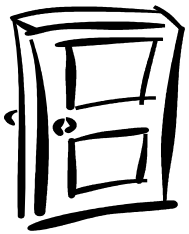
Emily Zachery
Dan Lauf

D&R International

Agenda

- Proposed Draft 1 Window Criteria
- Proposed Draft 1 Door Criteria
- Proposed Draft 1 Skylight Criteria
- Comment Period



Agenda

- Proposed Draft 1 Window Criteria
- Proposed Draft 1 Door Criteria
- Proposed Draft 1 Skylight Criteria
- Stakeholder Meeting

V6.0 Draft 1 Criteria

- Overview
- Technological Feasibility & Product Availability
- Cost-Effectiveness
- Aggregate National Energy Savings Potential
- Possible Considerations for V7.0

Proposed Criteria

Climate Zone	U-Factor	SHGC
Northern	≤ 0.27	Any
Trade-Off	= 0.28	≥ 0.32
North-Central	≤ 0.29	≤ 0.40
South-Central	≤ 0.31	≤ 0.25
Southern	≤ 0.40	≤ 0.25

Current Criteria

Climate Zone	U-Factor	SHGC
Northern	≤ 0.30	Any
Trade-Offs	= 0.31 = 0.32	≥ 0.35 ≥ 0.40
North-Central	≤ 0.32	≤ 0.40
South-Central	≤ 0.35	≤ 0.30
Southern	≤ 0.60	≤ 0.27

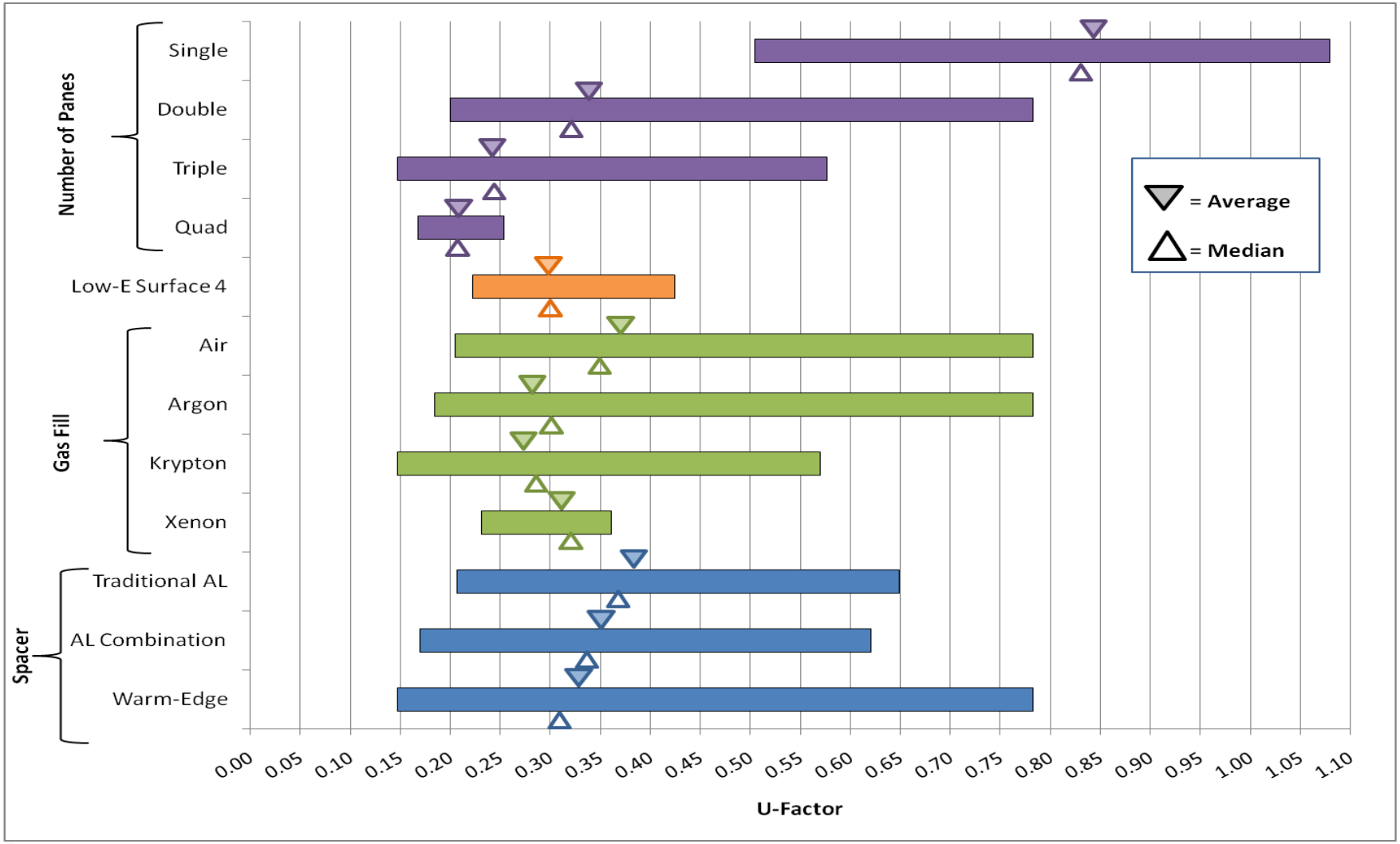
V6.0 Draft 1 Criteria

- Overview
- Technological Feasibility & Product Availability
- Cost-Effectiveness
- Aggregate National Energy Savings Potential
- Possible Considerations for V7.0

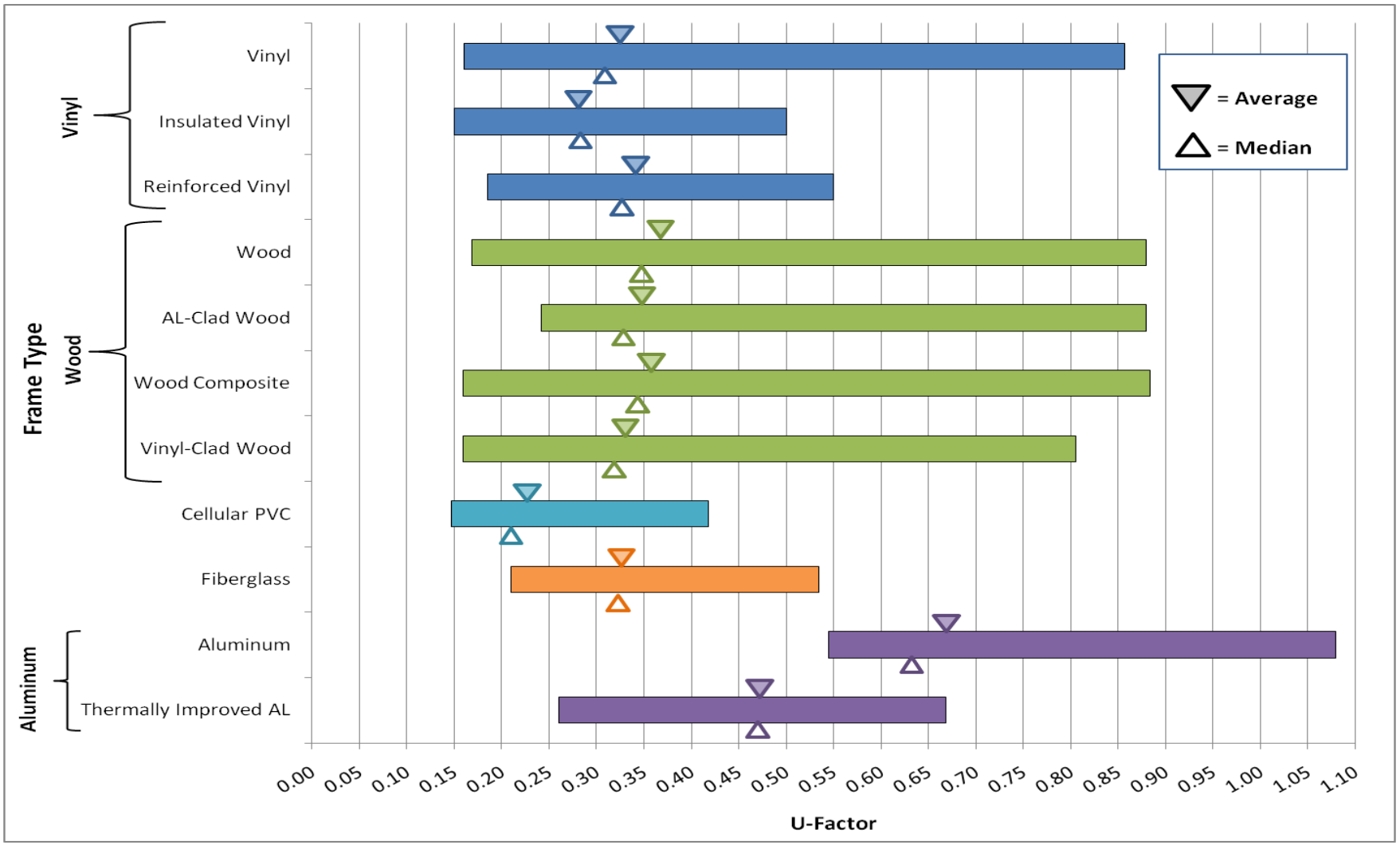
Technological Feasibility & Product Availability

- NFRC CPD Data Analysis
- Products Available for Sale Methodology
- Availability of Low U-Factor Windows
- Glazing Level and Gas Fill
- Glass Type
- Frame Materials
- Exploration of Select Alternate Proposals

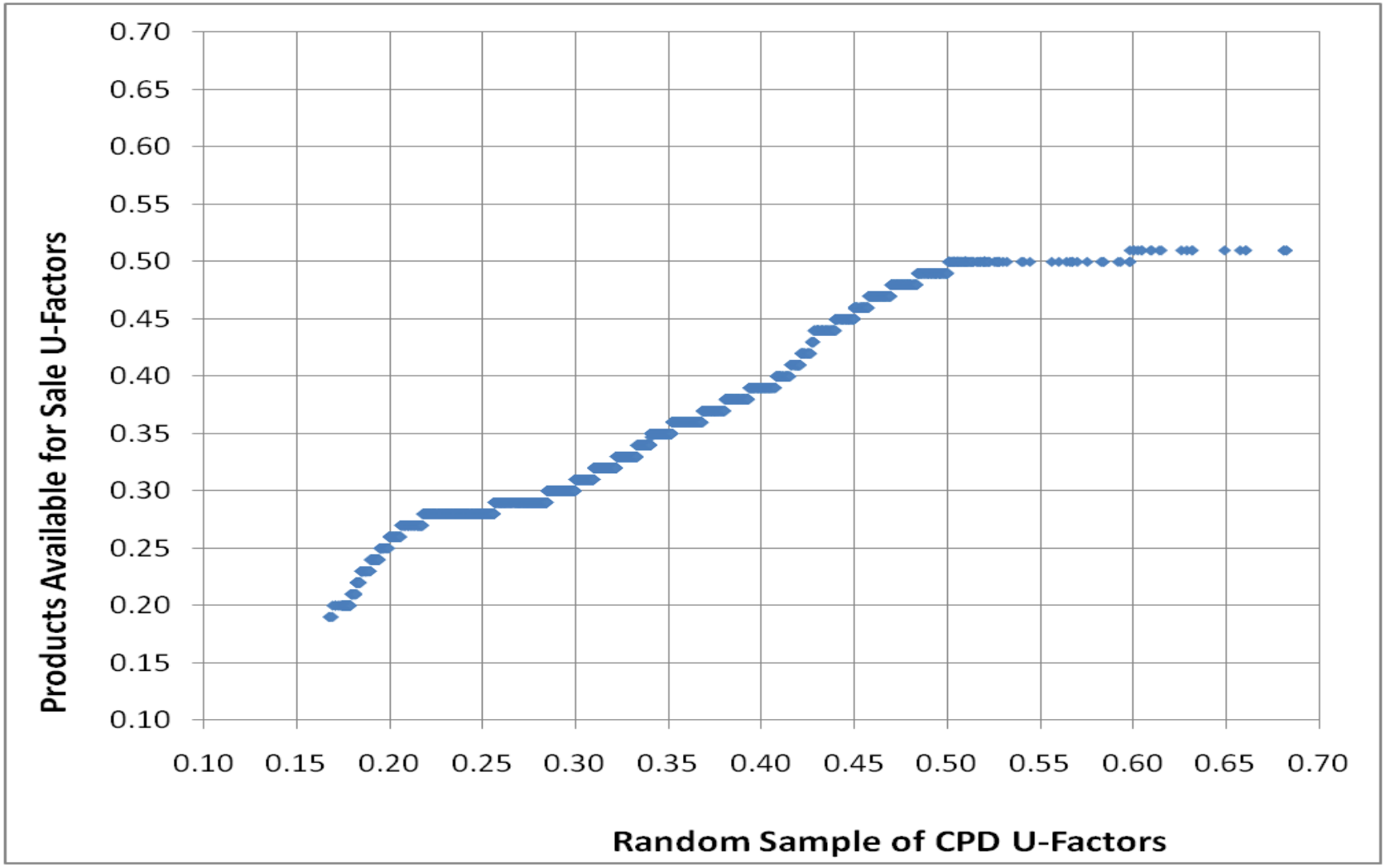
NFRC CPD Data Analysis



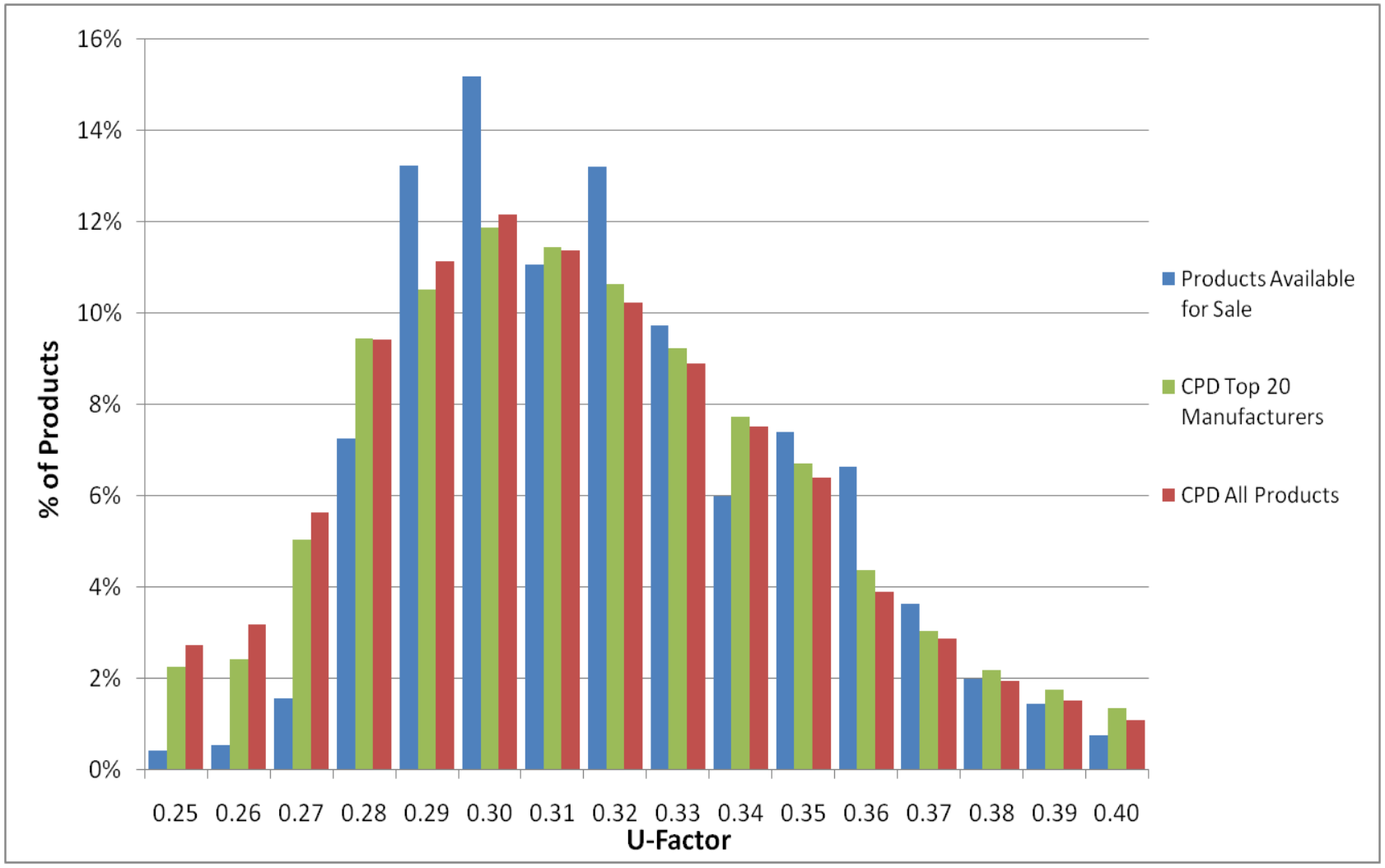
NFRC CPD Data Analysis



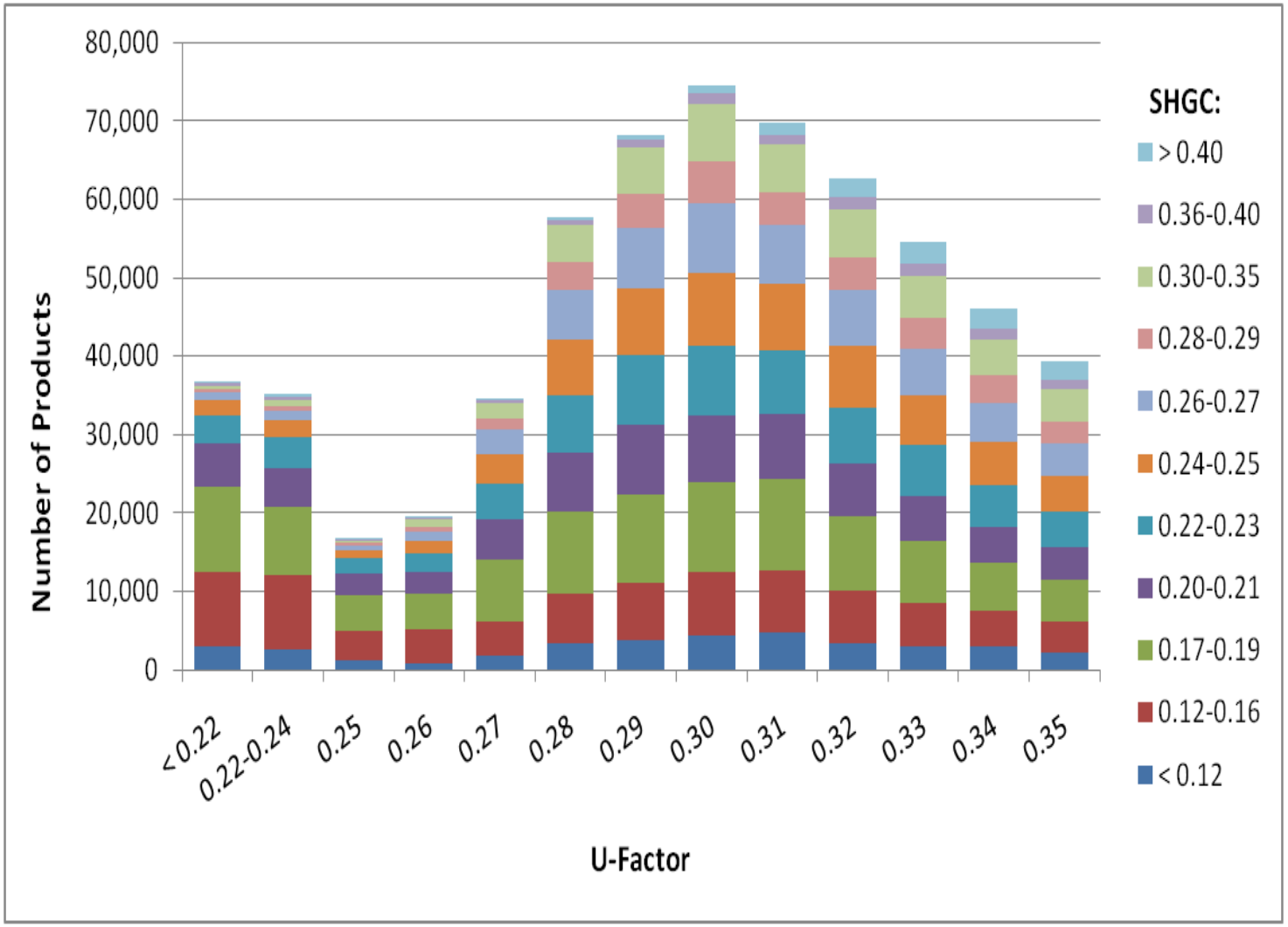
Products Available for Sale Methodology



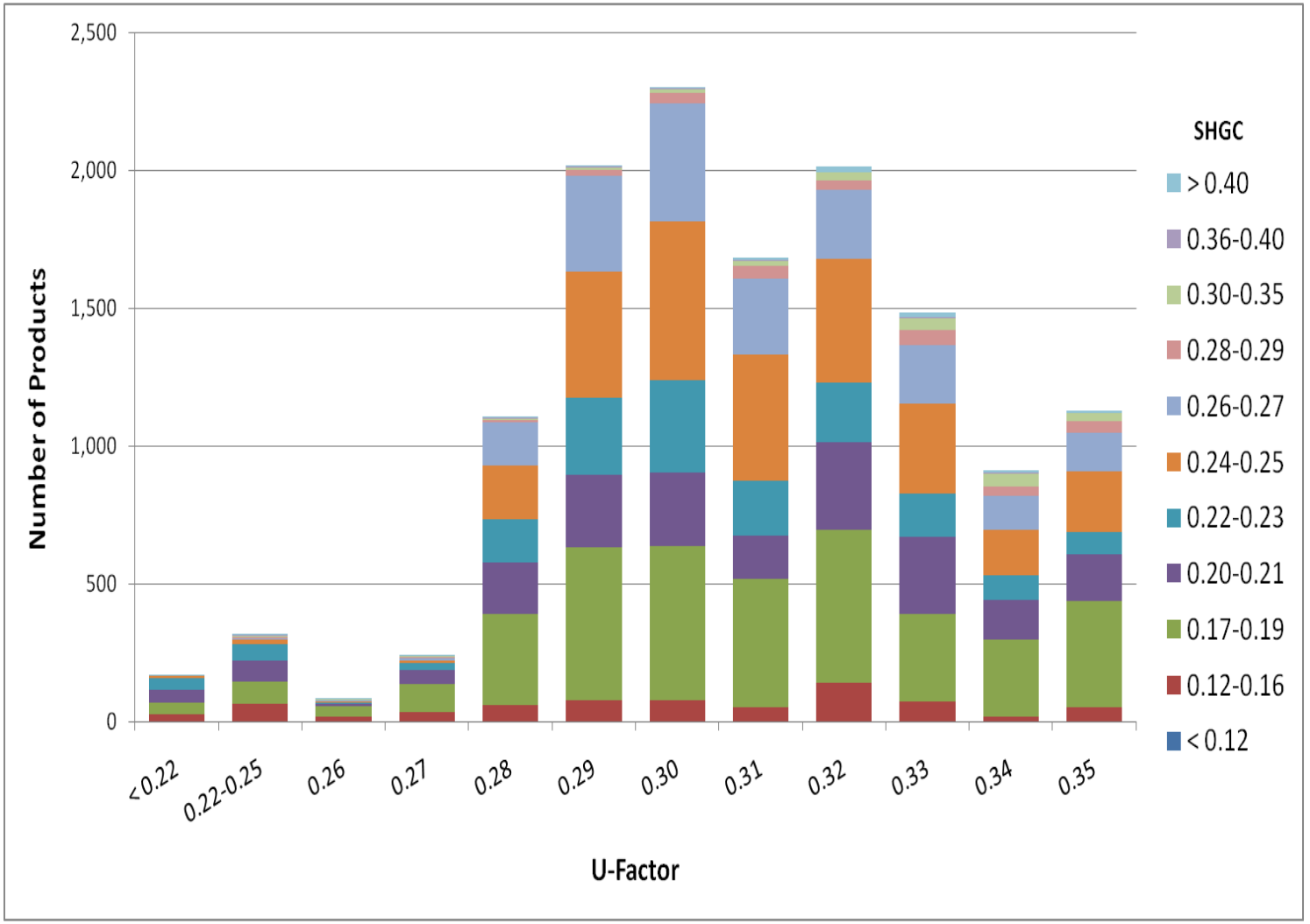
CPD versus PA Analysis



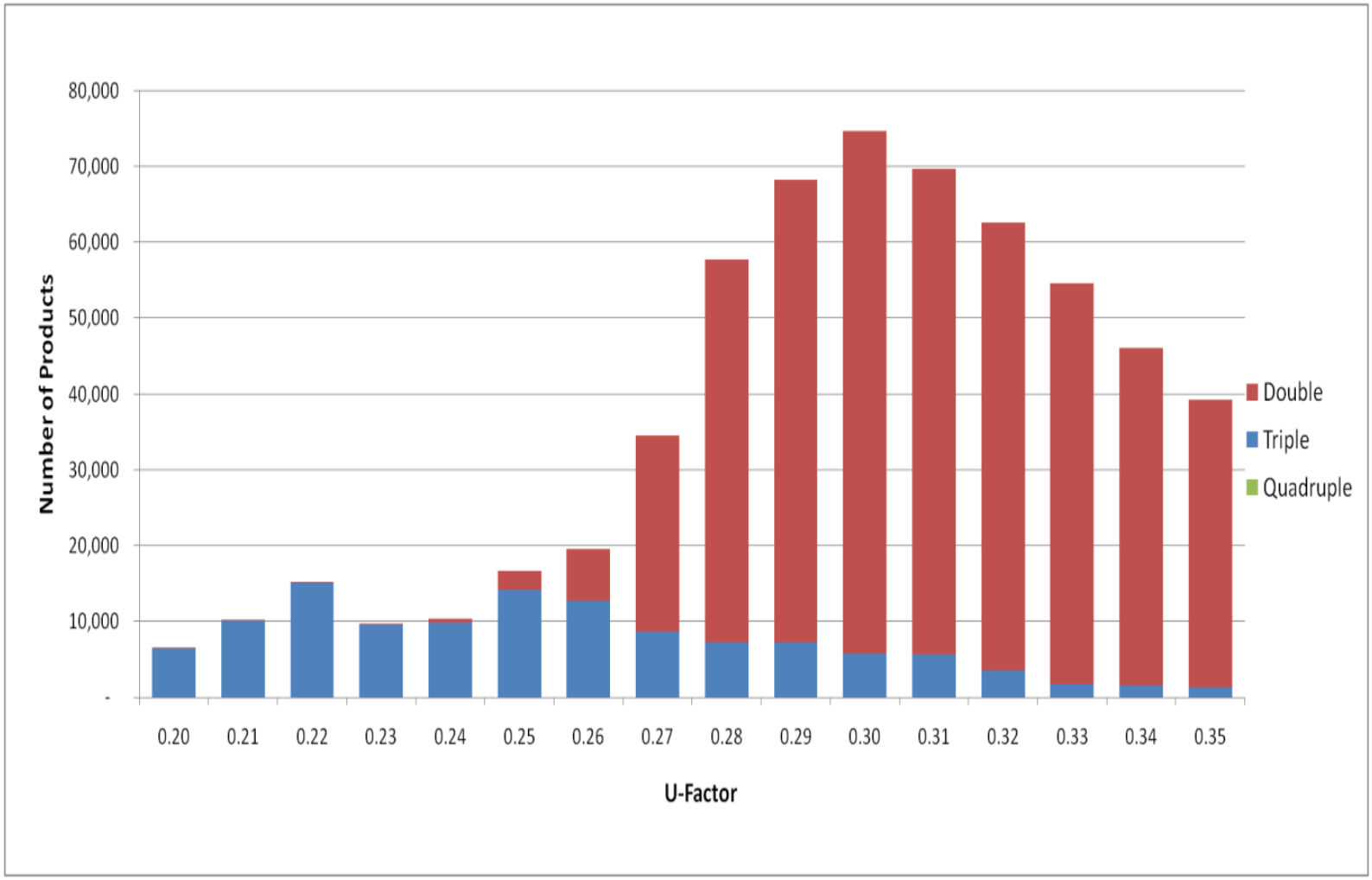
Availability of Low U-Factor Windows (CPD)



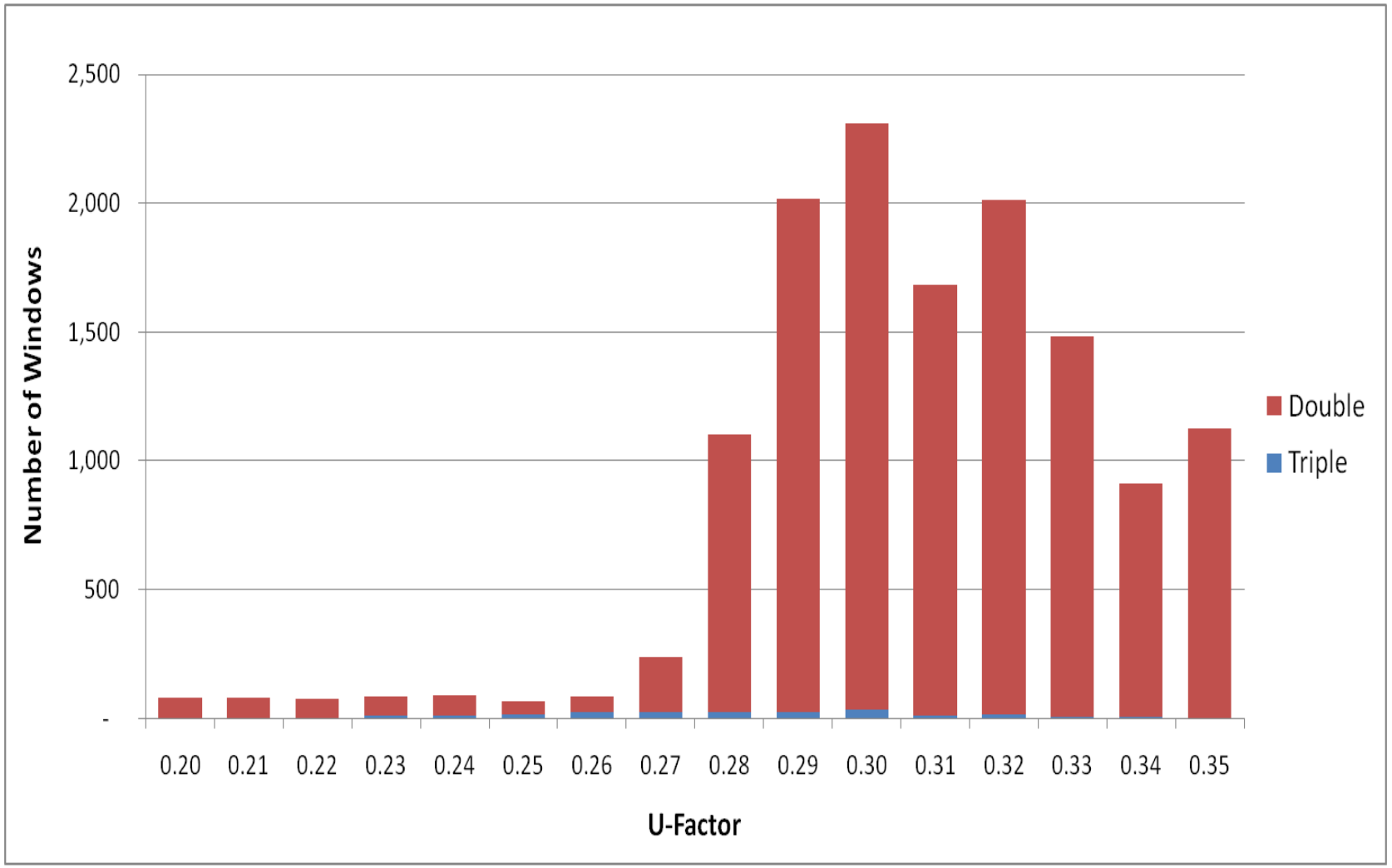
Availability of Low U-Factor Windows (PA)



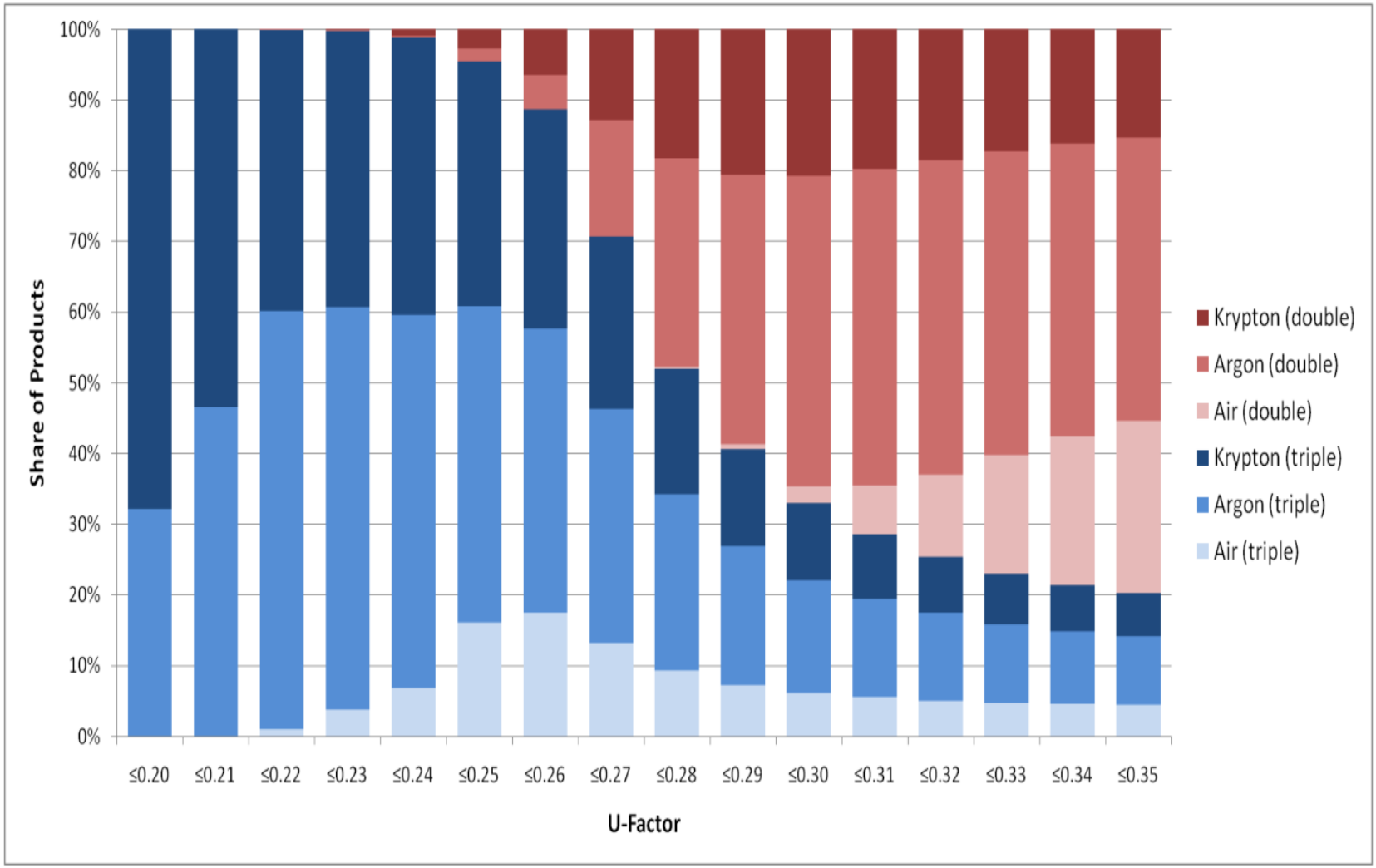
Glazing Level (CPD)



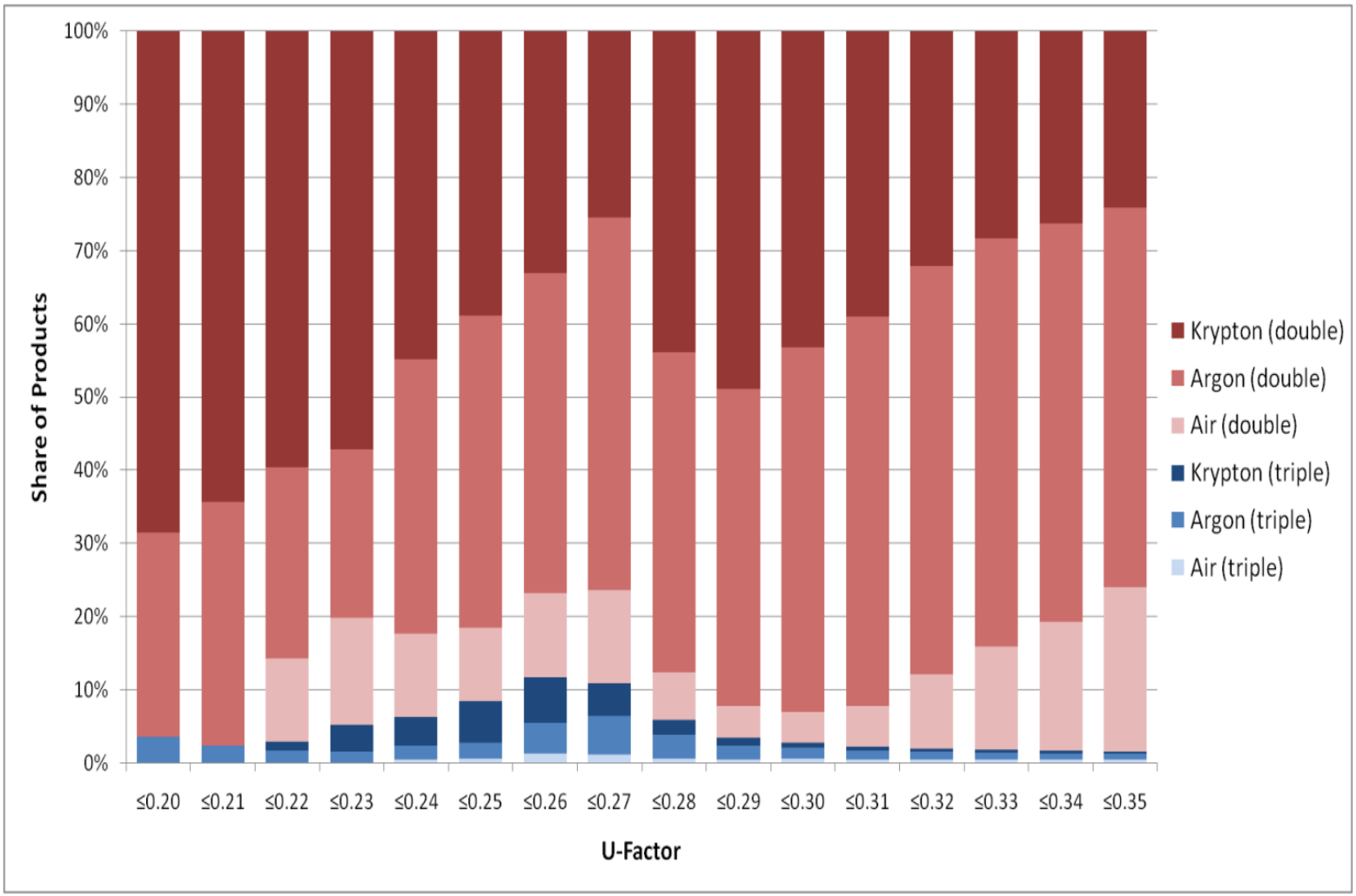
Glazing Level (PA)



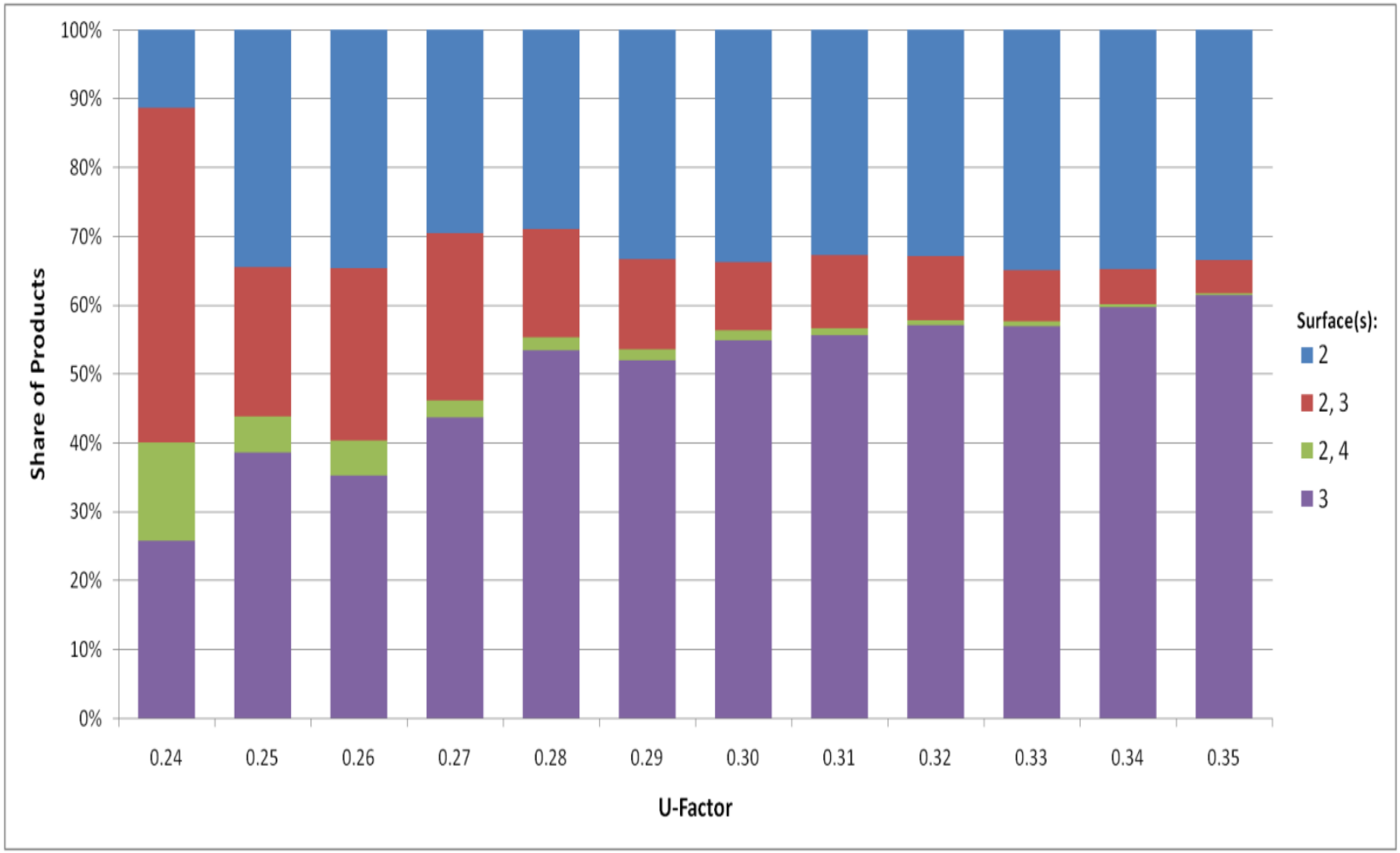
Glazing Level and Gas Fill (CPD)



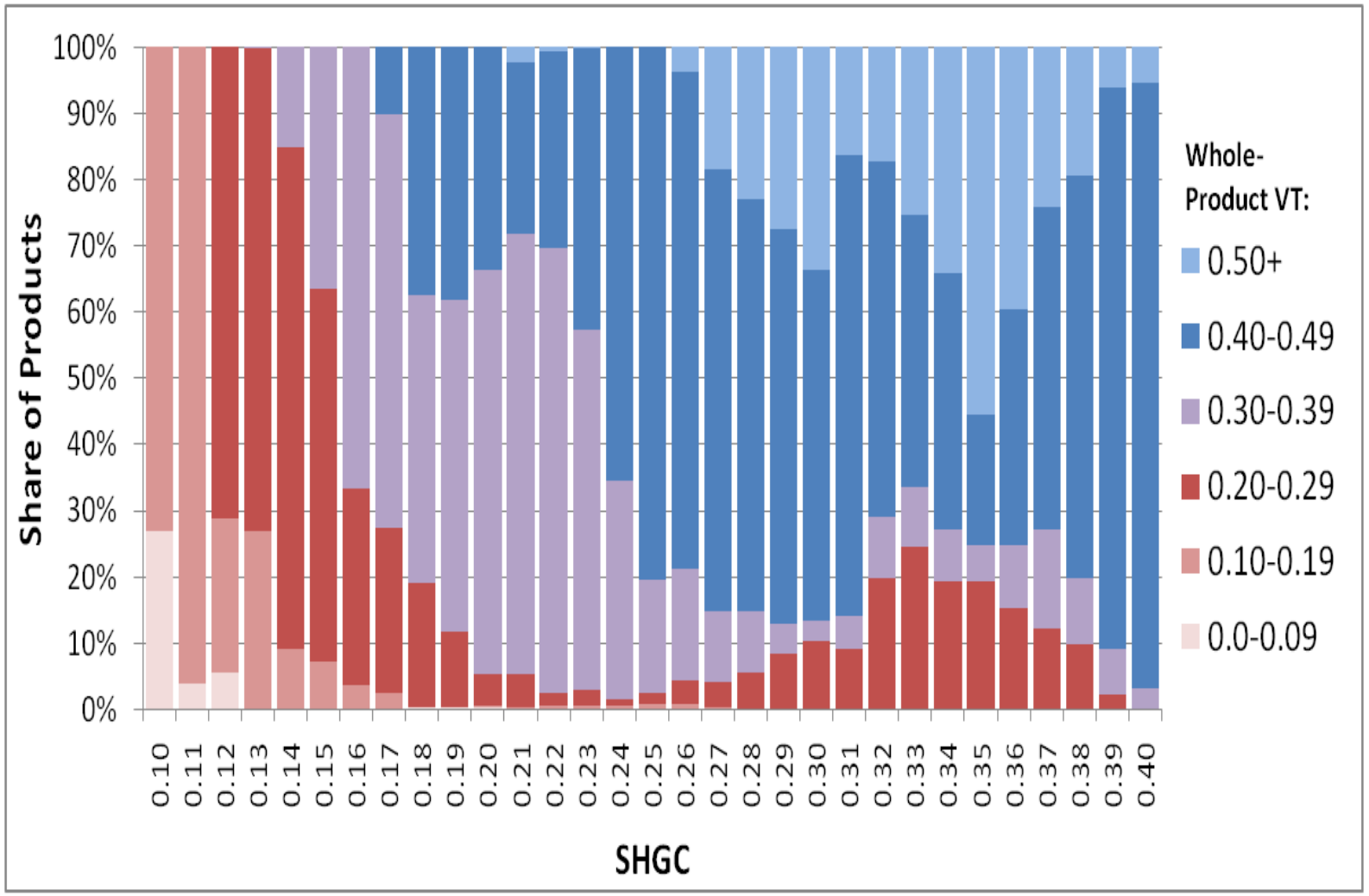
Glazing Level and Gas Fill (PA)



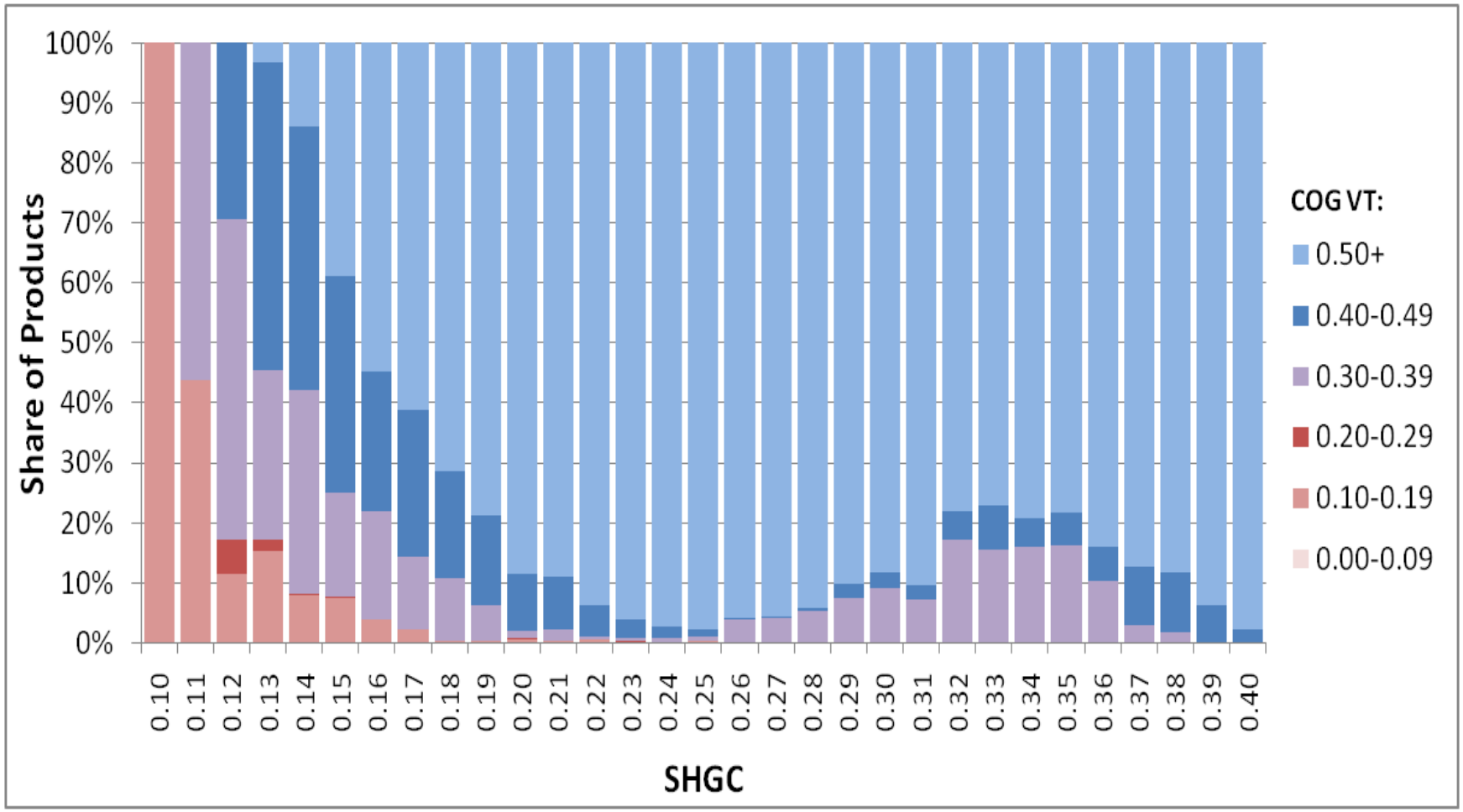
Glass Type: Surface 4 (CPD)



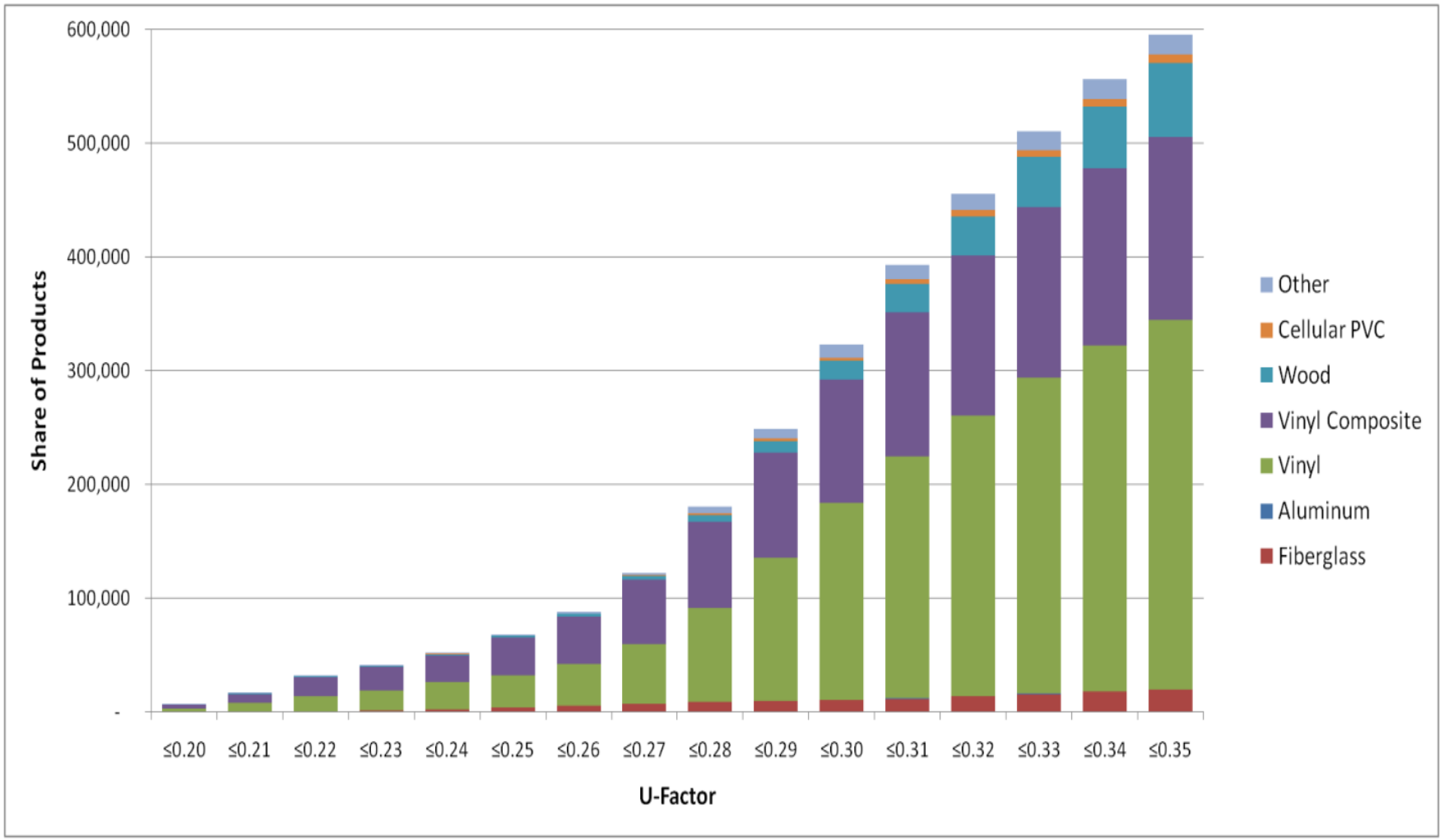
Glass Type: Whole-Product VT for Low SHGC (CPD)



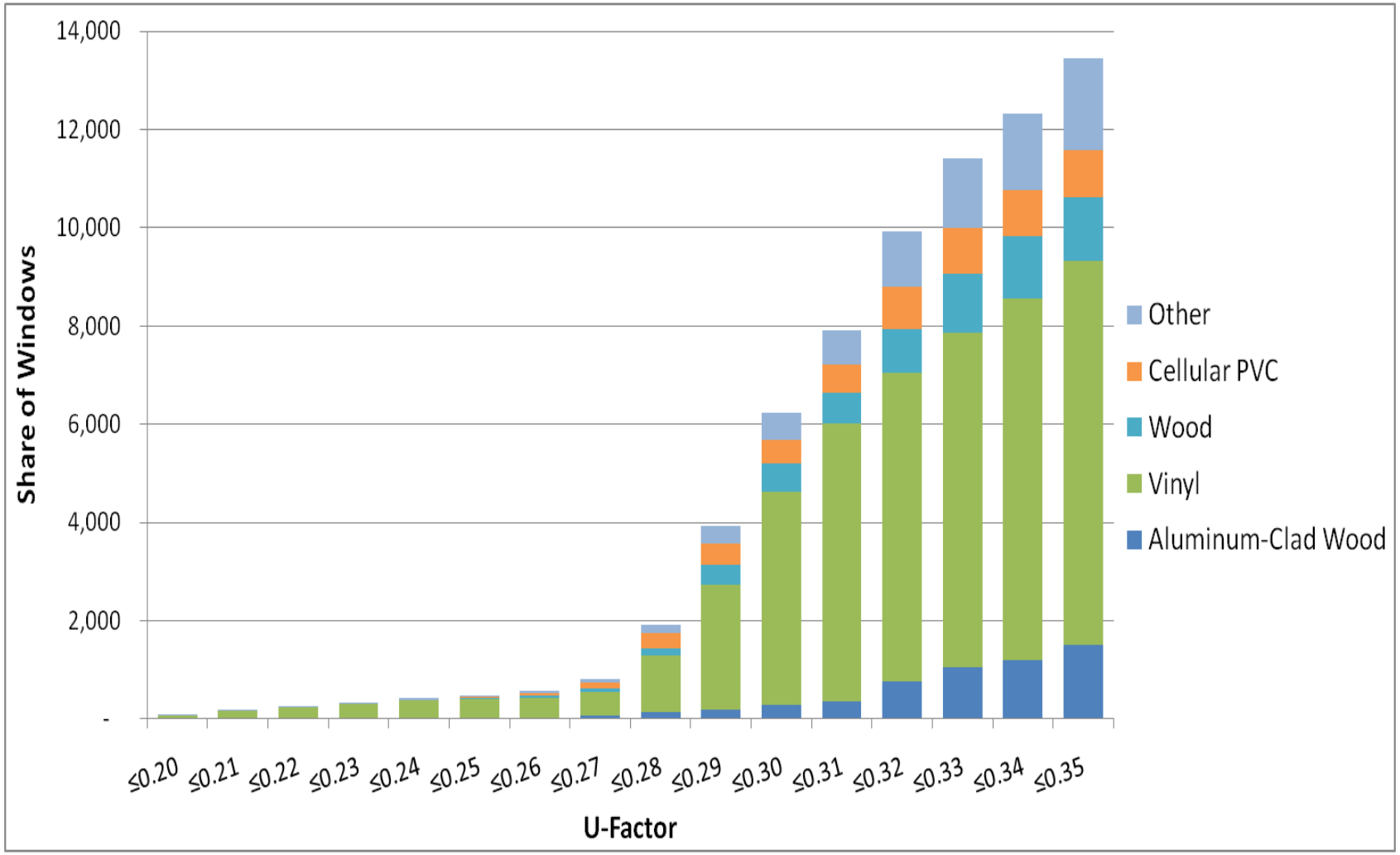
Glass Type: COG VT for Low SHGC (CPD)



Frame Materials (CPD)



Frame Materials (PA)



Exploration of Select Alternate Proposals

- Allow any SHGC in North-Central
  - ES would not meet code
- Establish minimum SHGC in Northern Zone

Windows in CPD

U-Factor ≤ 0.27	Double- and Triple-Pane		Double-Pane Only	
	Number	Percent	Number	Percent
SHGC ≥ 0.32	4,562	0.77%	1,489	0.31%
SHGC ≥ 0.40	933	0.16%	87	0.02%

("Products Available for Sale" database contained no windows meeting these criteria)

V6.0 Draft 1 Criteria

- Overview
- Technological Feasibility & Product Availability
- Cost-Effectiveness
- Aggregate National Energy Savings Potential
- Possible Considerations for V7.0

Cost-Effectiveness

- Incremental Product Costs
- Household Energy Savings
- Payback

Incremental Product Costs

- Calculated two sets of incremental product costs
  - Cost increase from V5.0 to V6.0 (to evaluate manufacturer cost)
  - Cost increase from IECC 2009 to V6.0 (to calculate payback for consumer)

Zone	U-Factor	SHGC	V5 to V6	IECC '09 to V5	IECC '09 to V6
Northern	0.27	Any	$34.00 $173.00 (incl. trips)	+ $20	$54.00
North-Central	0.29	0.35	$28.00	+ $20	$48.00
South-Central	0.31	0.25	$21.00	+ $20	$41.00
Southern	0.40	0.25	$13.00	+ $20	$33.00

Household Energy Savings

- Same methodology and assumptions as previous criteria revision
- Modeled two baselines
  - Single-pane clear
  - Double-pane clear
- Calculate marginal savings of V6.0 over both baselines
- Double-clear used to determine payback

Payback

- Average window lifetime 20-30 years
- Payback for Los Angeles Excluded
  - Extremely low baseline energy usage
- Median simple payback 11 years
- Mean simple payback 13 years

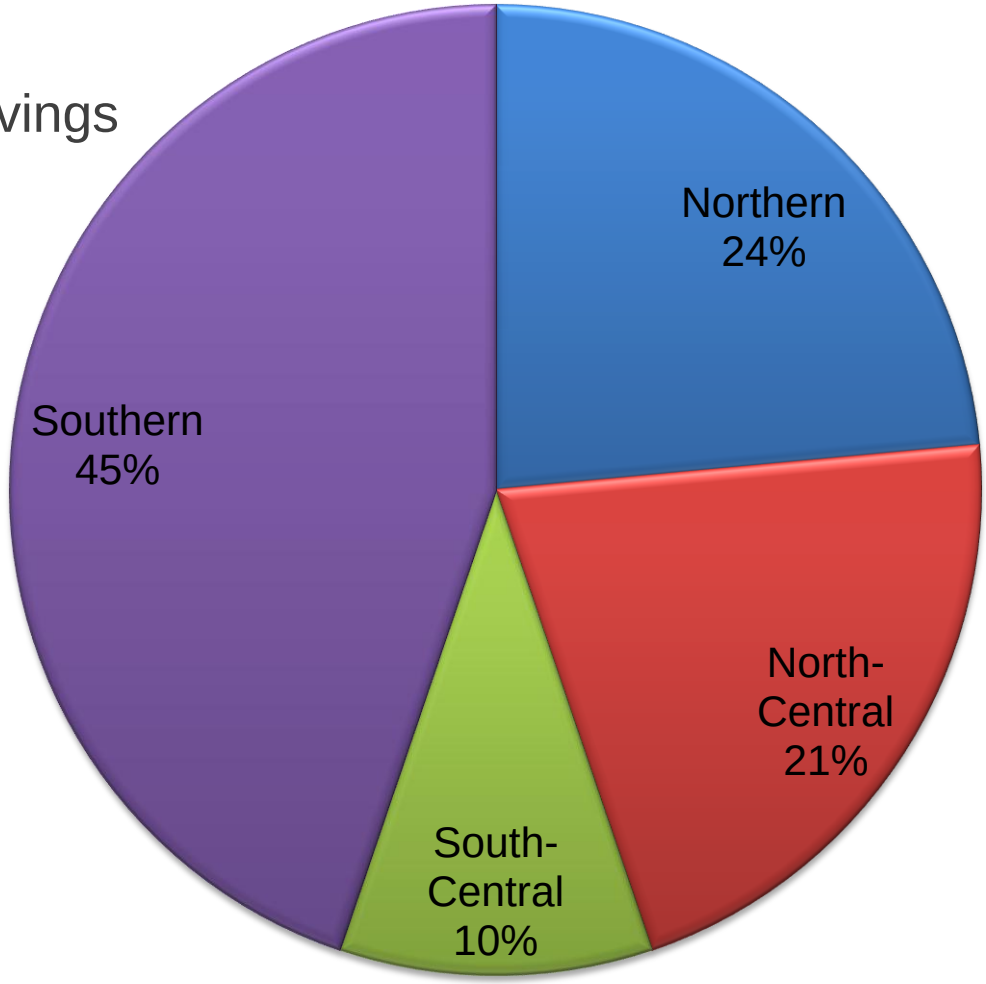
Climate Zone	Mean Payback Period
Northern	14 years
North-Central	16 years
South-Central	15 years
Southern	6 years

V6.0 Draft 1 Criteria

- Overview
- Technological Feasibility & Product Availability
- Cost-Effectiveness
- Aggregate National Energy Savings Potential
- Possible Considerations for V7.0

Aggregate National Energy Savings over V5

2.21 tBtu
Total First Year Savings



Full assumptions and methodology at http://windows.lbl.gov/energystar/version6/

V6.0 Draft 1 Criteria

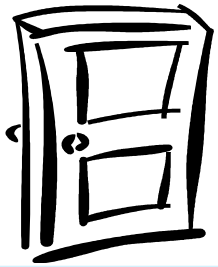
- Overview
- Technological Feasibility & Product Availability
- Cost-Effectiveness
- Aggregate National Energy Savings Potential
- Possible Considerations for V7.0

Possible Considerations for Version 7.0

- Program Elements Considered during Version 6.0 Criteria Revision
- Program Elements Unchanged during Version 6.0 Criteria Revision
- Future Codes
- Most Efficient Program
- Emerging Technologies

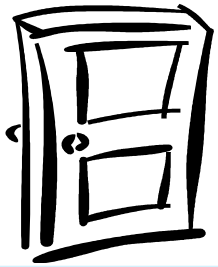
Agenda

- Proposed Draft 1 Window Criteria
- Proposed Draft 1 Door Criteria
- Proposed Draft 1 Skylight Criteria
- Comment Period



V6.0 Draft 1 Criteria

- Overview
- Technological Feasibility
- Cost-Effectiveness



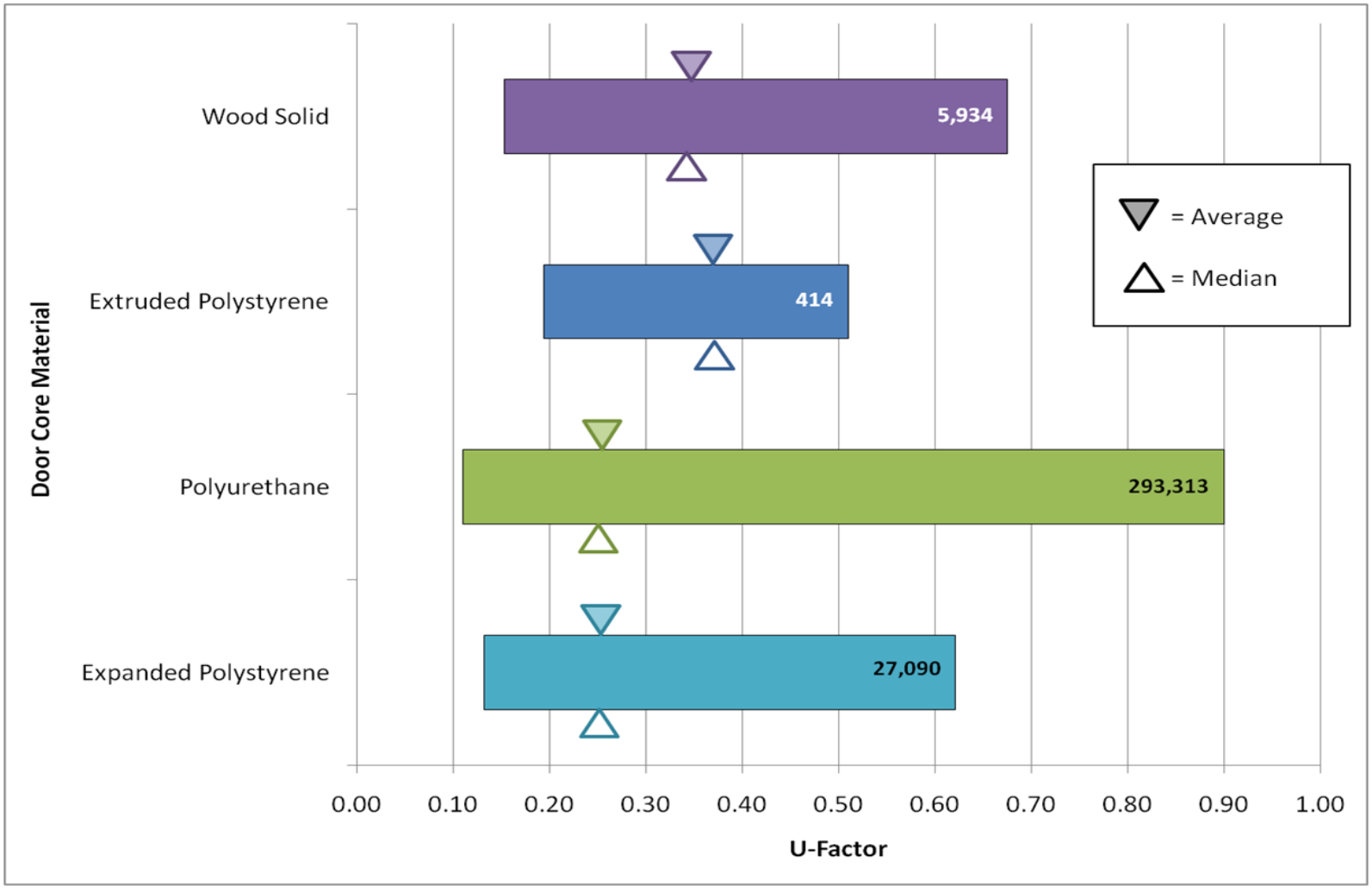
Proposed Criteria

Glazing Level	U-Factor	SHGC
Opaque	≤ 0.17	No Rating
≤ ½-Lite	≤ 0.23	≤ 0.25
> ½-Lite	≤ 0.30	≤ 0.25

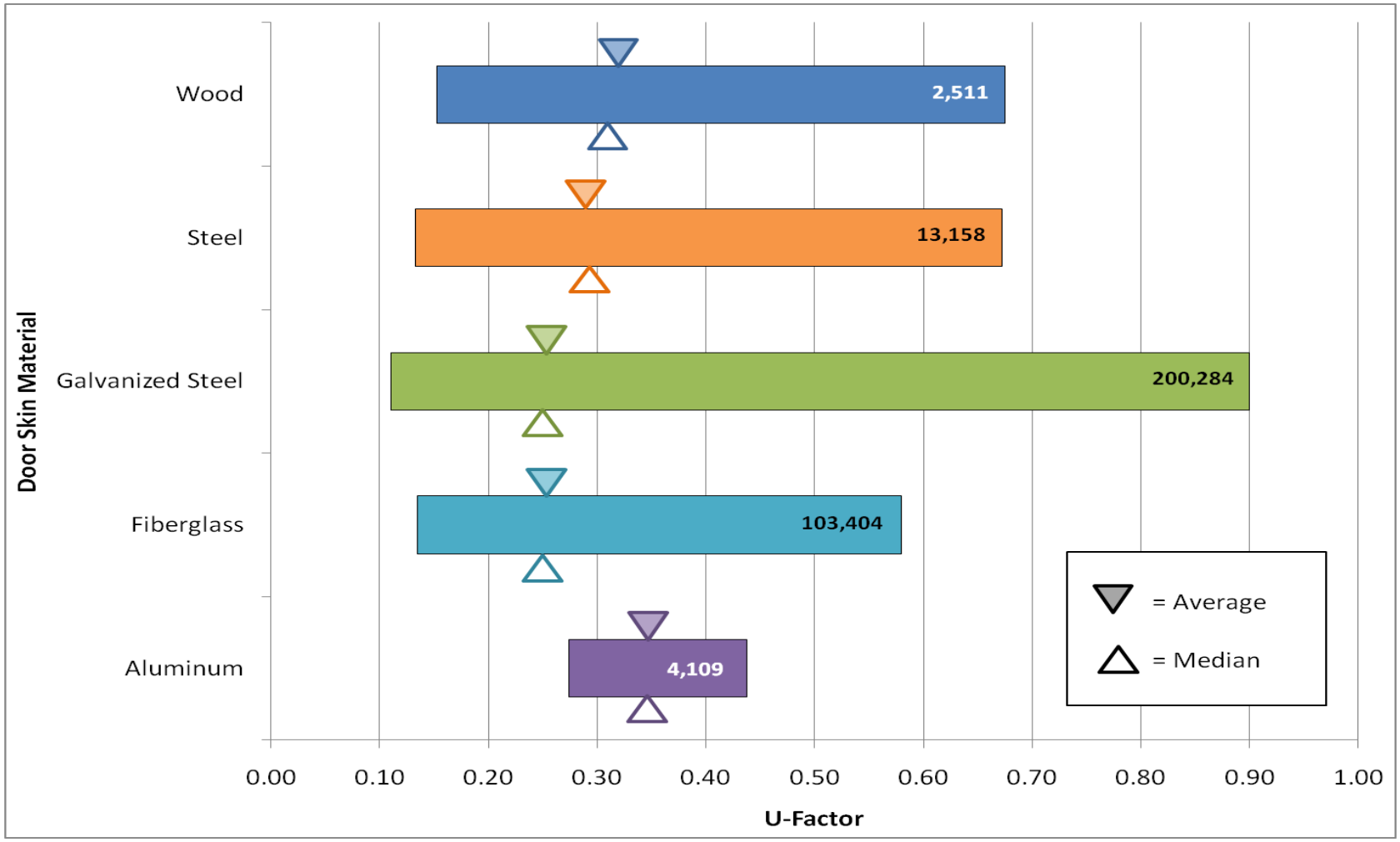
Current Criteria

Glazing Level	U-Factor	SHGC
Opaque	≤ 0.21	No Rating
≤ ½-Lite	≤ 0.27	≤ 0.30
> ½-Lite	≤ 0.32	≤ 0.30

Technological Feasibility

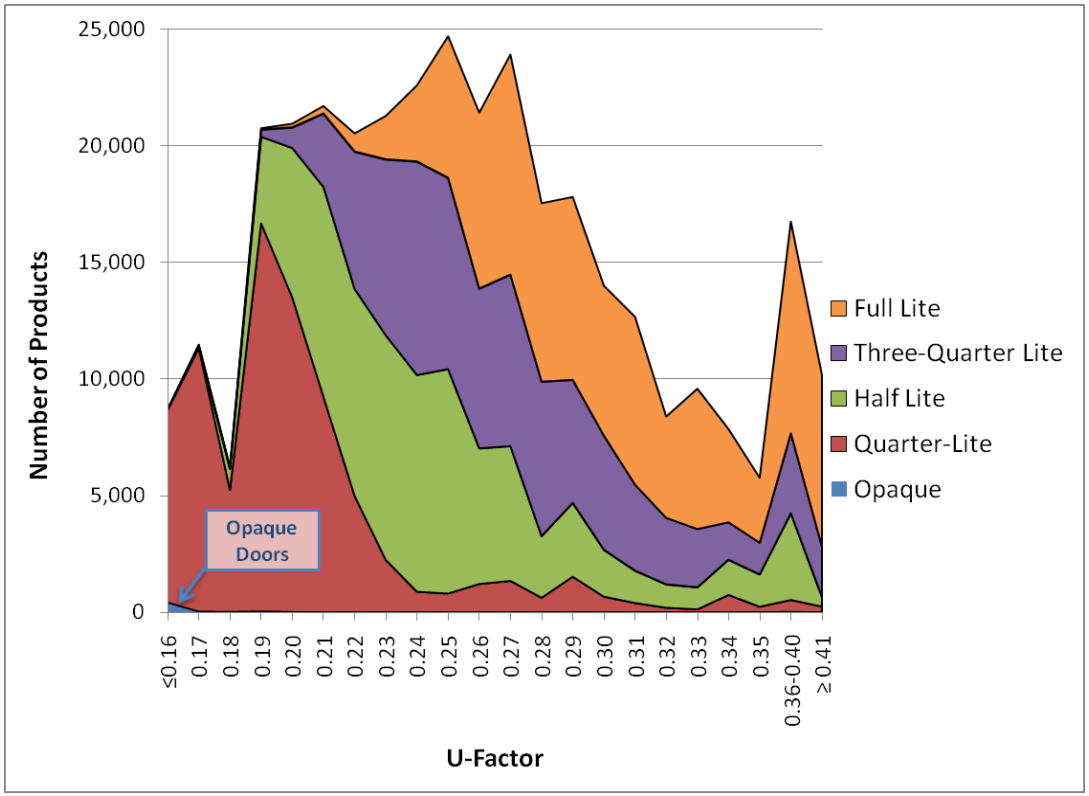


Technological Feasibility

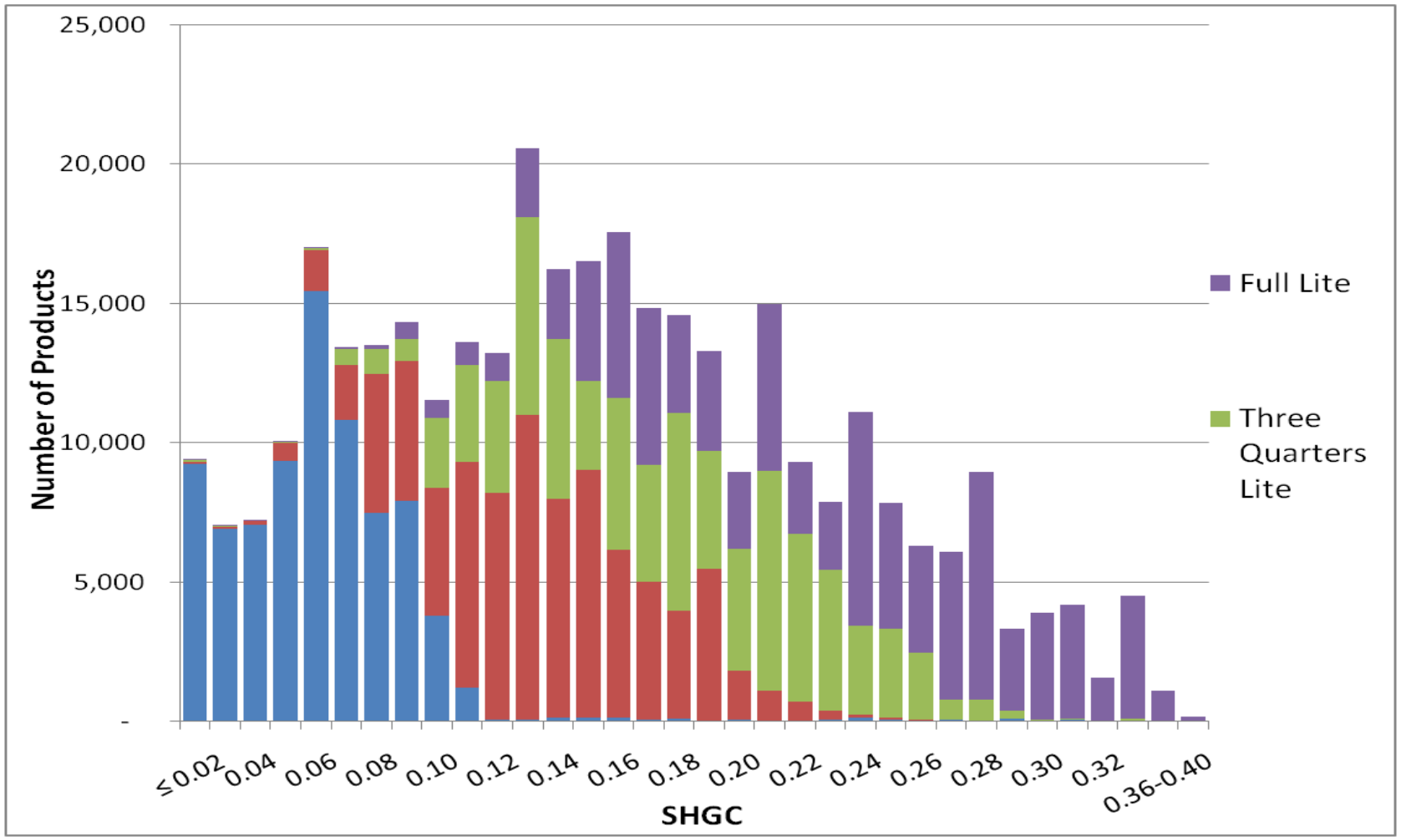


Technological Feasibility

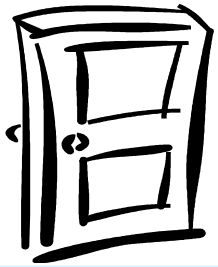
Glazing Level	Percent Qualifying
Opaque	77%
≤ ½-Lite	77%
> ½-Lite	67%



Technological Feasibility

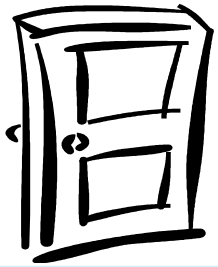


83% of Full-Lite Doors have SHGC ≤ 0.25



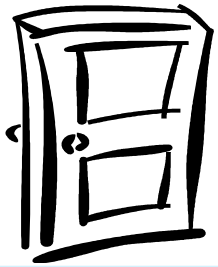
V6.0 Draft 1 Criteria

- Overview
- Technological Feasibility
- Cost-Effectiveness



Cost-Effectiveness

- Incremental Product Costs
- Household Energy Savings
- Payback

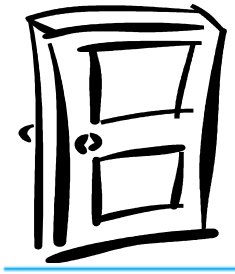


Incremental Product Costs

- Initial incremental product costs only included switching from V5.0 ES to V6.0
- For cost-effectiveness, IECC 2009 makes more sense as a baseline
- Requesting data accordingly in report
- Data shows spec change not cost-prohibitive for manufacturers

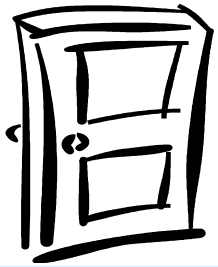
Glazing Level	U-Factor	SHGC	V5.0 to V6.0
Opaque	≤ 0.17	No Rating	None
≤ ½-Lite	≤ 0.23	≤ 0.25	$13.00
> ½-Lite	≤ 0.30	≤ 0.25	$30.00

EPA



Household Energy Savings

- Opaque Doors
  - V6.0 spec matches performance of best-selling products
  - No delta in spec = no energy savings
  - Also no marginal cost
- Less than/Equal to Half-Lite Doors
  - Zero to $2 per year
- Greater than Half-Lite Doors
  - Marginal savings (RESFEN rounds to zero)



Payback

- Opaque Doors
  - N/A (No energy savings; No marginal cost)
- Less than/Equal to Half-Lite Doors
  - Average of 22 years
- Greater than Half-Lite Doors
  - N/A (Marginal savings)
  - Requesting incremental cost from IECC 2009

Agenda

- Proposed Draft 1 Window Criteria
- Proposed Draft 1 Door Criteria
- Proposed Draft 1 Skylight Criteria
- Comment Period

V6.0 Draft 1 Criteria

- Overview
- Technological Feasibility & Product Availability
- Cost-Effectiveness

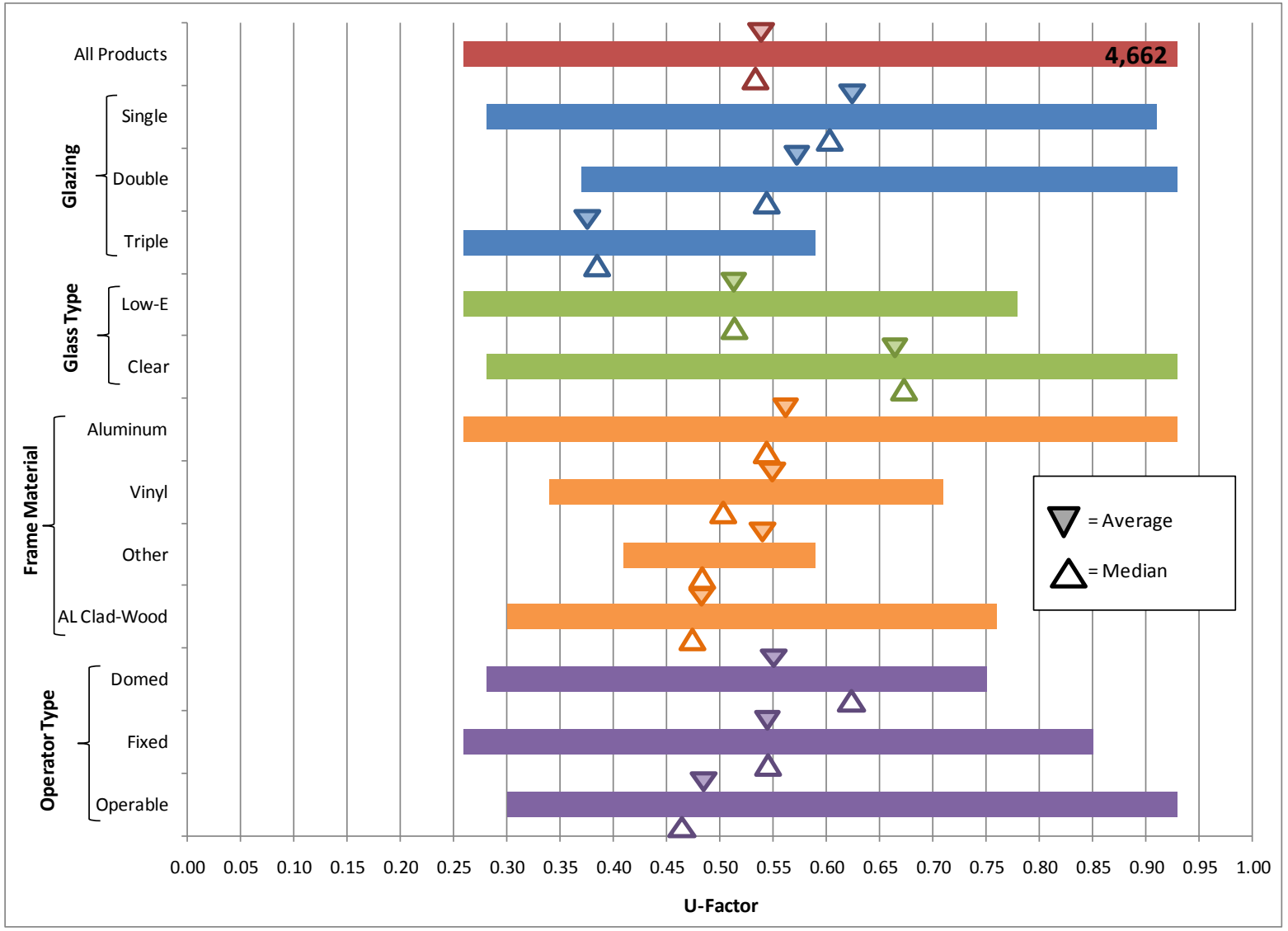
Proposed Criteria

Climate Zone	U-Factor	SHGC
Northern	≤ 0.45	≤ 0.35
North-Central	≤ 0.47	≤ 0.30
South-Central	≤ 0.50	≤ 0.25
Southern	≤ 0.60	≤ 0.25

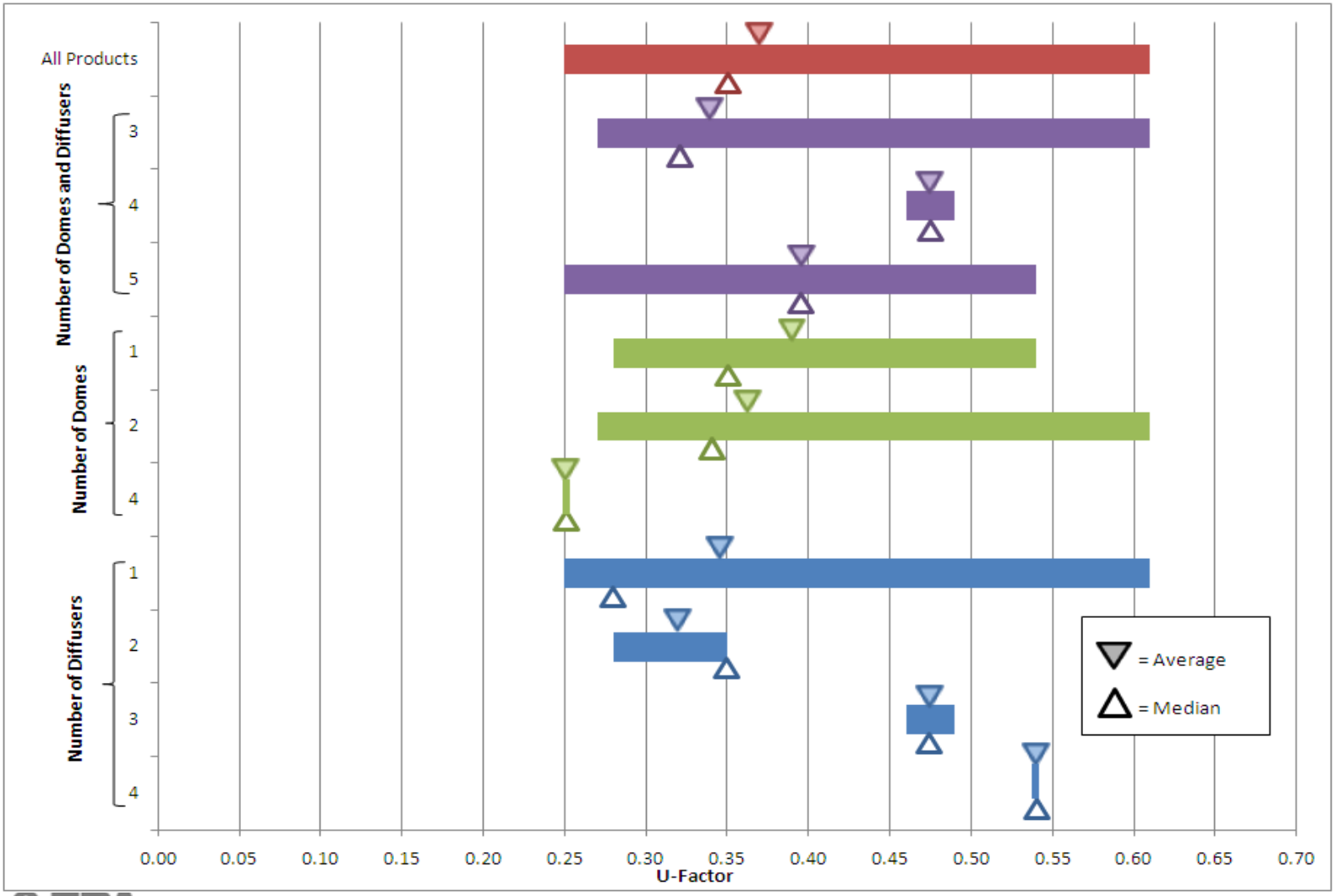
Current Criteria

Climate Zone	U-Factor	SHGC
Northern	≤ 0.55	Any
North-Central	≤ 0.55	≤ 0.40
South-Central	≤ 0.57	≤ 0.30
Southern	≤ 0.70	≤ 0. 30

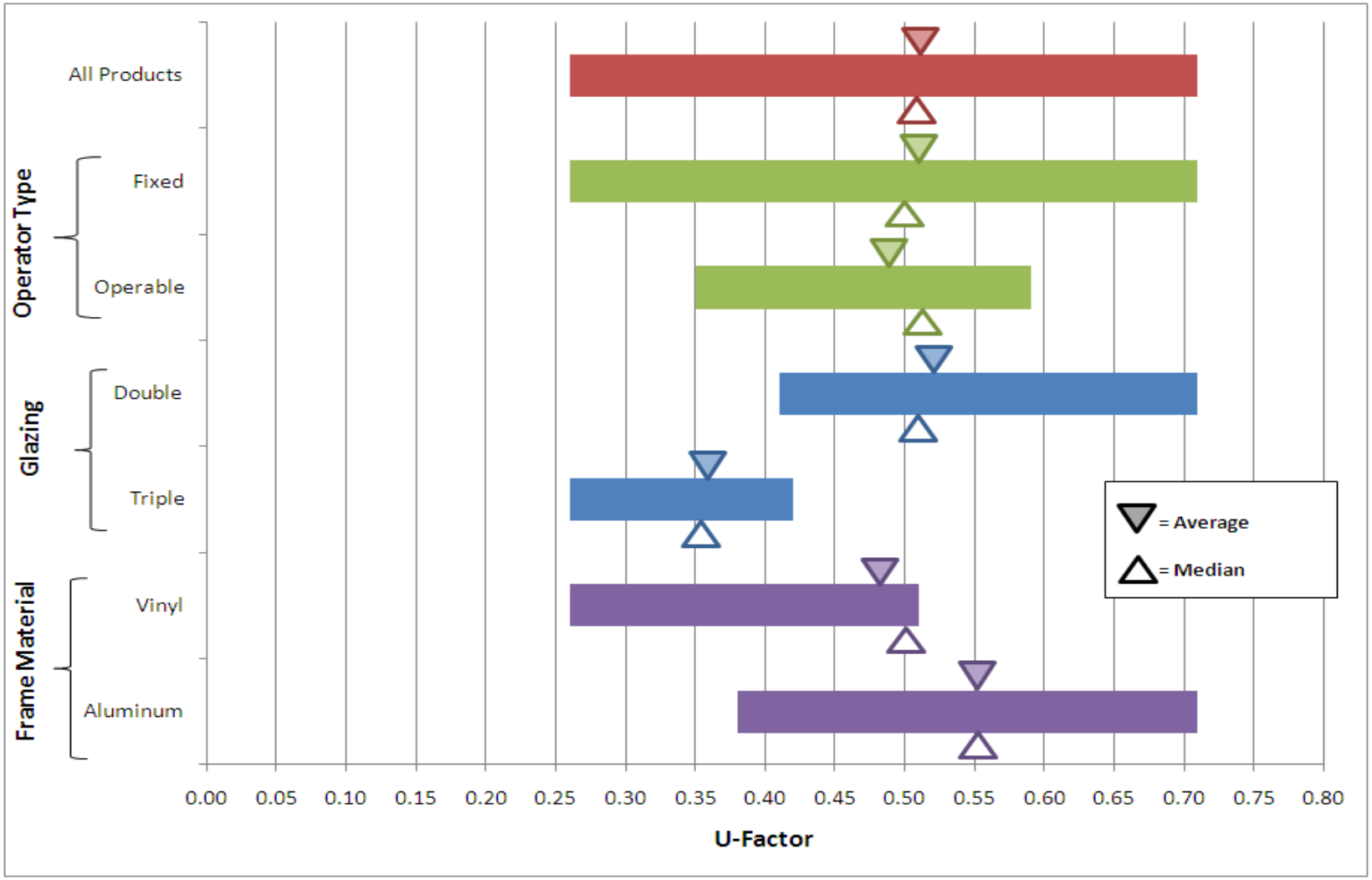
Technological Feasibility (CPD Skylights)



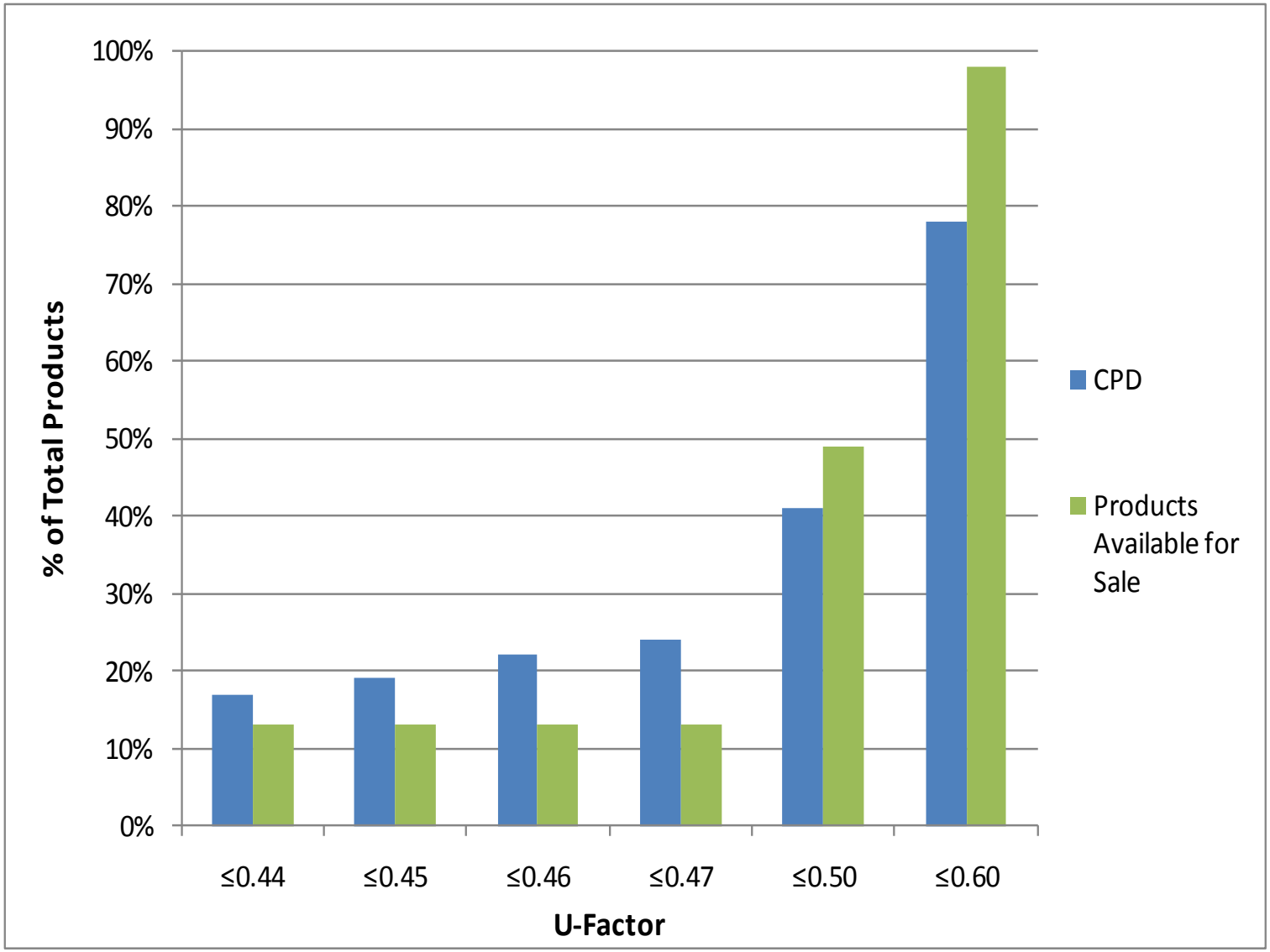
Technological Feasibility (CPD TDDs)



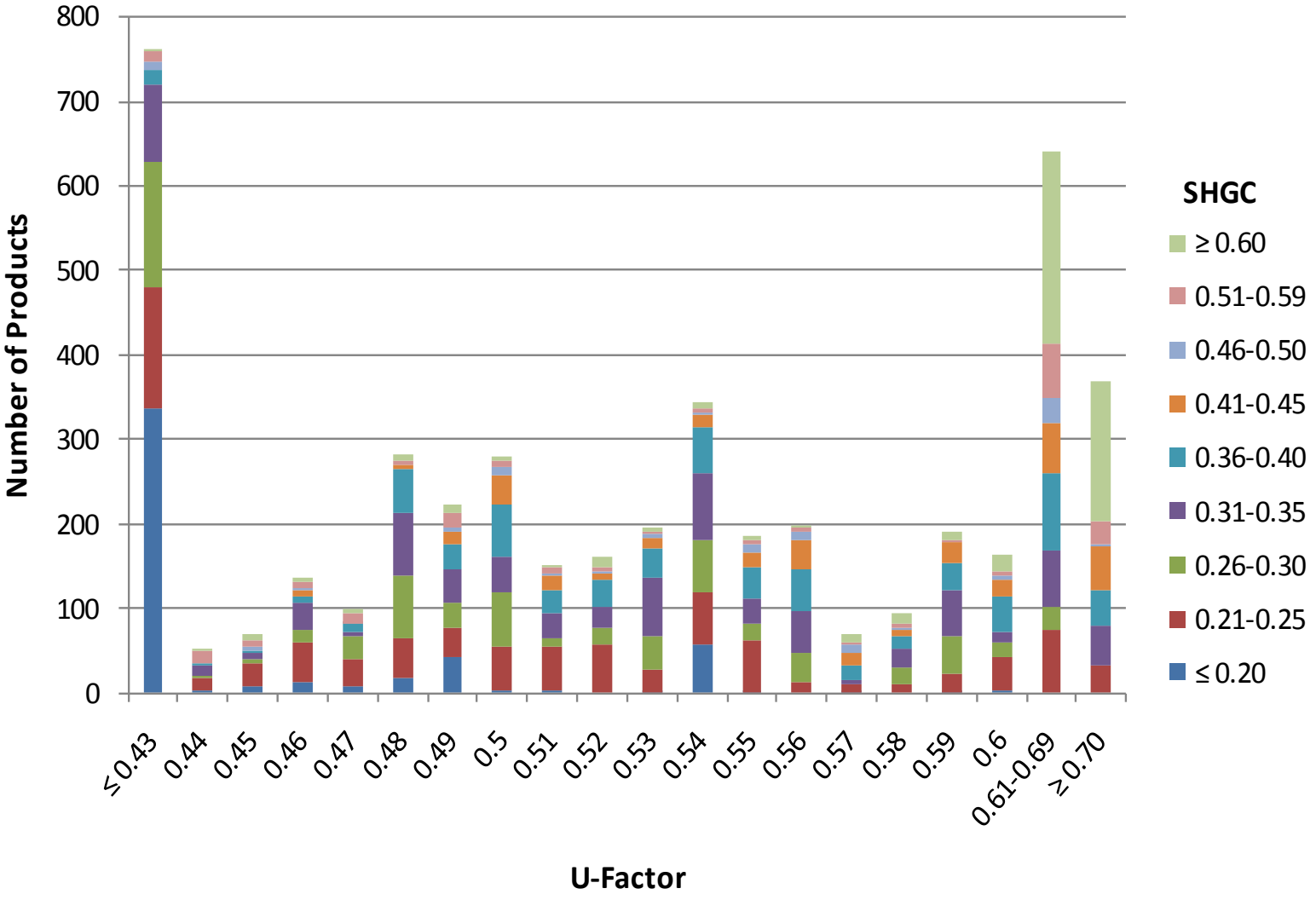
Product Availability Analysis



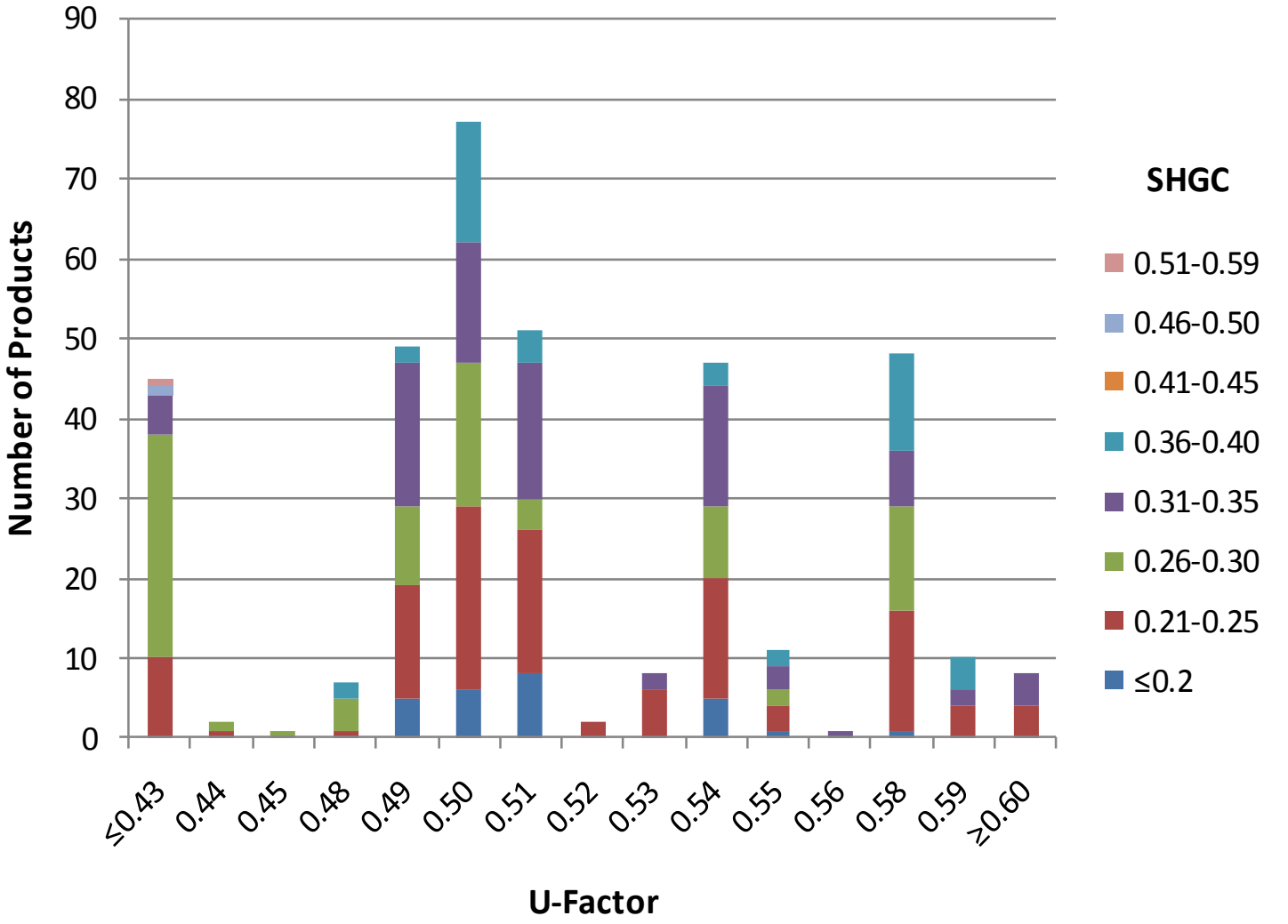
CPD versus PA Analysis



Technological Feasibility Analysis (CPD)



Product Availability Analysis



V6.0 Draft 1 Criteria

- Overview
- Technological Feasibility & Product Availability
- Cost-Effectiveness

Cost-Effectiveness

- Incremental Product Costs
  - Not enough skylight data received to publish
  - Too few TDDs to calculate

Zone	U-Factor	SHGC	V5.0 to V6.0
Northern	≤ 0.45	≤ 0.35	$0-20
North-Central	≤ 0.47	≤ 0.30	$0-20
South-Central	≤ 0.50	≤ 0.25	$20-$40
Southern	≤ 0.60	≤ 0.25	$20-$40

- Household Energy Savings
  - Zero to $4 per year
- Average Payback of 29 years

Agenda

- Proposed Draft 1 Window Criteria
- Proposed Draft 1 Door Criteria
- Proposed Draft 1 Skylight Criteria
- Comment Period

Comment Period

- Send to windows@energystar.gov
- Mark as “Confidential” any files not to be posted
- All other comments will be posted to http://www.energystar.gov/index.cfm?c=revisions.residential_windows_spec
- Comments due **Friday, Sept. 28**