

**APPENDIX T. LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS USING
ALTERNATIVE MATERIAL PRICE SCENARIOS**

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APPENDIX T. LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS USING ALTERNATIVE MATERIAL PRICE SCENARIOS

T.1 INTRODUCTION

This appendix presents life-cycle cost (LCC) and payback results using alternative material price scenarios. The Department of Energy (DOE or the Department) based the payback periods on the calculation methodology used in Chapter 8: Life-Cycle Cost and Payback Period Analysis.

This Appendix presents the key life-cycle cost and PBP results for the three alternative material price scenarios. Chapter 8 of the TSD provides more detailed life-cycle cost results for the 2002-2006 average material price scenario.

The cost of purchased components and most materials (cold rolled steel, aluminized steel, galvanized steel, painted cold rolled steel, and stainless steel) were based primarily upon the ANOPR engineering analysis prices adjusted for inflation. In the NOPR, DOE used a five-year average of material prices from years 2000 through 2004. For the final rule, DOE revised the material price averages used in the cost model to include material price data from 2005 and 2006. DOE used the BLS Producer Price Indices (PPIs) for cold rolled steel and stainless steel to calculate new five-year averages.

DOE also created two scenarios for the material-price-sensitivity analysis: a low-bound and a high-bound scenario. DOE calculated the low-bound scenario by finding the year ranging between 2002 and 2006 with the lowest cost of cold rolled steel, which was 2002. DOE then used the annual prices for all other materials in 2002 and applied a 15-percent reduction to each of the raw material costs. Likewise, DOE calculated the high-bound scenario using the annual average price for each of the raw materials from 2006.

In the final rule, the Department included an extra cost for Weatherized Gas Furnaces to reflect the cost of the stainless steel heat exchanger at 82% and 83% AFUE and for Gas Boilers to reflect the cost of the draft inducer for installations that require Category III venting. Tables T.2.2, T.2.3, T.2.6, and T.2.7 provide the results using low and high values for these additional costs. Section 8.3.1.1 in Chapter 8 provides further details regarding these changes.

T.2 LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS USING ALTERNATIVE MATERIAL PRICE SCENARIOS

For each product class, this section presents key LCC and PBP results using the alternative material price scenarios.

Table T.2.1 LCC and PBP Results for Alternative Material Price Scenarios, Non-Weatherized Gas Furnaces

Design Option: AFUE	Average LCC Savings (2006\$)			Households with LCC Savings > \$0 (%)			Average Payback Period (Years)		
	High Price Scenario	Average Price Scenario	Low Price Scenario	High Price Scenario	Average Price Scenario	Low Price Scenario	High Price Scenario	Average Price Scenario	Low Price Scenario
78%									
80%	\$2	\$2	\$2	1%	1%	1%	1.9	1.7	1.3
80% Modulation (Two-Stage)	(\$250)	(\$250)	(\$251)	1%	1%	1%	87	87	84
81%	\$13	\$15	\$18	34%	35%	35%	23	22	21
81% Modulation (Two-Stage)	(\$242)	(\$240)	(\$238)	3%	3%	3%	76	75	76
90%	\$12	\$55	\$134	24%	27%	32%	21	20	17
92%	\$1	\$37	\$95	27%	29%	30%	22	21	21
92% Modulation (Two-Stage)	(\$376)	(\$340)	(\$289)	15%	16%	18%	47	46	45
92% Modulation (Continuous)	(\$541)	(\$505)	(\$453)	11%	12%	13%	61	59	57
96% Modulation (Continuous)	(\$1,065)	(\$865)	(\$498)	7%	9%	15%	87	76	59

Table T.2.2 LCC and PBP Results for Alternative Material Price Scenarios, Weatherized Gas Furnaces (Low Cost)

Design Option: AFUE	Average LCC Savings (2006\$)			Households with LCC Savings > \$0 (%)			Average Payback Period (Years)		
	High Price Scenario	Average Price Scenario	Low Price Scenario	High Price Scenario	Average Price Scenario	Low Price Scenario	High Price Scenario	Average Price Scenario	Low Price Scenario
78%									
80%	\$19	\$19	\$19	18%	18%	18%	1.8	1.6	1.2
81%	\$59	\$62	\$66	89%	91%	92%	4.1	3.4	2.1
82%	(\$57)	(\$27)	\$16	18%	25%	40%	27	23	16
83%	(\$60)	(\$21)	\$36	22%	29%	46%	24	20	14

Table T.2.3 LCC and PBP Results for Alternative Material Price Scenarios, Weatherized Gas Furnaces (High Cost)

Design Option: AFUE	Average LCC Savings (2006\$)			Households with LCC Savings > \$0 (%)			Average Payback Period (Years)		
	High Price Scenario	Average Price Scenario	Low Price Scenario	High Price Scenario	Average Price Scenario	Low Price Scenario	High Price Scenario	Average Price Scenario	Low Price Scenario
78%									
80%	\$19	\$19	\$19	18%	18%	18%	1.8	1.6	1.2
81%	\$59	\$62	\$66	89%	91%	92%	4.1	3.4	2.1
82%	(\$811)	(\$655)	(\$431)	0%	0%	1%	140	117	83
83%	(\$814)	(\$649)	(\$412)	0%	1%	2%	100	83	60

Table T.2.4 LCC and PBP Results for Alternative Material Price Scenarios, Mobile Home Gas Furnaces

Design Option: AFUE	Average LCC Savings (2006\$)			Households with LCC Savings > \$0 (%)			Average Payback Period (Years)		
	High Price Scenario	Average Price Scenario	Low Price Scenario	High Price Scenario	Average Price Scenario	Low Price Scenario	High Price Scenario	Average Price Scenario	Low Price Scenario
75%									
80%	\$111	\$111	\$112	14%	14%	14%	3.7	3.7	3.5
80% Modulation (Two-Stage)	(\$335)	(\$337)	(\$341)	10%	10%	10%	84	84	85
81%	\$117	\$116	\$115	45%	44%	44%	23	23	23
81% Modulation (Two-Stage)	(\$336)	(\$338)	(\$342)	10%	10%	10%	98	98	99
82%	\$178	\$178	\$177	64%	64%	63%	15	15	16
82% Modulation (Two-Stage)	(\$273)	(\$275)	(\$279)	12%	12%	12%	66	66	67
90%	\$419	\$434	\$456	64%	65%	67%	19	18	17

Table T.2.5 LCC and PBP Results for Alternative Material Price Scenarios, Oil-Fired Furnaces

Design Option: AFUE	Average LCC Savings (2006\$)			Households with LCC Savings > \$0 (%)			Average Payback Period (Years)		
	High Price Scenario	Average Price Scenario	Low Price Scenario	High Price Scenario	Average Price Scenario	Low Price Scenario	High Price Scenario	Average Price Scenario	Low Price Scenario
78%									
80%	\$10	\$10	\$10	4%	4%	4%	0.3	0.3	0.3
81%	\$87	\$88	\$89	61%	61%	61%	1.1	0.9	0.6
81% Interrupted Ignition	\$131	\$131	\$130	68%	68%	68%	2.5	2.6	2.6
81% Modulation (Two-Stage)	(\$6)	(\$5)	(\$4)	25%	25%	26%	18	18	18
82%	\$176	\$177	\$180	70%	70%	70%	0.8	0.7	0.5
82% Interrupted Ignition	\$214	\$215	\$218	75%	75%	75%	2.8	2.7	2.6
82% Modulation (Two-Stage)	\$73	\$74	\$77	41%	41%	42%	14	14	14
83%	\$137	\$139	\$143	57%	58%	58%	9.5	9.4	9.2
83% Interrupted Ignition	\$179	\$181	\$184	65%	65%	66%	8.2	8.2	8.0
83% Modulation (Two-Stage)	\$24	\$26	\$30	35%	35%	36%	17	17	17
84%	\$94	\$96	\$101	47%	47%	48%	14	14	13
84% Interrupted Ignition	\$140	\$142	\$147	57%	57%	58%	11	11	11
84% Modulation (Two-Stage)	(\$28)	(\$26)	(\$21)	33%	33%	34%	18	18	18
85%	\$35	\$40	\$48	41%	42%	43%	16	16	16
85% Interrupted Ignition	\$85	\$89	\$97	51%	52%	53%	14	14	13
85% Modulation (Two-Stage)	(\$96)	(\$92)	(\$84)	31%	32%	32%	19	19	19

Table T.2.6 LCC and PBP Results for Alternative Material Price Scenarios, Gas Boilers (Low Cost)

Design Option: AFUE	Average LCC Savings (2006\$)			Households with LCC Savings > \$0 (%)			Average Payback Period (Years)		
	High Price Scenario	Average Price Scenario	Low Price Scenario	High Price Scenario	Average Price Scenario	Low Price Scenario	High Price Scenario	Average Price Scenario	Low Price Scenario
80%									
81%	\$188	\$189	\$191	35%	35%	35%	2.4	2.3	2.2
81% Modulation (Two-Stage)	\$47	\$51	\$60	30%	30%	31%	9.6	9.3	8.7
82%	\$206	\$208	\$211	46%	46%	46%	12	12	11
82% Modulation (Two-Stage)	\$31	\$37	\$49	29%	29%	30%	34	33	32
83%	\$159	\$161	\$165	41%	41%	42%	23	23	23
83% Modulation (Two-Stage)	(\$53)	(\$46)	(\$31)	25%	25%	26%	45	45	43
84%	\$293	\$300	\$313	67%	67%	68%	12	12	12
84% Modulation (Two-Stage)	\$58	\$70	\$95	35%	36%	39%	32	31	29
85%	\$48	\$60	\$83	38%	39%	40%	34	34	33
85% Modulation (Two-Stage)	(\$187)	(\$170)	(\$136)	24%	25%	27%	55	54	52
86%	(\$604)	(\$582)	(\$538)	15%	15%	16%	59	59	57
91%	(\$459)	(\$387)	(\$246)	24%	25%	30%	36	35	33
99%	(\$1,037)	(\$881)	(\$581)	19%	22%	26%	37	35	32

Table T.2.7 LCC and PBP Results for Alternative Material Price Scenarios, Gas Boilers (High Cost)

Design Option: AFUE	Average LCC Savings (2006\$)			Households with LCC Savings > \$0 (%)			Average Payback Period (Years)		
	High Price Scenario	Average Price Scenario	Low Price Scenario	High Price Scenario	Average Price Scenario	Low Price Scenario	High Price Scenario	Average Price Scenario	Low Price Scenario
80%									
81%	\$188	\$189	\$191	35%	35%	35%	2.4	2.3	2.2
81% Modulation (Two-Stage)	\$47	\$51	\$60	30%	30%	31%	9.6	9.3	8.7
82%	\$202	\$203	\$206	45%	45%	45%	12	12	12
82% Modulation (Two-Stage)	\$26	\$32	\$44	28%	29%	30%	35	34	33
83%	\$142	\$145	\$149	39%	39%	40%	24	24	24
83% Modulation (Two-Stage)	(\$70)	(\$62)	(\$48)	24%	24%	25%	47	46	45
84%	\$278	\$285	\$298	65%	66%	67%	13	13	12
84% Modulation (Two-Stage)	\$43	\$56	\$80	34%	35%	38%	33	32	30
85%	\$3	\$15	\$38	35%	35%	37%	36	36	35
85% Modulation (Two-Stage)	(\$232)	(\$215)	(\$181)	22%	23%	25%	57	56	54
86%	(\$694)	(\$671)	(\$628)	13%	13%	14%	63	62	60
91%	(\$450)	(\$378)	(\$237)	24%	26%	30%	36	35	32
99%	(\$1,029)	(\$872)	(\$573)	19%	22%	26%	37	35	32

Table T.2.8 LCC and PBP Results for Alternative Material Price Scenarios, Oil-Fired Boilers

Design Option: AFUE	Average LCC Savings (2006\$)			Households with LCC Savings > \$0 (%)			Average Payback Period (Years)		
	High Price Scenario	Average Price Scenario	Low Price Scenario	High Price Scenario	Average Price Scenario	Low Price Scenario	High Price Scenario	Average Price Scenario	Low Price Scenario
80%									
81%	\$12	\$12	\$12	5%	5%	5%	0.9	0.9	0.7
81% Interrupted Ignition	\$15	\$15	\$15	8%	8%	8%	8.9	8.9	8.9
82%	\$35	\$35	\$35	11%	11%	11%	1.0	0.9	0.8
82% Interrupted Ignition	\$38	\$39	\$39	14%	14%	14%	6.9	6.8	6.8
82% Modulation (Two-Stage)	(\$21)	(\$21)	(\$21)	4%	4%	4%	31	31	31
83%	\$68	\$69	\$69	16%	16%	16%	1.0	0.9	0.8
83% Interrupted Ignition	\$77	\$77	\$78	30%	30%	30%	9.4	9.4	9.3
83% Modulation (Two-Stage)	(\$70)	(\$70)	(\$69)	8%	8%	8%	28	28	28
84%	\$55	\$56	\$57	22%	22%	23%	19	19	19
84% Interrupted Ignition	\$70	\$70	\$71	37%	38%	38%	16	16	16
84% Modulation (Two-Stage)	(\$165)	(\$165)	(\$164)	8%	8%	8%	52	52	52
85%	\$25	\$27	\$30	28%	29%	29%	23	23	23
85% Interrupted Ignition	\$45	\$46	\$49	44%	44%	45%	19	19	19
85% Modulation (Two-Stage)	(\$278)	(\$276)	(\$274)	9%	9%	9%	53	53	53
86%	(\$10)	(\$7)	(\$2)	36%	37%	37%	25	25	24
86% Interrupted Ignition	\$11	\$14	\$19	43%	43%	44%	22	22	22
86% Modulation (Two-Stage)	(\$338)	(\$336)	(\$330)	12%	12%	12%	52	52	51
90%	(\$377)	(\$366)	(\$345)	23%	23%	24%	29	29	29
95%	(\$481)	(\$456)	(\$407)	28%	28%	30%	27	27	26