

APPENDIX 10-B. NATIONAL ENERGY SAVINGS AND NET PRESENT VALUE USING ALTERNATIVE ECONOMIC GROWTH SCENARIOS

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APPENDIX 10-B. NATIONAL ENERGY SAVINGS AND NET PRESENTVALUE USING ALTERNATIVE ECONOMIC GROWTH SCENARIOS

10-B.1 INTRODUCTION

This appendix presents national energy savings (NES) and net present value (NPV) results using inputs from alternative economic growth scenarios. The scenarios are based on the High Economic Growth case and the Low Economic Growth case from the March 2009 release of *AEO2009*¹ and the Early Release (December 2009) of the *AEO2010*.² The *AEO 2010* Early Release only provides forecasts for the Reference Case. Therefore, DOE based the low-growth and high-growth forecasts on the ratio between the *AEO 2009* March Release low- or high-growth forecasts and the *AEO 2009* March Release reference case. DOE then applied these ratios to the *AEO 2010* Early Release Reference case to construct its high- growth and low- growth forecasts.

Figures 10-B.1.1 to 10-B.1.3 show the forecasts for housing starts and residential electricity and natural gas prices under the different economic growth scenarios. *AEO2010* provides a forecast to 2035 for the Reference case. After 2035, in the high and low growth scenarios, DOE assumed a constant growth rate in housing starts of 0.5% per year. For energy prices after 2030 in the high and low scenarios, DOE assumed the same growth rate as was provided in *AEO2010* for the Reference Case.

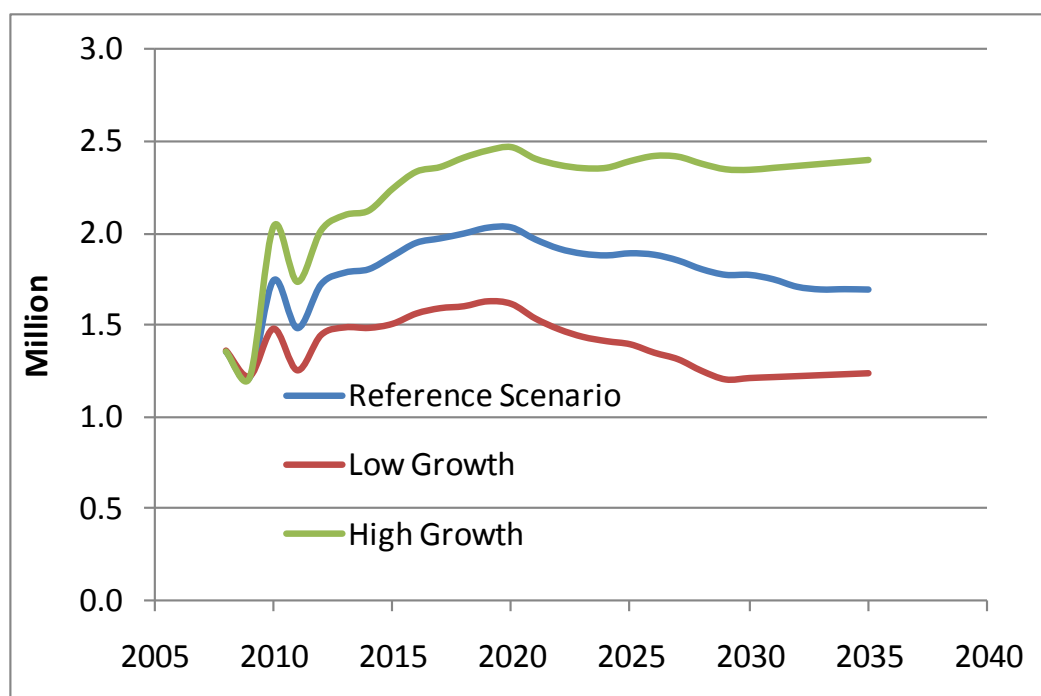


Figure 10-B.1.1 Housing Starts Forecast Under Alternative Economic Growth Scenarios

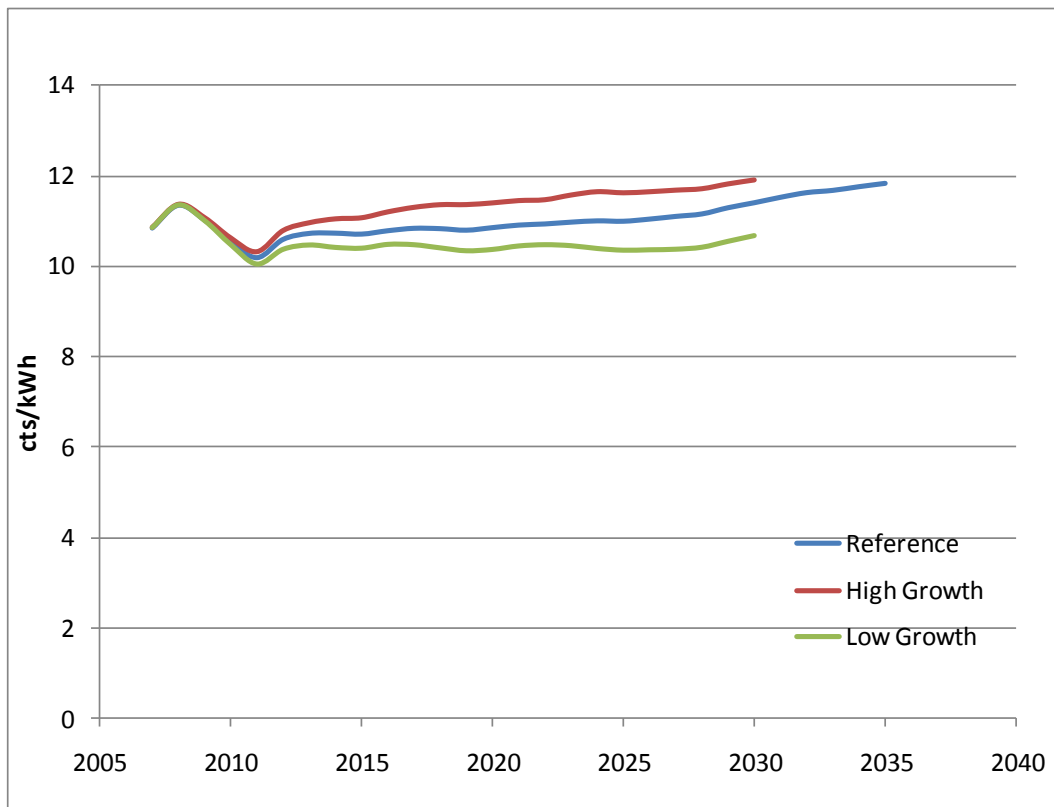


Figure 10-B.1.2 Average Residential Electricity Price Forecasts under Alternative Economic Growth Scenarios

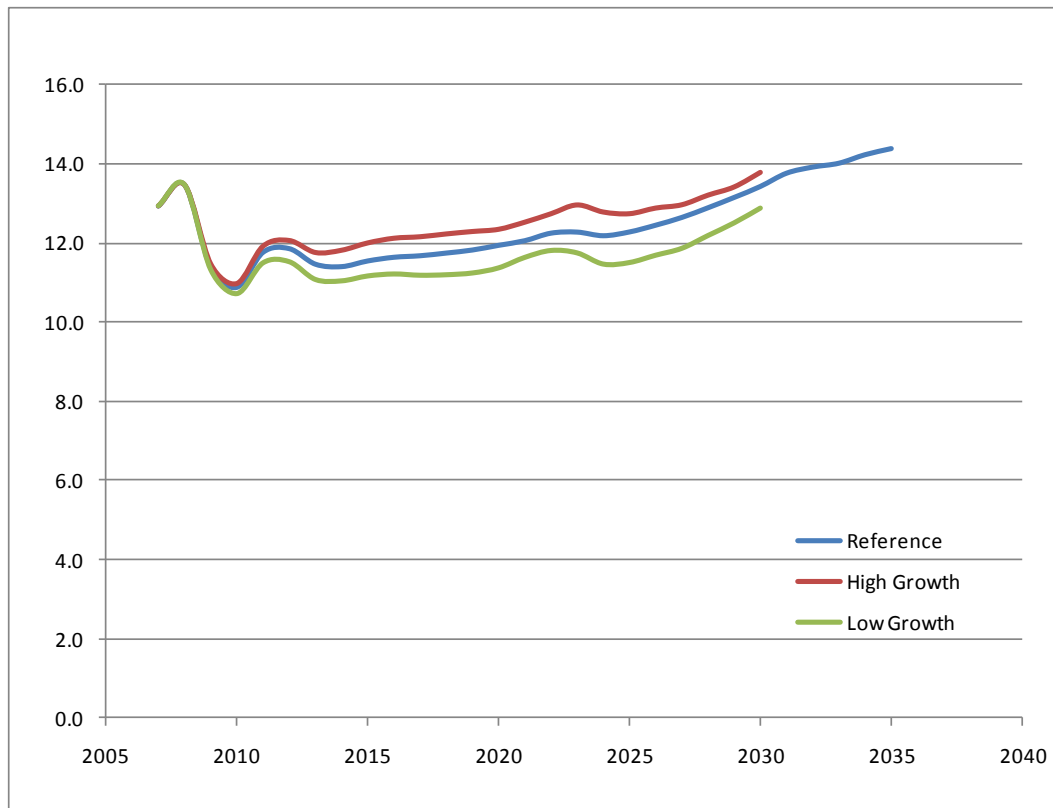


Figure 10-B.1.3 Average Residential Natural Gas Price Forecasts under Alternative Economic Growth Scenarios

10-B.2 RESULTS USING ALTERNATIVE ECONOMIC GROWTH SCENARIOS

For each product class, DOE calculated NES and NPV using forecasts of housing starts and energy prices from the High and Low Economic Growth cases. As one would expect, the NPV results are most favorable using energy prices in the High Growth scenario, and least favorable using prices in the Low Growth scenario.

10-B.2.1 NES/NPV Results Using High Economic Growth Scenario

Table 10-B.2.1 Cumulative National Energy Savings and Consumer Net Present Value for Gas-Fired Storage Water Heaters (High Growth)

Trial Standard Level (TSL)	Efficiency Level (EF)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	0.62	0.73	0.63	2.92
2	0.63	1.24	0.23	3.34
3	0.63	1.24	0.23	3.34
4	0.63	1.24	0.23	3.34
5	0.62	0.86	0.30	2.55
6	0.62	1.37	-0.10	2.97
7	0.63	1.24	0.23	3.34
8	0.77	5.21	-10.56	-8.03

Table 10-B.2.2 Cumulative National Energy Savings and Consumer Net Present Value for Electric Storage Water Heaters (High Growth)

Trial Standard Level (TSL)	Efficiency Level (EF)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	0.92	0.31	0.45	1.61
2	0.93	0.43	0.75	2.49
3	0.94	0.84	1.10	4.16
4	0.95	1.16	1.05	4.88
5	1.07	1.78	1.52	7.23
6	1.07	1.78	1.52	7.23
7	2.00	9.48	2.10	27.26
8	2.35	11.93	6.40	41.22

Table 10-B.2.3 Cumulative National Energy Savings and Consumer Net Present Value for Oil-Fired Storage Water Heater (High Growth)

Trial Standard Level (TSL)	Efficiency Level (EF)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	0.58	0.00	0.03	0.08
2	0.60	0.01	0.07	0.16
3	0.62	0.01	0.10	0.23
4	0.62	0.01	0.10	0.23
5	0.62	0.01	0.10	0.23
6	0.62	0.01	0.10	0.23
7	0.62	0.01	0.10	0.23
8	0.68	0.02	0.16	0.40

Table 10-B.2.4 Cumulative National Energy Savings and Consumer Net Present Value for Gas-Fired Instantaneous Storage Water Heaters (High Growth)

Trial Standard Level (TSL)	Efficiency Level (EF)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	0.82	0.09	0.00	0.26
2	0.82	0.09	0.00	0.26
3	0.82	0.09	0.00	0.26
4	0.82	0.09	0.00	0.26
5	0.82	0.09	0.00	0.26
6	0.82	0.09	0.00	0.26
7	0.82	0.09	0.00	0.26
8	0.95	0.61	-5.31	-8.81

Table 10-B.2.5 Cumulative National Energy Savings and Consumer Net Present Value for Gas Wall Fan DHE (High Growth)

Trial Standard Level (TSL)	Efficiency Level (AFUE)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	75%	0.01	0.02	0.06
2	76%	0.01	0.03	0.07
3	77%	0.01	0.03	0.08
4	80%	0.03	-0.03	0.00
5	75%	0.01	0.02	0.06
6	80%	0.03	-0.03	0.00

Table 10-B.2.6 Cumulative National Energy Savings and Consumer Net Present Value for Gas Wall Gravity DHE (High Growth)

Trial Standard Level (TSL)	Efficiency Level (AFUE)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	66%	0.01	0.02	0.04
2	66%	0.01	0.02	0.04
3	69%	0.03	0.02	0.08
4	69%	0.03	0.02	0.08
5	70%	0.06	-0.14	-0.11
6	70%	0.06	-0.14	-0.11

Table 10-B.2.7 Cumulative National Energy Savings and Consumer Net Present Value for Gas Floor DHE (High Growth)

Trial Standard Level (TSL)	Efficiency Level (AFUE)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	58%	0.0001	0.0001	0.0002
2	58%	0.0001	0.0001	0.0002
3	58%	0.0001	0.0001	0.0002
4	58%	0.0001	0.0001	0.0002
5	58%	0.0001	0.0001	0.0002
6	58%	0.0001	0.0001	0.0002

Table 10-B.2.8 Cumulative National Energy Savings and Consumer Net Present Value for Gas Room DHE (High Growth)

Trial Standard Level (TSL)	Efficiency Level (AFUE)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	66%	0.001	0.00	0.01
2	67%	0.002	0.01	0.02
3	68%	0.004	0.01	0.03
4	68%	0.004	0.01	0.03
5	83%	0.036	0.08	0.21
6	83%	0.036	0.08	0.21

Table 10-B.2.9 Cumulative National Energy Savings and Consumer Net Present Value for Gas Hearth DHE (High Growth)

Trial Standard Level (TSL)	Efficiency Level (AFUE)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	67%	0.19	0.53	1.26
2	67%	0.19	0.53	1.26
3	67%	0.19	0.53	1.26
4	72%	0.37	-1.15	-1.26
5	72%	0.37	-1.15	-1.26
6	93%	1.13	-4.14	-4.74

Table 10-B.2.10 Cumulative National Energy Savings and Consumer Net Present Value for Gas-Fired Pool Heaters (High Growth)

Trial Standard Level (TSL)	Efficiency Level (TE)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	81%	0.01	0.05	0.10
2	82%	0.02	0.04	0.11
3	83%	0.04	-0.05	0.00
4	84%	0.06	-0.15	-0.13
5	86%	0.09	-1.38	-2.30
6	95%	0.22	-2.84	-4.50

10-B.2.2 NES/NPV Results Using Low Economic Growth Scenario

Table 10-B.2.11 Cumulative National Energy Savings and Consumer Net Present Value for Gas-Fired Storage Water Heaters (Low Growth)

Trial Standard Level (TSL)	Efficiency Level (EF)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	0.62	0.65	0.55	2.55
2	0.63	1.10	0.20	2.95
3	0.63	1.10	0.20	2.95
4	0.63	1.10	0.20	2.95
5	0.62	0.77	0.25	2.23
6	0.62	1.22	-0.09	2.63
7	0.63	1.10	0.20	2.95
8	0.77	4.63	-9.36	-6.86

Table 10-B.2.12 Cumulative National Energy Savings and Consumer Net Present Value for Electric Storage Water Heaters (Low Growth)

Trial Standard Level (TSL)	Efficiency Level (EF)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	0.92	0.27	0.25	1.06
2	0.93	0.38	0.45	1.69
3	0.94	0.74	0.57	2.69
4	0.95	1.03	0.36	2.94
5	1.07	1.58	0.47	4.28
6	1.07	1.58	0.47	4.28
7	2.00	8.38	-3.55	11.23
8	2.35	10.58	-0.34	22.07

Table 10-B.2.13 Cumulative National Energy Savings and Consumer Net Present Value for Oil-Fired Storage Water Heaters (Low Growth)

Trial Standard Level (TSL)	Efficiency Level (EF)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	0.58	0.00	0.03	0.07
2	0.60	0.01	0.06	0.14
3	0.62	0.01	0.09	0.21
4	0.62	0.01	0.09	0.21
5	0.62	0.01	0.09	0.21
6	0.62	0.01	0.09	0.21
7	0.62	0.01	0.09	0.21
8	0.68	0.02	0.14	0.36

Table 10-B.2.14 Cumulative National Energy Savings and Consumer Net Present Value for Gas-Fired Instantaneous Storage Water Heater (Low Growth)

Trial Standard Level (TSL)	Efficiency Level (EF)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	0.82	0.08	0.00	0.23
2	0.82	0.08	0.00	0.23
3	0.82	0.08	0.00	0.23
4	0.82	0.08	0.00	0.23
5	0.82	0.08	0.00	0.23
6	0.82	0.08	0.00	0.23
7	0.82	0.08	0.00	0.23
8	0.95	0.54	-4.76	-7.80

Table 10-B.2.15 Cumulative National Energy Savings and Consumer Net Present Value for Gas Wall Fan DHE (Low Growth)

Trial Standard Level (TSL)	Efficiency Level (AFUE)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	75%	0.01	0.02	0.05
2	76%	0.01	0.02	0.06
3	77%	0.01	0.02	0.07
4	80%	0.03	-0.03	-0.01
5	75%	0.01	0.02	0.05
6	80%	0.03	-0.03	-0.01

Table 10-B.2.16 Cumulative National Energy Savings and Consumer Net Present Value for Gas Wall Gravity DHE (Low Growth)

Trial Standard Level (TSL)	Efficiency Level (AFUE)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	66%	0.01	0.01	0.03
2	66%	0.01	0.01	0.03
3	69%	0.03	0.01	0.06
4	69%	0.03	0.01	0.06
5	70%	0.06	-0.15	-0.14
6	70%	0.06	-0.15	-0.14

Table 10-B.2.17 Cumulative National Energy Savings and Consumer Net Present Value for Gas Floor DHE (Low Growth)

Trial Standard Level (TSL)	Efficiency Level (AFUE)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	58%	0.0001	0.0001	0.0002
2	58%	0.0001	0.0001	0.0002
3	58%	0.0001	0.0001	0.0002
4	58%	0.0001	0.0001	0.0002
5	58%	0.0001	0.0001	0.0002
6	58%	0.0001	0.0001	0.0002

Table 10-B.2.18 Cumulative National Energy Savings and Consumer Net Present Value for Gas Room DHE (Low Growth)

Trial Standard Level (TSL)	Efficiency Level (AFUE)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	66%	0.001	0.00	0.01
2	67%	0.002	0.01	0.02
3	68%	0.004	0.01	0.03
4	68%	0.004	0.01	0.03
5	83%	0.036	0.06	0.19
6	83%	0.036	0.06	0.19

Table 10-B.2.19 Cumulative National Energy Savings and Consumer Net Present Value for Gas Hearth DHE (Low Growth)

Trial Standard Level (TSL)	Efficiency Level (AFUE)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	67%	0.19	0.47	1.15
2	67%	0.19	0.47	1.15
3	67%	0.19	0.47	1.15
4	72%	0.37	-1.25	-1.48
5	72%	0.37	-1.25	-1.48
6	93%	1.13	-4.47	-5.45

Table 10-B.2.20 Cumulative National Energy Savings and Consumer Net Present Value for Gas-Fired Pool Heaters (Low Growth)

Trial Standard Level (TSL)	Efficiency Level (TE)	NES (Quads)	NPV (billion 2009\$)	
			7% Discount Rate	3% Discount Rate
1	81%	0.01	0.04	0.09
2	82%	0.02	0.03	0.10
3	83%	0.04	-0.07	-0.03
4	84%	0.06	-0.17	-0.17
5	86%	0.09	-1.41	-2.37
6	95%	0.22	-2.92	-4.67

10-B.3 RESULTS USING ALTERNATIVE ECONOMIC GROWTH SCENARIOS: COMPARISON

The following figures graphically display the NES and 7 percent NPV for each product class under the low growth, the reference case, and the high growth scenarios.

10-B.3.1 National Energy Savings (NES)

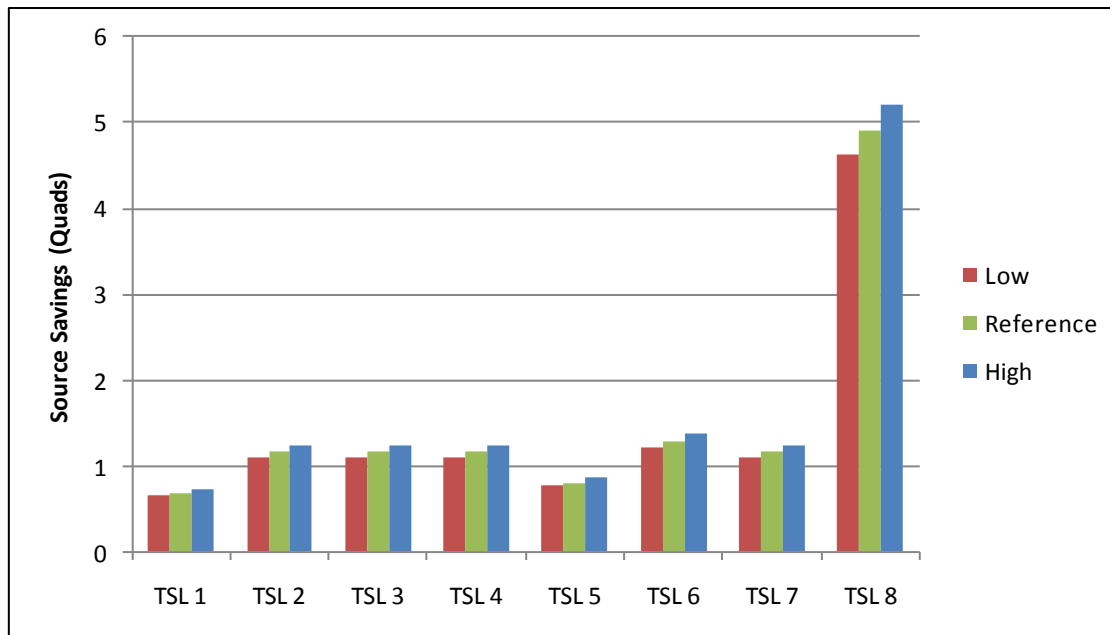


Figure 10-B.3.4 NES in Gas-Fired Storage Water Heater Economic Growth Scenarios

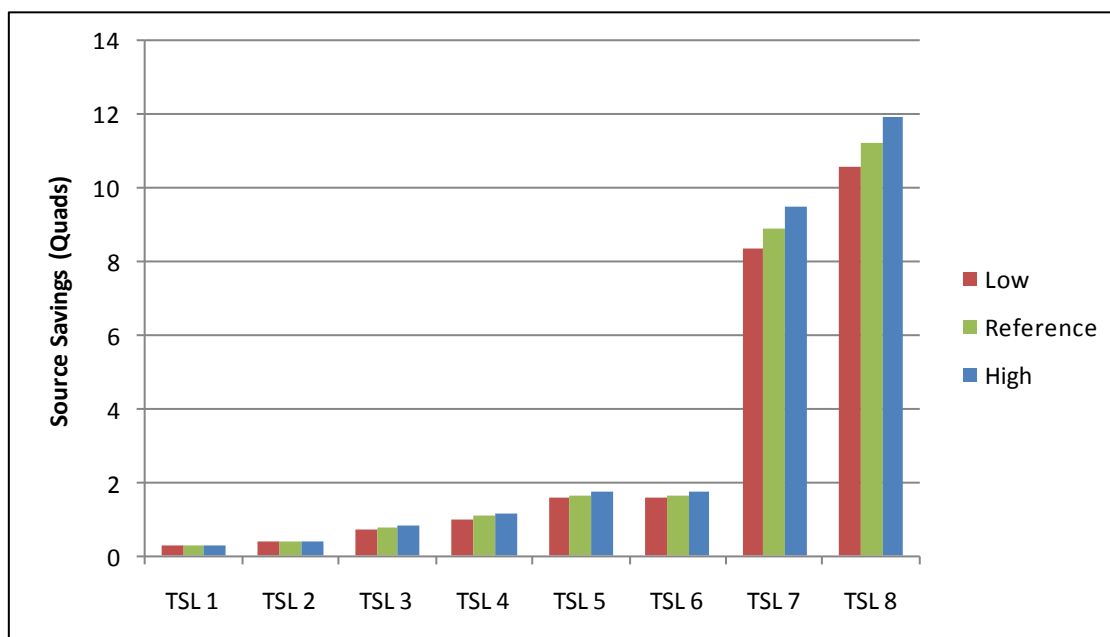


Figure 10-B.3.5 NES in Electric Storage Water Heater Economic Growth Scenarios

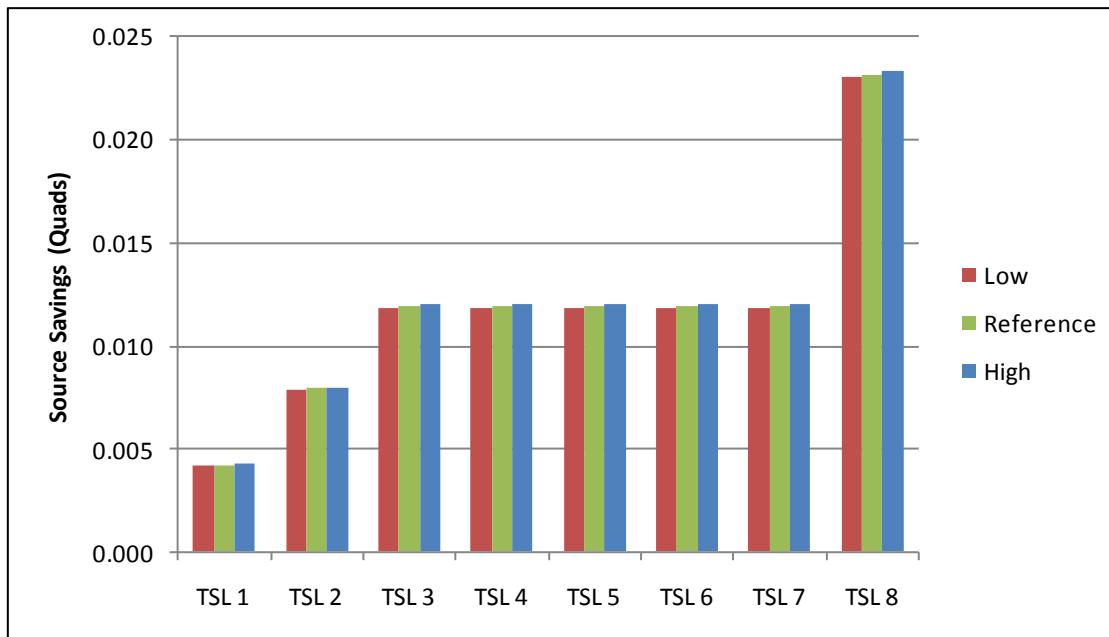


Figure 10-B.3.6 NES in Oil-Fired Storage Water Heater Economic Growth Scenarios

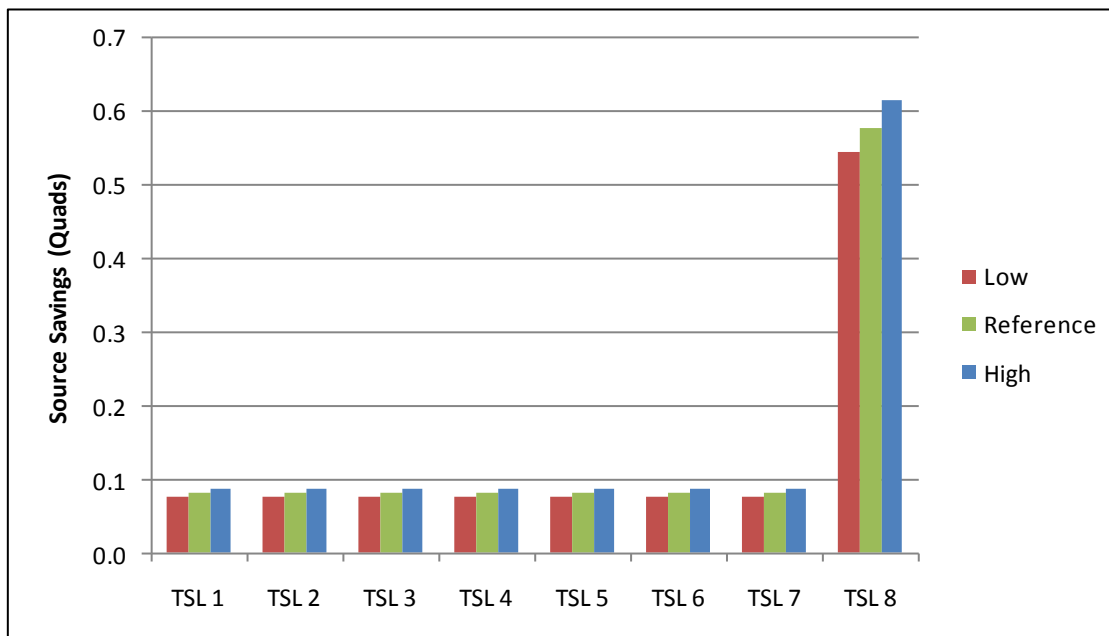


Figure 10-B.3.7 NES in Gas-Fired Instantaneous Storage Water Heater Economic Growth Scenarios

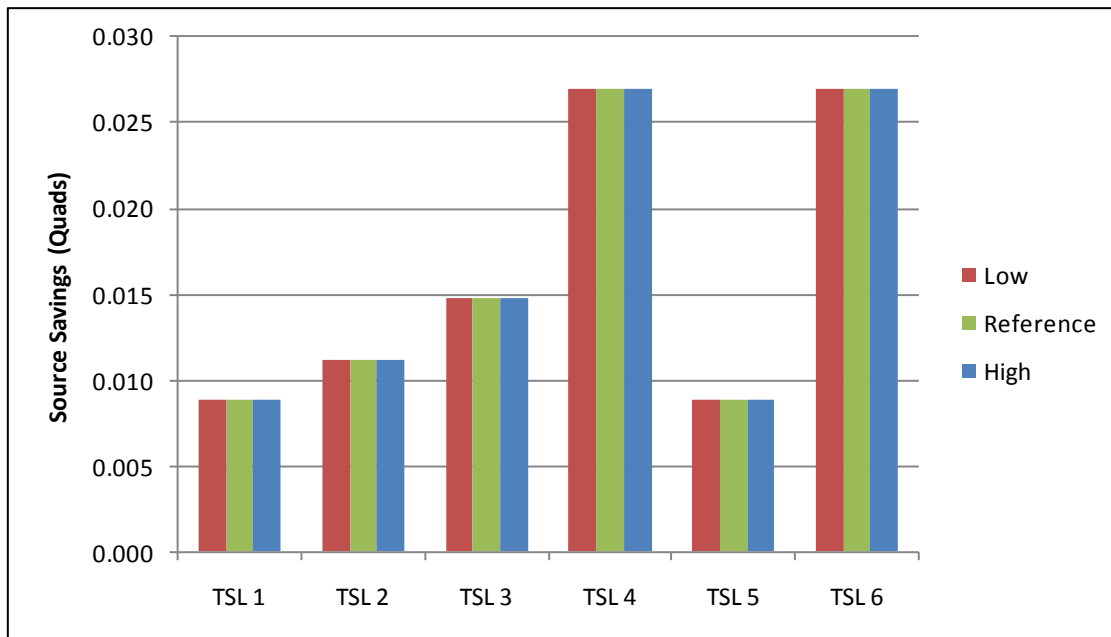


Figure 10-B.3.8 NES in Gas Wall Fan DHE Economic Growth Scenarios

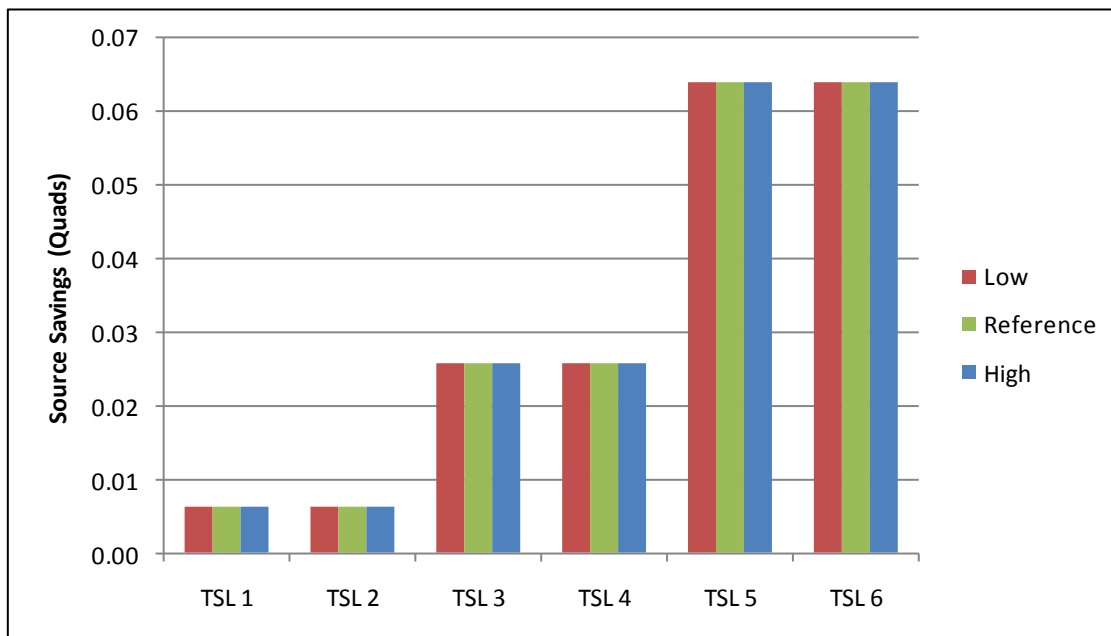


Figure 10-B.3.9 NES in Gas Wall Gravity DHE Economic Growth Scenarios

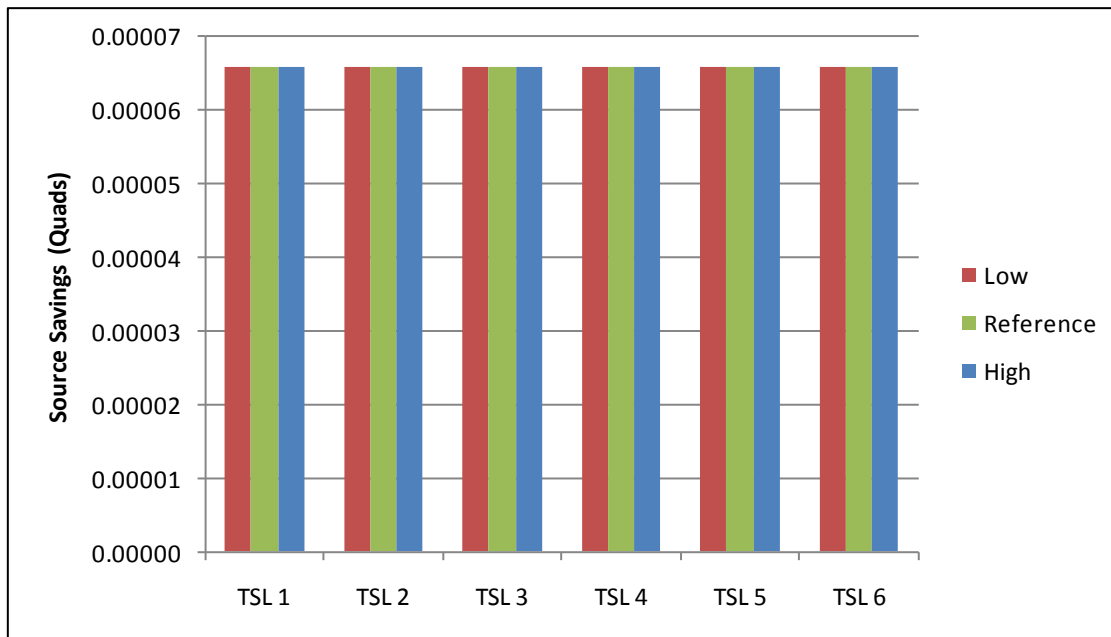


Figure 10-B.3.10 NES in Gas Floor DHE Economic Growth Scenarios

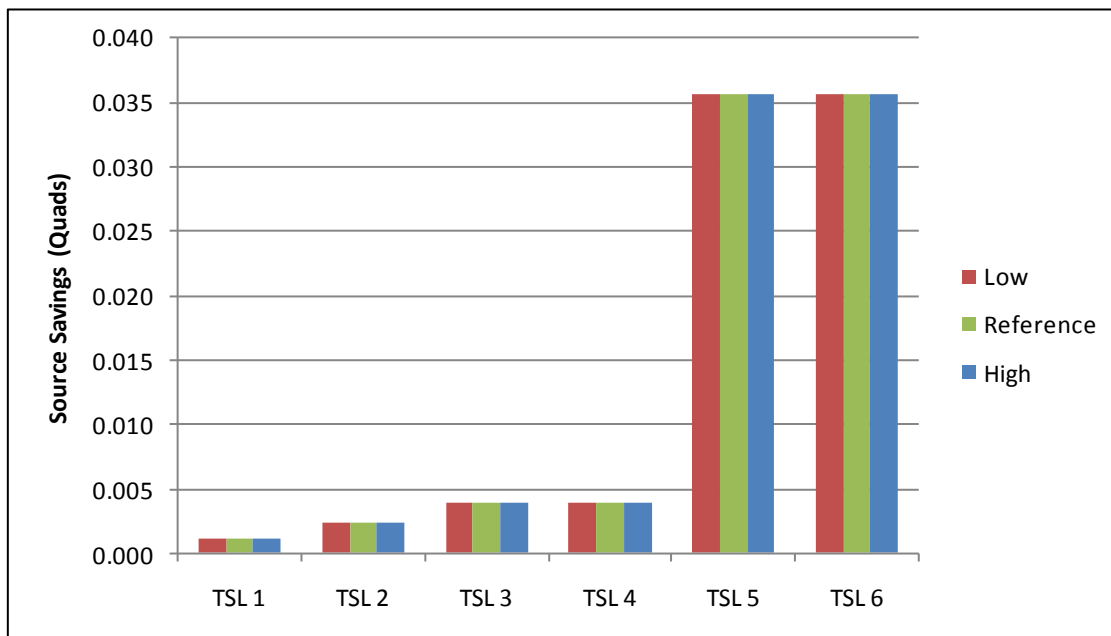


Figure 10-B.3.11 NES in Gas Room DHE Economic Growth Scenarios

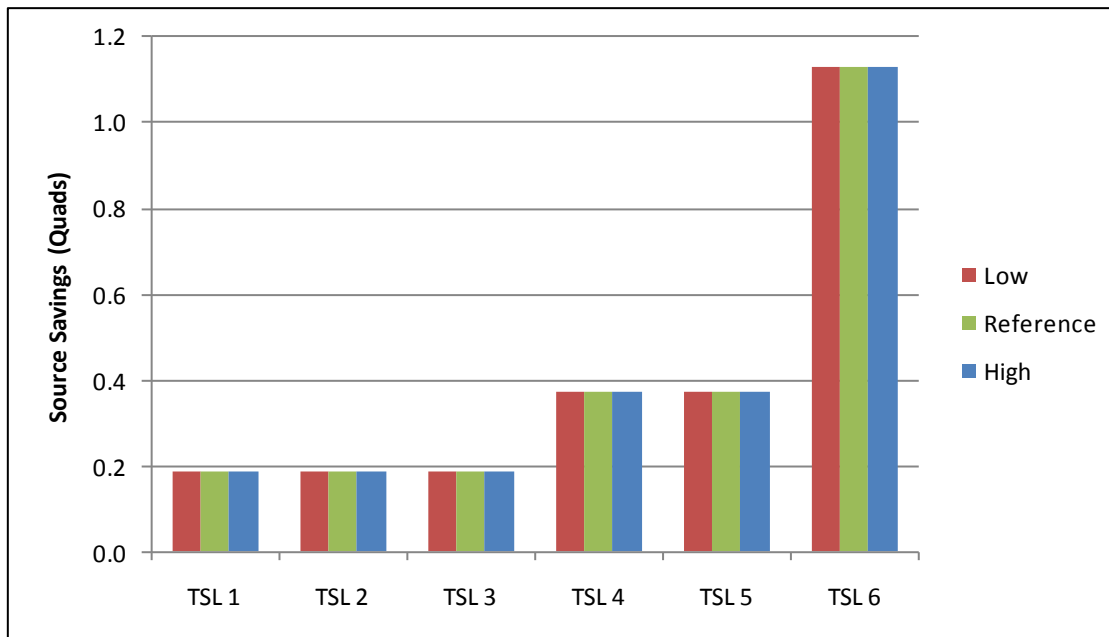


Figure 10-B.3.12 NES in Gas Hearth DHE Economic Growth Scenarios

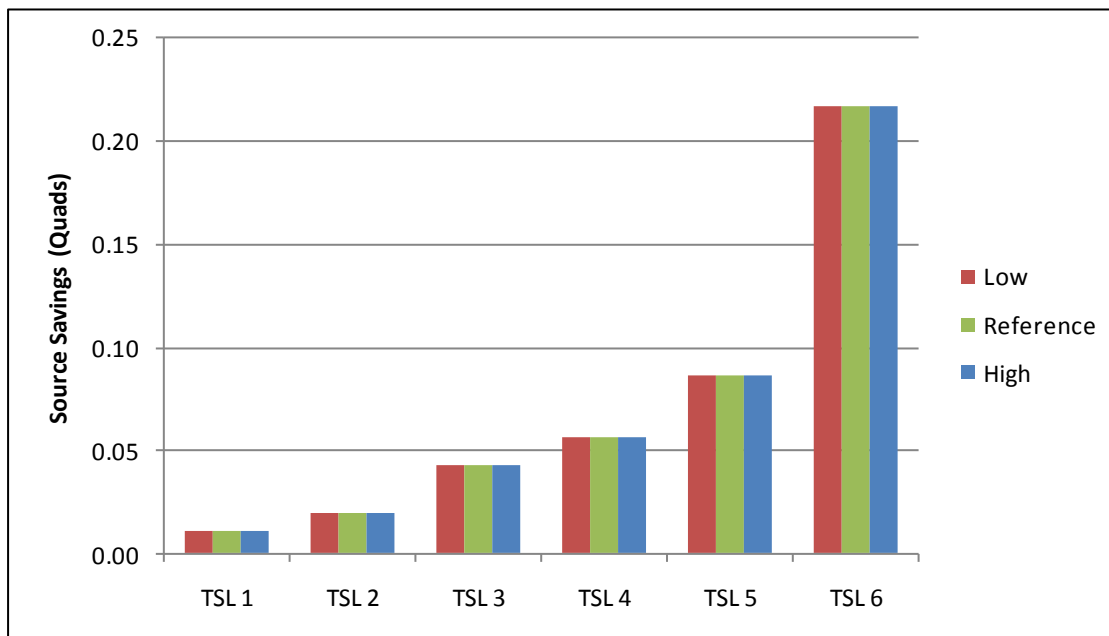


Figure 10-B.3.13 NES in Gas-Fired Pool Heater Economic Growth Scenarios

10-B.3.2 Net Present Values (NPV)

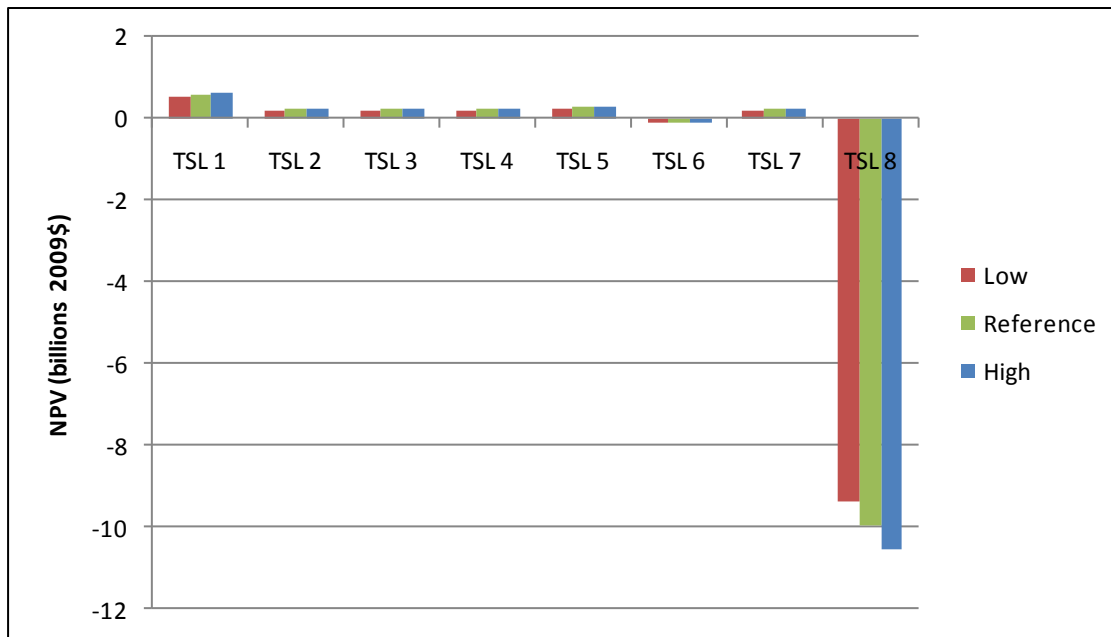


Figure 10-B.3.14 NPV in Gas-Fired Storage Water Heater Economic Growth Scenarios

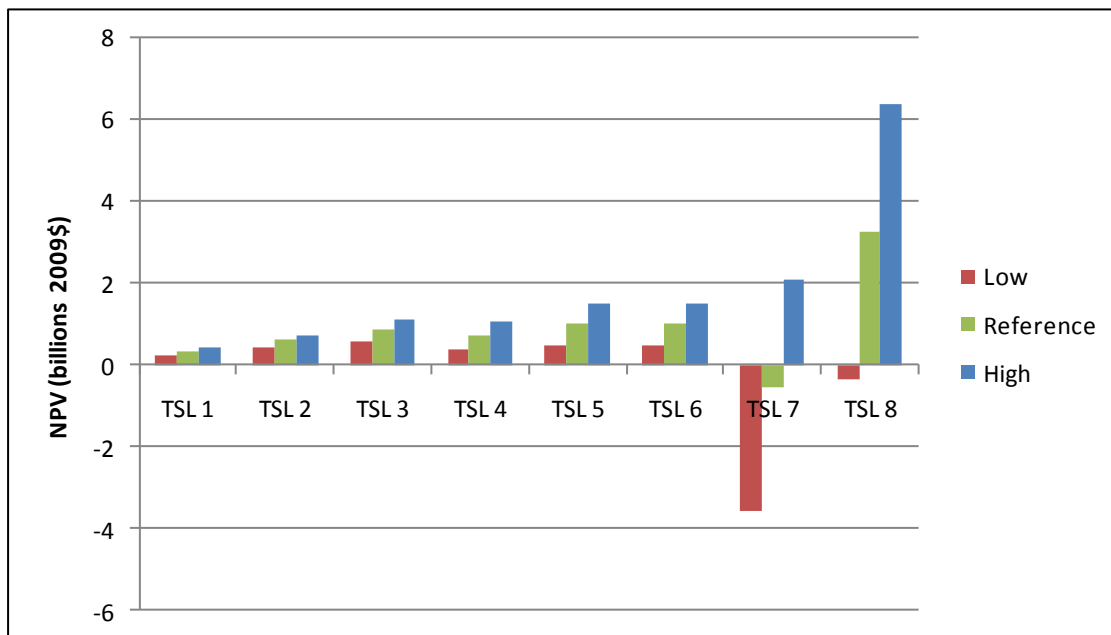


Figure 10-B.3.15 NPV in Electric Storage Water Heater Economic Growth Scenarios

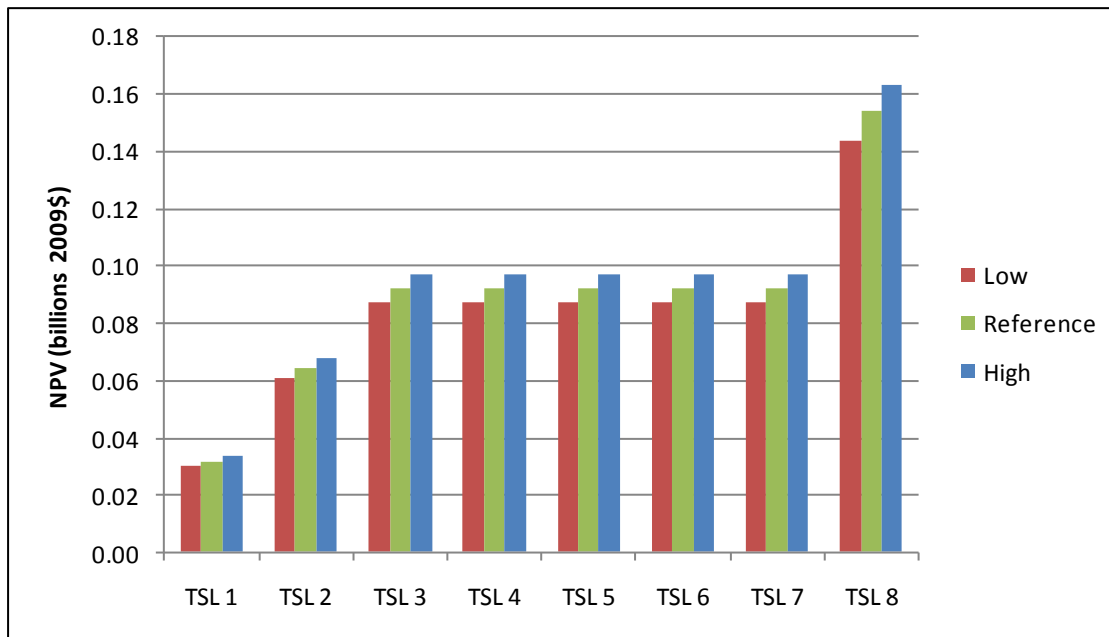


Figure 10-B.3.16 NPV in Oil-Fired Storage Water Heater Economic Growth Scenarios



Figure 10-B.3.17 NPV in Gas-Fired Instantaneous Storage Water Heater Economic Growth Scenarios

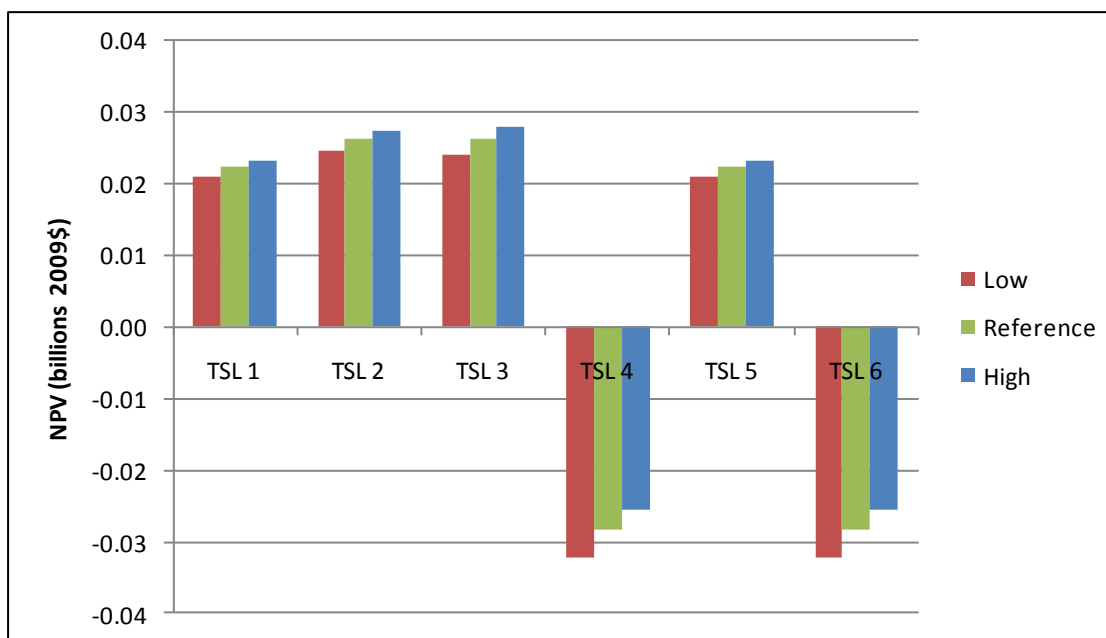


Figure 10-B.3.18 NPV in Gas Wall Fan DHE Economic Growth Scenarios

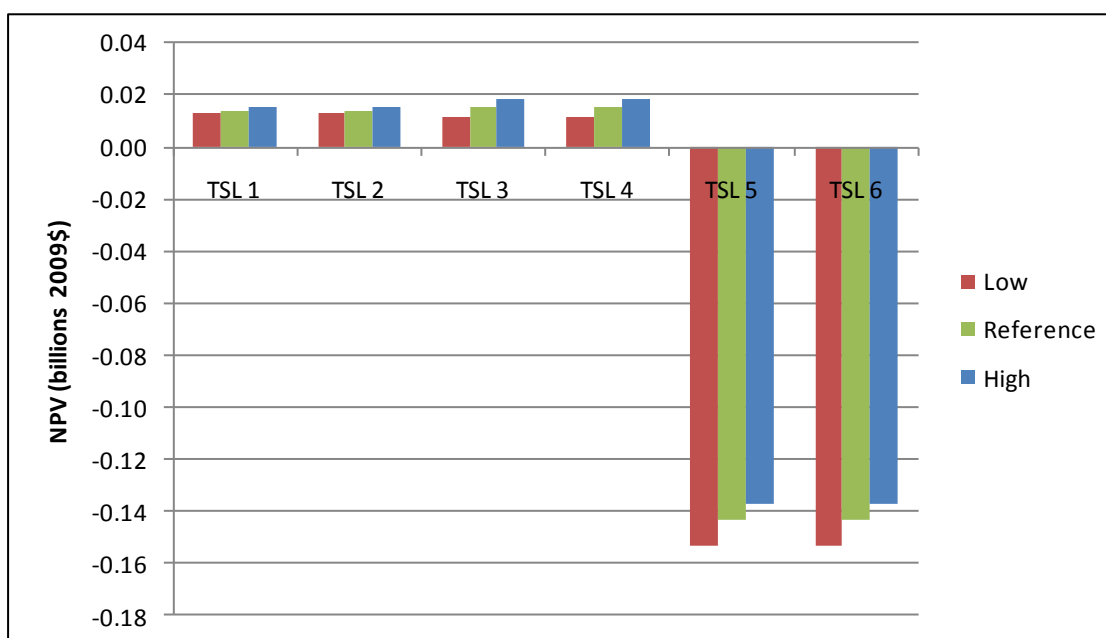


Figure 10-B.3.19 NPV in Gas Wall Gravity DHE Economic Growth Scenarios

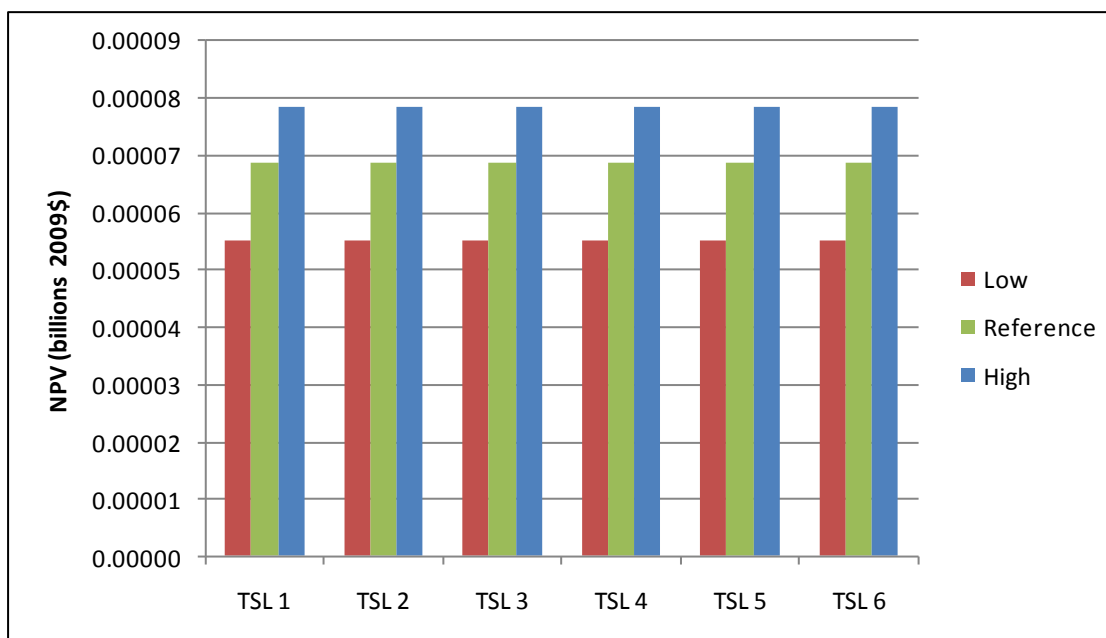


Figure 10-B.3.20 NPV in Gas Floor DHE Economic Growth Scenarios

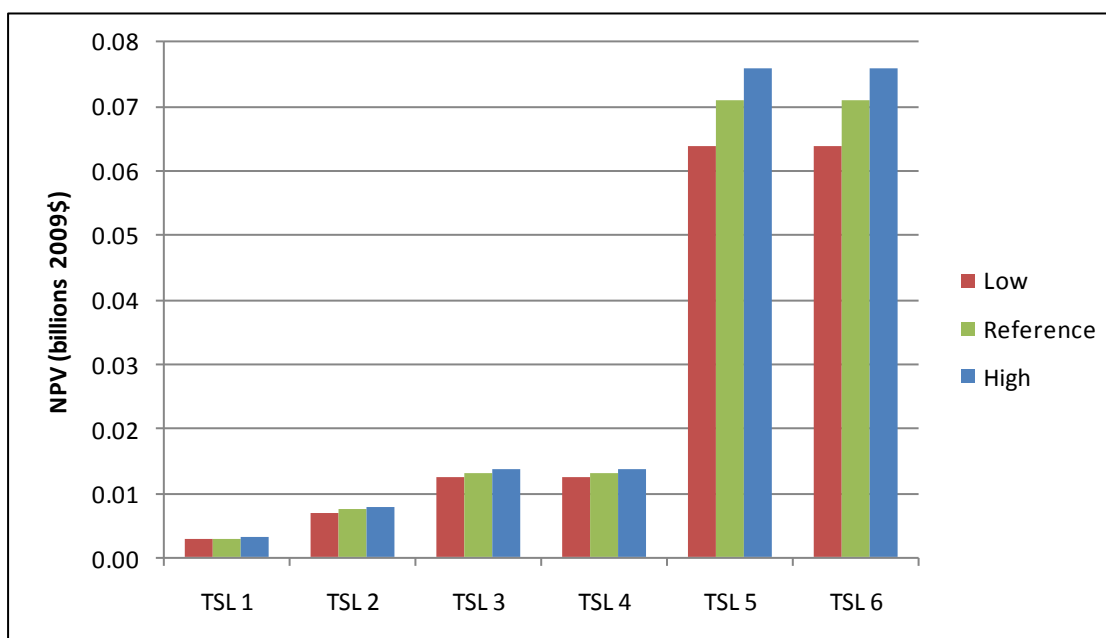


Figure 10-B.3.21 NPV in Gas Room DHE Economic Growth Scenarios

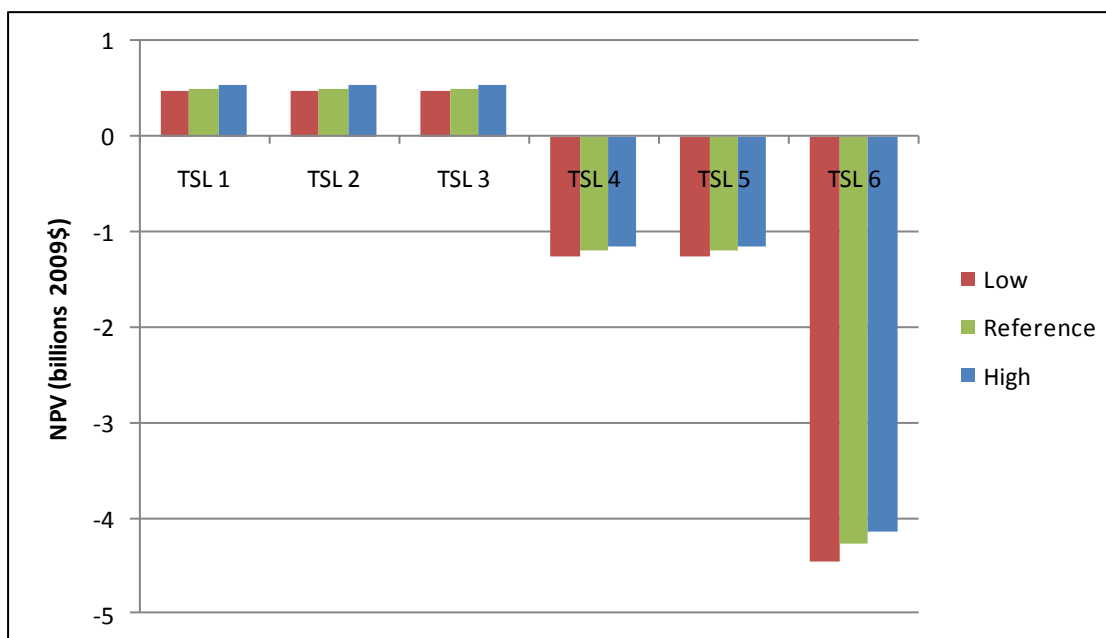


Figure 10-B.3.22 NPV in Gas Hearth DHE Economic Growth Scenarios

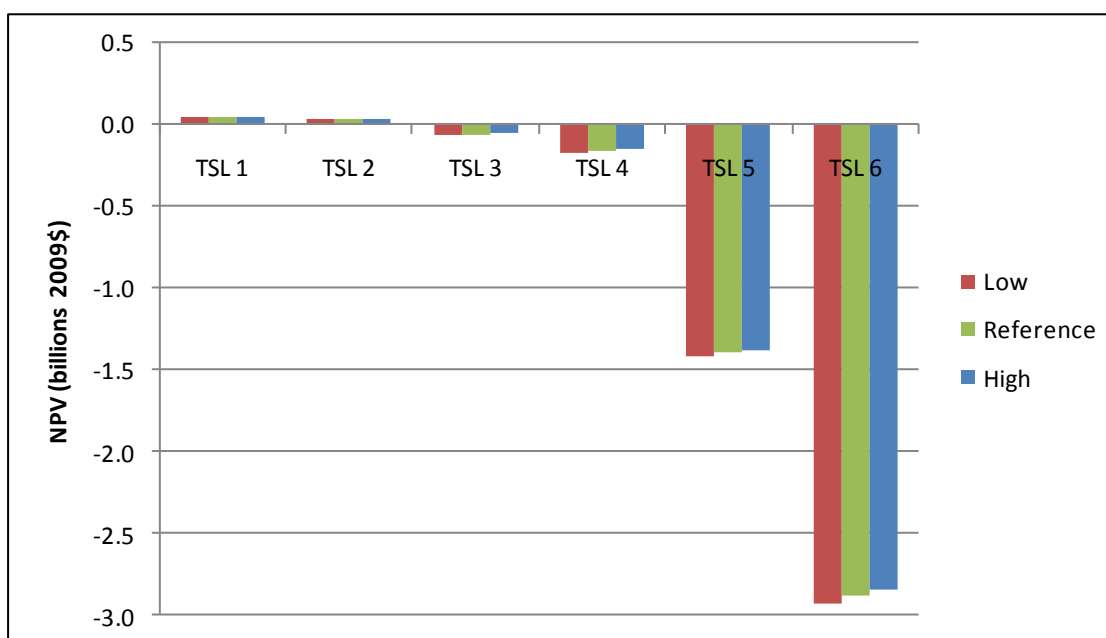


Figure 10-B.3.23 NPV in Gas-Fired Pool Heater Economic Growth Scenarios

REFERENCES

1. Energy Information Administration, *Annual Energy Outlook 2009 with Projections to 2030*, 2009. Washington, DC. Report No. DOE/EIA-0383(2009).
<<http://www.eia.doe.gov/oiaf/aeo/>>
2. Energy Information Administration, *Annual Energy Outlook 2010 (Early Release) with Projections to 2035*, 2010. Washington, DC. Report No. DOE/EIA-0383(2010).
<<http://www.eia.doe.gov/oiaf/aeo/>>