



Market Penetration Scenarios

Criteria Revision Stakeholder Meeting

U.S. Department of Energy

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Objective



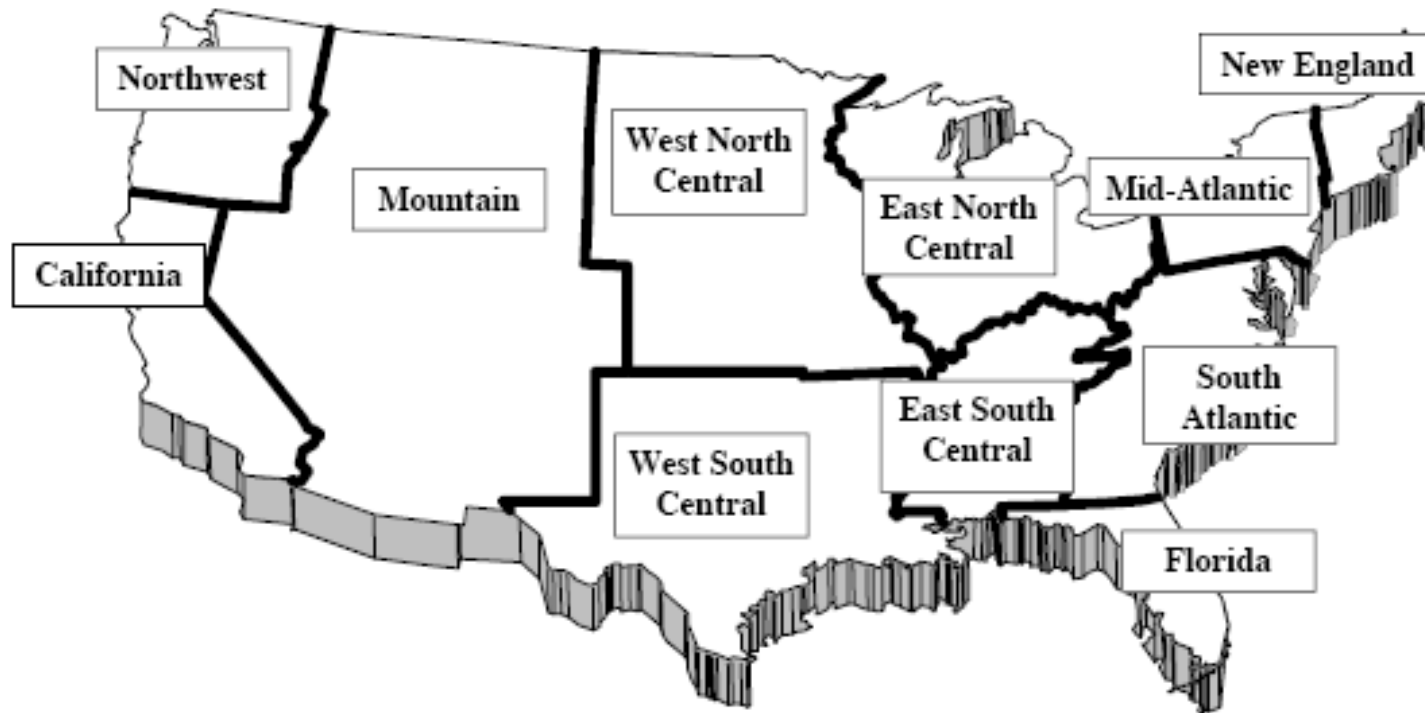
- Realistic estimate of national savings

Starting Points



- Ducker Report 2003, 2005, and 2007 shipment data
 - New construction and replace/remodel (R/R) regional splits
 - Low-e glass regional splits
 - Low-e glass growth trend
- Split of ENERGY STAR between new construction and replace/remodel markets (from manufacturers)

Ducker Regions



Simplifying Assumptions



- Low-e shipments to date = ENERGY STAR
- No single pane windows
 - Estimated shipments of double- and single-pane windows
- Historic regional and sector shipment trends persist

Market Shares for Current



Table B-1: IECC 2006, IECC 2009, and Current ENERGY STAR Market Share			
Division	Total (%)	New Construction (%)	Remodel/Replace (R/R) (%)
Northeast	81.8	41	100
Mid-Atlantic	81.7	45	100
South Atlantic	56.7	19	100
Florida	40.7	10	84
East North Central	70.0	21	100
East South Central	31.1	20	40
West North Central	55.8	10	89
West South Central	41.2	10	72
Mountain	59.3	31	100
Pacific Northwest	80.6	62	100
California	63.6	24	90
U.S.	59.1	23	90

Phase 1: Aggregate Energy Savings



Savings for Phase 1 ENERGY STAR
are relative to IECC 2006

Reference Case Scenarios



Table B-2: IECC 2006 and IECC 2009 Market Shares of New Construction and Remodel/Replace

Division	New Construction		Remodel/Replace		Total
	Double-Pane, Clear Glass	IECC Prescriptive	Double-Pane, Clear Glass	IECC Prescriptive	
Northeast	18	12	0	69	100
Mid-Atlantic	18	15	0	66	100
South Atlantic	43	10	0	47	100
Florida	53	6	6	35	100
East North Central	30	8	0	62	100
East South Central	36	9	33	22	100
West North Central	38	4	6	52	100
West South Central	45	5	14	36	100
Mountain	41	18	0	41	100
Pacific Northwest	19	31	0	50	100
California	30	10	6	54	100

Phase 1: Assumptions



- Start with current ENERGY STAR market splits
- In the New Construction market:
 - 5% of current double-pane, clear windows move to Phase 1
 - 10% of current ENERGY STAR sales move to Phase 1
- In the R/R market:
 - 20% of current double-pane, clear window shift to Phase 1
 - 80% of current ENERGY STAR sales shift to Phase 1

Phase 1 ENERGY STAR Scenario



Table B-3: Sales of Windows Occurring for Phase 1

Division	New Construction			Remodel/Replace			Total (%)
	Double-Pane, Clear Glass (%)	ENERGY STAR		Double-Pane, Clear Glass (%)	ENERGY STAR		
		Current (%)	Phase 1 (%)		Current (%)	Phase 1 (%)	
Northeast	16	12	2	0	14	56	100
Mid-Atlantic	16	15	2	0	13	53	100
South Atlantic	39	11	3	0	9	37	100
Florida	48	8	3	2	10	29	100
East North Central	27	9	2	0	12	50	100
East South Central	32	10	3	10	21	24	100
West North Central	34	6	2	2	14	43	100
West South	40	7	3	4	14	32	100
Mountain	37	18	4	0	8	33	100
Pacific Northwest	17	29	4	0	10	40	100
California	27	10	2	2	14	44	100



Phase 1: As Modeled Criteria

Table B-5: 2006 IECC Window Criteria				
IECC Climate Zone	U-Factor		SHGC	
	Requirement	As Modeled	Requirement	As Modeled
8	≤ 0.35	0.35	NR	0.30
7	≤ 0.35	0.35	NR	0.30
6	≤ 0.35	0.35	NR	0.30
5	≤ 0.35	0.35	NR	0.30
4	≤ 0.40	0.40	NR	0.30
3	≤ 0.65	0.65	≤ 0.40	0.30
2	≤ 0.75	0.75	≤ 0.40	0.30
1	≤ 1.20	1.20	≤ 0.40	0.30

Phase 1: As Modeled Criteria



Table B-7: Phase 1 ENERGY STAR Criteria and Model Criteria

Climate Zone	U-Factor		SHGC	
	Requirement	As Modeled	Requirement	As Modeled
ES5a	≤ 0.30	0.30	≤ 0.55	0.30
ES5	EP ~ 0.32/0.25	0.32	EP ~ 0.32/0.25	0.25
ES4	EP ~ 0.33/0.25	0.33	EP ~ 0.33/0.25	0.25
ES3	≤ 0.33	0.33	≤ 0.40	0.30
ES2	≤ 0.35	0.35	≤ 0.30	0.30
ES1	≤ 0.50	0.50	≤ 0.25	0.25

Phase 2: Aggregate Energy Savings



Savings for Phase 2 ENERGY STAR
are relative to proposed IECC 2009

Phase 2: Assumptions



- Start with Phase1 ENERGY STAR market splits
- In the New Construction market:
 - 5% of current double-pane, clear windows move to Phase 2
 - 10% of current ENERGY STAR sales move to Phase 2
 - 5% of Phase 1 ENERGY STAR sales move to Phase 2
- In the R/R market:
 - 70% of current double-pane, clear window shift to Phase 2
 - 40% of current ENERGY STAR sales shift to Phase 2
 - 40% of Phase 1 ENERGY STAR sales shift to Phase 2

Phase 2 ENERGY STAR Scenario



Table B-4: Sales of Windows Occurring for Phase 2

Division	New Construction				Remodel/Replace				Total (%)
	Double Pane, Clear Glass (%)	ENERGY STAR			Double Pane, Clear Glass (%)	ENERGY STAR			
		Current (%)	Phase 1 (%)	Phase 2 (%)		Current (%)	Phase 1 (%)	Phase 2 (%)	
Northeast	1	15	13	2	3	1	38	28	100
Mid-Atlantic	1	16	14	2	3	1	37	27	100
South Atlantic	1	28	21	3	2	0	26	19	100
Florida	1	32	22	3	1	1	22	17	100
East North Central	1	20	15	2	2	1	34	25	100
East South	1	23	18	3	1	2	27	25	100
West North	1	23	16	2	2	1	31	24	100
West South	1	27	19	3	2	1	26	21	100
Mountain	2	29	24	4	2	0	23	16	100
Pacific Northwest	2	22	23	4	2	0	27	20	100
California	1	21	16	3	2	1	32	24	100

Phase 2: As Modeled Criteria



Table B-6: Proposed 2009 IECC Window Criteria

IECC Climate Zone	U-Factor		SHGC	
	Requirement	As Modeled	Requirement	As Modeled
8	≤ 0.35	0.35	NR	0.30
7	≤ 0.35	0.35	NR	0.30
6	≤ 0.35	0.35	NR	0.30
5	≤ 0.35	0.35	NR	0.30
4	≤ 0.35	0.35	NR	0.30
3	≤ 0.40	0.40	≤ 0.30	0.30
2	≤ 0.50	0.50	≤ 0.30	0.30
1	≤ 0.65	0.65	≤ 0.30	0.30



Phase 2: As Modeled Criteria

Table B-8: Phase 2 ENERGY STAR Criteria and Model Criteria

Climate Zone	U-Factor		SHGC	
	Requirement	As Modeled	Requirement	As Modeled
ES5	EP ~ 0.22/0.25	0.22	EP ~ 0.22/0.25	0.25
ES4	EP ~ 0.23/0.25	0.23	EP ~ 0.23/0.25	0.25
ES3	≤ 0.30	0.30	≤ 0.40	0.30
ES2	≤ 0.30	0.30	≤ 0.30	0.30
ES1	≤ 0.45	0.45	≤ 0.20	0.20



Next Up

- Aggregate Energy Savings from LBNL