

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

TABLE OF CONTENTS

T.1	INTRODUCTION	T.4-1
T.2	LIFE-CYCLE COST AND PAYBACK PERIOD RESULTS USING ALTERNATIVE MATERIAL PRICE SCENARIOS	T.4-1

LIST OF TABLES

Table T.2.1	LCC and PBP Results for Alternative Material Price Scenarios, Non-Weatherized Gas Furnaces	T.4-2
Table T.2.2	LCC and PBP Results for Alternative Material Price Scenarios, Weatherized Gas Furnaces	T.4-2
Table T.2.3	LCC and PBP Results for Alternative Material Price Scenarios, Mobile Home Gas Furnaces	T.4-3
Table T.2.4	LCC and PBP Results for Alternative Material Price Scenarios, Oil-Fired Furnaces	T.4-4
Table T.2.5	LCC and PBP Results for Alternative Material Price Scenarios, Gas Boilers	T.4-5
Table T.2.6	LCC and PBP Results for Alternative Material Price Scenarios, Oil-Fired Boilers	T.4-6

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.

Core steel is one of the major cost drivers of a distribution transformer and is fundamentally linked to the efficiency of the finished transformer. When looking at energy conservation standards for distribution transformers, it is important to understand core steel pricing and influences on that pricing. In the ANOPR analysis, the Department used a five-year average material price (2000 through 2004). The Department received several comments on the ANOPR analysis that material prices, and particularly core steel, were experiencing a rapid increase. Therefore, in addition to its analysis on a five-year average material price (2000 through 2004), the Department developed a “high price” scenario using prices as of the first quarter 2005, and also a “low price” scenario for the LCC sensitivity analysis. The low price scenario is based on material prices in 2002 (the calendar year with the lowest \$/pound for M6 core steel) and reduces all the material prices in that year by 15%.

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 2000-2004 average material price scenario.

This Appendix refers to the Q1 2005 material price as the “high” price scenario, the five-year average material price as the “medium” scenario, and the 2002 material prices as the “low” price scenario.

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			Households with LCC Savings > \$0 (%)			Median Payback Period (Years)		
	High Price Scenario	Medium Price Scenario	Low Price Scenario	High Price Scenario	Medium Price Scenario	Low Price Scenario	High Price Scenario	Medium Price Scenario	Low Price Scenario
78%									
80%	\$2	\$2	\$2	2%	2%	2%	1.0	0.8	0.7
80% 2-stage Modulation	(\$196)	(\$194)	(\$193)	2%	2%	2%	48.9	48.4	48.0
81%	\$0	\$2	\$3	31%	32%	32%	13.9	13.2	12.7
81% 2-stage Modulation	(\$199)	(\$196)	(\$194)	4%	4%	4%	41.5	41.0	40.6
90%	(\$49)	\$5	\$24	21%	25%	27%	17.5	15.4	14.6
92%	(\$114)	(\$45)	(\$40)	20%	24%	24%	19.4	17.2	17.3
92% 2-stage Modulation	(\$373)	(\$304)	(\$299)	14%	16%	16%	28.2	25.8	25.7
96% Modulation (Continuous)	(\$516)	(\$447)	(\$442)	9%	11%	11%	32.8	30.0	29.8
96% Modulation (Continuous)	(\$986)	(\$731)	(\$612)	5%	8%	10%	46.5	38.8	35.0

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

Design Option: AFUE	Average LCC Savings			Households with LCC Savings > \$0 (%)			Median Payback Period (Years)		
	High Price Scenario	Medium Price Scenario	Low Price Scenario	High Price Scenario	Medium Price Scenario	Low Price Scenario	High Price Scenario	Medium Price Scenario	Low Price Scenario
78%									
80%	\$2	\$2	\$2	2%	2%	2%	1.6	1.3	1.1
80% 2-stage Modulation	\$18	\$19	\$20	50%	52%	53%	4.0	2.9	2.1
81%	\$44	\$46	\$47	77%	78%	78%	2.9	2.7	2.4
81% 2-stage Modulation	\$69	\$73	\$75	91%	94%	95%	4.2	3.6	3.1

Table T.2.3 LCC and PBP Results for Alternative Material Price Scenarios, Mobile Home Gas Furnaces

Design Option: AFUE	Average LCC Savings			Households with LCC Savings > \$0 (%)			Median Payback Period (Years)		
	High Price Scenario	Medium Price Scenario	Low Price Scenario	High Price Scenario	Medium Price Scenario	Low Price Scenario	High Price Scenario	Medium Price Scenario	Low Price Scenario
75%									
80%	\$51	\$51	\$51	14%	14%	14%	2.9	2.9	2.9
80% 2-stage Modulation	(\$262)	(\$262)	(\$262)	9%	9%	9%	52.2	52.2	52.2
81%	\$18	\$18	\$18	24%	24%	24%	23.7	23.7	23.7
81% 2-stage Modulation	(\$296)	(\$296)	(\$296)	8%	8%	8%	56.0	56.0	56.0
82%	\$45	\$45	\$45	42%	42%	42%	16.1	16.1	16.1
82% 2-stage modulation	(\$269)	(\$296)	(\$269)	10%	10%	10%	44.3	44.3	44.3
90%	\$107	\$124	\$139	51%	53%	55%	13.6	13.0	12.4

Table T.2.4 LCC and PBP Results for Alternative Material Price Scenarios, Oil-Fired Furnaces

Design Option: AFUE	Average LCC Savings			Households with LCC Savings > \$0 (%)			Median Payback Period (Years)		
	High Price Scenario	Medium Price Scenario	Low Price Scenario	High Price Scenario	Medium Price Scenario	Low Price Scenario	High Price Scenario	Medium Price Scenario	Low Price Scenario
78%									
80%	\$7	\$7	\$7	4%	4%	4%	0.3	0.3	0.3
81%	\$55	\$56	\$57	61%	61%	61%	1.1	0.9	0.7
81% int. ignition	\$105	\$105	\$105	68%	68%	68%	1.9	1.9	1.9
81% 2-stage modulation	(\$12)	(\$11)	(\$10)	24%	25%	25%	12.7	12.7	12.6
82%	\$111	\$113	\$114	70%	70%	70%	0.8	0.7	0.5
82% int. ignition	\$157	\$159	\$160	75%	75%	75%	2.1	2.0	1.9
82% 2-stage modulation	\$37	\$39	\$40	36%	36%	36%	10.2	10.1	10.0
83%	\$46	\$49	\$50	43%	44%	44%	8.9	8.7	8.6
83% int. ignition	\$96	\$98	\$100	56%	57%	57%	7.2	7.0	7.0
83% 2-stage modulation	(\$36)	(\$34)	(\$32)	28%	29%	29%	13.0	13.0	12.9
84%	(\$27)	(\$23)	(\$20)	30%	31%	32%	13.4	13.2	13.1
84% int. ignition	\$28	\$32	\$34	45%	45%	46%	10.2	10.1	10.0
84% 2-stage modulation	(\$116)	(\$112)	(\$110)	25%	25%	25%	14.9	14.8	14.7
85%	(\$115)	(\$109)	(\$104)	25%	25%	26%	16.4	16.2	16.0
85% int. ignition	(\$56)	(\$50)	(\$46)	38%	39%	40%	12.5	12.4	12.3
85% 2-stage modulation	(\$212)	(\$206)	(\$201)	23%	23%	23%	16.6	16.4	16.3

Table T.2.5 LCC and PBP Results for Alternative Material Price Scenarios, Gas Boilers

Design Option: AFUE	Average LCC Savings			Households with LCC Savings > \$0 (%)			Median Payback Period (Years)		
	High Price Scenario	Medium Price Scenario	Low Price Scenario	High Price Scenario	Medium Price Scenario	Low Price Scenario	High Price Scenario	Medium Price Scenario	Low Price Scenario
80%									
81%	\$141	\$141	\$141	35%	35%	35%	2.4	2.4	2.4
81% 2-stage Modulation	\$35	\$35	\$35	29%	29%	29%	8.2	8.2	8.2
82%	\$158	\$158	\$158	46%	46%	46%	6.0	6.0	6.0
82% 2-stage Modulation	\$26	\$26	\$26	28%	28%	28%	12.4	12.4	12.4
83%	\$128	\$128	\$128	42%	42%	42%	11.2	11.2	11.2
83% 2-stage Modulation	(\$32)	(\$32)	(\$32)	26%	26%	26%	19.4	19.4	19.4
84%	\$225	\$232	\$235	67%	67%	66%	6.7	6.6	7.1
84% 2-stage Modulation	\$48	\$56	\$59	37%	37%	36%	15.9	16.3	17.0
85%	\$52	\$69	\$76	42%	43%	41%	15.9	15.6	16.7
85% 2-stage Modulation	(\$124)	(\$107)	(\$101)	27%	27%	26%	23.7	23.4	24.5
86%	(\$388)	(\$373)	(\$361)	19%	20%	19%	29.0	28.6	29.5
91%	(\$469)	(\$442)	(\$420)	22%	22%	21%	23.8	23.5	24.3
99%	(\$840)	(\$795)	(\$742)	20%	21%	19%	24.1	23.6	24.5

Table T.2.6 LCC and PBP Results for Alternative Material Price Scenarios, Oil-Fired Boilers

Design Option: AFUE	Average LCC Savings			Households with LCC Savings > \$0 (%)			Median Payback Period (Years)		
	High Price Scenario	Medium Price Scenario	Low Price Scenario	High Price Scenario	Medium Price Scenario	Low Price Scenario	High Price Scenario	Medium Price Scenario	Low Price Scenario
80%									
81%	\$7	\$7	\$7	5%	5%	5%	1.1	0.9	0.9
81% int. ignition	\$10	\$10	\$10	9%	9%	9%	5.2	5.1	5.0
82%	\$20	\$20	\$20	11%	11%	11%	1.1	1.0	0.9
82% int. ignition	\$24	\$24	\$24	14%	14%	14%	3.9	3.7	3.7
82% 2-stage modulation	(\$33)	(\$33)	(\$33)	1%	1%	1%	32.3	32.2	32.1
83%	\$40	\$40	\$40	16%	16%	16%	1.2	1.0	0.9
83% int. ignition	\$50	\$50	\$51	31%	31%	31%	5.4	5.3	5.3
83% 2-stage modulation	(\$91)	(\$90)	(\$90)	4%	4%	4%	24.5	24.2	24.2
84%	\$0	\$1	\$1	15%	15%	15%	19.1	19.0	18.9
84% int. ignition	\$16	\$17	\$17	33%	33%	33%	13.3	13.2	13.2
84% 2-stage modulation	(\$209)	(\$208)	(\$207)	3%	3%	3%	56.7	56.5	56.5
85%	(\$72)	(\$69)	(\$68)	15%	16%	16%	24.4	24.1	24.0
85% int. ignition	(\$50)	(\$47)	(\$47)	34%	34%	34%	17.4	17.3	17.2
85% 2-stage modulation	(\$358)	(\$355)	(\$355)	3%	3%	3%	57.1	56.8	56.7
86%	(\$161)	(\$156)	(\$154)	18%	19%	19%	25.5	25.1	25.0
86% int. ignition	(\$139)	(\$133)	(\$132)	27%	27%	28%	21.1	20.9	20.8
86% 2-stage modulation	(\$472)	(\$466)	(\$465)	4%	4%	4%	52.1	51.7	51.6
90%	(\$716)	(\$713)	(\$701)	9%	9%	9%	31.2	31.1	30.8
95%	(\$1,105)	(\$1,070)	(\$1,042)	10%	10%	11%	29.9	29.4	29.1