

**"User Friendly"
Building life-Cycle
Costing**

a spreadsheet
implementation of
BICC

**Enhancements to
"User-Friendly LCC" spreadsheet
1 April 2006**

Enhancements, 1 April 2006:

- ***FY 2006 rates*** - fiscal year 2006 discount rates and DOE fuel price projections were provided to replace FY 2005 rates.

Enhancements, 1 April 2005:

- ***FY 2005 rates*** - fiscal year 2005 discount rates and DOE fuel price projections were provided to replace FY 2004 rates.

Enhancements, 1 April 2004:

- Added up to five year construction period prior to occupancy (see General Data tab).
- Added occupancy/use factor multiplier by year (see General Data tab).
- ***FY 2004 rates*** - fiscal year 2004 discount rates and DOE fuel price projections were provided to replace FY 2003 rates.

Enhancements, 1 April 2003:

- ***FY 2003 rates*** - fiscal year 2003 discount rates and DOE fuel price projections were provided to replace FY 2002 rates.

Enhancements, 1 April 2002:

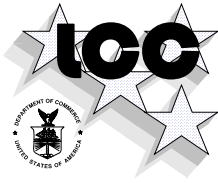
- ***FY 2002 rates*** - fiscal year 2002 discount rates and DOE fuel price projections were provided to replace FY 2001 rates.

Enhancements, 1 April 2001:

- ***FY 2001 rates*** - fiscal year 2001 discount rates and DOE fuel price projections were provided to replace FY 2000 rates.

Enhancements, 1 April 2000:

- ***LCC vs Simple Payback*** - the least LCC case and least Simple Payback case are now automatically identified. Also, the added benefit due to the LCC choice (i.e., least LCC case) over the SP case are automatically calculated.
- ***Undiscounted LCC*** - Undiscounted LCC results are reported as an estimate of net operating budget, in today's dollars, required or saved by each alternative.



Enhancements, 1 April 2004:

USER-FRIENDLY BUILDING LIFE-CYCLE COST ANALYSIS

updated: 1 April 2004

by M.S. Addison and Associates, Tempe, AZ marlin.addison@doe2.com

User input fields are indicated in blue.

IMPORTANT NOTE: This spreadsheet should be updated (replaced) every April, after DOE releases updated energy price escalation factors. Visit <http://www.doe2.com> to download the current copy.

Basic Data, this analysis

DOE/FEMP Fiscal Year 2004

Year Analysis Performed 2004

Year Project comes "On-Line" 2004

Real Discount Rate for this Analysis 3.0%

Number of Analysis Years 25

Number of Project Service Years 25

DOE Fuel Price Escalation Region 4 (West)
(1 through 4, see map below, 5=U.S. average)

Analysis Sector 2 (Commercial)
(1=Residential; 2=Commercial; 3=Industrial)

Second Fuel Type 1 (Natural Gas)
(0=None, 1=N.Gas; 2=LPG, 3=Dist Oil; 4=Resid Oil; 5=Coal)

FY 2004 Federal Discount Rates:

	real	nominal*
DOE/FEMP	3.0%	4.8%
OMB 3-year	1.6%	3.4%
5-year	2.1%	3.9%
7-year	2.4%	4.2%
10-year	2.8%	4.6%
30-year	3.5%	5.3%

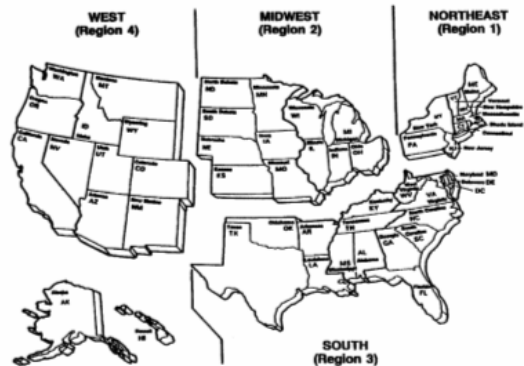
* "nominal" assumes 1.75% general inflation

Convert:

Nominal-to-Real:	4.8%	Nominal Discount Rate
	1.75%	General Inflation Rate
	3.0%	Real Discount Rate
Real-to-Nominal:	3.0%	Real Discount Rate
	1.75%	General Inflation Rate
	4.8%	Nominal Discount Rate

Uniform Electric Price Escalation Rate (to use DOE escalation rates, which vary by year, leave this entry empty)

Uniform Natural Gas Price Escalation Rate (to use DOE escalation rates, which vary by year, leave this entry empty)

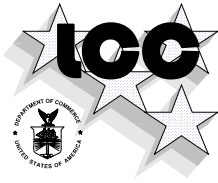


Source: U.S. Bureau of the Census

Year #	Occ/Use Multiplier
1	100%
2	100%
3	100%
4	100%
5	100%
6	100%
7	100%
8	100%
9	100%
10	100%
11	100%
12	100%
13	100%
14	100%
15	100%
16	100%
17	100%
18	100%
19	100%
20	100%
21	100%
22	100%
23	100%
24	100%
25	100%

Occupancy/Use factor multiplier

Year Analysis Performed vs Year Project comes "On-Line" permits users to define a (up to 5 year) design/construction phase before utility cash flow begins.



Enhancements, 1 April 2000:

New Version

Life-Cycle Costs Summary
Glazing Selection Example Analysis

Case	Description	One-Time Costs		Total Utility			Maintenance		Total Undisc'd LCC PV \$	Total LCC PV \$	Net Savings NS	Simple Payback yrs	Discnt'd Payback yrs	Saving-to-Invest Ratio SIR
		1st year \$	LCC PV \$	1st year \$	Undisc LCC PV \$	LCC PV \$	1st year \$	LCC PV \$						
Life-Cycle COSTS														
Base Single Clear		\$54,300	\$54,300	\$681,630	\$15,500,535	\$10,388,984	\$0	\$0	\$15,554,835	\$10,443,284	n/a	n/a	n/a	n/a
Alt 1 Single Pane Azurlite **		\$74,880	\$74,880	\$655,380	\$14,907,633	\$9,991,471	\$0	\$0	\$14,982,513	\$10,066,351	n/a	n/a	n/a	n/a
Alt 2 Calif Series - Water White Crystal		\$482,040	\$482,040	\$645,720	\$14,690,295	\$9,845,727	\$0	\$0	\$15,172,335	\$10,327,767	n/a	n/a	n/a	n/a
Alt 3 Calif Series - Sea Foam Low-E Clear		\$383,760	\$383,760	\$639,220	\$14,536,487	\$9,742,834	\$0	\$0	\$14,920,247	\$10,126,594	n/a	n/a	n/a	n/a
Alt 4 Calif Series - Tahoe Blue		\$332,280	\$332,280	\$639,140	\$14,543,797	\$9,747,438	\$0	\$0	\$14,876,077	\$10,079,718	n/a	n/a	n/a	n/a
Alt 5 Viracon - VE1-55 - Low-E Clear		\$169,650	\$169,650	\$642,060	\$14,586,513	\$9,776,836	\$0	\$0	\$14,756,163	\$9,946,486	n/a	n/a	n/a	n/a
Alt 6 Viracon - VE1-85 - Low-E Clear		\$174,330	\$174,330	\$662,150	\$15,041,278	\$10,081,702	\$0	\$0	\$15,215,608	\$10,256,032	n/a	n/a	n/a	n/a
Alt 7 Viracon - VE7-55 - Low-E Azurlite		\$256,470	\$256,470	\$626,930	\$14,247,408	\$9,549,395	\$0	\$0	\$14,503,878	\$9,805,865	n/a	n/a	n/a	n/a
Alt 8 Viracon - VE7-85 - Low-E Azurlite		\$245,540	\$245,540	\$636,780	\$14,468,027	\$9,697,371	\$0	\$0	\$14,713,567	\$9,942,911	n/a	n/a	n/a	n/a
Alt 9 Viracon - SolarBan 2000 *		\$224,660	\$224,660	\$628,370	\$14,281,816	\$9,572,403	\$0	\$0	\$14,506,476	\$9,797,063	n/a	n/a	n/a	n/a
		* alternative with least life-cycle cost												
		** alternative with most rapid simple payback												
Life-Cycle SAVINGS (negative entries indicate increased costs)														
Alt 1 Single Pane Azurlite **		(\$20,580)	(\$20,580)	\$26,250	\$592,902	\$397,514	\$0	\$0	\$572,322	\$376,934	\$376,934	0.8	0.8	19.3
Alt 2 Calif Series - Water White Crystal		(\$427,740)	(\$427,740)	\$35,910	\$810,241	\$543,257	\$0	\$0	\$382,501	\$115,517	\$115,517	11.9	17.4	1.3
Alt 3 Calif Series - Sea Foam Low-E Clear		(\$329,460)	(\$329,460)	\$42,410	\$964,048	\$646,150	\$0	\$0	\$634,588	\$316,690	\$316,690	7.8	10.0	2.0
Alt 4 Calif Series - Tahoe Blue		(\$277,980)	(\$277,980)	\$42,490	\$956,738	\$641,546	\$0	\$0	\$678,758	\$363,566	\$363,566	6.5	8.2	2.3
Alt 5 Viracon - VE1-55 - Low-E Clear		(\$115,350)	(\$115,350)	\$39,570	\$914,022	\$612,149	\$0	\$0	\$798,672	\$496,799	\$496,799	2.9	3.2	5.3
Alt 6 Viracon - VE1-85 - Low-E Clear		(\$120,030)	(\$120,030)	\$19,480	\$459,257	\$307,282	\$0	\$0	\$339,227	\$187,252	\$187,252	6.2	7.3	2.6
Alt 7 Viracon - VE7-55 - Low-E Azurlite		(\$202,170)	(\$202,170)	\$54,700	\$1,253,127	\$839,589	\$0	\$0	\$1,050,957	\$637,419	\$637,419	3.7	4.2	4.2
Alt 8 Viracon - VE7-85 - Low-E Azurlite		(\$191,240)	(\$191,240)	\$44,850	\$1,032,509	\$691,614	\$0	\$0	\$841,269	\$500,374	\$500,374	4.3	4.9	3.6
Alt 9 Viracon - SolarBan 2000 *		(\$170,360)	(\$170,360)	\$53,260	\$1,218,719	\$816,582	\$0	\$0	\$1,048,359	\$646,222	\$646,222	3.2	3.6	4.8
		* LCC Choice												
		** Simple Payback choice												
LCC choice minus Simple Payback choice		(\$149,780)	(\$149,780)	\$27,010	\$625,817	\$419,068	\$0	\$0	\$476,037	\$269,288	\$269,288			

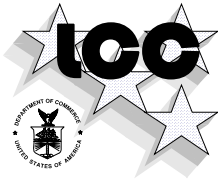
Analysis Assumptions:

DOE/FEMP Fiscal Year	2000
Real Discount Rate for this Analysis	3.4%
Number of Analysis Years	25
DOE Fuel Price Escalation Region	4 (West)
Analysis Sector	2 (Commercial)

LCC Choice (Least LCC) and Simple Payback Choice (Least SP) are automatically marked (Least LCC case labeled in Bold font)

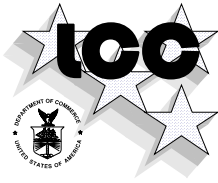
The difference in savings between the least LCC case and the shortest Simple Payback case is automatically displayed here (i.e., savings due to the least LCC case minus the savings due to the shortest Simple Payback case)

Undiscounted LCC added (useful for making future utility budget projections)



Enhancements, January 2000:

- ***2nd fuel type*** - the *User-Friendly LCC* spreadsheet permits only two energy types in any analysis. Previously, this was limited to electricity and natural gas. Now, *ANY* non-electric fuel can be selected as the second fuel type.
- ***Savings-to-Investment Ratio (SIR)*** - Savings-to-Investment Ratio (SIR), is now calculated and reported on the "Results Summary" sheet. Note that this required the non-annual recurring costs to be subdivided into two cost categories: Investment-related costs and Operations-related costs. This distinction follows the FEMP convention in the BLCC training materials and permits *User-Friendly LCC* to report Savings-to-Investment Ratio (SIR).
- ***Adjusted Internal Rate of Return (AIRR)*** - Adjusted Internal Rate of Return (AIRR), is also now reported on the "Results Summary" sheet.
- ***Discounted Payback*** - *User-Friendly LCC* has always reported Simple Payback. With this release, Discounted Payback is also reported on the "Results Summary" sheet. Simple Payback, of course, is calculated as: initial investment divided by first year energy savings. Discounted Payback is more comprehensive. Discounted Payback reports year-by-year investment-related costs divided by year-by-year operations-related savings. In effect, Discounted Payback tracks all costs and savings until the sum of the additional savings equals the sum of the additional costs. This point in time when the operations-related savings accumulate to the point where they equal the investment-related costs is the Discounted Payback. It is essentially the same as Simple Payback, except that all costs and savings used in the calculation are appropriately discounted. See the next item for an example.
- ***Net Savings Graph*** - a graph has been added that tracks the cumulative net savings of all project alternatives, over the life of the proposed project (25 years max). This graph is useful to illustrate the shortcoming of Simple Payback to select projects. The Net Savings are illustrated as a negative quantity in year zero. The project alternative having the largest Net Savings at the end of the analysis period is the LCC best choice. (Note that the point at which the Net Savings line crosses the X-axis is the Discounted Payback.)



Enhancements

Previous Version

Alt 1 Single Pane Azurite		FEMP Fiscal Year: 1999				Disc. Rate: 3.1%		DOE Region: Midwest				
						Years of Analysis: 25		Analysis Sector: Commercial				
NON-ANNUALLY RECURRING COSTS			ELECTRIC COSTS			NATURAL GAS COSTS			ANNUALLY RECURRING COSTS		TOTAL COSTS	
Year	Constan \$	Discounted PV \$	Annual Requiring Electric Constan \$	Electric Differential Escalation %	Discounted Electric w/Fuel Esc. PV \$	Annual Requiring Nat Gas Constan \$	Nat Gas Differential Escalation %	Discounted Nat Gas w/Fuel Esc. PV \$	Annual Requiring Maintenance Constan \$	Discounted Maintenance PV \$	Year	Discounted Total Costs
0	\$74,880	\$74,880	\$630,000			\$25,380			\$0	\$0	0	\$74,880
1	\$0	\$0	\$630,000	-1.00%	\$604,412	\$25,380	0.41%	\$24,718	\$0	\$0	1	\$629,130
2	\$0	\$0	\$630,000	-1.85%	\$576,571	\$25,380	-0.20%	\$25,926	\$0	\$0	2	\$604,496
3	\$0	\$0	\$630,000	-1.93%	\$564,436	\$25,380	-0.20%	\$25,159	\$0	\$0	3	\$571,595
4	\$0	\$0	\$630,000	-0.40%	\$531,394	\$25,380	0.00%	\$22,462	\$0	\$0	4	\$553,857
5	\$0	\$0	\$630,000	-0.05%	\$515,149	\$25,380	-0.41%	\$21,698	\$0	\$0	5	\$538,847
6	\$0	\$0	\$630,000	-0.62%	\$498,548	\$25,380	0.00%	\$21,045	\$0	\$0	6	\$517,594
7	\$0	\$0	\$630,000	-0.16%	\$480,864	\$25,380	0.21%	\$20,455	\$0	\$0	7	\$501,318
8	\$0	\$0	\$630,000	-0.31%	\$464,941	\$25,380	-0.41%	\$19,758	\$0	\$0	8	\$484,699
9	\$0	\$0	\$630,000	-0.63%	\$448,122	\$25,380	-0.41%	\$19,085	\$0	\$0	9	\$467,207
10	\$0	\$0	\$630,000	-0.53%	\$432,353	\$25,380	-0.41%	\$18,434	\$0	\$0	10	\$470,788
11	\$0	\$0	\$630,000	-0.89%	\$416,460	\$25,380	-0.42%	\$17,805	\$0	\$0	11	\$434,266
12	\$0	\$0	\$630,000	-1.19%	\$399,188	\$25,380	-0.21%	\$17,234	\$0	\$0	12	\$416,422
13	\$0	\$0	\$630,000	-2.54%	\$377,343	\$25,380	-0.42%	\$16,646	\$0	\$0	13	\$389,990
14	\$0	\$0	\$630,000	-1.72%	\$359,701	\$25,380	-0.21%	\$16,112	\$0	\$0	14	\$375,813
15	\$0	\$0	\$630,000	-1.56%	\$343,370	\$25,380	-0.21%	\$15,594	\$0	\$0	15	\$359,664
16	\$0	\$0	\$630,000	-1.15%	\$329,224	\$25,380	0.21%	\$15,157	\$0	\$0	16	\$344,381
17	\$0	\$0	\$630,000	-1.39%	\$314,877	\$25,380	0.21%	\$14,733	\$0	\$0	17	\$329,610
18	\$0	\$0	\$630,000	-1.00%	\$302,353	\$25,380	0.21%	\$14,320	\$0	\$0	18	\$316,673
19	\$0	\$0	\$630,000	-0.89%	\$290,821	\$25,380	0.00%	\$13,918	\$0	\$0	19	\$304,710
20	\$0	\$0	\$630,000	-0.96%	\$279,371	\$25,380	-0.21%	\$13,443	\$0	\$0	20	\$292,814
21	\$0	\$0	\$630,000	-1.09%	\$268,018	\$25,380	-0.21%	\$13,012	\$0	\$0	21	\$281,030
22	\$0	\$0	\$630,000	-0.31%	\$259,164	\$25,380	0.21%	\$12,647	\$0	\$0	22	\$271,811
23	\$0	\$0	\$630,000	0.00%	\$251,372	\$25,380	0.42%	\$12,318	\$0	\$0	23	\$269,690
24	\$0	\$0	\$630,000	0.00%	\$243,814	\$25,380	0.42%	\$11,998	\$0	\$0	24	\$268,811
25	\$0	\$0	\$630,000	0.00%	\$236,483	\$25,380	0.42%	\$11,686	\$0	\$0	25	\$268,168
	\$74,880	\$74,880	\$15,750,000		\$9,770,351	\$634,500		\$431,335	\$0	\$0		\$10,276,569

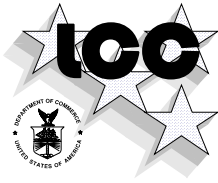
New Version

Alt 1 Single Pane Azurite		FEMP Fiscal Year: 1999				Disc. Rate: 3.1%		DOE Region: West									
						Years of Analysis: 25		Analysis Sector: Commercial									
NON-ANNUAL RECURRING COSTS			ELECTRIC COSTS			NATURAL GAS COSTS			ANNUAL RECURRING COSTS		TOTAL COSTS		COSTS CUMULATIVE SAVINGS		Payback		
Year	Investment-Related Costs <i>(e.g., first cost, replacement, residual)</i>		Operations-Related Costs <i>(e.g., nonannual maintenance)</i>		Annual Requiring Electric Constan \$	Electric Differential Escalation %	Discounted Electric w/Fuel Esc. PV \$	Annual Requiring Nat Gas Constan \$	Nat Gas Differential Escalation %	Discounted Nat Gas w/Fuel Esc. PV \$	Annual Requiring Maintenance Constan \$	Discounted Maintenance PV \$	Year	Discounted Total Costs	Discounted Cumulative Costs	Discounted Cumulative Savings	Discounted Payback yrs
	Description of Cost	Constan \$	Discounted PV \$	Description of Cost													
0	First Cost	\$74,880			\$630,000			\$25,380			\$0	\$0	0	\$74,880	\$74,880	(\$0,580)	
1	\$0	\$0			\$630,000	-1.30%	\$603,125	\$25,380	1.00%	\$24,684	\$0	\$0	1	\$628,010	\$702,890	\$4,540	0.8
2	\$0	\$0			\$630,000	-1.46%	\$576,472	\$25,380	0.36%	\$24,223	\$0	\$0	2	\$600,695	\$1,303,585	\$28,586	
3	\$0	\$0			\$630,000	-2.29%	\$546,347	\$25,380	0.19%	\$23,536	\$0	\$0	3	\$569,888	\$1,873,468	\$51,327	
4	\$0	\$0			\$630,000	-0.44%	\$527,598	\$25,380	0.71%	\$22,991	\$0	\$0	4	\$550,598	\$2,424,062	\$73,305	
5	\$0	\$0			\$630,000	-0.10%	\$511,228	\$25,380	0.18%	\$22,340	\$0	\$0	5	\$533,657	\$2,957,619	\$94,603	
6	\$0	\$0			\$630,000	-0.10%	\$495,370	\$25,380	0.35%	\$21,744	\$0	\$0	6	\$517,114	\$3,474,733	\$115,239	
7	\$0	\$0			\$630,000	0.34%	\$482,125	\$25,380	0.53%	\$21,202	\$0	\$0	7	\$503,328	\$3,978,061	\$135,323	
8	\$0	\$0	Overhaul	\$0	\$630,000	-0.59%	\$464,894	\$25,380	-0.35%	\$20,489	\$0	\$0	8	\$485,377	\$4,463,438	\$154,689	
9	\$0	\$0			\$630,000	-0.49%	\$448,697	\$25,380	-0.89%	\$19,702	\$0	\$0	9	\$468,389	\$4,931,827	\$173,391	
10	\$0	\$0			\$630,000	-0.45%	\$433,289	\$25,380	-1.06%	\$18,906	\$0	\$0	10	\$452,165	\$5,383,992	\$191,430	
11	\$0	\$0			\$630,000	-0.65%	\$417,518	\$25,380	-1.08%	\$18,140	\$0	\$0	11	\$436,658	\$5,819,658	\$208,823	
12	\$0	\$0			\$630,000	-1.30%	\$399,699	\$25,380	-1.45%	\$17,340	\$0	\$0	12	\$417,039	\$6,236,690	\$225,475	
13	\$0	\$0			\$630,000	-0.61%	\$383,325	\$25,380	-1.29%	\$16,602	\$0	\$0	13	\$401,927	\$6,638,616	\$241,527	
14	\$0	\$0			\$630,000	-0.36%	\$372,405	\$25,380	-1.30%	\$15,839	\$0	\$0	14	\$388,298	\$7,026,915	\$257,042	
15	\$0	\$0	Replace	\$0	\$630,000	0.15%	\$361,762	\$25,380	-1.13%	\$15,241	\$0	\$0	15	\$377,003	\$7,403,917	\$272,114	
16	\$0	\$0			\$630,000	-0.36%	\$348,630	\$25,380	-0.57%	\$14,698	\$0	\$0	16	\$364,328	\$7,768,246	\$286,680	
17	\$0	\$0			\$630,000	-0.51%	\$337,379	\$25,380	-0.38%	\$14,201	\$0	\$0	17	\$351,691	\$8,118,828	\$300,738	
18	\$0	\$0			\$630,000	-0.62%	\$326,212	\$25,380	0.00%	\$13,774	\$0	\$0	18	\$338,988	\$8,458,812	\$314,286	
19	\$0	\$0			\$630,000	0.21%	\$318,088	\$25,380	0.00%	\$13,360	\$0	\$0	19	\$329,448	\$8,788,260	\$327,454	
20	\$0	\$0	Overhaul	\$0	\$630,000	-0.98%	\$303,570	\$25,380	0.19%	\$12,983	\$0	\$0	20	\$316,553	\$9,104,813	\$340,101	
21	\$0	\$0			\$630,000	-0.94%	\$291,673	\$25,380	0.19%	\$12,617	\$0	\$0	21	\$304,230	\$9,408,101	\$352,232	
22	\$0	\$0			\$630,000	-0.21%	\$282,207	\$25,380	0.39%	\$12,265	\$0	\$0	22	\$294,591	\$9,703,695	\$364,013	
23	\$0	\$0			\$630,000	0.00%	\$273,818	\$25,380	0.38%	\$11,961	\$0	\$0	23	\$285,779	\$9,988,474	\$375,420	
24	\$0	\$0			\$630,000	0.00%	\$265,585	\$25,380	0.38%	\$11,645	\$0	\$0	24	\$277,230	\$10,266,704	\$386,483	
25	\$0	\$0	Residual	\$0	\$630,000	0.00%	\$257,599	\$25,380	0.38%	\$11,338	\$0	\$0	25	\$268,938	\$10,535,642	\$397,215	0.8
	\$74,880	\$74,880	\$0	\$0	\$15,750,000		\$10,028,602	\$634,500		\$432,100	\$0	\$0		\$10,535,642	\$10,535,642	\$397,215	0.8

Now permits ANY second fuel type (e.g., fuel oil, coal, none, etc.)

Investment-related vs Operations-related costs (permits SIR calculation)

Cumulative costs and savings (permits Discounted Payback)



New Results Summary Table

Life-Cycle Costs Summary Glazing Selection Example Analysis

Case	Description	One-Time Costs		Total Utility Costs		Maintenance		Total LCC	Net Savings	Simple Payback yrs	Discnt'd Payback yrs	Saving-to-Invest Ratio SIR	Adjusted Internal Rate-of-Return AIRR
		1st year \$	LCC PV \$	1st year \$	LCC PV \$	1st year \$	LCC PV \$						
Life-Cycle COSTS													
Base Single Clear		\$54,300	\$54,300	\$681,630	\$10,878,556	\$0	\$0	\$10,932,856	n/a	n/a	n/a	n/a	n/a
Alt 1 Single Pane Azurlite		\$74,880	\$74,880	\$655,380	\$10,460,762	\$0	\$0	\$10,535,642	n/a	n/a	n/a	n/a	n/a
Alt 2 Calif Series - Water White Crystal		\$482,040	\$482,040	\$645,720	\$10,307,255	\$0	\$0	\$10,789,295	n/a	n/a	n/a	n/a	n/a
Alt 3 Calif Series - Sea Foam Low-E Clear		\$383,760	\$383,760	\$639,220	\$10,201,814	\$0	\$0	\$10,585,574	n/a	n/a	n/a	n/a	n/a
Alt 4 Calif Series - Tahoe Blue		\$332,280	\$332,280	\$639,140	\$10,203,131	\$0	\$0	\$10,535,411	n/a	n/a	n/a	n/a	n/a
Alt 5 Viracon - VE1-55 - Low-E Clear		\$169,650	\$169,650	\$642,060	\$10,243,006	\$0	\$0	\$10,412,656	n/a	n/a	n/a	n/a	n/a
Alt 6 Viracon - VE1-85 - Low-E Clear		\$174,330	\$174,330	\$662,150	\$10,563,041	\$0	\$0	\$10,737,371	n/a	n/a	n/a	n/a	n/a
Alt 7 Viracon - VE7-55 - Low-E Azurlite		\$256,470	\$256,470	\$626,930	\$10,002,944	\$0	\$0	\$10,259,414	n/a	n/a	n/a	n/a	n/a
Alt 8 Viracon - VE7-85 - Low-E Azurlite		\$245,540	\$245,540	\$636,780	\$10,159,188	\$0	\$0	\$10,404,728	n/a	n/a	n/a	n/a	n/a
Alt 9 Viracon - SolarBan 2000		\$224,660	\$224,660	\$628,370	\$10,026,398	\$0	\$0	\$10,251,058	n/a	n/a	n/a	n/a	n/a
Life-Cycle SAVINGS (negative entries indicate increased costs)													
Alt 1 Single Pane Azurlite		(\$20,580)	(\$20,580)	\$26,250	\$417,795	\$0	\$0	\$397,215	\$397,215	0.8	0.8	20.3	16.3%
Alt 2 Calif Series - Water White Crystal		(\$427,740)	(\$427,740)	\$35,910	\$571,302	\$0	\$0	\$143,562	\$143,562	11.9	16.4	1.3	4.3%
Alt 3 Calif Series - Sea Foam Low-E Clear		(\$329,460)	(\$329,460)	\$42,410	\$676,742	\$0	\$0	\$347,282	\$347,282	7.8	9.5	2.1	6.1%
Alt 4 Calif Series - Tahoe Blue		(\$277,980)	(\$277,980)	\$42,490	\$675,426	\$0	\$0	\$397,446	\$397,446	6.5	7.8	2.4	6.8%
Alt 5 Viracon - VE1-55 - Low-E Clear		(\$115,350)	(\$115,350)	\$39,570	\$635,551	\$0	\$0	\$520,201	\$520,201	2.9	3.2	5.5	10.4%
Alt 6 Viracon - VE1-85 - Low-E Clear		(\$120,030)	(\$120,030)	\$19,480	\$315,515	\$0	\$0	\$195,485	\$195,485	6.2	7.2	2.6	7.2%
Alt 7 Viracon - VE7-55 - Low-E Azurlite		(\$202,170)	(\$202,170)	\$54,700	\$875,612	\$0	\$0	\$673,442	\$673,442	3.7	4.1	4.3	9.3%
Alt 8 Viracon - VE7-85 - Low-E Azurlite		(\$191,240)	(\$191,240)	\$44,850	\$719,368	\$0	\$0	\$528,128	\$528,128	4.3	4.8	3.8	8.7%
Alt 9 Viracon - SolarBan 2000		(\$170,360)	(\$170,360)	\$53,260	\$852,158	\$0	\$0	\$681,798	\$681,798	3.2	3.5	5.0	10.0%

Discounted Payback, Savings-to-Investment Ratio (SIR), Adjusted IRR are added

New Cumulative Life-Cycle (Net Savings) Graph

