. However, first year savings only tell a fraction of the positive impact from an updated energy code, as energy and cost savings from efficiency measures are cumulative in nature. When analyzing cumulative savings over the years 2010 to 2030, Minnesotans will collectively save over \$1.3 billion dollars by regularly updating their residential energy code.⁸ An investment in cost-effective updated building energy codes will put more money into Minnesotans pockets, improving local economies for years to come.

4. Energy codes help create more resilient homes and serve as a critical consumer protection by locking in energy and financial savings for decades to come.

⁵https://www.energycodes.gov/sites/default/files/documents/Impacts_Of_Model_Energy_Codes.pdf

⁶ The intent of this bill, and others across the U.S. like it, is to not establish a minimum of six years, but to create a code cycle that improves the reliability and certainty of code updates.

⁷ Clean Energy Trust, Clean Jobs Minnesota. <https://www.cleanjobsmidwest.com/state/minnesota>

⁸ See DOE, Impacts of Model Building Energy Codes. (Table 7)

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



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The adoption of the 2018 IECC will result in more comfortable and more resilient homes. A study conducted after Superstorm Sandy found that homes built to newer energy codes enabled residents to safely stay in their homes longer after a power outage compared to similar building built under an older code.⁹ The ability to shelter in place longer saves lives and provides critical flexibility for deploying first responder resources. This benefit is a direct result of the improvements newer energy codes make to the building envelope.

Additionally, the adoption of the 2018 IECC would help ease the financial burden on low-income households. Low-income households operate on fixed incomes and tight budgets. This population already spends an average of 7.2 percent of their income on energy bills compared to the national average at 3.5 percent. Considering that most newly built homes will still be occupied in 50 to 100 years, many homes built today will eventually be inhabited by low-income families. The 2018 IECC helps to ensure that all new homes are constructed with a quality building envelope, locking in key efficiency and health improvements for years to come. It is important to note that these building features are rarely updated, so it is critical to have them included as part of the original construction.

5. Adopting the 2018 IECC will provide more flexibility for residential builders in terms of compliance.

The 2018 IECC includes the Energy Rating Index (ERI) compliance path. This optional compliance method uses an energy model - typically a Home Energy Rating Score (HERS)- which accounts for all efficiency aspects in a home, allowing full credit for more efficient HVAC equipment, water heaters, and appliances. Builders in Minnesota have supported legislation and policy changes to include an ERI code compliance option in Minnesota at the level in the 2015 IECC. When compared to the 2015 IECC, the 2018 ERI path provides even more flexibility to the builders as it relaxes the required ERI number by 5-7 points (depending on CZ) and provides an option to incorporate renewable energy. It is anticipated that, given the increased flexibility, this compliance path will see significantly more use if it is established into the code.

Given that HERS assessments are typically used for ERI compliance, one can use HERS data to better inform how builders might comply with the ERI compliance path in the 2018 IECC. A recent statewide analysis of HERS rated homes (2014-2016), shows that over 32% (10,937) of newly constructed single-family homes built in Minnesota received a HERS assessment. This robust dataset reveals that the average HERS score in the state is a 52, with a majority of builders achieving a HERS score of 55 or better. These scores are significantly stronger than those required in the ERI compliance path for both climate zones six and seven.¹⁰ Although this dataset only

⁹ ACEEE. *Leaks and Lives: How Better Building Envelopes Make Blackouts Less Dangerous*

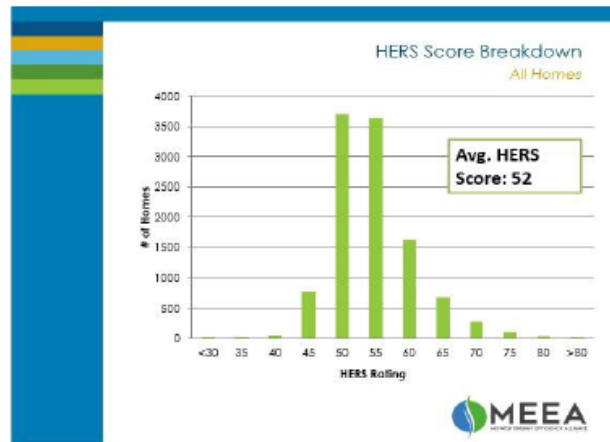
<http://aceee.org/files/proceedings/2014/data/papers/1-439.pdf>

¹⁰ It's important to note that this HERS dataset was analyzed in REM/Rate V. 14.6 or earlier (the energy model primarily used for HERS ratings). The 2018 IECC requires that REM/Rate V. 15 or better be used for ERI compliance, which typically increases a HERS score by an average of 3 points, although not always. Thus, if these HERS ratings were assessed in the



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represents 32% of new construction, it demonstrates that meeting this code compliance method is within the abilities of Minnesota builders.



Since 2009, residential energy codes have collectively saved Minnesotans over 150 million dollars.¹¹ MEEA strongly recommends consideration of the adoption of the 2018 IECC without weakening amendments for residential buildings in Minnesota. This is a cost-effective way to reduce long-term energy use and costs for residents, improve the livability and resiliency of new homes, continue to spur local construction and manufacturing jobs, create healthier and more comfortable indoor environments, and increase the resiliency of the building stock so new residential dwellings last for the next 75-100 years.

If you have any questions about this testimony, noted reports and references, or the general impact and analysis of building energy codes, please contact Nicole Westfall, Building Policy Associate for MEEA at nwestfall@mwalliance.org or 312-374-0918.

Sincerely,

Stacey Paradis

Stacey Paradis
Executive Director

new REM/Rate version the average HERS score would likely be a 58, and approximately 75% would have met the 2018 IECC ERI number.

¹¹ MEEA Midwest Energy Codes Impact Analysis: <http://www.mwalliance.org/sites/default/files/media/MN-codes-infographic.pdf>



Memorandum

To: Fresh Energy Staff
From: Ben Passer, J.D., Esq., Senior Policy Associate
Re: Review and Adoption of Minnesota Building Codes
Date: March 13, 2018

Questions Presented

1. Is there a process for reviewing and adopting updated building codes under Minnesota law?
2. Assuming *arguendo* that Minnesota law is ambiguous on this topic, is there other relevant authority that is sufficiently instructive?

Short Answer

1. Yes. Minn. Stat. § 326B.106 subd.1(c) clearly establishes a process to review and adopt updated model building codes in the state of Minnesota.
2. Yes. Minn. Stat. §§ 645.08, 645.16, and 645.17 provide significant guidance regarding statutory interpretation in the event of ambiguity.

Discussion

Minn. Stat. § 326B.106 governs the general powers of the Commissioner of Labor and Industry. Minn. R. 1300 provides administrative provisions for the State Building Code, which includes the Minnesota Conservation Code for Existing Buildings,¹ Minnesota Residential and Commercial Energy Codes,² and the Minnesota Building Code.³ Minn. R. 1300.0080 specifically addresses code adoption and amendments.

¹ Minn. R. 1311.

² Minn. R. 1322 and 1323.

³ Minn. R. 1305.

1. Minnesota Statute 326B.106 subd. 1(c) clearly establishes a process for reviewing and updating the model building codes for use in the state of Minnesota.

Minn. Stat. § 326B.106 subd. 1(c) states, in part:

Beginning with the 2018 edition of the model building codes and every six years thereafter, the commissioner shall review the new model building codes and adopt the model codes as amended for use in Minnesota, within two years of the published edition date.

Under a plain reading of the statute, Minn. Stat. § 326B.106 subd. 1(c) directs the Commissioner of Labor and Industry, “beginning with the 2018 edition of the model building codes,” to review “the new model building codes” and adopt those model building codes “as amended for use in Minnesota.” This process is to continue “every six years thereafter.”⁴

Minn. R. 1300.0080 clearly supports this reading of the statute: “Under Minnesota Statutes, section 326B.106, the code is adopted and periodically updated to include current editions of national model codes in general use and existing statewide specialty codes and their amendments” (emphasis added). Minn. Stat. § 326B.106 subd. 1(a) also reinforces this point: “The code must conform insofar as practicable to model building codes generally accepted and in use throughout the United States...The code must be based on the application of scientific principles, approved tests, and professional judgment. To the extent possible, the code must be adopted in terms of desired results instead of the means of achieving those results, avoiding wherever possible the incorporation of specifications of particular methods or materials. To that end the code must encourage the use of new methods and new materials” (emphasis added).

As a matter of process, Minnesota caselaw provides further guidance. As stated above, the Commissioner of Labor and Industry is required to “review and adopt” the new model building codes. As the Minnesota Supreme Court has stated, “Rules must be adopted in accordance with specific notice and comment procedures established by statute...and the failure to comply with necessary procedures results in invalidity of the rule.”⁵ In an unpublished opinion, the Court of Appeals also explained that “[t]he agency must provide notice that includes a description of the subject matter, the groups and individuals likely to be affected, and give notice of and hold a

⁴ It appears from the construction of the statute that every six years, the “new model building codes” would be those that were most recently published in each respective six-year period following the 2018 cycle. This is further discussed in the “Legislative Intent” section below.

⁵ *Johnson Bros. Wholesale Liquor Co. v. Novak*, 295 N.W.2d 238, 242 (Minn. 1980).

public hearing...the purpose of the hearing is to ensure that the agency ‘does not deprive the public of fair notice of the agency’s intentions.’”⁶

Thus, it is clearly the intent of Minnesota law that the Commissioner of Labor and Industry regularly open a review process, in accordance with specific notice and comment procedures, to update the building codes of the state of Minnesota to include the current editions of the model codes used nationally.

2. Even if Minn. Stat. § 326B.106 subd. 1(c) is ambiguous, Minn. Stat. §§ 645.08, 645.16, and 645.17 are sufficient to resolve any potential ambiguity.

Under Minnesota law, “a statute is ambiguous only if it is subject to more than one reasonable interpretation.”⁷ As discussed above, the only reasonable interpretation of Minn. Stat. 326B.106 subd. 1(c) is that the Commissioner of Labor and Industry is required to review and adopt the new model building codes every six years, beginning with the 2018 edition of the model building codes. However, assuming *arguendo* that the meaning of Minn. Stat. § 326B.106 subd. 1(c) is unclear, Minn. Stat. §§ 645.08, 645.16, and 645.17 sufficiently resolve any possible ambiguity in favor of the interpretation of the statute as discussed above.

Canons of Construction

Chapter 645 of Minnesota Statutes discusses interpretation of statutes and rules. In particular, Minn. Stat. § 645.08 pertaining to canons of construction states, in part: “...general words are to be construed to be restricted in their meaning by preceding particular words...”⁸

In Minn. Stat. § 326B.106 subd. 1(c), it could be asserted that “adopt the model building codes” uses “model building codes” as a general phrase, and is thus vague as to which model building codes should be adopted. However, Minn. Stat. § 645.08 clearly rejects this assertion. The general phrase “model building codes” is restricted in its meaning by the preceding particular words “**new model building codes**” (emphasis added), as stated in Minn. Stat. § 326B.106 subd. 1(c). Therefore, the statute clearly directs the Commissioner of Labor and Industry to review and adopt the new model building codes as amended for use in Minnesota.

Legislative Intent

If neither the plain reading nor the canons of construction resolve a statute’s possible ambiguity, legislative intent may be considered to determine its meaning. Minn. Stat. § 645.16 states, in

⁶ *Coalition of Greater Minn. Cities v. Minn. Pollution Control Agency*, No. A08-1198 (Minn. Ct. App. May 12, 2009).

⁷ *500, LLC v. City of Minneapolis*, 837 N.W.2d 287, 290 (Minn. 2013).

⁸ Minn. Stat. § 645.08 (3)

part: "...When the words of a law in their application to an existing situation are clear and free from all ambiguity, the letter of the law shall not be disregarded under the pretext of pursuing the spirit. When the words of a law are not explicit, the intention of the legislature may be ascertained by considering, among other matters: ...the circumstances under which it was enacted; [and] the consequences of a particular interpretation..."

Taken alone, the *circumstances* under which Minn. Stat. § 326B.106 subd. 1(c) was enacted might suggest that the "new model building codes" are those that became effective in 2015, since Minn. Stat. § 326B.106 subd. 1(c) was enacted during the 89th Minnesota Legislature in 2015,⁹ and the Minnesota Residential Energy Code and Minnesota Building Code both became effective on February 14, 2015, and June 2, 2015, respectively.¹⁰

However, the *consequence* of such an interpretation would be that the model building codes would be reviewed and "updated" to those that became effective in 2015 in perpetuity, or until statute directed the adoption of more recent model building codes. But this would be contrary to Minnesota law, which clearly states a preference toward the most current building codes possible, as discussed above. Further, the enactment of Minn. Stat. § 326B.106 subd. 1(c) implemented a new six-year code cycle, which is clearly intended to begin "with the 2018 edition of the 2018 model building codes."

Indeed, Minn. Stat. § 645.17 pertaining to presumptions in ascertaining legislative intent states, in part: "...the legislature does not intend a result that is absurd, impossible of execution, or unreasonable..." Therefore, the "new model building codes" cannot simply mean those that became effective in 2015, but rather, the model building codes that are new in a given code cycle year (i.e., 2018 and every six years thereafter).

Conclusion

Minnesota law is clear with respect to the duties of the Commissioner of Labor and Industry to review and adopt building codes for use in Minnesota. Under Minn. Stat. § 326B.106 subd. 1(c), the Commissioner is directed to review the new model building codes, and adopt those model building codes as amended for use in Minnesota, every six years beginning with the 2018 edition.

Even if the language of Minn. Stat. § 326B.106 subd. 1(c) were ambiguous, Minnesota law resolves any possible ambiguity. Neither the construction of the statute, nor the likely legislative intent, avails an interpretation of the statute that is contrary to the plain reading discussed above.

⁹ SF 1371, Status in the Senate for the 89th Legislature (2015-2016), available at <https://www.revisor.mn.gov/bills/bill.php?b=Senate&f=SF1371&y=2015&ssn=0>

¹⁰ Effective dates of Minnesota's state building codes, Minnesota Department of Labor and Industry, available at http://www.dli.mn.gov/ccld/codes15_effective.asp

RECA Comments on MN Adoption of 2018 *IECC* (Commercial)

The Responsible Energy Codes Alliance (RECA) submits the following comments on the Energy TAG review of the 2018 *IECC*, and in response to the Department's request for feedback on its May 15 document, the *2018 International Model Codes Review*. RECA is a broad coalition of product and equipment manufacturers, trade associations, building science experts, and energy efficiency advocates. A list of our members can be found on our website, www.reca-codes.com. Our mission is to promote the adoption of the latest model energy codes without substantive weakening amendments, and to help states and cities achieve the benefits their citizens have come to expect from modern building energy codes, such as ensuring occupant comfort and welfare through all weather conditions, saving energy and energy costs and reducing harm to the environment, to name a few.

RECA supports the adoption of the 2018 *IECC* without weakening amendment for commercial buildings in Minnesota. We participated in several of the meetings of the Energy TAG in person or over the phone and submitted code change proposals that would bring Minnesota closer to the 2018 *IECC*. We strongly agree with the recommendation of the Energy TAG to adopt the 2018 *IECC* commercial provisions.

The owners, renters, and occupants of Minnesota's commercial buildings stand to benefit from the adoption of the 2018 *IECC* in several ways:

- **Energy Savings.** The 2018 *IECC* incorporates by reference the 2016 version of ASHRAE Standard 90.1, which was extensively reviewed and analyzed by the U.S. Department of Energy, and which was determined to be an improvement in efficiency over the previous version of Standard 90.1. U.S. DOE found that ASHRAE 90.1-2016 improved source energy savings by 7.9% as compared to the ASHRAE Standard 90.1-2013.ⁱ These savings build upon the 8.5% source energy savings achieved in the 2013 edition.ⁱⁱ And although the U.S. DOE has not yet analyzed the savings impact of the 2018 *IECC* (which incorporates ASHRAE Standard 90.1-2016), we expect the result to be of similar magnitude to the ASHRAE Standard 90.1-2016 update.ⁱⁱⁱ The combined savings of two model code update cycles will provide a significant, long-term boost to the efficiency of all new commercial buildings in Minnesota.
- **Low Energy Costs.** These energy savings will save owners and renters money. Updating Minnesota's commercial energy code to the 2015 *IECC*, for example, is estimated to reduce annual energy costs an average of \$0.115/square foot/month (depending on location and building type), as compared to Minnesota's current commercial energy code. This translates to 30-year life-cycle savings of \$3.88/square foot for privately-owned buildings and \$5.88 for publicly-owned buildings.^{iv} And although the U.S. DOE has not yet issued an analysis of the impact of the 2018 *IECC* on Minnesota, we expect that the improvement from the 2015 *IECC* to the 2018 *IECC* will be of similar scale. A reduction in energy costs of roughly 15% will have a big bottom-line impact for owners and renters of commercial buildings. Money not spent on heating and cooling commercial buildings can be reinvested in Minnesota's economy.

- **Better Buildings.** The 2015 and 2018 *IECC* both incorporate improvements to the building thermal envelope, including improvements in insulation and fenestration that will keep occupants more comfortable in heating and cooling seasons. Improvements in mechanical equipment and lighting will likewise save energy and help maintain occupant health. And the 2018 *IECC* contains the most up-to-date references, definitions, and streamlined language, providing a solid platform for effective code compliance and enforcement. Constructing commercial buildings to the most recent national model energy codes is a solid investment in Minnesota's energy future.

In sum, we agree with the Energy TAG that the 2018 *IECC* would be a valuable update for the state's commercial buildings. We appreciate the opportunity to directly participate in the TAG process, and we offer our assistance and experience in energy code adoption and implementation as you work to maximize building energy efficiency. We hope that you will not hesitate to draw on RECA's support and willingness to help. Please contact me at (202) 339-6366 if you have any questions or would like to discuss how RECA can be of assistance.

Sincerely,

Eric Lacey, RECA Chairman

ⁱ See U.S. Department of Energy, Final Determination Regarding Energy Efficiency Improvements in ANSI/ASHRAE/IES Standard 90.1-2016: Energy Standard for Buildings, Except Low-Rise Residential Buildings, 83 Fed. Reg. 8463, 8464 (Feb. 27, 2018).

ⁱⁱ See U.S. Department of Energy, Determination Regarding Energy Efficiency Improvements in ANSI/ASHRAE/IES Standard 90.1-2013: Energy Standard for Buildings, Except Low-Rise Residential Buildings, 79 Fed. Reg. 57900 (Sep. 26, 2014).

ⁱⁱⁱ The *IECC* commercial provisions and ASHRAE Standard 90.1 have historically been very close in terms of energy conservation. For example, DOE found that as compared to the 2012 *IECC*, the 2015 *IECC* reduced energy costs by 11.5% on a national average basis. See U.S. Department of Energy, Energy and Energy Cost Savings Analysis of the 2015 *IECC* for Commercial Buildings, at vi (August 2015). Although U.S. DOE has produced more analyses based on ASHRAE Standard 90.1, these are commonly used as proxies for corresponding editions of the *IECC*.

^{iv} See U.S. Department of Energy, Cost-Effectiveness of ASHRAE Standard 90.1-2013 for the State of Minnesota, at 3-4 (Dec. 2015).