

Meeting Minutes: Construction Codes Advisory Council

Date: May 30, 2019
Time: 9:30 a.m.
Location: Minnesota Room, Department of Labor and Industry
443 Lafayette Road North, St. Paul, MN 55155

Members:

Mark Brunner
Jennifer DeJournett
Tom Downs
Tom Erdman
Bill Freitag
Todd Gray
Gerhard Guth – via teleconference
Mike Herman
Ken Hinz
Laura McCarthy
Dan McConnell
Scott McLellan (Chair)
Scott Novotny
Mike Paradise
Russ Scherber
Jim Smith
Reed Sprung
Steve Ubl

Members Absent:

None

Staff & Visitors

Deputy Commissioner Robertson – DLI
Kate Perushek – DLI
Jeff Lebowski – DLI
Suzanne Todnem – DLI
Lyndy Logan – DLI
Eileen McNiff – DLI
Bill Reinke – DLI
Todd Green – DLI
Paul Swett – DLI
Tim Manz – DLI
Rich Lockrem – DLI
Dan Kelsey – DLI
Don Sivigny – DLI
Amanda Spuckler – DLI
Rob Buchanan – Xcel Energy
Remi Stone – BAM
Nick Erickson – Housing First MN
Kristen Ober – Housing First MN
Mary Jean Fenske – MN Pollution Control
Mark Brengman – Steen Engineering
John Hazurha – Steen Engineering
Irene Kao – League of MN Cities
Rebecca Olson – CEE
Dominique Boczer – ICF
Lisa Frenette – CAM
Charlie Devine – Ox Engineering
Nicole Westfall – Midwest Energy Alliance

Via teleconference:

Marcus Branstad – Am. Chemistry Council
Eric Lacey – Responsible Energy Codes Alliance

1. Call to Order

- a) **Roll call of members**
- b) **Audience introductions**
- c) **Housekeeping announcements**
- d) **Safety**

Members and guests introduced themselves and a quorum was declared with 16 of 17 members – the meeting began at 9:31 a.m.; Scott Novotny joined the meeting at 9:53 resulting in 17 of 17 members present in person or via teleconference.

2. Approval of meeting agenda

A motion was made by Gray, seconded by Erdman, to approve the agenda as presented. The roll call vote was unanimous with 16 votes in favor; the motion carried.

3. Approval of previous minutes

A motion was made by Paradise, seconded by Brunner, to approve the June 21, 2018, meeting minutes as presented. The roll call vote was unanimous with 16 votes in favor; the motion carried.

Scott Novotny joined the meeting at 9:53 a.m. resulting in 17 of 17 members present in person or via teleconference.

4. Department reports

- a) **Deputy Commissioner Robertson** – Roslyn Robertson, DLI’s newly appointed Deputy Commissioner, introduced herself and gave a brief agency overview.
- b) **Legislative update** – Kate Perushek, Director of Legislative Affairs, provided an update on legislation that impacts the department.
 - Additional funding was authorized for the department in the following areas:
 - Workers’ Comp Modernization project
 - Wage Theft Initiative
 - Workforce Development
 - Youth Skills Training Program
 - Helmets to Hardhats apprenticeship program
 - The licensing of solar contractors as residential building contractors did not pass.
 - The Omnibus Bill that passed (House File #2) included CCLD housekeeping language. To view, please visit https://www.revisor.mn.gov/bills/text.php?session=ls91&number=HF0002&session_number=1&session_year=2019&version=list

5. New business

a) 1303 Rule changes

Dan Kelsey, Structural Engineer, CCLD, DLI, said proposed amendments to Section 1303.2200, Simplified Wind Loads, had two main changes:

- Correct an error in the equation to calculate P’s net wind pressure; and,
- Add a factor to convert the net wind pressure to allowable stress design (request by stakeholder).

b) Code adoption update

Eileen McNiff, Manager of Code Development and Education, CCLD, DLI. The following rule drafts have been completed:

- Building Code Administration (1300)
- International Building Code (1305)
- Existing Building Code (1311)
- Accessibility Code (1341)
- Fire Code (7511)

The following codes are nearing completion:

- Elevator Code (1307)
- Mechanical and Fuel Gas Code (1346)
- Commercial Energy Code (1323)
- International Residential Code (1309)

DLI anticipates publishing dual notices for some of the codes toward the middle/end of June. Following publication there will be a 30-day public comment period.

McLellan added that the proposed rules adopting codes would go into effect on March 31, 2020, or 5 days after publication in the State Register.

Rulemaking dockets are available on the department's website at:

<http://www.dli.mn.gov/about-department/rulemaking/construction-codes-and-licensing-rulemaking>

c) Residential Energy Code

Chair McLellan stated that DLI is awaiting a *final* determination from the US Department of Energy (DOE) as to whether the code will be more efficient than its predecessor (2015). DOE released their *preliminary* findings on May 2, 2019.

There are specific statutory procedures that must be followed before the Commissioner can adopt all or a part of an energy code relating to the construction of residential buildings. There must be research and analysis that addresses, at a minimum, air quality, building durability, moisture, enforcement, enforceability cost benefit, and liability. The research and analysis must be completed in cooperation with practitioners in residential construction and building science and an affirmative recommendation by the Construction Codes Advisory Council. [M.S. 326B.118]

Jeff Lebowski said the Residential Energy Code (REC) is different from the other state codes where the Commissioner has authority to adopt rules because the REC must also comply with federal requirements. At this time the department has only received a preliminary determination. The DOE's comment period remains open until June 3, 2019. Lebowski said comments can be submitted on the preliminary determination by visiting DOE's website. The DOE will review and respond to all comments and then

make a final determination. Once the final determination is made and states are notified, the department can then decide whether to proceed with adoption. If a determination is made by the Administrative Law Judge (ALJ) and the DLI Commissioner (CO) agrees to open the code for review, then the actual rulemaking process would begin. This would include hearings and a building study on durability after which CCAC would decide whether to make an affirmative recommendation to the CO on whether to adopt. Potentially there could be 2 hearings, one initially on whether to open for rulemaking and a second, if 25 or more persons request one, to determine what portions of the code would be adopted and the validity of those portions.

Don Sivigny, Construction Code Specialist, CCLD, DLI, gave a presentation on a report of the Preliminary Cost Effectiveness of the Residential provisions of the 2018 IECC as prepared by Pacific Northwest National Labs as well as a State analysis of the preliminary findings of the US DOE on the efficiency of the residential provisions of the 2018 IECC – see **Attachment A**.

6. Open forum

a) Nicole Westfall, Midwest Energy Efficiency Alliance

The Midwest Energy Efficiency Alliance supports adoption of the residential provisions of the 2018 IECC because they will provide homeowners with energy and cost savings.

b) Ben Rabe, Fresh Energy

Fresh Energy supports adoption of the residential energy provisions contained in the 2018 IECC.

c) Ron Ellwood, Legal Aid

Legal Aid supports the state adoption of the residential provisions of the 2018 IECC.

d) Charlie Devine, Ox Engineering Products

Ox Engineering Products supports adoption of the 2018 IECC.

7. Adjournment

There may be a special meeting scheduled sometime in the next 6 weeks to provide a current update on code adoption. A motion was made by Smith, seconded by Paradise, to adjourn the meeting at 11:36 a.m. The roll call vote was unanimous with 17 votes in favor; the motion carried.

Respectfully Submitted,

Lyndy Logan

Executive Secretary to the CCAC



2018 IECC Residential Provisions

Analysis of DOE Report

Federal Law / DOE Analysis

- Section 304(a) of the Energy Conservation and Production Act (ECPA), as amended, directs the Secretary of Energy to review the International Energy Conservation Code (IECC) and **make a *determination* as to whether updated editions would improve energy efficiency in residential buildings.**
- **The IECC is developed by the International Code Council (ICC)** through an established industry review and consensus process with updated editions typically published every three years.
- DOE reviews the energy savings impact of updated code editions and publishes its findings in the *Federal Register*. The DOE determination and accompanying technical analysis serve as useful guidance to state and local governments as they review and update their building codes

Federal Law / DOE Analysis

- The most recent edition, the **2018 International Energy Conservation Code (IECC)**, was published in August 2017, triggering the DOE review and determination process. In response, DOE and their consulting lab, Pacific Northwest National Laboratory (PNNL), conducted a **preliminary analysis** to determine energy savings for the 2018 IECC residential provisions relative to the previous edition—the 2015 IECC.
- This report documents the methodology used to conduct the analysis and summarizes the results and findings.

Federal Law / DOE Analysis

The DOE analysis entails a combination of both **qualitative** and **quantitative** components in order to identify Changes that have a direct impact on energy efficiency in estimating overall energy savings on average.

- **Qualitative** - *Individual changes are characterized to identify those that will have a direct impact on energy savings in a significant portion of the residential building.*
 - ***Do they have a direct impact on energy savings?***
- **Quantitative** - *Individual changes are filtered to only retain those on that are expected to have a direct impact and could be reasonably quantified through energy modeling and analysis.*
 - ***Can this direct impact be quantified through energy modeling?***

Federal Law / DOE Analysis

DOE research states “Many changes to the 2018 IECC, do not have a direct impact on energy efficiency and are therefore not designated as falling into one of the two categories.”

- Changes affecting only procedural aspects of complying with the code, such as those providing guidance on inspection protocols or modeling rulesets;
- Changes where impacts are captured under a complementary code requirement, such as the relationship between air tightness testing, associated thresholds (e.g., 5 ACH50), and component air sealing requirements—this serves to avoid double-counting in the quantitative analysis;
- Changes targeting non-energy aspects of the IECC, such as water efficiency requirements, and;
- Administrative changes, including editorial corrections, reordering or numbering of code sections, clarifications and reference updates.

2018 Results / DOE Analysis

47 ICC approved code changes were identified and analyzed for the 2018 IECC residential provisions.

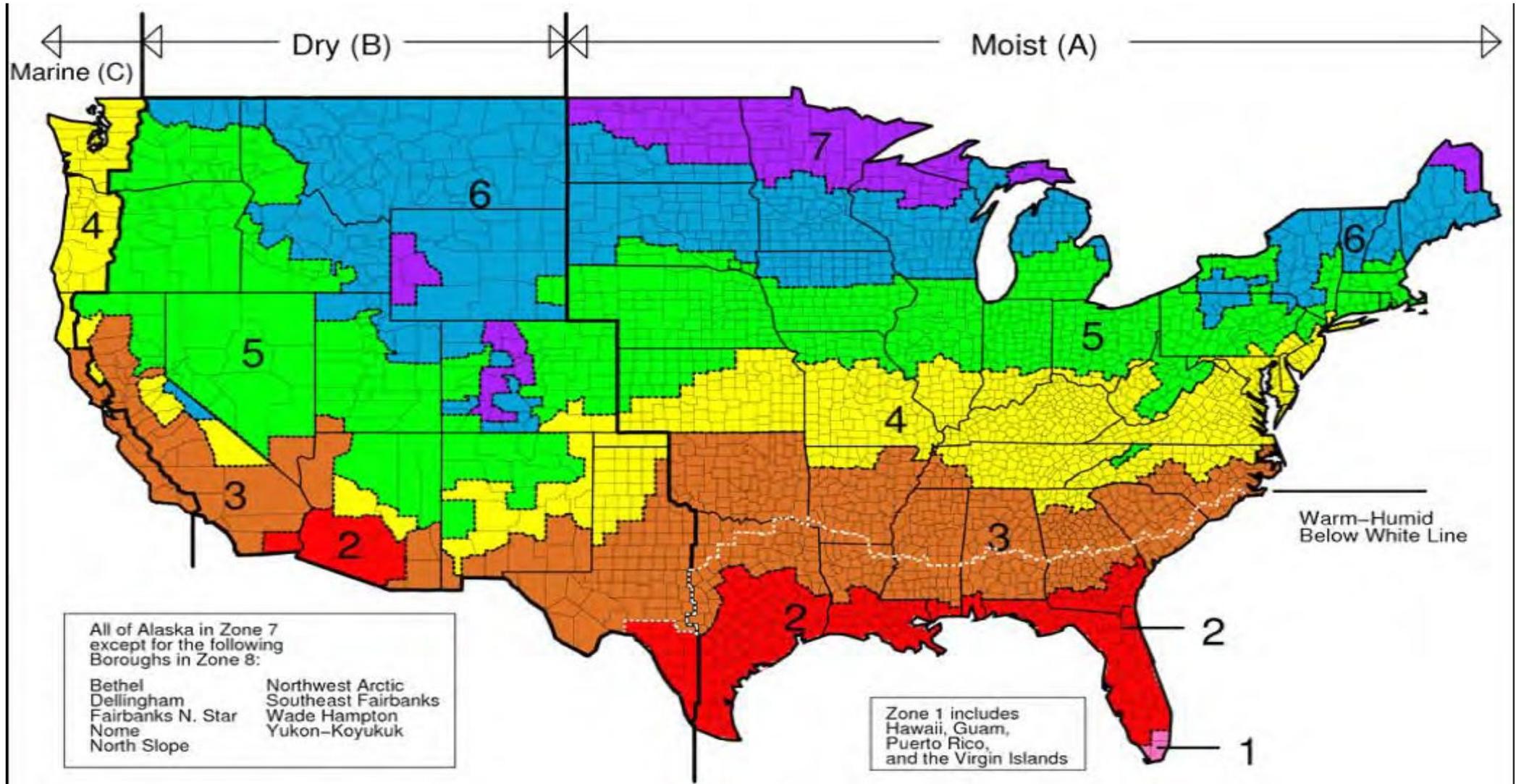
Category of Change	Number
Decreases Energy Use	11
Increases Energy Use	3
Not Energy Related	3
Administrative	30
Total	47

2018 Results / DOE Analysis

Of the 14 changes characterized a having a direct impact on Energy efficiency, **only 2** are expected to impact a significant number of new homes and warranted further quantitative analysis.

- **Window U-Factor**
- **High Efficacy Lighting**

US Climate Zones / DOE Analysis



2018 Results / DOE Analysis

Climate Zone	Site EUI (%) (Onsite Consumption savings)	Source EUI % (Building, generation and transmission savings)	Energy Costs (%) (Total cost savings including all building functions)
6	1.62	1.98	2.10
6	.88 (2015)		
Total	2.50		
7	1.58	1.84	1.93
7	.85 (2015)		
Total	2.43		

Qualitative Assessment / DOE Analysis

Proposal Number	Code Section(s)	Description of Change(s)	Impact on Energy Efficiency	Included in Energy Analysis	Discussion
RE17-16	R402.1	Exempts log homes designed in accordance with ICC-400 from the thermal envelope requirements of the IECC	Increases energy use	No	<p>ICC-400 allows substantially less efficient walls than the IECC, resulting in an expected increase in energy use. Log homes make up a relatively small portion of the housing stock, therefore this change affects about 0.4% of new homes(c). Log construction is not a feature of typical homes as represented by the standard residential prototypes.</p> <p><i>Minnesota Code currently requires a minimum of a 7" log diameter structure, similar to the ICC 400 standard, however MN requires a better window U- factor of a 0.29 overall on average or better.</i></p>

Qualitative Assessment / DOE Analysis

Proposal Number	Code Section(s)	Description of Change(s)	Impact on Energy Efficiency	Included in Energy Analysis	Discussion
RE22-16	Table R402.1.2 (IRC Table N1102.1.2)	Requires R-5 under the entire slab-on-grade when the slab is heated	Decreases energy use	No	<p>Reduces heat loss in homes with heated slabs, thereby decreasing energy use. Heated slabs are not a feature in typical homes as represented by the prototypes.</p> <p><i>Manufacturers of these heating system under the slab already require a minimum of a R-5 insulation to keep the heat in the slab and not allow it to go into the earth.</i></p>

Qualitative Assessment / DOE Analysis

Proposal Number	Code Section(s)	Description of Change(s)	Impact on Energy Efficiency	Included in Energy Analysis	Discussion
RE31-16	Table R402.1.2 Table R402.1.4	Lowers (improves) Window and Door U-factors in climate zones 3-8	Decreases energy use		<p>Reduces heat loss/gain through windows and doors, thereby decreasing energy use. This change affects all residences in 6 of the IECC's 8 climate zones.</p> <p><i>Minnesota builders and homebuyers recognize the need for better windows and we are seeing windows averaging between 0.27 to 0.29 already with many U factors even lower than that as well.</i></p>

Qualitative Assessment / DOE Analysis

Proposal Number	Code Section(s)	Description of Change(s)	Impact on Energy Efficiency	Included in Energy Analysis	Discussion
RE99-16	R403.3, R403.3.6 (New)	Adds provisions for ducts buried in attic insulation	Decreases energy use	No	<p>Adds new provisions for buried ducts as an optional feature. Not included in the quantitative analysis because buried ducts are not a feature of typical homes as represented by the prototypes, and because buried ducts are provided as an optional alternative to standard practice.</p> <p><i>Current Minnesota code requires a R-8 with a vapor jacket on any duct in attics or outside conditioned spaces.</i></p>

Qualitative Assessment / DOE Analysis

Proposal Number	Code Section(s)	Description of Change(s)	Impact on Energy Efficiency	Included in Energy Analysis	Discussion
RE100-16	R403.3, R403.3.6 (New), R403.3.7 (New)	Allows buried attic ducts meeting specified insulation and air-sealing criteria to be considered equivalent to ducts located entirely within conditioned space in the simulated performance alternative compliance path.	Increases energy use	No	<p>Increases heat loss/gain and air leakage into attics compared to ducts entirely within conditioned space, a comparison relevant to a limited number of homes that both have buried ducts and comply via the performance path. Not included in the quantitative analysis as the provision for buried ducts is provided as an optional alternative, and because buried ducts are not a feature in typical homes as represented by the prototypes.</p> <p><i>Current Minnesota code does not allow this.</i></p>

Qualitative Assessment / DOE Analysis

Proposal Number	Code Section(s)	Description of Change(s)	Impact on Energy Efficiency	Included in Energy Analysis	Discussion
RE121-16	R403.6.1, Table R403.6.1	Adds HRV/ERV-specific fan-efficacy requirements	Decreases energy use	No	<p>Replaces prior efficacy values (for generic “in-line fans”) that were considered inappropriate when installing an HRV/ERV systems. Not included in the energy analysis because HRV/ERV systems are an optional feature and not required by the IECC.</p> <p><i>These systems are not required in Minnesota- This is a mandate on Manufacturers of these systems</i></p>

Qualitative Assessment / DOE Analysis

Proposal Number	Code Section(s)	Description of Change(s)	Impact on Energy Efficiency	Included in Energy Analysis	Discussion
RE127-16	R404.1	Increases high-efficacy lighting requirements from 75% to 90% of permanently installed lighting fixtures in all homes. Eliminates option of calculating percentages based on lamp counts instead of fixture counts	Decreases energy use	Yes	<p>The increased percentage of high- efficacy lighting results in a clear reduction in energy use. This change is applicable across all homes complying with the IECC.</p> <p><i>In Minnesota, many homeowners are already demanding this in their homes</i></p>

Qualitative Assessment / DOE Analysis

Proposal Number	Code Section(s)	Description of Change(s)	Impact on Energy Efficiency	Included in Energy Analysis	Discussion
RE149-16	Table R405.5.2	Reformulates equation for ventilation fan energy in the Standard Reference Design of the simulated performance alternative compliance path to reference prescriptive fan-efficacy requirements.	Decreases energy use	No	<p>Because the equation in the prior code used a term based on outdated fan efficacies, the change reduces ventilation fan energy in homes complying via the performance path.</p> <p>Not included in the quantitative analysis as this provision is offered as an option under the performance path and is intended to create alignment with current prescriptive baseline requirements.</p> <p>Only affects the optional “Performance path” of energy code. It does not affect prescriptive path.</p>

Qualitative Assessment / DOE Analysis

Proposal Number	Code Section(s)	Description of Change(s)	Impact on Energy Efficiency	Included in Energy Analysis	Discussion
RE166-16	R406.3, R406.3.1, R406.6.1, R406.7, R406.7.1, R406.7.2, R406.7.3	Replaces definition of Energy Rating Index (ERI) with a reference to ANSI/RESNET/ICC 301, except for Reference Home ventilation rates, which are modified to be consistent with IRC requirements (Section M1507.3 of the 2015 IRC)	Decreases energy use	No	<p>Bases ERI target on the IRC's ventilation rates, which are lower than those in ANSI/RESNET/ICC 301.</p> <p>This reduces ventilation energy in homes meeting the target in the ERI path. However, RE166-16 did not modify the 301 standard's ventilation specifications for the Rated Home, which are generally equivalent to those of the Reference home, so the <u>actual energy difference following this code change is expected to be minimal</u></p> <p><i>Only affect the optional "Performance path" of energy code. It does not affect prescriptive path.</i></p>

Qualitative Assessment / DOE Analysis

Proposal Number	Code Section(s)	Description of Change(s)	Impact on Energy Efficiency	Included in Energy Analysis	Discussion
RE173-16	Table R406.4 (IRC Table N1106.4)	Raises (relaxes) ERI thresholds	Increases energy use	No	Raising ERI thresholds allows higher energy use in residences under the ERI compliance path.
		Improves mandatory envelope requirements in the ERI compliance path for homes with on-site generation	Decreases energy use	No	By strengthening mandatory minimum envelope efficiency requirements, the change prevents degrading envelope efficiency in trade for on-site generation

Qualitative Assessment / DOE Analysis

Proposal Number	Code Section(s)	Description of Change(s)	Impact on Energy Efficiency	Included in Energy Analysis	Discussion
CE177-16, Part II	R403.10.3	Modifies and clarifies an exception to the pool cover requirements	Decreases energy use	No	<p>Modestly increases the level of site-recovered energy required to qualify for the exception.</p> <p>Not included in the quantitative analysis because pools are not part of typical homes as represented by the prototypes.</p> <p><i>Requires site recovery for Pools. This is a hit or miss for everyday homes in Minnesota.</i></p>

Qualitative Assessment / DOE Analysis

Proposal Number	Code Section(s)	Description of Change(s)	Impact on Energy Efficiency	Included in Energy Analysis	Discussion
RE183-16	R502.1.1.2, R503.1.2	Requires new HVAC systems in additions and alterations to comply with the same requirements as systems in new homes	Decreases energy use	No	Improves HVAC efficiency in some additions and alterations. Not included in the quantitative analysis because the established residential methodology and prototypes focus on new housing.

Summary / DOE Analysis

A total of 47 approved code change proposals were analyzed for the 2018 IECC.

- The analyses identified 14 changes with a direct impact on energy use in residential buildings
 - 11 are expected to reduce energy use
 - 3 increase energy use.

Summary / DOE Analysis

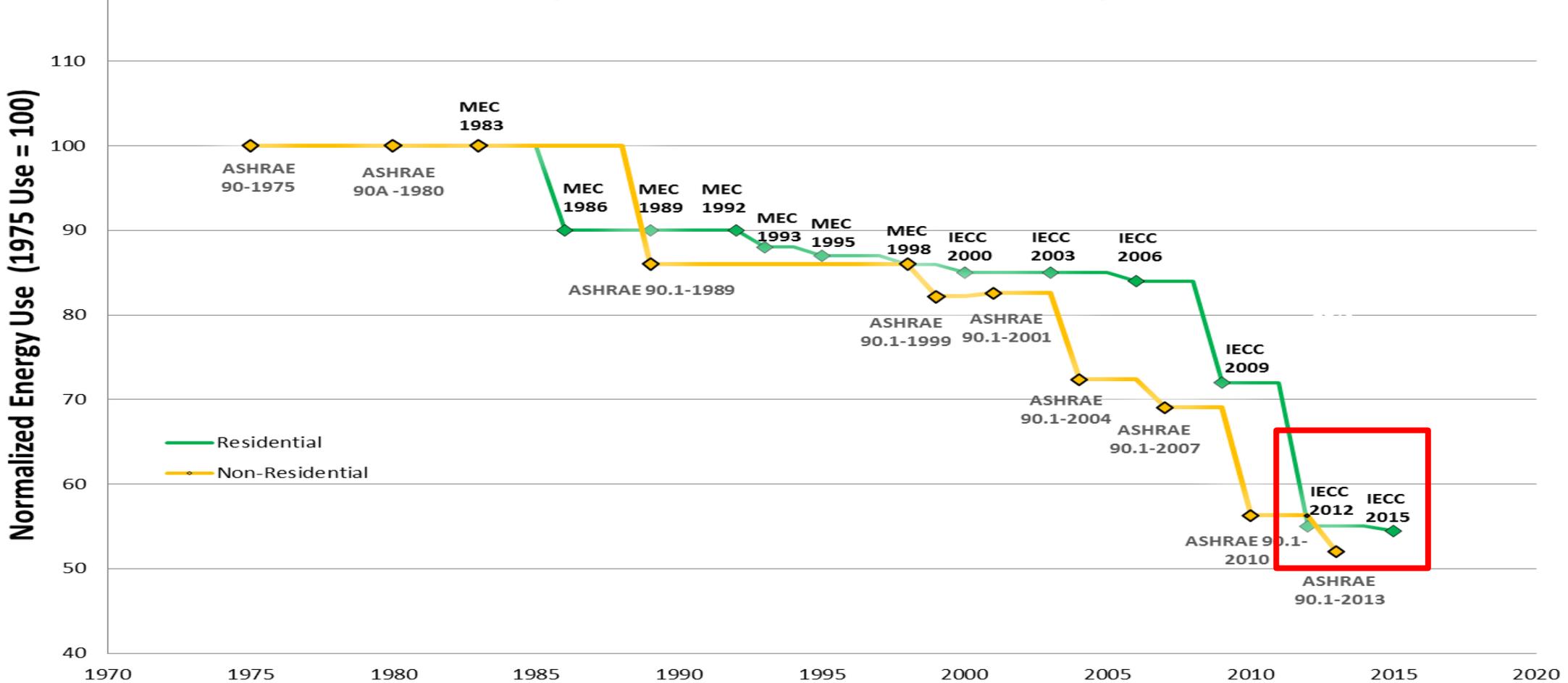
On May 2, 2019 – DOE issued a **preliminary determination** that the 2018 International Energy Conservation Code (IECC), **will improve energy efficiency in residential buildings** as follows:

- **1.68 percent site energy savings** (Energy consumed at the building or as shown on the building utility bill)

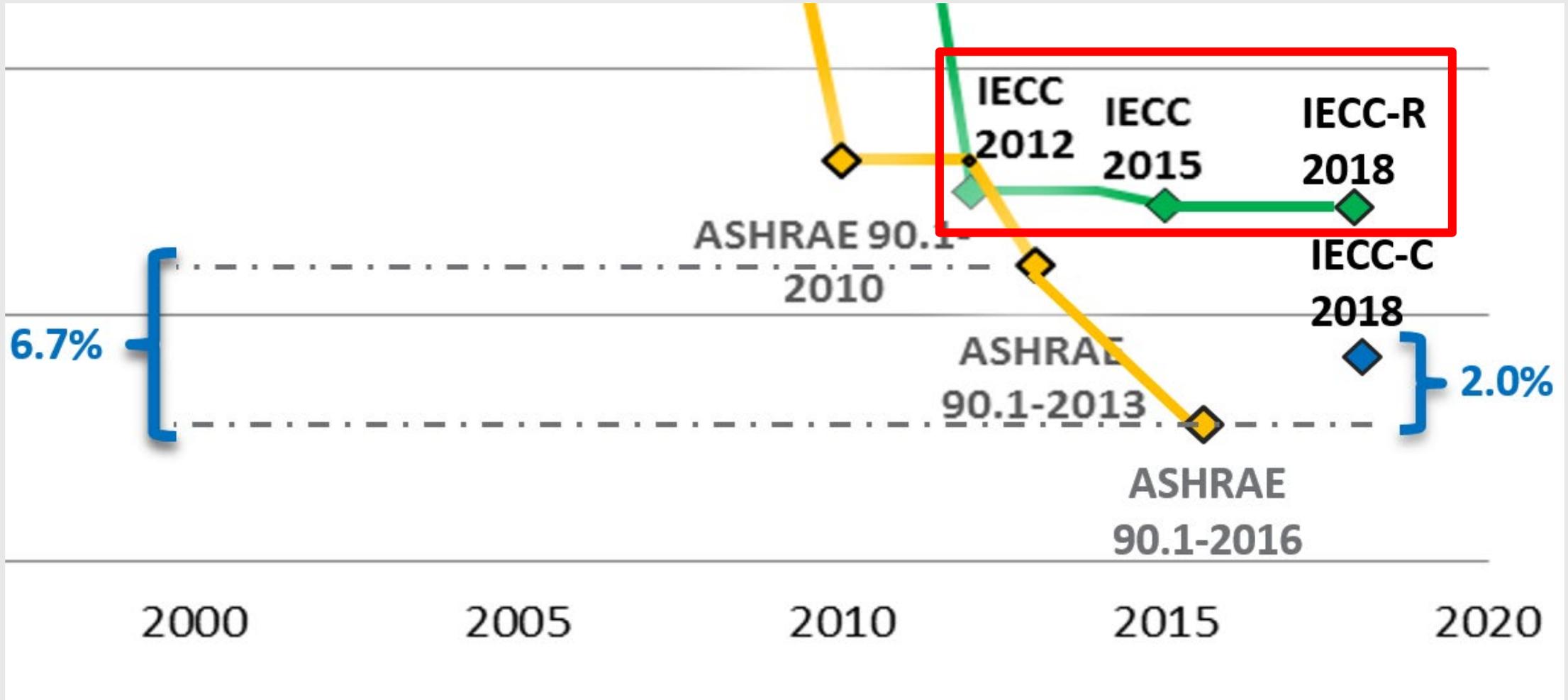
Graphing the changes for 2015 / DOE Analysis

Improvement in Residential and Non-Residential Model Energy Codes (Year 1975-2015)

Courtesy of Pacific Northwest National Laboratory



Graphing the changes for 2018 / DOE Analysis

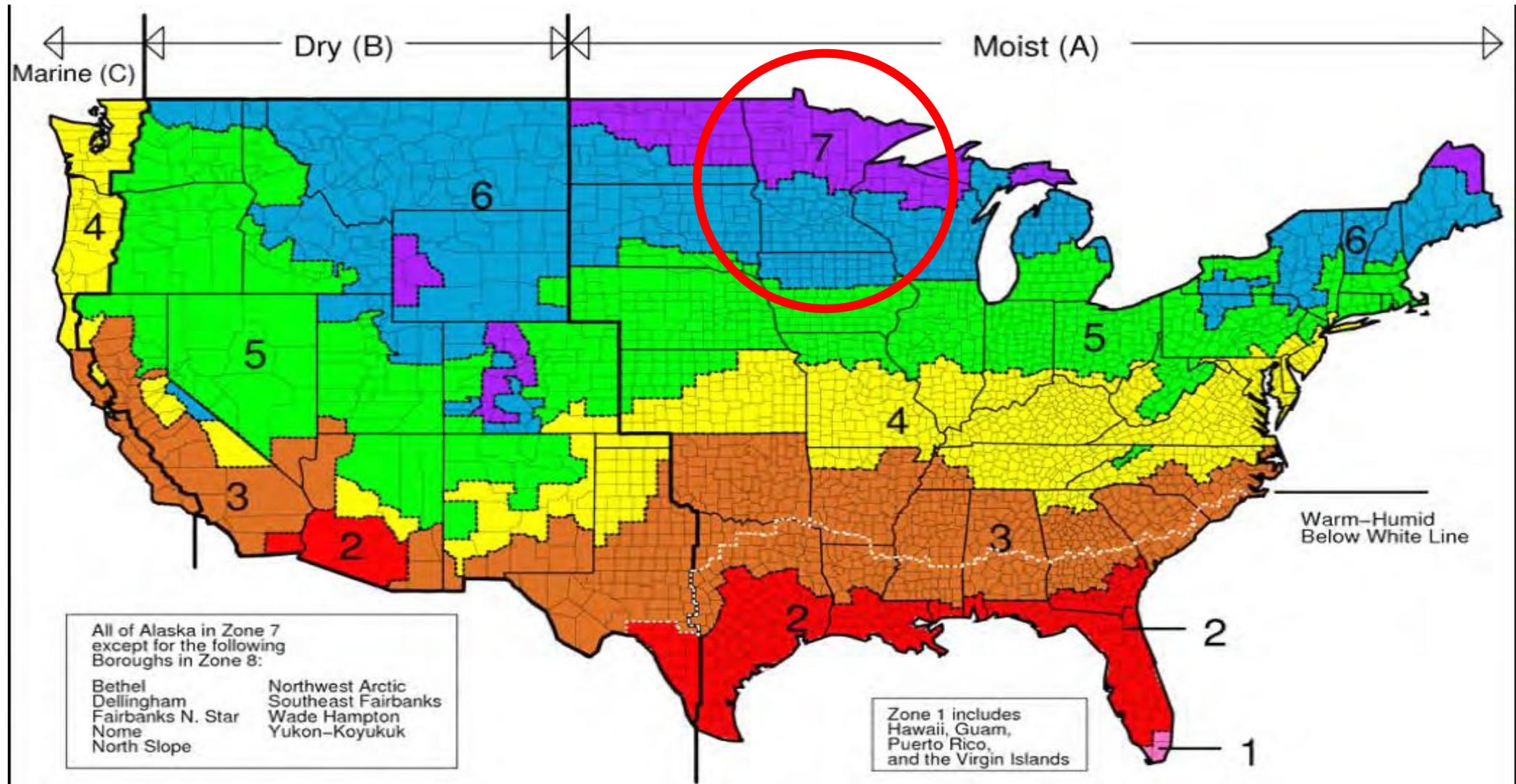


Analysis of Minnesota Report

Analysis of Minnesota Report

- On March 20, 2019, the Department of Labor and Industry (DLI) requested the U.S. Department of Energy (DOE) to analysis and provide a memorandum, comparing the current Minnesota Energy Code with amendments, to the 2018 IECC National Code as written.
- This analysis was performed by Pacific Northwest National Labs (PNNL) and is based on the DOE methodology used in all previous versions of analyzing the IECC.
- DLI received this memorandum back from PNNL on April 3, 2019

Minnesota Climate Zones / Minnesota Analysis



2012–2018 Economic Parameters / Minnesota Analysis

- Costs associated with bringing the Minnesota code up to the 2018 IECC include the differences between the 2012 and 2018 editions of the IECC plus Minnesota amendments to the 2012 IECC
- For this analysis, the cost differences between the 2012 and 2018 IECCs were taken from current, existing and in-progress DOE/PNNL reports on the cost effectiveness of new code editions.

2012–2018 Economic Parameters / Minnesota Analysis

Economic Parameter	Value	Notes
Study period	30 years	
Life efficiency measures	60 years	
Discount rate (nominal)	5%	Equal to loan interest rate
Loan interest rate	5%	
Loan term	30 years	
Loan down payment	10%	
Private mortgage insurance rate	0.5% of loan balance	Eliminated after loan balance is less than 80% of home value
Loan fee rate	0.7% of loan amount	
Inflation rate	2.52%	Eliminated after loan balance is less than 80% of home value
Income Tax Rate	12%	12% federal, 7.05% state
Property Tax Rate	0.5%	

Annual Energy Cost Savings (\$/dwelling) Minnesota Analysis

Climate Zone	Single Family
6	\$146
7	\$169
State	\$151

Construction Costs, Current Code to 2018 IECC (\$/dwelling) / Minnesota Analysis

Climate Zone	Single Family
6	\$556
7	\$449
State	\$543

This analysis does not account for the following Minnesota Specific Items:

1. Potential Increase to change from R-10 foundation insulation to R -15 foundation insulation
2. Most Minnesota builders already meet the 2018 requirements for lighting and windows and doors.
3. Minnesota Window to wall ratio is 12% not 15%.
4. Most Minnesota builders use 90%+ efficient Furnaces and High efficient water heaters.
5. Minnesota averages 1.7 ACH/50 for blower door testing

Cost analysis based on Economic Parameters / Minnesota Analysis

Climate Zone	Life Cycle Cost savings (60 yrs.)	Construction Costs	Interest @ 5% (30 yrs.)	Total (60 yrs.)
6	\$2653	\$556	\$519	\$1578
7	\$3259	\$499	\$465	\$2295
Average	\$2792	\$543	\$506	\$1743