COOPERATIVE EXTENSION
WASHINGTON STATE UNIVERSITY
ENERGY PROGRAM

Simplifying Code Language to Support the Inspection Process.

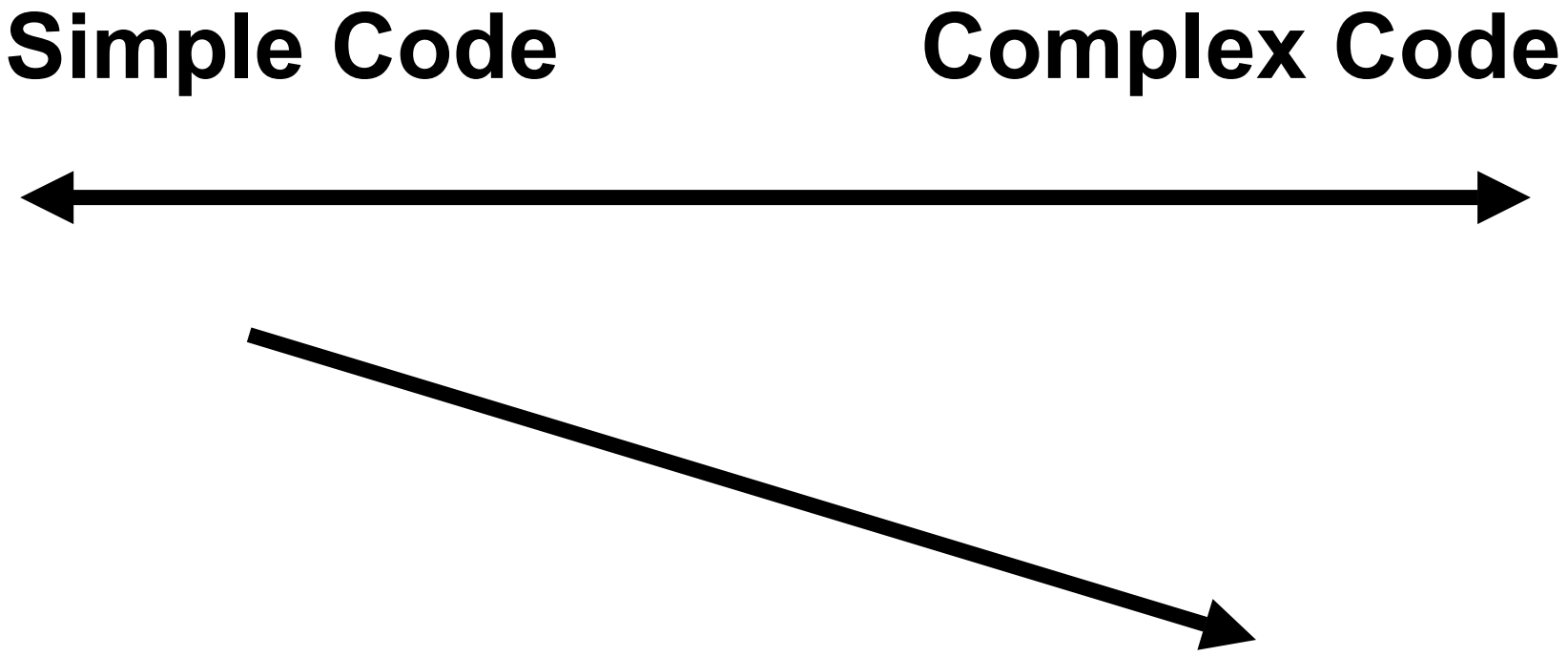
Chuck Murray

$\geq$0.62-0.0019V*

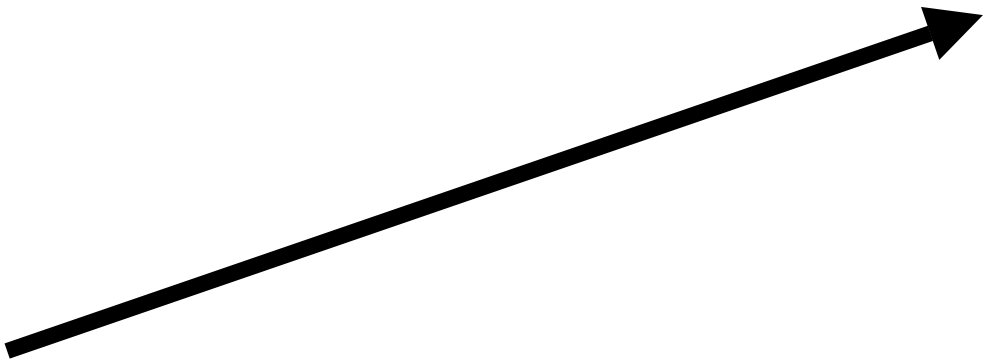
Simple Code **Complex Code**

Code Compliance Success

- **Efficiency for Each Building?**
- **Efficiency for a Population of Buildings?**


Simple Code
Complex Code
Success of Implementation?

Simple Code **Complex Code**



Cost of Implementation?

How do you increase the efficiency of the building?

- **More sophisticated code implementation.**
  - ***Add more components to the code check list?***
  - ***Add performance test measures?***
- **More stringent standards for basic components**
  - ***Upgrade wall requirement from R-13 to R-13+4?***

Multiple Compliance Methods

- Prescriptive
- Component Performance
- Systems Analysis

- Why?
  - Provide Flexibility?
  - Support Innovation?
  - Politics of passing a code?

	Survey Data	Code	% Pass
	UA/ft2	UA/ft2	
Idaho	0.267	0.261	51.9%
Montana	0.247	0.251	86.8%
Oregon	0.220	0.230	100%
Washington	0.242	0.248	93.6%

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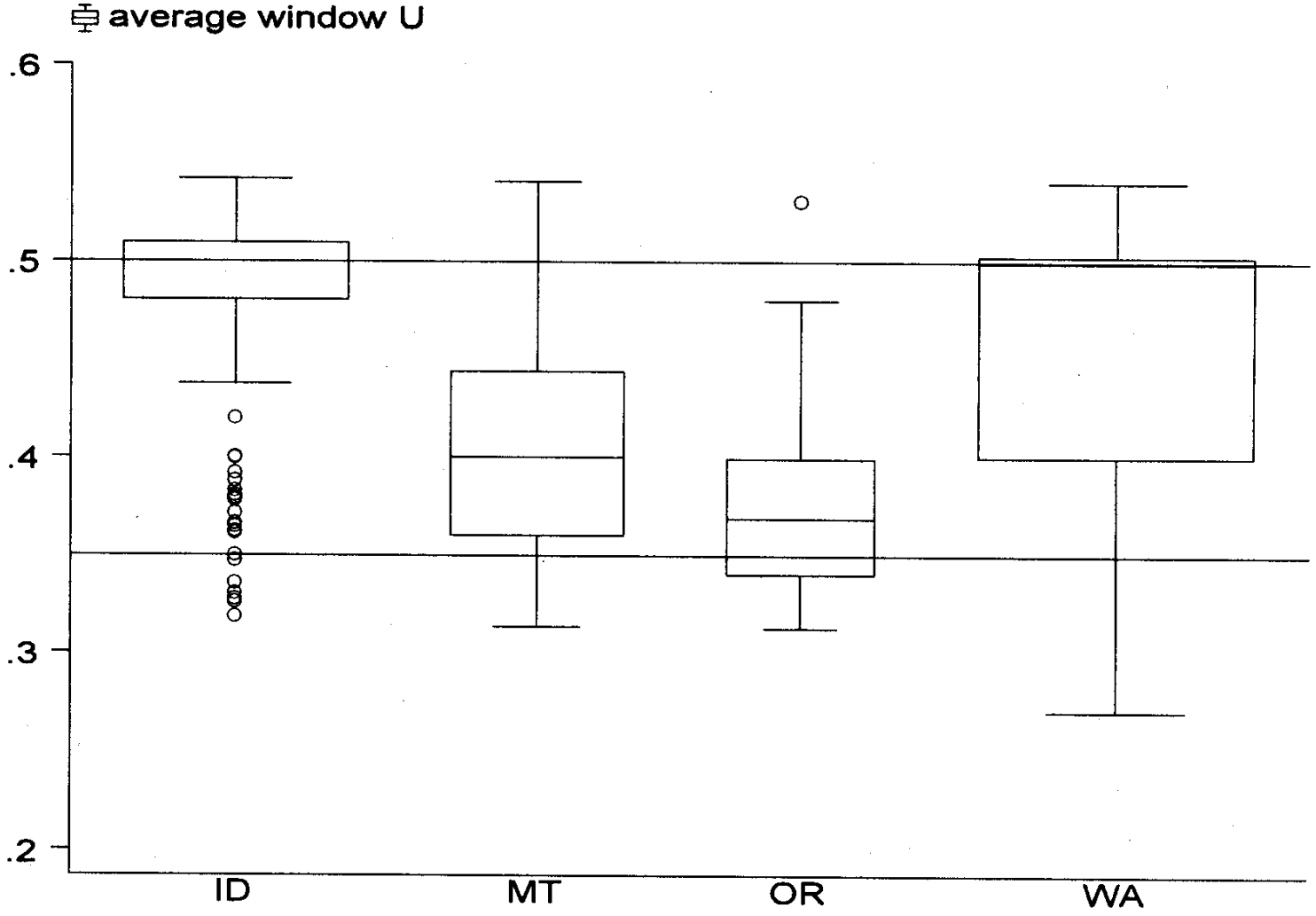
Washington	0.242	0.248	93.6%

	Survey Data		Code	
	U-factor	% Glazing	U-factor	% Glazing
Idaho	0.47	12.7%	0.50	17%
Montana	0.40	13.1%	0.50	NA
Oregon	0.37	15.2%	0.40	NA
Washington	0.46	14.8%	0.65	15%

Figure 3.1: Distribution of Window U-Values



	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Glazing or Door U-Factor	UA
Ceiling 1: All-Wood Joist/Rafter/Truss	1676	30.0	0.0		59
Skylight 1: Vinyl Frame, Double Pane with Low-E	24			0.580	14
Exterior Wall 1: Wood Frame, 16" o.c.	1780	13.0	0.0		146
Window 1: Vinyl Frame, Double Pane with Low-E	20			0.330	7
Window 2: Vinyl Frame, Double Pane with Low-E	10			0.420	4
Window 3: Vinyl Frame, Double Pane with Low-E	10			0.390	4
Window 4: Vinyl Frame, Double Pane with Low-E	10			0.420	4
Window 5: Vinyl Frame, Double Pane with Low-E	10			0.400	4
Window 6: Vinyl Frame, Double Pane with Low-E	22			0.390	9
Window 7: Vinyl Frame, Double Pane with Low-E	12			0.410	5
Window 8: Vinyl Frame, Double Pane with Low-E	12			0.370	4
Window 9: Vinyl Frame, Double Pane with Low-E	16			0.370	6
Window 10: Vinyl Frame, Double Pane with Low-E	16			0.370	6
Window 11: Vinyl Frame, Double Pane with Low-E	16			0.370	6
Window 12: Vinyl Frame, Double Pane with Low-E	21			0.370	8
Window 13: Vinyl Frame, Double Pane with Low-E	18			0.340	6
Window 14: Vinyl Frame, Double Pane with Low-E	18			0.340	6
Window 15: Vinyl Frame, Double Pane with Low-E	18			0.340	6
Window 16: Vinyl Frame, Double Pane with Low-E	21			0.420	9
Window 17: Vinyl Frame, Double Pane with Low-E	16			0.370	6
Window 18: Vinyl Frame, Double Pane with Low-E	16			0.370	6
Window 19: Vinyl Frame, Double Pane with Low-E	16			0.370	6
Door 1: Other	28			0.340	10
Door 2: Glass	44			0.370	16
Floor 1: All-Wood Joist/Truss, Over Unconditioned Space	1700	19.0	0.0		80
Furnace 1: Forced Hot Air, 82 AFUE					

Compliance: Passes | Max. UA: 437 | Your UA: 437 | 0.0 % Better Than Code

[ ] 2. Window 2: Vinyl Frame, Double Pane with Low-E, U-factor: 0.420
For windows without labeled U-factors, describe features:
Panes____ Frame Type_____ Thermal Break? [ ] Yes [ ] No
Comments/Location_____

[ ] 3. Window 3: Vinyl Frame, Double Pane with Low-E, U-factor: 0.390
For windows without labeled U-factors, describe features:
Panes____ Frame Type_____ Thermal Break? [ ] Yes [ ] No
Comments/Location_____

[ ] 4. Window 4: Vinyl Frame, Double Pane with Low-E, U-factor: 0.420
For windows without labeled U-factors, describe features:
Panes____ Frame Type_____ Thermal Break? [ ] Yes [ ] No
Comments/Location_____

[ ] 5. Window 5: Vinyl Frame, Double Pane with Low-E, U-factor: 0.400
For windows without labeled U-factors, describe features:
Panes____ Frame Type_____ Thermal Break? [ ] Yes [ ] No
Comments/Location_____

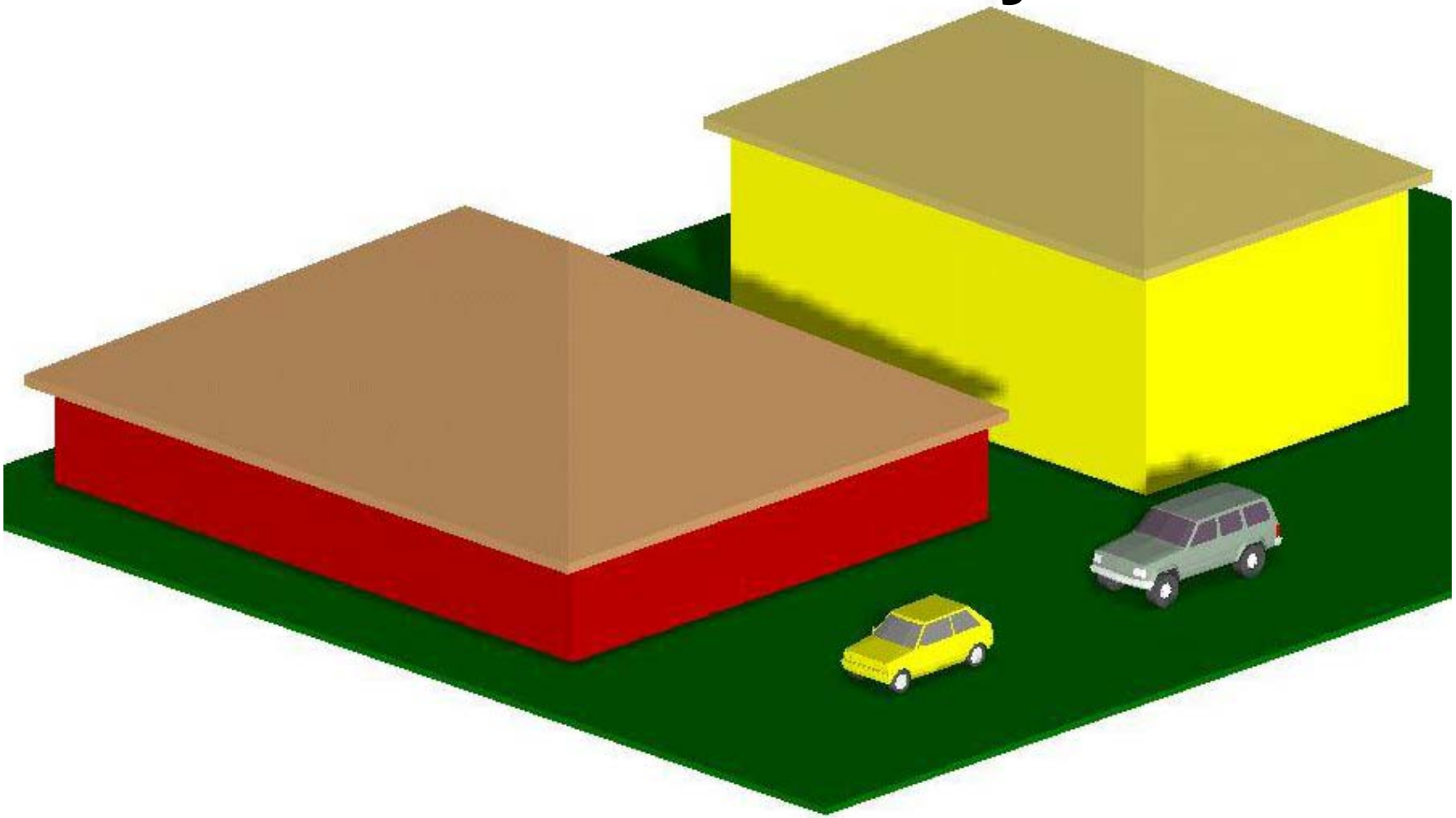
[ ] 6. Window 6: Vinyl Frame, Double Pane with Low-E, U-factor: 0.390
For windows without labeled U-factors, describe features:
Panes____ Frame Type_____ Thermal Break? [ ] Yes [ ] No
Comments/Location_____

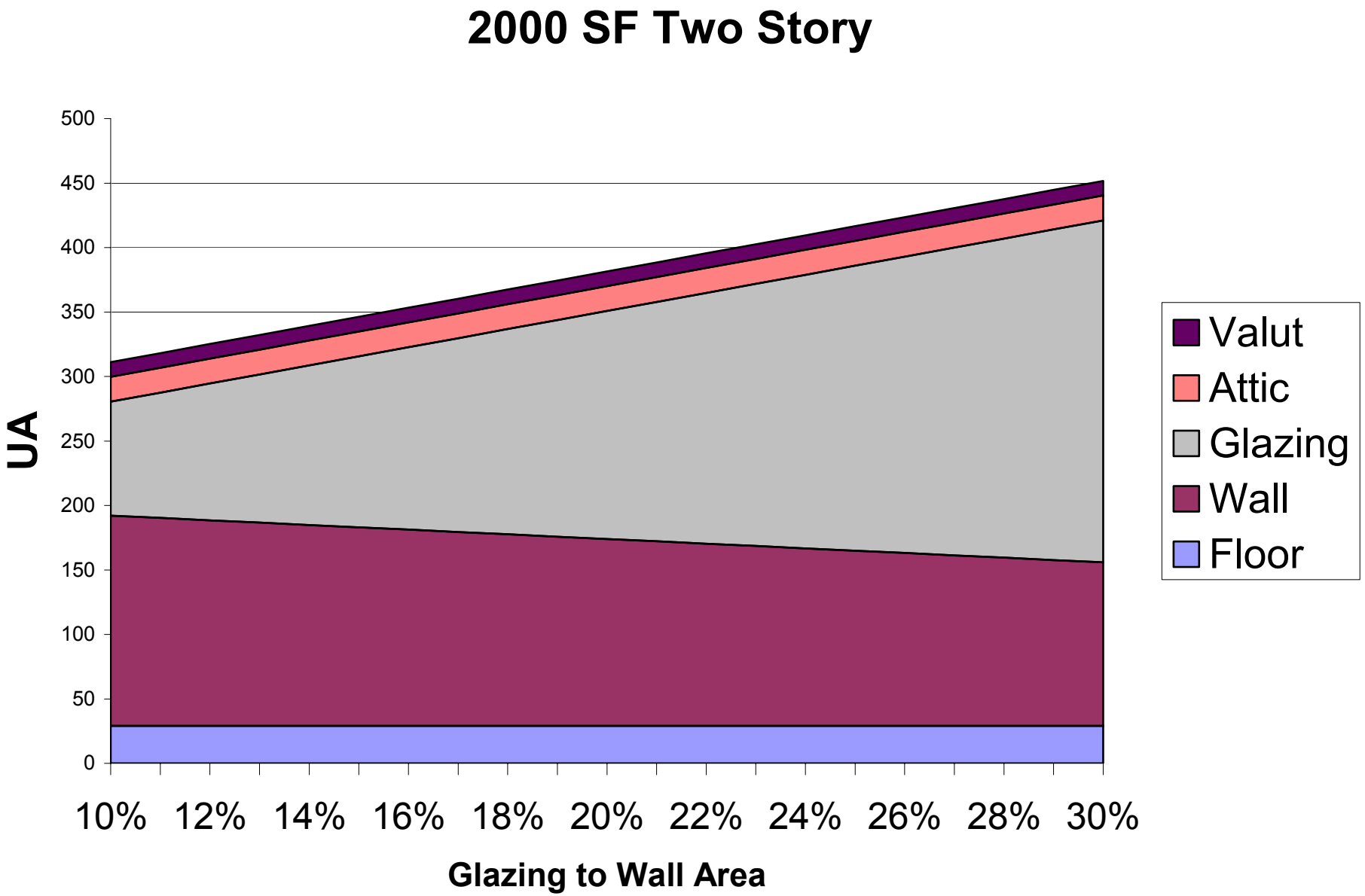
[ ] 7. Window 7: Vinyl Frame, Double Pane with Low-E, U-factor: 0.410
For windows without labeled U-factors, describe features:
Panes____ Frame Type_____ Thermal Break? [ ] Yes [ ] No
Comments/Location_____

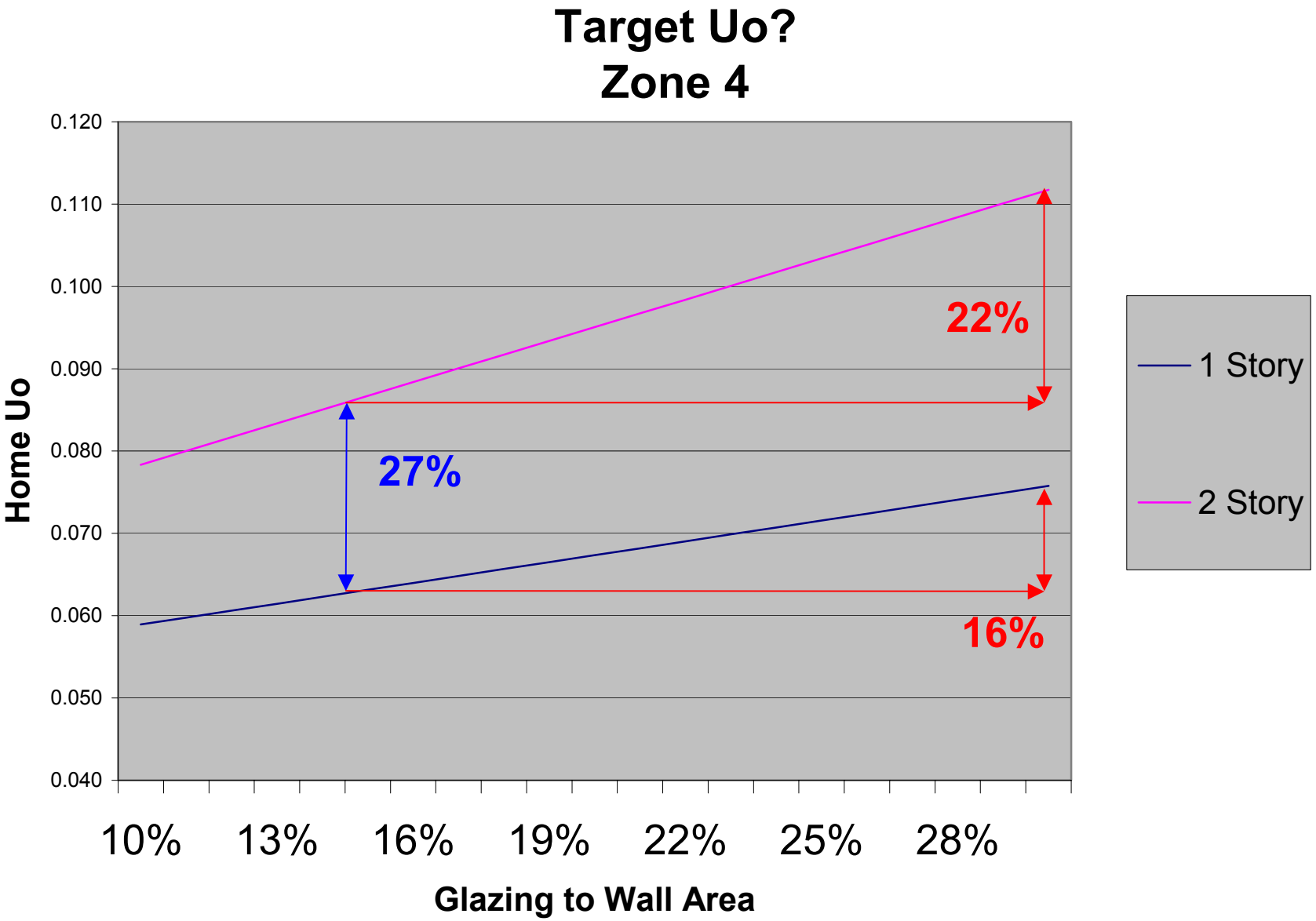
[ ] 8. Window 8: Vinyl Frame, Double Pane with Low-E, U-factor: 0.370
For windows without labeled U-factors, describe features:
Panes____ Frame Type_____ Thermal Break? [ ] Yes [ ] No
Comments/Location_____

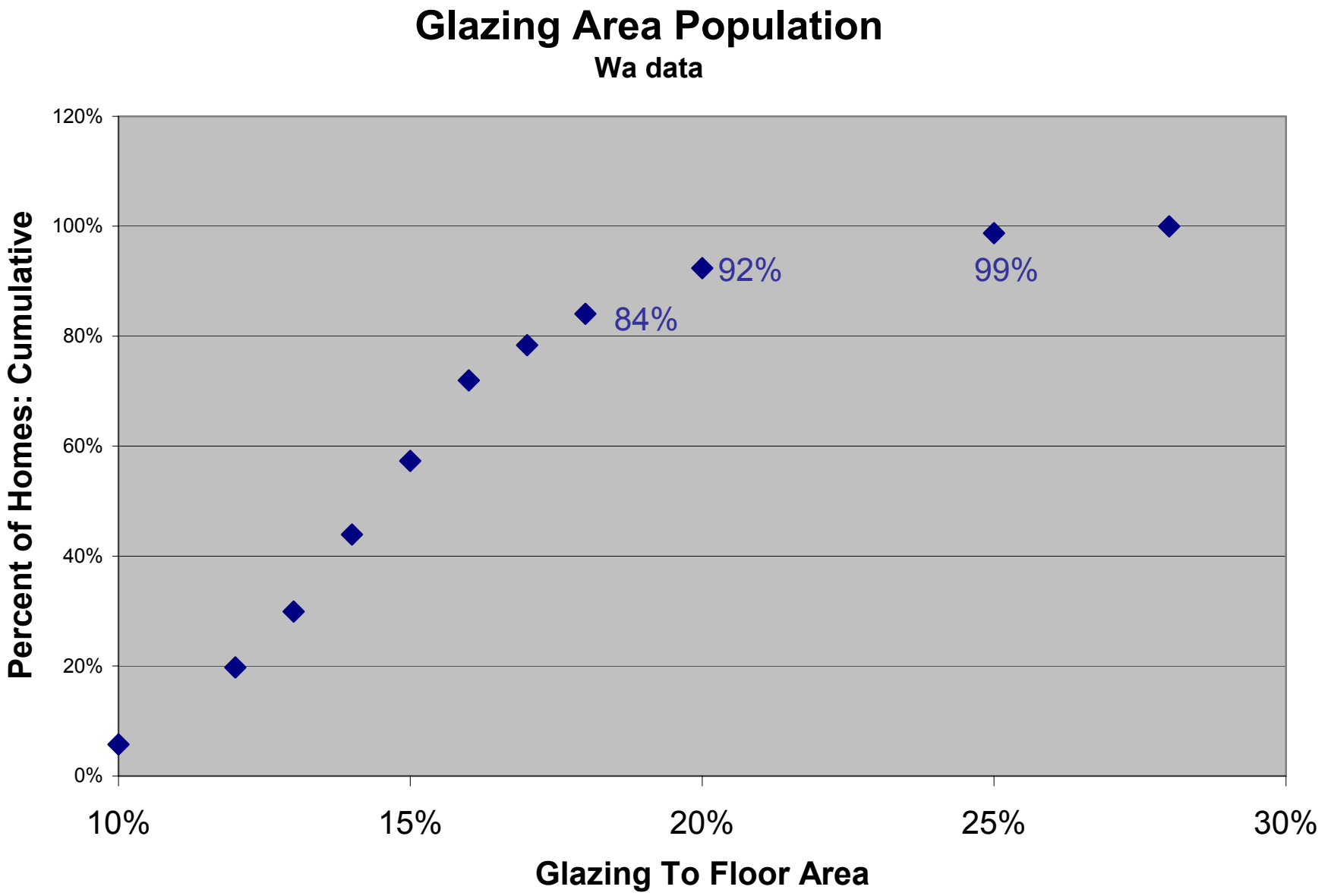
[ ] 9. Window 9: Vinyl Frame, Double Pane with Low-E, U-factor: 0.370
For windows without labeled U-factors, describe features:

Code Compliance and Home Geometry

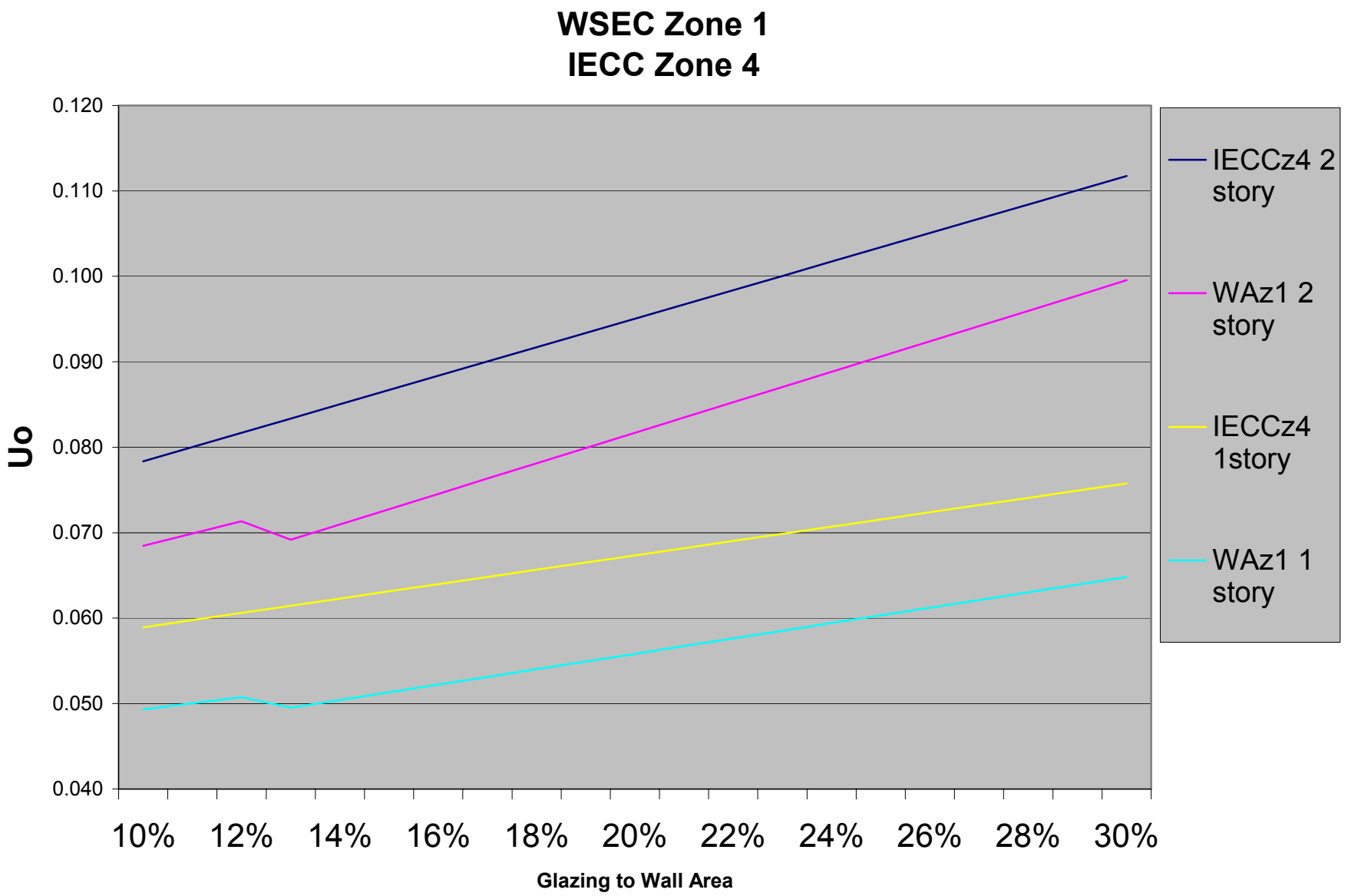



2000 SF Two Story
UA
500
450
400
350
300
250
200
150
100
50
0
10%
12%
14%
16%
18%
20%
22%
24%
26%
28%
30%
Glazing to Wall Area
Valut
Attic
Glazing
Wall
Floor


Target Uo?
Zone 4
Home Uo
0.120
0.110
0.100
0.090
0.080
0.070
0.060
0.050
0.040
22%
27%
16%
1 Story
2 Story
10%
13%
16%
19%
22%
25%
28%
Glazing to Wall Area


Glazing Area Population
Wa data
Percent of Homes: Cumulative
120%
100%
80%
60%
40%
20%
0%
92%
84%
99%
10%
15%
20%
25%
30%
Glazing To Floor Area

	Vault	Attic	Wall	Glazing	Floor
1	R-30	R-38	R-13	U- 0.4	R-19
2	R-30	R-38	R-21	U- 0.4	R-30


WSEC Zone 1
IECC Zone 4
0.120
0.110
0.100
0.090
0.080
0.070
0.060
0.050
0.040
Uo
10%
12%
14%
16%
18%
20%
22%
24%
26%
28%
30%
Glazing to Wall Area
IECCz4 2 story
WAz1 2 story
IECCz4 1story
WAz1 1 story