

NGA GLASS CONFERENCE™ MILWAUKEE

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NGA

NATIONAL GLASS ASSOCIATION with GANA



Energy Codes Update

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Climate Zones

- All building criteria (U-factor, SHGC) are set based on project's building location and climate zone.
- Climate zones range from zone 0 (extremely hot) to zone 8 (subarctic / arctic)
- As the climate changes, the zones move ... and the ASHRAE 90.1 map is changing again ...

Climate Zone Map – ASHRAE 90.1-2013 and before

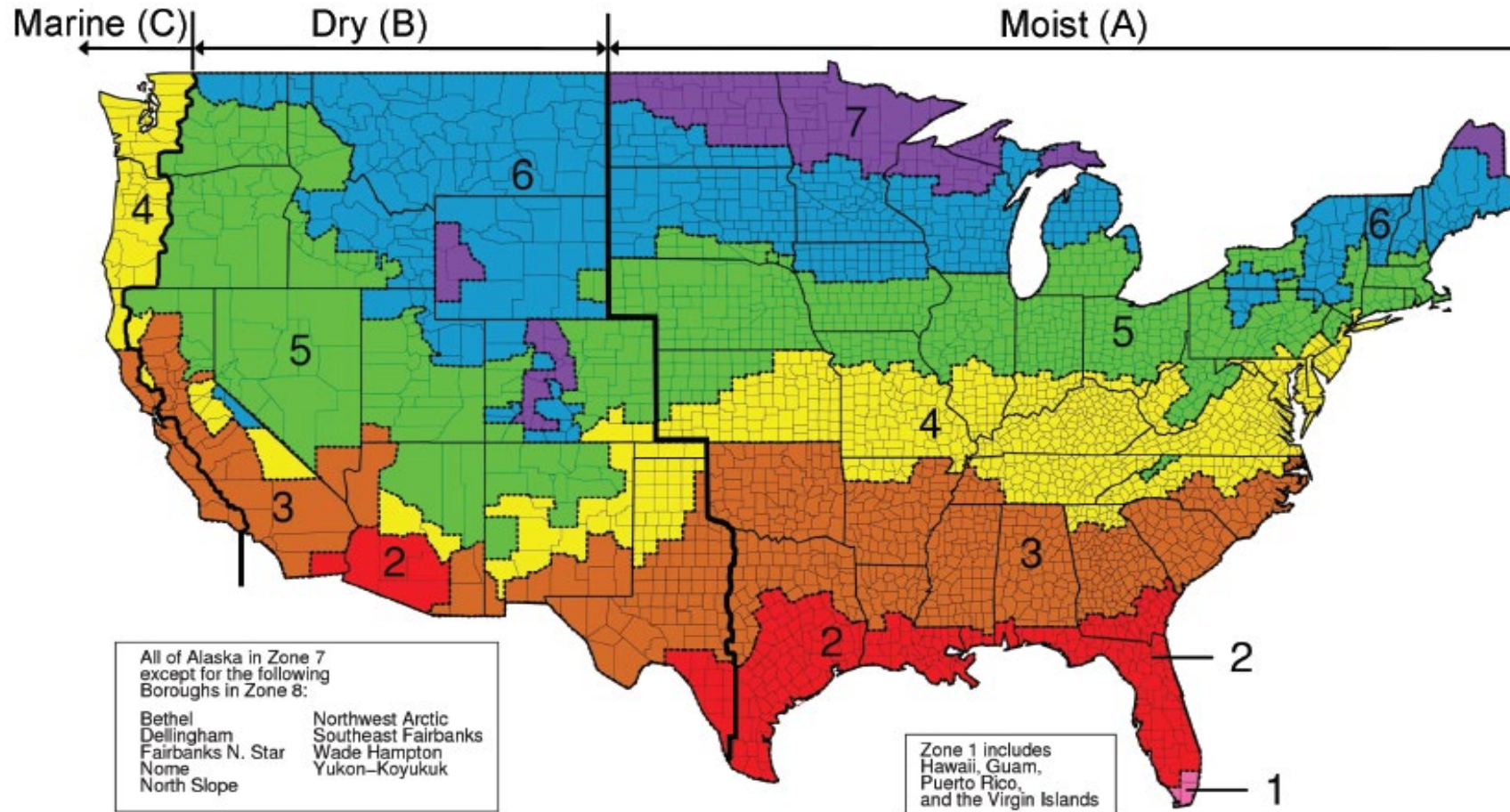
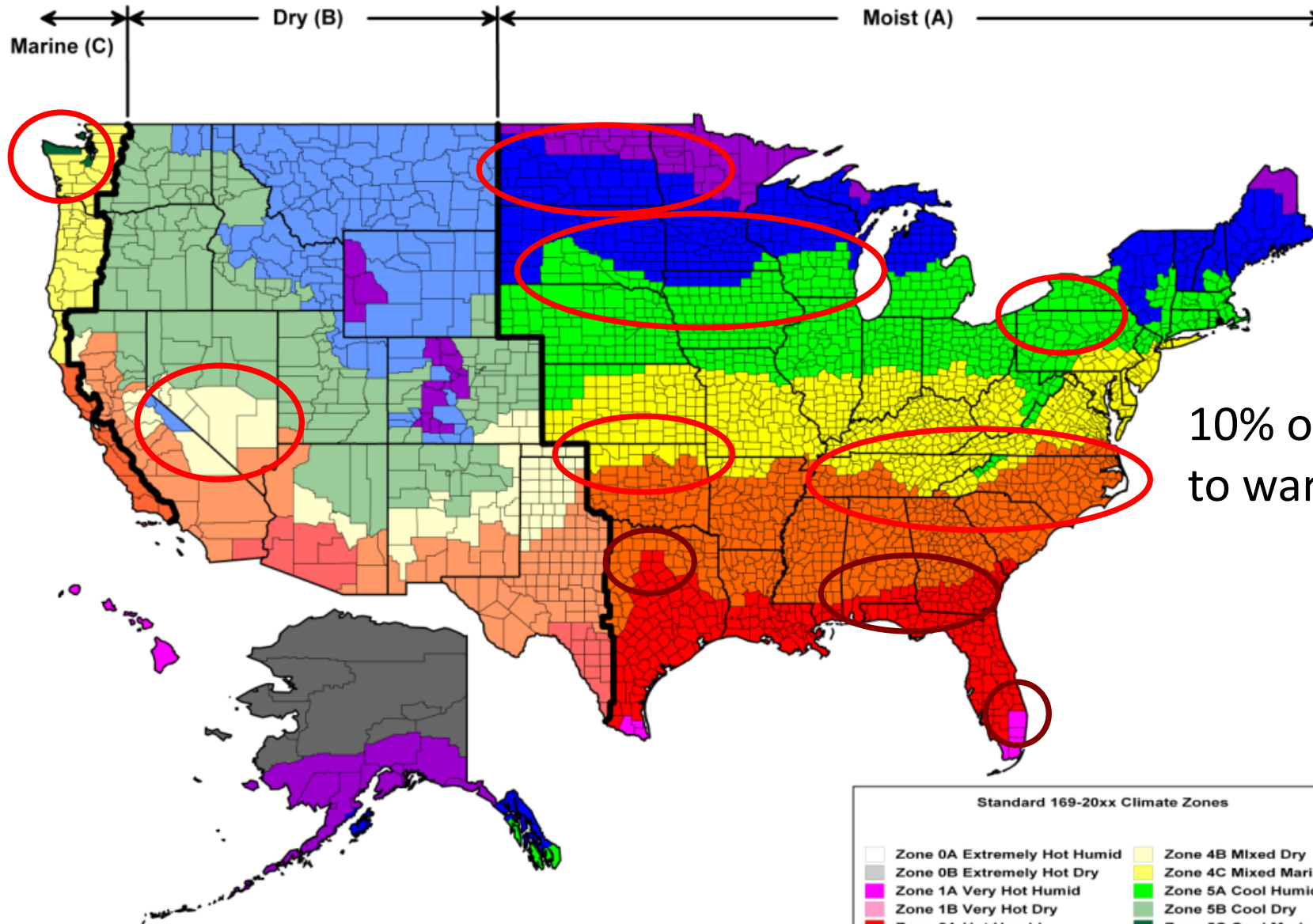


Figure B1-1 U.S. climate zone map (ASHRAE Transactions, Briggs et al., 2003).

ASHRAE 90.1-2016 through 90.1-2022

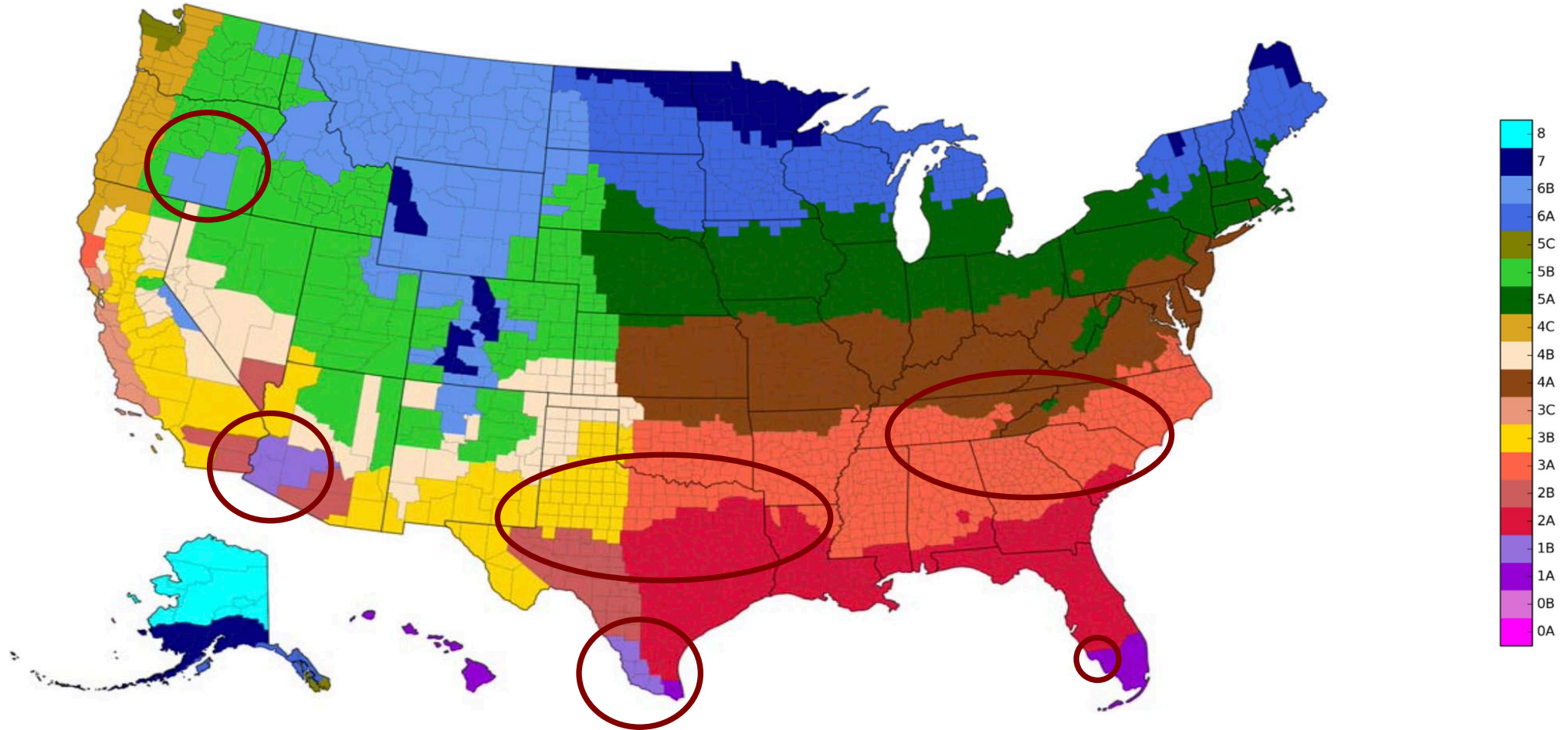


Standard 169-20xx Climate Zones

Zone 0A Extremely Hot Humid	Zone 4B Mixed Dry
Zone 0B Extremely Hot Dry	Zone 4C Mixed Marine
Zone 1A Very Hot Humid	Zone 5A Cool Humid
Zone 1B Very Hot Dry	Zone 5B Cool Dry
Zone 2A Hot Humid	Zone 5C Cool Marine
Zone 2B Hot Dry	Zone 6A Cold Humid
Zone 3A Warm Humid	Zone 6B Cold Dry
Zone 3B Warm Dry	Zone 7 Very Cold
Zone 3C Warm Marine	Zone 8 Subarctic/Arctic

New Climate Map for ASHRAE 90.1-2025

9% of counties moved to warmer climate zone
3% of counties moved to cooler climate zone



International Energy Conservation Code (IECC)

- The 2024 IECC is now complete. Redline version available for purchase.
- *No changes in window area limits.*
- Marginal improvements in commercial and residential fenestration U-factor
 - For example, zone 4-5 went from 0.36 to 0.34, zone 3 went from 0.42 to 0.38. No changes in SHGC.
- Credit for high performance windows, increased daylight area, automated shading, PV and BIPV.
- New requirements for on-site renewable energy (PV, BIPV) with off-site options if can't be done on-site.
- Other electrification items (e.g. heat pump incentives, EV charging stations, demand response) were stripped out and made optional after appeal by multifamily builders and gas industry. But our interests (PV, BIPV) not affected.

ASHRAE 90.1 – Fenestration Criteria

- Worked for last 2 years on next step in fenestration criteria for 90.1-2025.
 - Very detailed life cycle cost effectiveness analysis. Some new aspects also examined such as HVAC downsizing, social-cost-of-carbon, different baselines.
 - Once we see what passes / fails, then negotiate the final values looking at product impacts and overall targets.
 - Some want to see big changes, some want no change -- and we usually end up somewhere in-between.
- Good news ... after negotiation, we came to consensus with the proposal receiving unanimous support by the committee.
- Now out for public review through Sep 9.
- *So what's in it?*

ASHRAE 90.1 – Fenestration Criteria

- **No reduction in window area.**
- Comprehensive changes in fixed windows, operable windows, skylights / sloped glazing. No changes to glazed entrance doors.
- Roughly 3-13% changes in U-factor.
SHGC already mostly optimized so main change is extending the 0.23 SHGC up to zone 2.

Both NONRESIDENTIAL and RESIDENTIAL

Zone	U-FACTOR Fixed		U-FACTOR Operable		SHGC			
	90.1-2022 U	2025 prop. U	90.1-2022 U	2025 prop. U	90.1-2022 SHGC-fixed	SHGC-oper	2025 proposal	
							SHGC-fixed	SHGC-oper
8	0.26	0.25	0.32	0.31	0.40	0.36	0.40	0.36
7	0.29	0.28	0.36	0.35	0.40	0.36	0.40	0.36
6	0.34	0.31	0.42	0.38	0.38	0.34	0.38	0.34
5	0.36	0.32	0.45	0.39	0.38	0.33	0.38	0.33
4	0.36	0.35	0.45	0.43	0.36	0.32	0.34	0.31
3	0.42	0.42	0.54	0.54	0.25	0.23	0.25	0.23
2	0.45	0.45	0.60	0.60	0.25	0.23	0.23	0.21
1	0.50	0.48	0.62	0.62	0.23	0.21	0.23	0.21
0	0.50	0.48	0.62	0.62	0.22	0.20	0.21	0.19

footnote +0.02 in z5-7

footnote +0.02 in z5-7

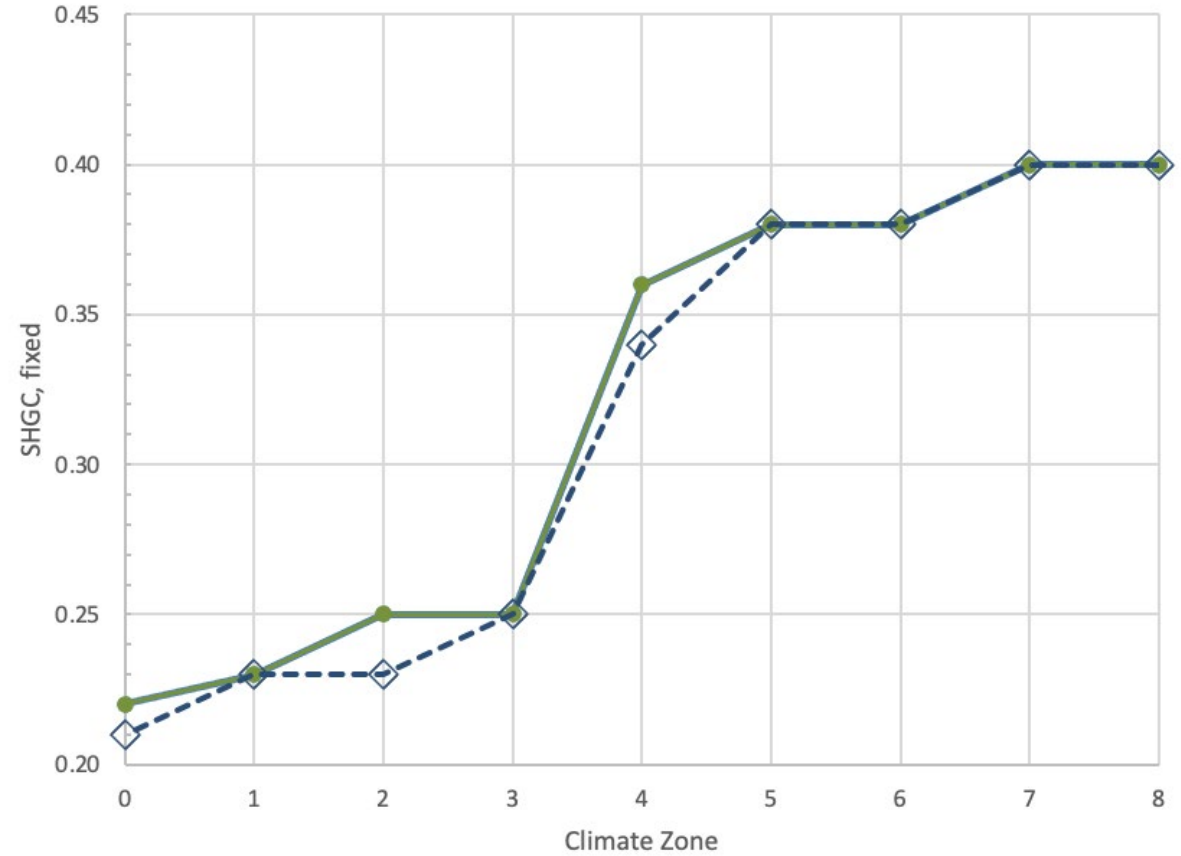
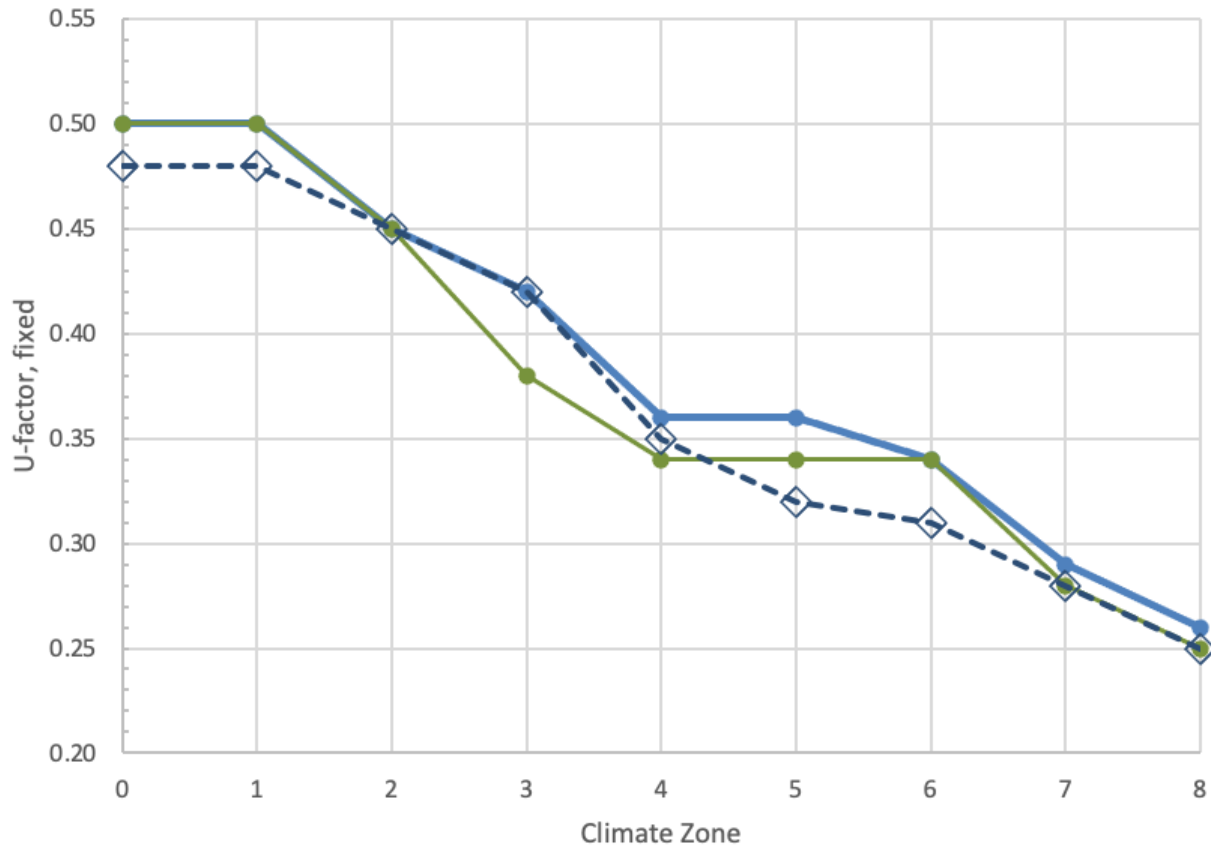
ASHRAE 90.1 – Fenestration Criteria

SKYLIGHTS / SLOPED GLAZING

Zone	90.1-2022	2025 prop.	90.1-2022	2025 prop.
	U	U	SHGC	SHGC
8	0.41	0.40	NR	NR
7	0.44	0.44	NR	NR
6	0.47/0.50	0.45	0.40	0.40
5	0.50	0.46	0.40	0.40
4	0.50	0.49	0.40	0.40
3	0.55	0.55	0.30	0.30
2	0.65	0.65	0.30	0.30
1	0.70	0.68	0.30	0.30
0	0.70	0.68	0.30	0.30

- Also separate less stringent requirements for semiheated spaces (e.g. warehouses)

ASHRAE 90.1 – Fenestration Criteria



- 90.1-2022
- 2024 IECC
- 90.1-2025 proposal?

ASHRAE 90.1 – Fenestration Criteria

What's next?

- We are hoping there are minimal public comments, but GICC members and others are reviewing. We expect there might be some comments on the skylight numbers.
- Any comments will be reviewed and responded by committee, and any necessary tweaks will go out for public review before being included in 90.1-2025.

ASHRAE 90.1 – Other Items

- Proposal to allow credit for **dynamic glazing** and **automated shading** in Ch 12 performance path similar to what is already in Appendix G performance path. Unanimous approval by committee.
- Proposal to **increase on-site renewable energy (PV, BIPV)** requirement from 0.50 to 0.75 W/ft². This one is a little more controversial.
- Clean up of **existing building** language.
- New **net-zero operational carbon** appendix out for public review.
 - A prescriptive appendix that jurisdictions can optionally adopt as a net-zero energy and net-zero carbon code. Pushed by IRA funding and overall policy goals.
 - Set efficiency a notch higher (~10-15%), then determine how much renewable energy is required to get to net-zero.
 - We made sure it does not lower the window area limit as some were initially proposing.
 - *Pushes higher performance glazing, and glass in PV, BIPV.*

Other things you want to discuss?

- Colorado Energy Star?
- Massachusetts?
- P100?
- PAWS?