

2012 WSEC Code Proposals for Glazing Vertical WWR Percentage
Section C402.3.1.1



Glazing Cost vs Energy Savings Table

Description	Climate Zones	Vertical Glazing Performance Properties							Vertical Wall Cost Data				Energy Modeling & Energy Payback Data (Note 6)						Notes	
		Glazing Description	Code Maximum Vertical WWR Glazing Percentage	Proposed Building Vertical WWR Glazing Percentage	Metal Framed Glazing Max. U-Value	Metal Framed Glazing Max. SHGC	Metal Framed Glazing Min. VT	VT/SHGC Ratio	Vertical Glazing Cost (\$/SF)	Opaque Wall Cost (\$/SF)	Total Vertical Skin Cost (\$/SF)	% Cost Diff. from 2012 SEC 30% WWR Option	Electrical Utility Cost (\$/kWh)	Annual Energy Usage (1000 kWh)	% Different in Annual Energy Usage	Building Annual Energy Cost (\$)	Annual Energy Cost Diff. (\$)	Energy Savings & Cost Recap		Simple Payback (years)
2009 WSEC Code 0-40%WWR Baseline Glazing Criteria	1	Curtainwall, Double Pane, 4 Sided Captures Glass with Argon Fill	40%	40%	0.40	0.40	n/a	n/a	\$ 78.00	\$ 90.00	\$ 85.20	-6.3%	\$ 0.077	4390.2	1.76%	\$338,045	\$ 77,132	Moderate cost savings, Major energy increase	224.4	Notes 1, 5, 8
2012 WSEC Code 0-30%WWR Baseline Glazing Criteria	5 and 4M	Curtainwall, Double Pane, 4 Sided Structural Silicon Glazing with Argon Fill	30%	30%	0.38	0.40	0.40	1.00	\$ 82.50	\$ 94.50	\$ 90.90	Baseline	\$ 0.077	4314.4	Baseline	\$332,209	Baseline	Baseline	Baseline	Notes 1, 5
2012 WSEC Code 40%WWR Daylighting Option Glazing Criteria	5 and 4M	Curtainwall, Double Pane, 4 Sided Structural Silicon Glazing with Argon Fill	40%	40%	0.38	0.40	0.44	1.1	\$ 82.50	\$ 94.50	\$ 89.70	-1.3%	\$ 0.077	4367.50	1.23%	\$336,298	\$ 53,754	Minor cost savings, Moderate energy increase	N/A Costs Less than Baseline	Notes 1, 2, 5
2012 WSEC Target UA 40% Max Glazing Criteria without Daylighting Option	5 and 4M	Curtainwall, Double Pane, 4 Sided Structural Silicon Glazing, 30MM Isolated Strut and Double Low E Coating	30%	40%	0.30	0.30	0.40	1.33	\$ 94.00	\$ 106.00	\$ 102.40	12.7%	\$ 0.077	4290.50	-0.55%	\$330,369	\$ (1,840)	Major cost add, Minor energy savings	1,189.8	Notes 1, 5
2012 WSEC Target UA 50% Max Glazing Criteria	5 and 4M	Curtainwall, Triple Pane, Double Low-e Coating	30%	50%	0.23 - 0.25	0.24	0.40	1.67	\$ 97.50	\$ 109.50	\$ 105.90	16.5%	\$ 0.077	4260.40	-1.25%	\$328,051	\$ (4,158)	Major cost add, Minor energy savings	686.9	Notes 1, 5
2012 WSEC Code 40%WWR Adjusted Daylighting Option Code Proposal Glazing Criteria	5 and 4M	Curtainwall, Double Pane, 4 Sided Structural Silicon Glazing with Argon Fill	40%	40%	0.38	0.40	0.50	1.25	\$ 84.00	\$ 96.00	\$ 91.20	0.3%	\$ 0.077	4361.00	1.08%	\$335,797	\$ 3,588	Minor cost add, Moderate energy increase	N/A Never pays back	Notes 1, 2, 5, 7
2012 WSEC Code Proposal 40% Max Alternate Option Glazing Criteria (Similar Criteria Proposed for 2009 SEC)	5 and 4M	Curtainwall, Double Pane, 4 Sided Structural Silicon Glazing with Low E Coating	30%	40%	0.34	0.32	0.50	1.5	\$ 92.00	\$ 104.00	\$ 100.40	10.5%	\$ 0.077	4222.80	-2.12%	\$325,156	\$ (7,053)	Moderate cost increase, Major energy savings	256.5	Notes 1, 3, 5

Notes:

- Based on current UA calculation experience glazing thermal performance is typically above the code default to compensate for thermal bridging in opaque wall assemblies.
- Default values for 0-30% WWR or Up to 40% when 50% Daylighting Criteria is met. For Daylighting option the glazing assembly VT must be equal or greater than the SHGC * 1.1.
- Seattle Energy Code Optional Compliance Path with U-Value = 0.38 for first 30% glazing and U-Value = 0.22 for next 40% glazing.
SEC Option results in a vertical wall and vertical glazing UA that is 10.6% less efficient than the 2012 WSEC for a 40%WWR Building.
- Opaque wall assembly assumes a curtainwall assembly with insulated spandrel panel with R-10 continuous insulation and a 3.5" metal stud wall with R-13 insulation.
- Cost data was developed by Turner Construction Company working with Rushing and Vulcan, Inc. Turner averaged cost data from four glazing contractors to develop average assembly cost and type for each glazing option above.
- Energy Modeling utilized a 25 story core shell office tower. The same floorplate was assumed on each floor. Modeling was performed in eQuest/DOE 2.2.
The simplified energy model used a continuous band of glazing around the building perimeter. The model was broken into 15 foot deep exterior zones that received daylighting controls.
Model utilized glazing properties above, plug loads of 0.75 watts/sf of misc equipment, and code lighting levels.
The only modification between each run were the WWR glazing percentage and the vertical glazing properties.
- Simplified Energy Model did not assume any corrections for the daylight zone depth or daylight zone to conditioned floor vs adjusted conditioned floor ratio for this modeling run.
- Simple payback calculation assumes that 2009 WSEC is the baseline and it takes 224 years to payback the change to 30% WWR in 2012 WSEC.