

APPENDIX J: SUPPLEMENTAL APPENDIX

This Supplemental Appendix contains information and data on which the Final Rule for residential central air conditioners and heat pumps is based. Most data contained in this appendix provide results based on the use of Reverse Engineering manufacturing cost data. The tables and figures presented in this appendix usually have a corresponding table or figure from one of the chapters in the Technical Support Document (TSD). Tables and figures in this appendix with corresponding information in the TSD use the same table or figure numbers as the TSD but with an “S” added after the number to designate it as supplemental information. For example, Table 5.28 from Chapter 5 of the TSD that provides average repair costs based on ARI mean manufacturing cost data is shown in this appendix as Table 5.28S with the results based on Reverse Engineering manufacturing cost data. There are some tables and figures in this appendix that do not have a corresponding table or figure from the TSD. In these cases, the supplemental tables and figures are identified with the table or figure number from the TSD that the new data most closely pertains to and an “A” is added after the number to designate it as additional information.

J.1 SUPPLEMENTAL TABLES AND FIGURES TO CHAPTER 5

Table 5.3S Reverse Engineering Standard-Level Manufacturer Cost Multipliers

| SEER | Split A/C Most Likely Value | Split HP Most Likely Value | Package A/C Most Likely Value | Package HP Most Likely Value |
|-----------------|--------------------------------|-------------------------------|----------------------------------|---------------------------------|
| 10 | 1.00 | 1.00 | 1.00 | 1.00 |
| 11 | 1.12 | 1.05 | 1.09 | 1.08 |
| 12 | 1.28 | 1.13 | 1.16 | 1.13 |
| 13 | 1.44 | 1.30 | 1.43 | 1.38 |
| 18 ^a | 1.99 | 1.94 | 1.87 | 1.86 |

^a Cost multipliers for 18 SEER are based on data for 15 SEER.

Table 5.8S Weighted-Average Total Installed Costs for Central Air Conditioners and Heat Pumps based on Reverse Engineering Manufacturing Costs

| SEER | Split A/C 1998\$ | Package A/C 1998\$ | Split HP 1998\$ | Package HP 1998\$ |
|------|---------------------|-----------------------|--------------------|----------------------|
| 10 | \$2,236 | \$2,607 | \$3,668 | \$3,599 |
| 11 | \$2,327 | \$2,696 | \$3,723 | \$3,691 |
| 12 | \$2,449 | \$2,765 | \$3,812 | \$3,748 |
| 13 | \$2,571 | \$3,032 | \$4,000 | \$4,034 |
| 18 | \$2,990 | \$3,466 | \$4,707 | \$4,584 |

Table 5.28S Central Air Conditioner and Heat Pump Average Repair Costs based on Reverse Engineering Manufacturing Costs

| SEER <i>Btu/W·hr</i> | Split System A/C <i>1998\$</i> | Single Package A/C <i>1998\$</i> | Split System HP <i>1998\$</i> | Single Package HP <i>1998\$</i> |
|--------------------------------|--|--|---|---|
| 10 | \$26 | \$34 | \$38 | \$39 |
| 11 | \$26 | \$34 | \$38 | \$39 |
| 12 | \$27 | \$34 | \$38 | \$40 |
| 13 | \$27 | \$35 | \$39 | \$40 |
| 18 | \$46 | \$57 | \$66 | \$66 |

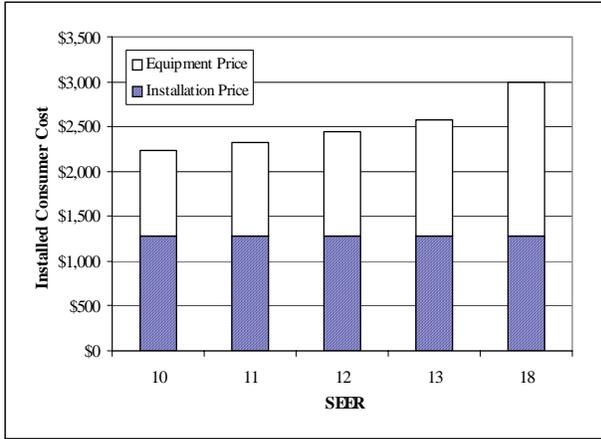


Figure 5.29S Split A/C: Mean Installed Consumer Costs based on Rev Eng Manufacturing Costs

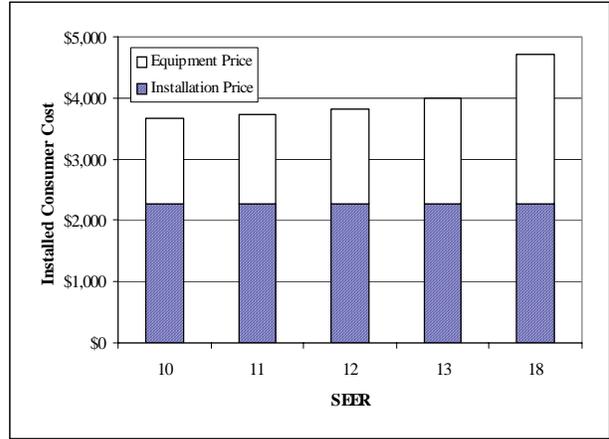


Figure 5.32S Split HP: Mean Installed Consumer Costs based on Rev Eng Manufacturing Costs

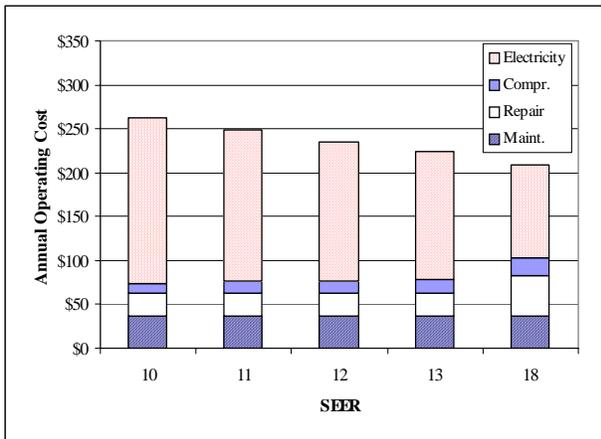


Figure 5.30S Split A/C: Mean Annual Operating Costs based on Rev Eng Manufacturing Costs

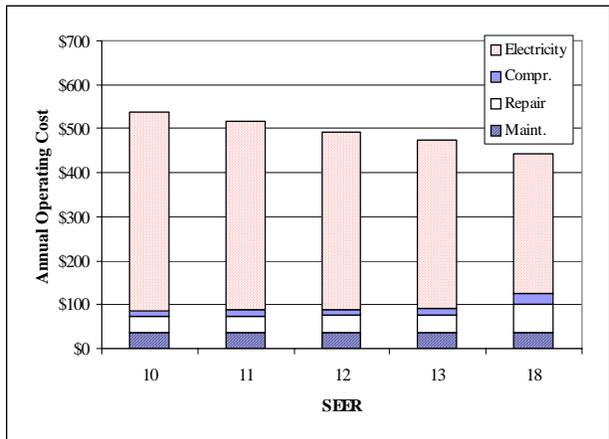


Figure 5.33S Split HP: Mean Annual Operating Costs based on Rev Eng Manufacturing Costs

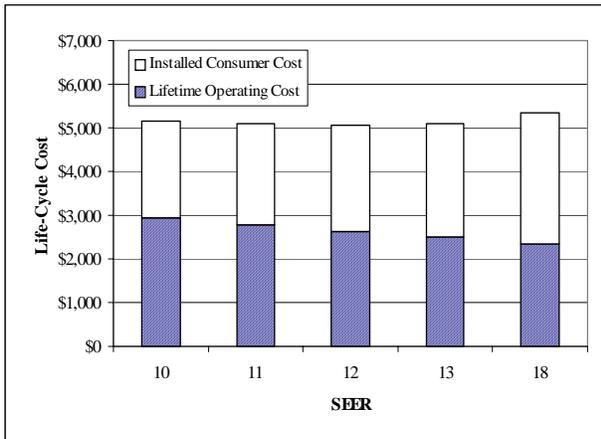


Figure 5.31S Split A/C: Mean Life-Cycle Costs based on Rev Eng Manufacturing Costs

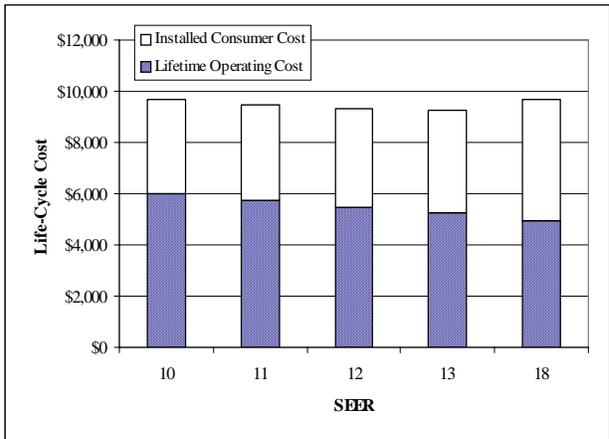


Figure 5.34S Split HP: Mean Life-Cycle Costs based on Rev Eng Manufacturing Costs

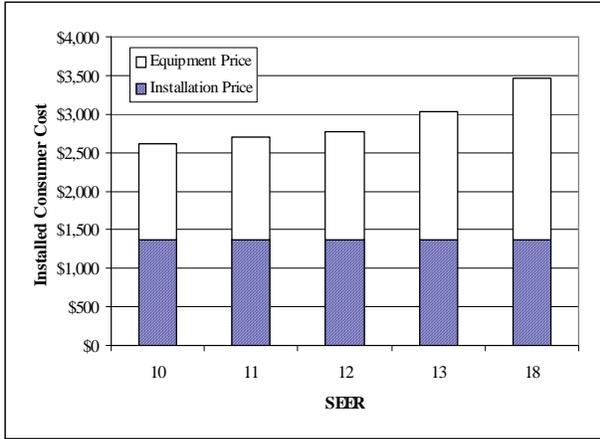


Figure 5.35S Pack A/C: Mean Installed Consumer Costs based on Rev Eng Manufacturing Costs

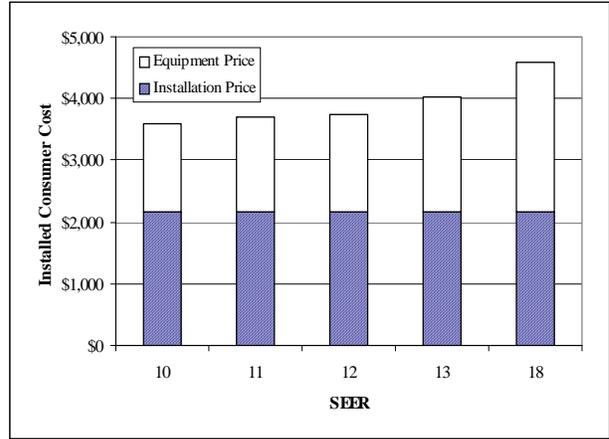


Figure 5.38S Pack HP: Mean Installed Consumer Costs based on Rev Eng Manufacturing Costs

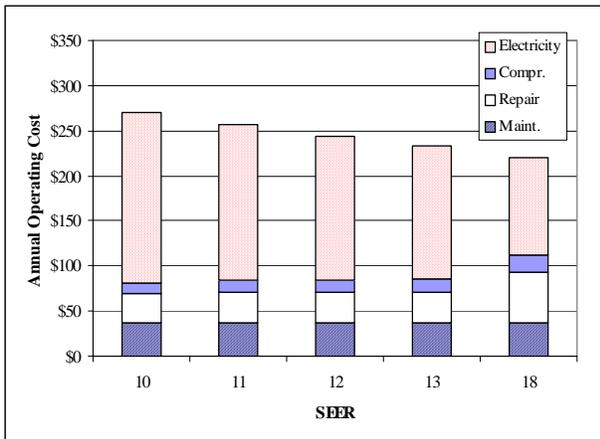


Figure 5.36S Pack A/C: Mean Annual Operating Costs based on Rev Eng Manufacturing Costs

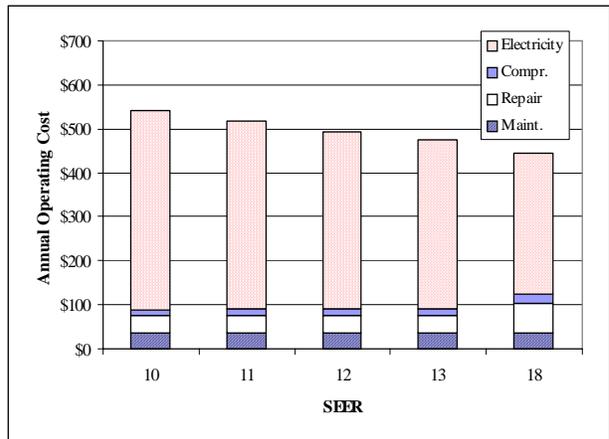


Figure 5.39S Pack HP: Mean Annual Operating Costs based on Rev Eng Manufacturing Costs

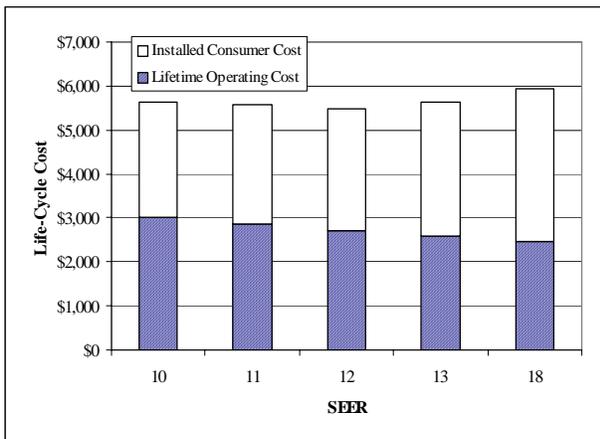


Figure 5.37S Pack A/C: Mean Life-Cycle Costs based on Rev Eng Manufacturing Costs

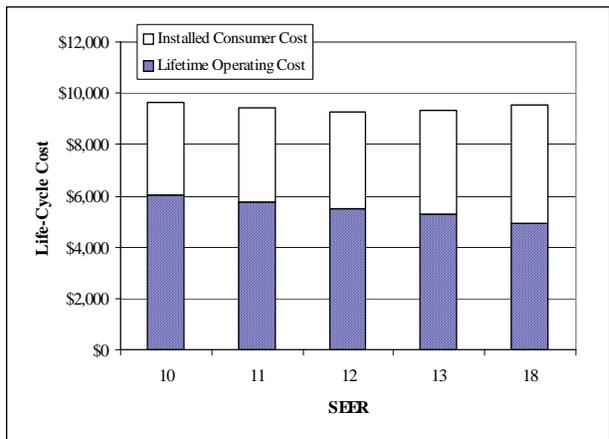


Figure 5.40S Pack HP: Mean Life-Cycle Costs based on Rev Eng Manufacturing Costs

Table 5.35S Summary of LCC Results for Split System Air Conditioners based on Reverse Engineering Manufacturing Costs

| Efficiency Level (SEER) | Change in LCC from Baseline Shown by Percentiles of the Distribution of Results (values in 1998\$) | | | | | | | | | | | | Percent of Households with reduced LCC |
|----------------------------|---|--------|--------|--------|-------|-------|-------|-------|-------|-------|---------|--------|---|
| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% | Mean | |
| 11 | \$-2,060 | \$-301 | \$-160 | \$-90 | \$-44 | \$-14 | \$10 | \$31 | \$51 | \$71 | \$168 | \$-75 | 56% |
| 12 | \$-4,382 | \$-525 | \$-276 | \$-147 | \$-64 | \$-4 | \$43 | \$83 | \$121 | \$160 | \$344 | \$-113 | 51% |
| 13 | \$-4,372 | \$-676 | \$-345 | \$-157 | \$-46 | \$35 | \$99 | \$155 | \$206 | \$262 | \$530 | \$-113 | 45% |
| 18 | \$-9,321 | \$-922 | \$-282 | \$47 | \$250 | \$390 | \$508 | \$611 | \$719 | \$866 | \$1,840 | \$137 | 28% |

Table 5.36S Summary of LCC Results for Split System Heat Pumps based on Reverse Engineering Manufacturing Costs

| Efficiency Level (SEER) | Change in LCC from Baseline Shown by Percentiles of the Distribution of Results (values in 1998\$) | | | | | | | | | | | | Percent of Households with reduced LCC |
|----------------------------|---|----------|--------|--------|--------|--------|--------|--------|-------|---------|---------|--------|---|
| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% | Mean | |
| 11 / 7.1 | \$-1,676 | \$-488 | \$-332 | \$-250 | \$-192 | \$-147 | \$-109 | \$-77 | \$-45 | \$-10 | \$100 | \$-209 | 92% |
| 12 / 7.4 | \$-3,205 | \$-881 | \$-597 | \$-440 | \$-334 | \$-249 | \$-179 | \$-116 | \$-59 | \$10 | \$234 | \$-365 | 89% |
| 13 / 7.7 | \$-4,214 | \$-1,106 | \$-700 | \$-484 | \$-330 | \$-216 | \$-115 | \$-28 | \$58 | \$145 | \$484 | \$-372 | 73% |
| 18 / 8.8 | \$-12,215 | \$-1,333 | \$-560 | \$-148 | \$131 | \$347 | \$514 | \$659 | \$817 | \$1,012 | \$1,947 | \$41 | 35% |

Table 5.37S Summary of LCC Results for Single Package Air Conditioners based on Reverse Engineering Manufacturing Costs

| Efficiency Level (SEER) | Change in LCC from Baseline Shown by Percentiles of the Distribution of Results (values in 1998\$) | | | | | | | | | | | | Percent of Households with reduced LCC |
|-------------------------|---|--------|--------|--------|--------|-------|-------|-------|-------|---------|---------|--------|--|
| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% | Mean | |
| 11 | \$-2,179 | \$-310 | \$-172 | \$-97 | \$-49 | \$-16 | \$10 | \$30 | \$50 | \$70 | \$151 | \$-78 | 56% |
| 12 | \$-4,756 | \$-577 | \$-329 | \$-197 | \$-111 | \$-49 | \$-3 | \$37 | \$73 | \$109 | \$226 | \$-163 | 61% |
| 13 | \$-6,374 | \$-650 | \$-269 | \$-79 | \$48 | \$129 | \$192 | \$249 | \$303 | \$364 | \$611 | \$-29 | 36% |
| 18 | \$-8,768 | \$-779 | \$-138 | \$187 | \$393 | \$538 | \$658 | \$759 | \$867 | \$1,011 | \$1,677 | \$276 | 24% |

Table 5.38S Summary of LCC Results for Single Package Heat Pumps based on Reverse Engineering Manufacturing Costs

| Efficiency Level (SEER) | Change in LCC from Baseline Shown by Percentiles of the Distribution of Results (values in 1998\$) | | | | | | | | | | | | Percent of Households with reduced LCC |
|-------------------------|---|----------|--------|--------|--------|--------|--------|--------|-------|-------|---------|--------|--|
| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% | Mean | |
| 11 / 7.1 | \$-1,190 | \$-520 | \$-343 | \$-253 | \$-190 | \$-143 | \$-102 | \$-67 | \$-30 | \$13 | \$185 | \$-207 | 87% |
| 12 / 7.4 | \$-3,373 | \$-977 | \$-681 | \$-514 | \$-399 | \$-310 | \$-233 | \$-165 | \$-95 | \$-16 | \$227 | \$-421 | 92% |
| 13 / 7.7 | \$-4,405 | \$-1,138 | \$-712 | \$-487 | \$-318 | \$-194 | \$-89 | \$9 | \$107 | \$219 | \$613 | \$-353 | 69% |
| 18 / 8.8 | \$-8,734 | \$-1,689 | \$-878 | \$-416 | \$-92 | \$144 | \$340 | \$525 | \$715 | \$953 | \$2,086 | \$-166 | 44% |

Table 5.53S Summary of Payback Period Results for Split Air Conditioners based on Reverse Engineering Manufacturing Costs

| Efficiency Level (SEER) | Payback Period in Years Shown by Percentiles of the Distribution of Results | | | | | | | | | | | |
|-------------------------|--|-----|-----|-----|-----|-----|-----|-----|-----|------|-------|------|
| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% | Mean |
| 11 | 1 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 24 | 339 | 12 |
| 12 | 1 | 3 | 5 | 6 | 8 | 10 | 12 | 15 | 20 | 31 | 571 | 15 |
| 13 | 1 | 4 | 6 | 7 | 9 | 11 | 14 | 17 | 23 | 34 | 670 | 17 |
| 18 | 1 | 5 | 8 | 11 | 15 | 20 | 27 | 41 | 89 | 1000 | >1000 | 174 |

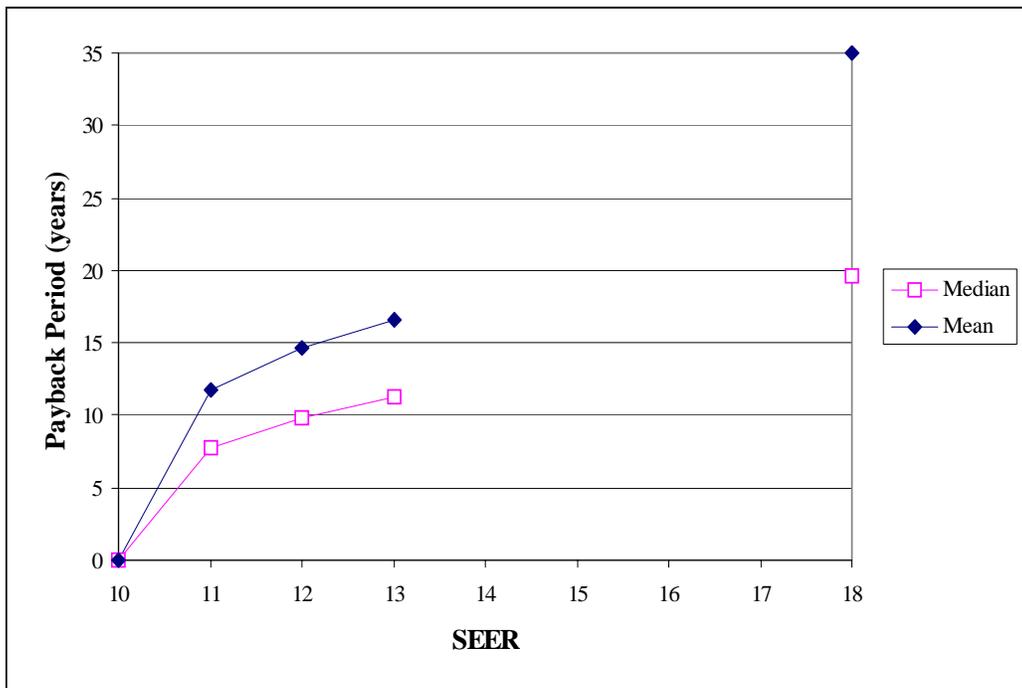


Figure 5.72S Split A/C: Median and Mean Payback Periods based on Reverse Engineering Manufacturing Costs

Table 5.54S Summary of Payback Period Results for Split Heat Pumps based on Reverse Engineering Manufacturing Costs

| Efficiency Level (SEER / HSPF) | Payback Period in Years Shown by Percentiles of the Distribution of Results | | | | | | | | | | | |
|-----------------------------------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|------|
| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% | Mean |
| 11 / 7.1 | 0 | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 5 | 7 | 1000 | 4 |
| 12 / 7.4 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 5 | 7 | 9 | >1000 | 6 |
| 13 / 7.7 | 1 | 3 | 4 | 5 | 5 | 6 | 7 | 9 | 11 | 15 | 1000 | 9 |
| 18 / 8.8 | 2 | 5 | 7 | 9 | 11 | 14 | 17 | 22 | 32 | 62 | >1000 | 78 |

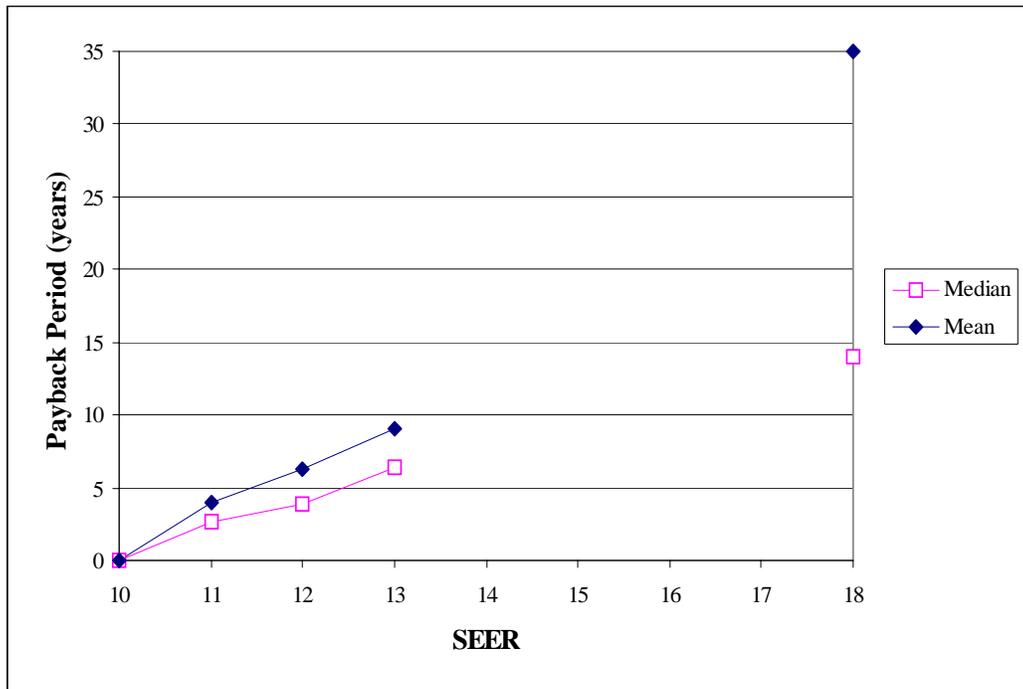


Figure 5.73S Split HP: Median and Mean Payback Periods based on Reverse Engineering Manufacturing Costs

Table 5.55S Summary of Payback Period Results for Single Package Air Conditioners based on Reverse Engineering Manufacturing Costs

| Efficiency Level (SEER) | Payback Period in Years Shown by Percentiles of the Distribution of Results | | | | | | | | | | | |
|-------------------------|--|-----|-----|-----|-----|-----|-----|-----|-----|------|-------|------|
| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% | Mean |
| 11 | 1 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 24 | 299 | 11 |
| 12 | 1 | 3 | 4 | 5 | 6 | 8 | 9 | 12 | 16 | 24 | 591 | 11 |
| 13 | 1 | 5 | 7 | 9 | 12 | 15 | 18 | 22 | 30 | 46 | >1000 | 22 |
| 18 | 1 | 6 | 9 | 13 | 18 | 25 | 35 | 57 | 163 | 1000 | >1000 | 240 |

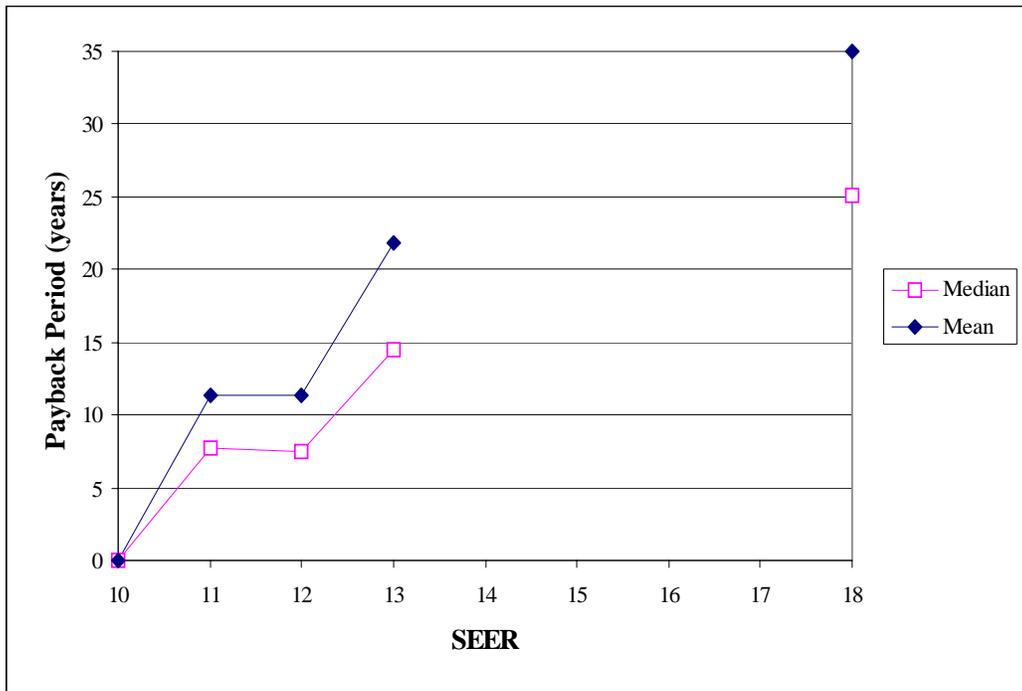


Figure 5.74S Package A/C: Median and Mean Payback Periods based on Reverse Engineering Manufacturing Costs

Table 5.56S Summary of Payback Period Results for Single Package Heat Pumps based on Reverse Engineering Manufacturing Costs

| Efficiency Level (SEER / HSPF) | Payback Period in Years Shown by Percentiles of the Distribution of Results | | | | | | | | | | | |
|-----------------------------------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|------|
| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% | Mean |
| 11 / 7.1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | 7 | 11 | >1000 | 7 |
| 12 / 7.4 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 10 | 1000 | 6 |
| 13 / 7.7 | 1 | 4 | 5 | 6 | 7 | 8 | 10 | 12 | 15 | 20 | >1000 | 13 |
| 18 / 8.8 | 2 | 5 | 7 | 9 | 11 | 13 | 16 | 21 | 28 | 56 | >1000 | 62 |

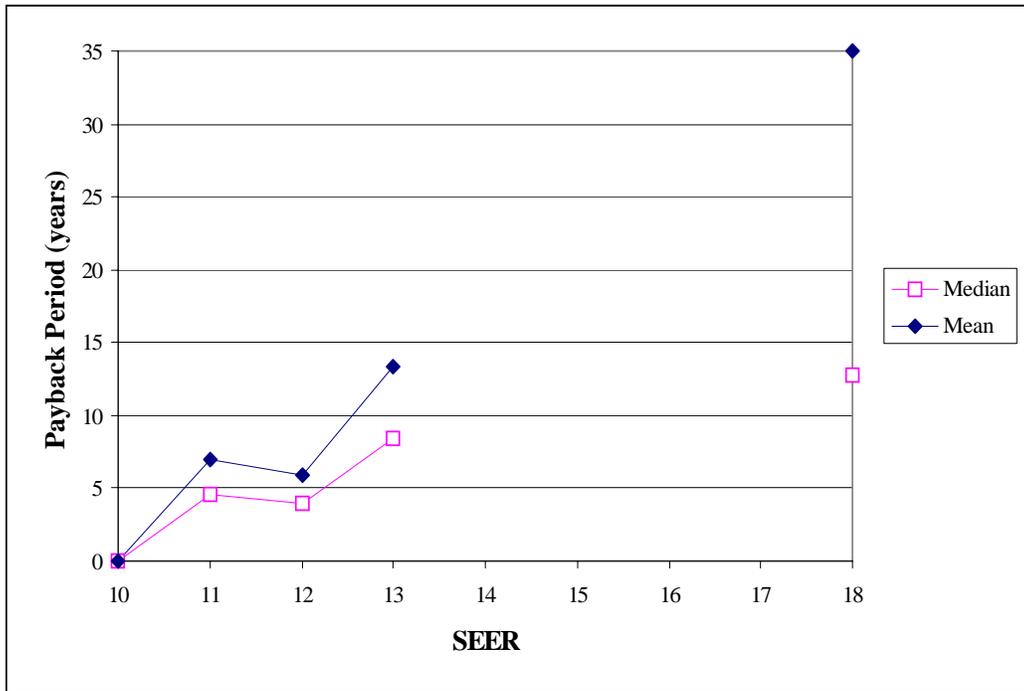


Figure 5.75S Package HP: Median and Mean Payback Periods based on Reverse Engineering Manufacturing Costs

Table 5.58S Summary of Rebuttable PBPs and Inputs for Split System Air Conditioners based on Reverse Engineering Manufacturing Costs

| Effc'y Level <i>SEER</i> | Installed Consumer Cost <i>1998\$</i> | Annual Energy Use <i>kWh/yr</i> | Annual Repair Cost <i>1998\$</i> | Annual Maint. Cost <i>1998\$</i> | Annual Operating Expense <i>1998\$</i> | Assumed 2006 Effc'y Distr. | Weighted-Avg of Units Sold below Effc'y | | Rebutt. Payback Period <i>years</i> |
|-----------------------------|--|------------------------------------|-------------------------------------|-------------------------------------|---|----------------------------|--|---|--|
| | | | | | | | Installed Consumer Cost <i>1998\$</i> | Annual Operating Expense <i>1998\$</i> | |
| 10 | \$2,236 | 3,600 | \$26 | \$36 | \$357 | 78.7% | - | - | - |
| 11 | \$2,327 | 3,273 | \$26 | \$36 | \$331 | 5.4% | \$2,236 | \$357 | 3.5 |
| 12 | \$2,449 | 3,000 | \$27 | \$36 | \$310 | 12.0% | \$2,241 | \$355 | 4.5 |
| 13 | \$2,571 | 2,769 | \$27 | \$36 | \$292 | 3.6% | \$2,267 | \$350 | 5.2 |
| 18 | \$2,990 | 2,000 | \$46 | \$36 | \$250 | 0.2% | \$2,279 | \$347 | 7.3 |

Table 5.59S Summary of Rebuttable PBPs and Inputs for Split System Heat Pumps based on Reverse Engineering Manufacturing Costs

| Effc'y Level <i>SEER/HSPF</i> | Installed Consumer Cost <i>1998\$</i> | Annual Energy Use <i>kWh/yr</i> | Annual Repair Cost <i>1998\$</i> | Annual Maint. Cost <i>1998\$</i> | Annual Operating Expense <i>1998\$</i> | Assumed 2006 Effc'y Distr. | Weighted-Avg of Units Sold below Effc'y | | Rebutt. Payback Period <i>years</i> |
|----------------------------------|--|------------------------------------|-------------------------------------|-------------------------------------|---|----------------------------|--|---|--|
| | | | | | | | Installed Consumer Cost <i>1998\$</i> | Annual Operating Expense <i>1998\$</i> | |
| 10 / 6.8 | \$3,668 | 11,844 | \$38 | \$36 | \$894 | 59.3% | - | - | - |
| 11 / 7.1 | \$3,723 | 11,168 | \$38 | \$36 | \$850 | 15.0% | \$3,668 | \$894 | 1.3 |
| 12 / 7.4 | \$3,812 | 10,575 | \$38 | \$36 | \$812 | 19.7% | \$3,679 | \$885 | 1.8 |
| 13 / 7.7 | \$4,000 | 10,049 | \$39 | \$36 | \$778 | 4.5% | \$3,707 | \$870 | 3.2 |
| 18 / 8.8 | \$4,707 | 8,370 | \$66 | \$36 | \$697 | 0.5% | \$3,734 | \$864 | 5.8 |

Table 5.60S Summary of Rebuttable PBPs and Inputs for Single Package Air Conditioners based on Reverse Engineering Manufacturing Costs

| Effc'y Level <i>SEER</i> | Installed Consumer Cost <i>1998\$</i> | Annual Energy Use <i>kWh/yr</i> | Annual Repair Cost <i>1998\$</i> | Annual Maint. Cost <i>1998\$</i> | Annual Operating Expense <i>1998\$</i> | Assumed 2006 Effc'y Distr. | Weighted-Avg of Units Sold below Effc'y | | Rebutt. Payback Period <i>years</i> |
|-----------------------------|--|------------------------------------|-------------------------------------|-------------------------------------|---|----------------------------|--|---|--|
| | | | | | | | Installed Consumer Cost <i>1998\$</i> | Annual Operating Expense <i>1998\$</i> | |
| 10 | \$2,607 | 3,600 | \$34 | \$36 | \$365 | 82.3% | - | - | - |
| 11 | \$2,696 | 3,273 | \$34 | \$36 | \$339 | 9.7% | \$2,607 | \$365 | 3.5 |
| 12 | \$2,765 | 3,000 | \$34 | \$36 | \$318 | 6.8% | \$2,616 | \$362 | 3.3 |
| 13 | \$3,032 | 2,769 | \$35 | \$36 | \$300 | 1.2% | \$2,627 | \$359 | 6.8 |
| 18 | \$3,466 | 2,000 | \$57 | \$36 | \$261 | 0.0% | \$2,632 | \$358 | 8.6 |

Table 5.61S Summary of Rebuttable PBPs and Inputs for Single Package Heat Pumps based on Reverse Engineering Manufacturing Costs

| Effc'y Level <i>SEER/HSPF</i> | Installed Consumer Cost <i>1998\$</i> | Annual Energy Use <i>kWh/yr</i> | Annual Repair Cost <i>1998\$</i> | Annual Maint. Cost <i>1998\$</i> | Annual Operating Expense <i>1998\$</i> | Assumed 2006 Effc'y Distr. | Weighted-Avg of Units Sold below Effc'y | | Rebutt. Payback Period <i>years</i> |
|---|---|---|--|--|--|-----------------------------------|---|--|---|
| | | | | | | | Installed Consumer Cost <i>1998\$</i> | Annual Operating Expense <i>1998\$</i> | |
| 10 / 6.8 | \$3,599 | 11,844 | \$39 | \$36 | \$895 | 64.2% | - | - | - |
| 11 / 7.1 | \$3,691 | 11,168 | \$39 | \$36 | \$852 | 13.6% | \$3,599 | \$895 | 2.1 |
| 12 / 7.4 | \$3,748 | 10,575 | \$40 | \$36 | \$814 | 22.2% | \$3,615 | \$888 | 1.8 |
| 13 / 7.7 | \$4,034 | 10,049 | \$40 | \$36 | \$780 | 0.0% | \$3,645 | \$871 | 4.3 |
| 18 / 8.8 | \$4,584 | 8,370 | \$66 | \$36 | \$696 | 0.0% | \$3,645 | \$871 | 5.4 |

J.2 SUPPLEMENTAL TABLES AND FIGURES TO CHAPTER 7

Table 7.11S Cumulative NES Results based on Reverse Engineering Manufacturing Costs and AEO2000 Reference Case (2006 - 2030)

| Trial Standard Level | Efficiency Scenario | | |
|----------------------|---------------------|--------------|--------------|
| | NAECA | Roll-up | Shift |
| | <i>Quads</i> | <i>Quads</i> | <i>Quads</i> |
| 1 | 1.7 | 1.5 | 1.9 |
| 2 | 3.0 | 2.9 | 3.5 |
| 3 | 3.5 | 3.4 | 3.9 |
| 4 | 4.3 | 4.2 | 4.7 |
| 5 | 8.6 | 8.8 | 8.6 |

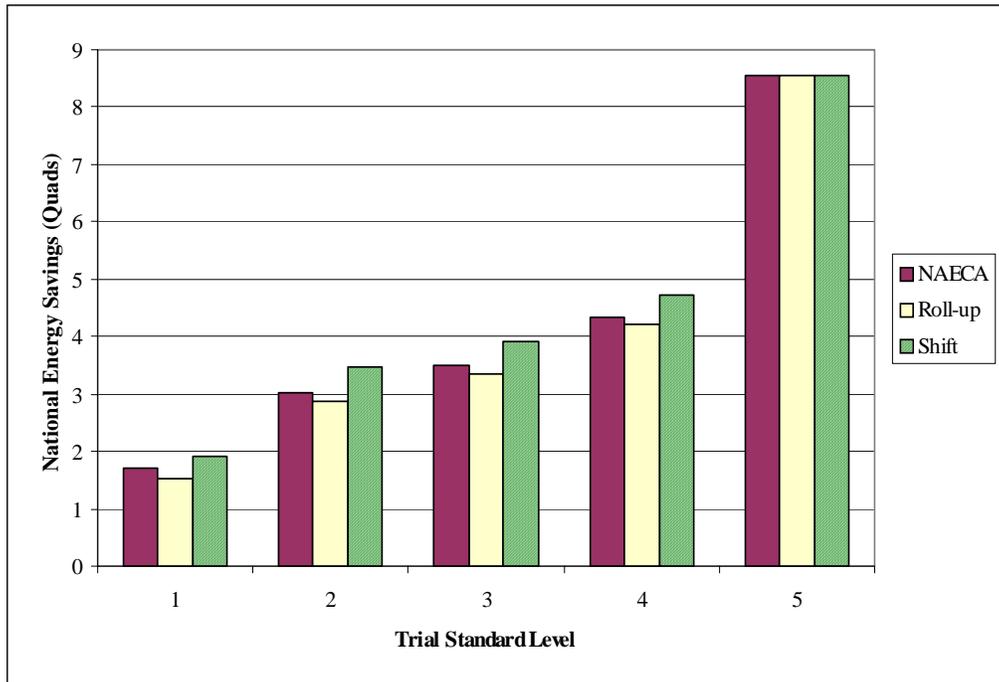


Figure 7.2S Cumulative NES Results based on Reverse Engineering Manufacturing Costs and AEO2000 Reference Case (2006-2030)

Table 7.12S Cumulative NES Results based on Reverse Engineering Manufacturing Costs and AEO2000 Low Growth Case (2006 - 2030)

| Trial Standard Level | Efficiency Scenario | | |
|----------------------|---------------------|--------------|--------------|
| | NAECA | Roll-up | Shift |
| | <i>Quads</i> | <i>Quads</i> | <i>Quads</i> |
| 1 | 1.7 | 1.5 | 1.9 |
| 2 | 2.9 | 2.8 | 3.4 |
| 3 | 3.4 | 3.3 | 3.8 |
| 4 | 4.3 | 4.1 | 4.7 |
| 5 | 8.4 | 8.4 | 8.4 |

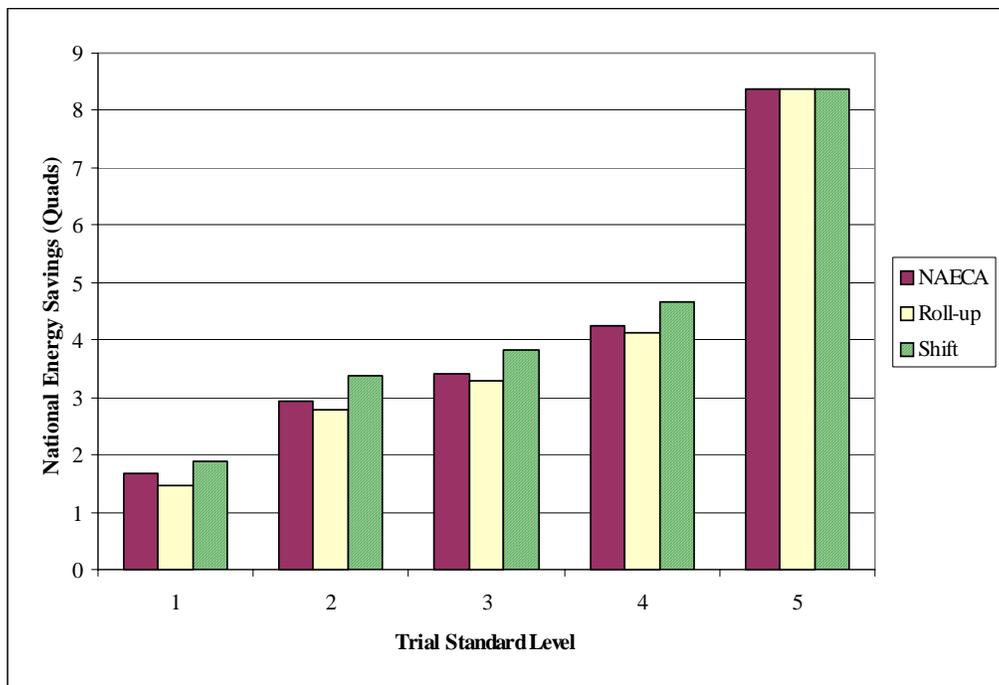


Figure 7.3S Cumulative NES Results based on Reverse Engineering Manufacturing Costs and AEO2000 Low Growth Case (2006-2030)

Table 7.13S Cumulative NES Results based on Reverse Engineering Manufacturing Costs and AEO2000 High Growth Case (2006 - 2030)

| Trial Standard Level | Efficiency Scenario | | |
|----------------------|---------------------|--------------|--------------|
| | NAECA | Roll-up | Shift |
| | <i>Quads</i> | <i>Quads</i> | <i>Quads</i> |
| 1 | 1.8 | 1.6 | 2.0 |
| 2 | 3.2 | 3.0 | 3.6 |
| 3 | 3.7 | 3.5 | 4.1 |
| 4 | 4.6 | 4.4 | 5.0 |
| 5 | 9.0 | 9.0 | 9.0 |

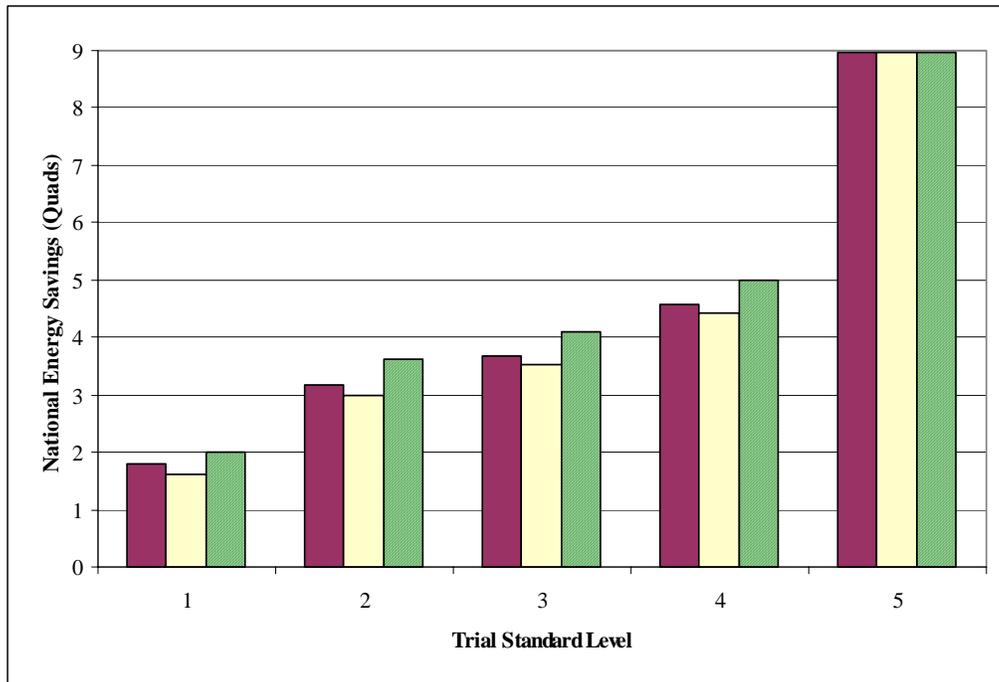


Figure 7.4S Cumulative NES Results based on Reverse Engineering Manufacturing Costs and AEO2000 High Growth Case (2006-2030)

Table 7.14S Cumulative NPV Results based on Reverse Engineering Manufacturing Costs and AEO2000 Reference Case (2006 - 2030)

| TSL | Base Case Total <i>billion 98\$</i> | Efficiency Scenario | | | | | | | | |
|-----|---|------------------------------|----------------------------|--|------------------------------|----------------------------|--|------------------------------|----------------------------|--|
| | | NAECA | | | Roll-up | | | Shift | | |
| | | Total <i>billion 98\$</i> | NPV <i>billion 98\$</i> | <i>as % of Base Case Total</i> | Total <i>billion 98\$</i> | NPV <i>billion 98\$</i> | <i>as % of Base Case Total</i> | Total <i>billion 98\$</i> | NPV <i>billion 98\$</i> | <i>as % of Base Case Total</i> |
| 1 | \$379 | \$378 | \$2 | 0.4% | \$377 | \$2 | 0.5% | \$378 | \$1 | 0.4% |
| 2 | \$379 | \$377 | \$2 | 0.5% | \$377 | \$3 | 0.7% | \$380 | (\$1) | -0.2% |
| 3 | \$379 | \$378 | \$1 | 0.4% | \$377 | \$2 | 0.6% | \$381 | (\$2) | -0.5% |
| 4 | \$379 | \$379 | \$0 | 0.0% | \$378 | \$1 | 0.3% | \$383 | (\$4) | -0.9% |
| 5 | \$379 | \$390 | (\$10) | -2.7% | \$390 | (\$10) | -2.7% | \$390 | (\$10) | -2.7% |

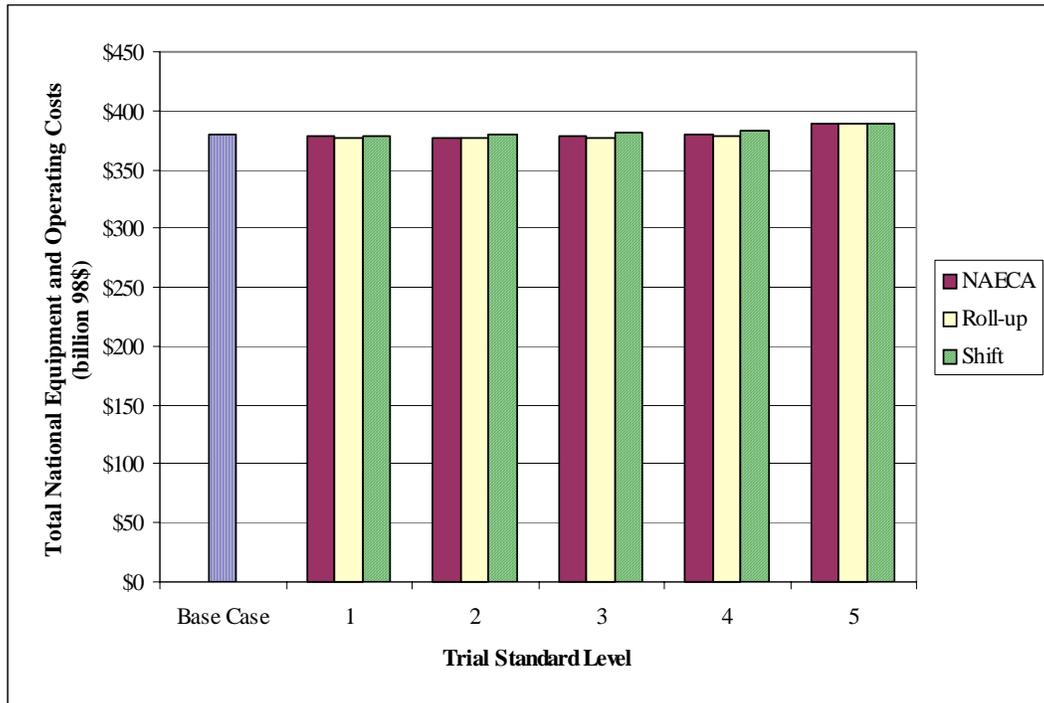


Figure 7.10S Cumulative Total National Equipment and Operating Costs based on Reverse Engineering Manufacturing Costs and AEO2000 Reference Case (2006 - 2030)

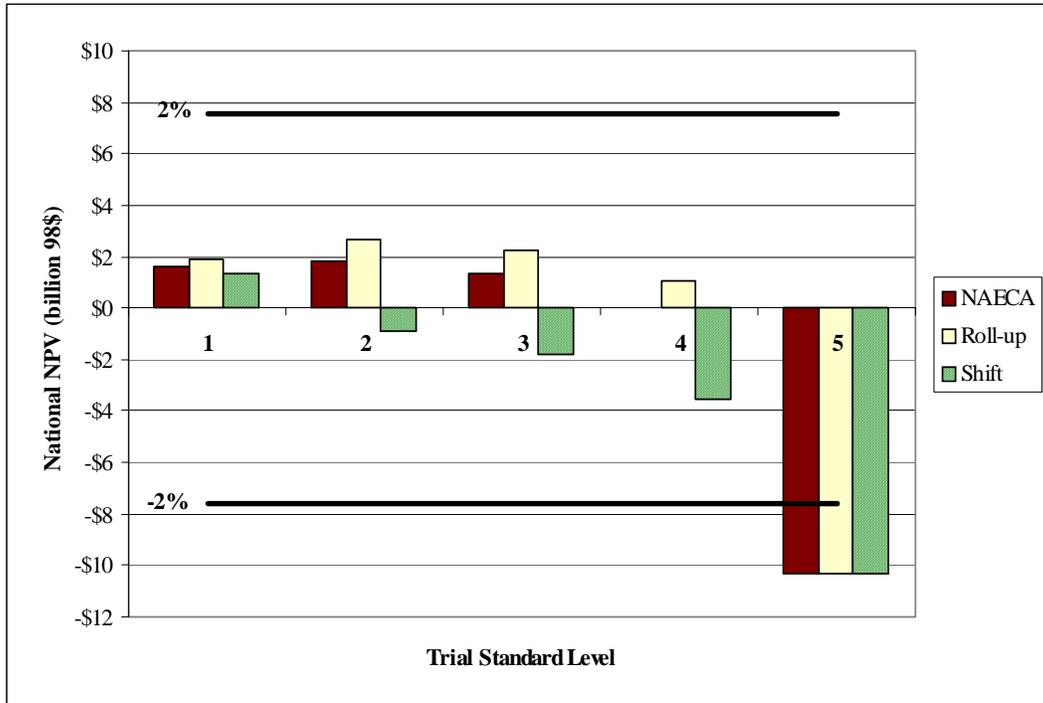


Figure 7.11S Cumulative NPVs relative to $\pm 2\%$ of Total National Base Case Costs based on Reverse Engineering Manufacturing Costs and AEO2000 Reference Case (2006 - 2030)

Table 7.15S Cumulative NPV Results based on Reverse Engineering Manufacturing Costs and AEO2000 Low Growth Case (2006 -2030)

| TSL | Base Case Total <i>billion 98\$</i> | Efficiency Scenario | | | | | | | | |
|-----|---|------------------------------|----------------------------|-------------------------------|------------------------------|----------------------------|-------------------------------|------------------------------|----------------------------|-------------------------------|
| | | NAECA | | | Roll-up | | | Shift | | |
| | | Total <i>billion 98\$</i> | NPV <i>billion 98\$</i> | as % of Base Case Total | Total <i>billion 98\$</i> | NPV <i>billion 98\$</i> | as % of Base Case Total | Total <i>billion 98\$</i> | NPV <i>billion 98\$</i> | as % of Base Case Total |
| 1 | \$367 | \$366 | \$1 | 0.4% | \$365 | \$2 | 0.5% | \$366 | \$1 | 0.3% |
| 2 | \$367 | \$366 | \$1 | 0.4% | \$365 | \$2 | 0.6% | \$368 | (\$1) | -0.3% |
| 3 | \$367 | \$366 | \$1 | 0.3% | \$365 | \$2 | 0.5% | \$369 | (\$2) | -0.5% |
| 4 | \$367 | \$367 | \$0 | -0.1% | \$366 | \$1 | 0.2% | \$371 | (\$4) | -1.0% |
| 5 | \$367 | \$378 | (\$11) | -2.9% | \$378 | (\$11) | -2.9% | \$378 | (\$11) | -2.9% |

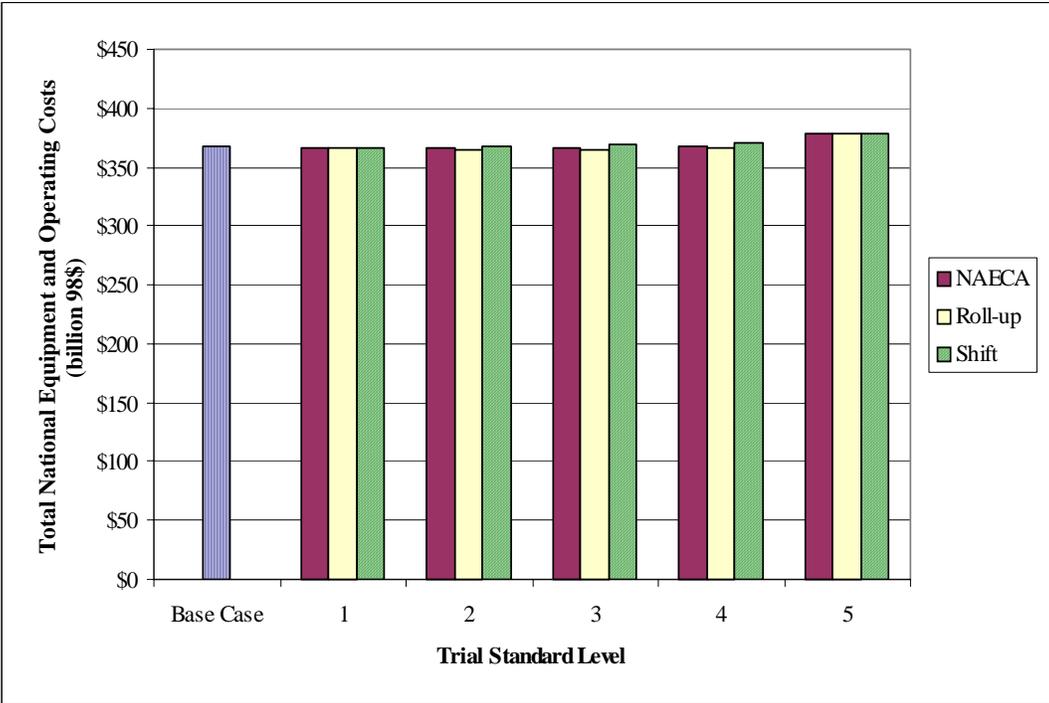


Figure 7.12S Cumulative Total National Equipment and Operating Costs based on Reverse Engineering Manufacturing Costs and AEO2000 Low Growth Case (2006 - 2030)

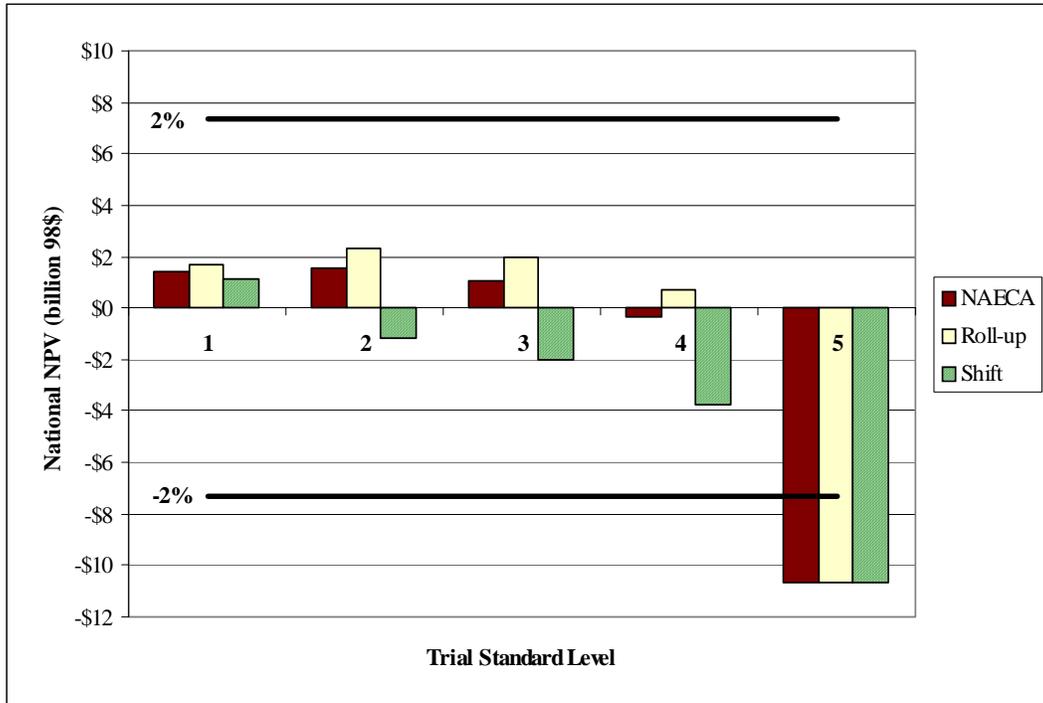


Figure 7.13S Cumulative National NPVs relative to ±2% of Total National Base Case Costs based on Reverse Engineering Manufacturing Costs and AEO2000 Low Growth Case (2006 - 2030)

Table 7.16S Cumulative NPV Results based on Reverse Engineering Manufacturing Costs and AEO2000 High Growth Case (2006 -2030)

| TSL | Base Case Total <i>billion 98\$</i> | Efficiency Scenario | | | | | | | | |
|-----|---|------------------------------|----------------------------|--|------------------------------|----------------------------|--|------------------------------|----------------------------|--|
| | | NAECA | | | Roll-up | | | Shift | | |
| | | Total <i>billion 98\$</i> | NPV <i>billion 98\$</i> | <i>as % of Base Case Total</i> | Total <i>billion 98\$</i> | NPV <i>billion 98\$</i> | <i>as % of Base Case Total</i> | Total <i>billion 98\$</i> | NPV <i>billion 98\$</i> | <i>as % of Base Case Total</i> |
| 1 | \$402 | \$400 | \$2 | 0.5% | \$400 | \$2 | 0.6% | \$400 | \$2 | 0.4% |
| 2 | \$402 | \$400 | \$2 | 0.6% | \$399 | \$3 | 0.8% | \$402 | \$0 | -0.1% |
| 3 | \$402 | \$400 | \$2 | 0.5% | \$399 | \$3 | 0.7% | \$403 | (\$1) | -0.3% |
| 4 | \$402 | \$401 | \$1 | 0.1% | \$400 | \$2 | 0.4% | \$405 | (\$3) | -0.8% |
| 5 | \$402 | \$412 | (\$10) | -2.4% | \$412 | (\$10) | -2.4% | \$412 | (\$10) | -2.4% |

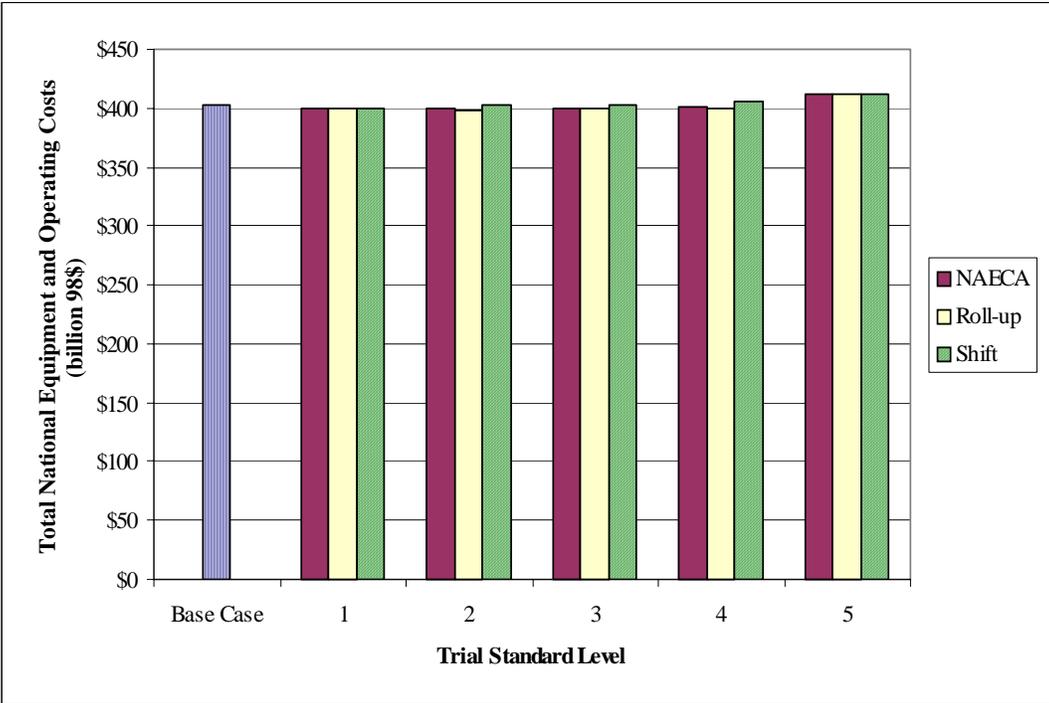


Figure 7.14S Cumulative Total National Equipment and Operating Costs based on Reverse Engineering Manufacturing Costs and AEO2000 High Growth Case (2006 - 2030)

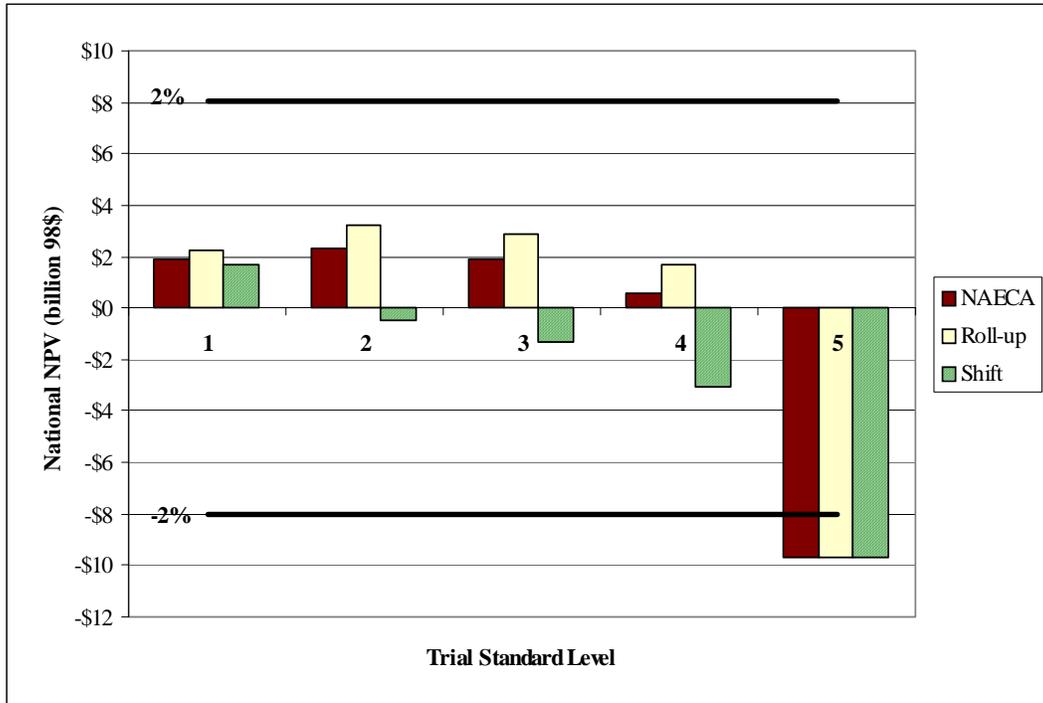


Figure 7.15S Cumulative National NPVs relative to ±2% of Total National Base Case Costs based on Reverse Engineering Manufacturing Costs and AEO2000 High Growth Case (2006 - 2030)

Table 7.19S Cumulative NPV Results based on Reverse Engineering Manufacturing Costs, NAECA Efficiency Scenario (2006 - 2030): 3% Discount Rate Scenario

| TSL | Base Case Total <i>billion 98\$</i> | TSL Total <i>billion 98\$</i> | TSL NPV | |
|-----|--|----------------------------------|---------------------|--------------------------------|
| | | | <i>billion 98\$</i> | <i>as % of Base Case Total</i> |
| 1 | \$708 | \$702 | \$6 | 0.9% |
| 2 | \$708 | \$698 | \$10 | 1.4% |
| 3 | \$708 | \$698 | \$10 | 1.4% |
| 4 | \$708 | \$699 | \$9 | 1.2% |
| 5 | \$708 | \$716 | (\$8) | -1.2% |

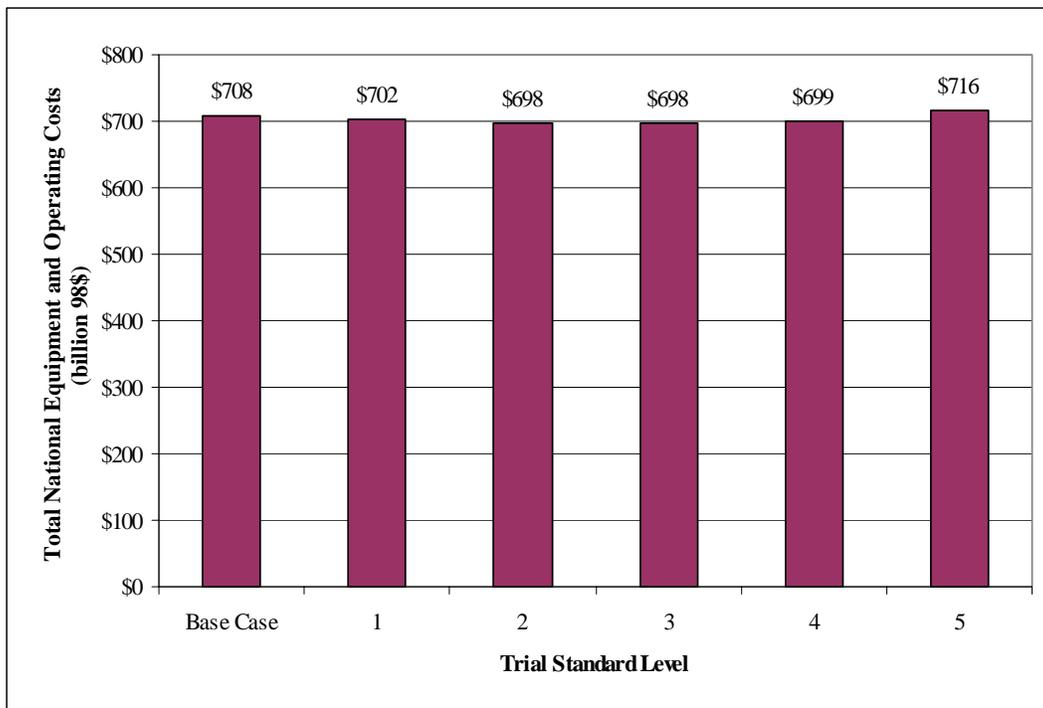


Figure 7.26S Cumulative Total National Equipment and Operating Costs based on Reverse Engineering Manufacturing Costs, NAECA Efficiency Scenario, and 3% Discount Rate Scenario (2006 - 2030)

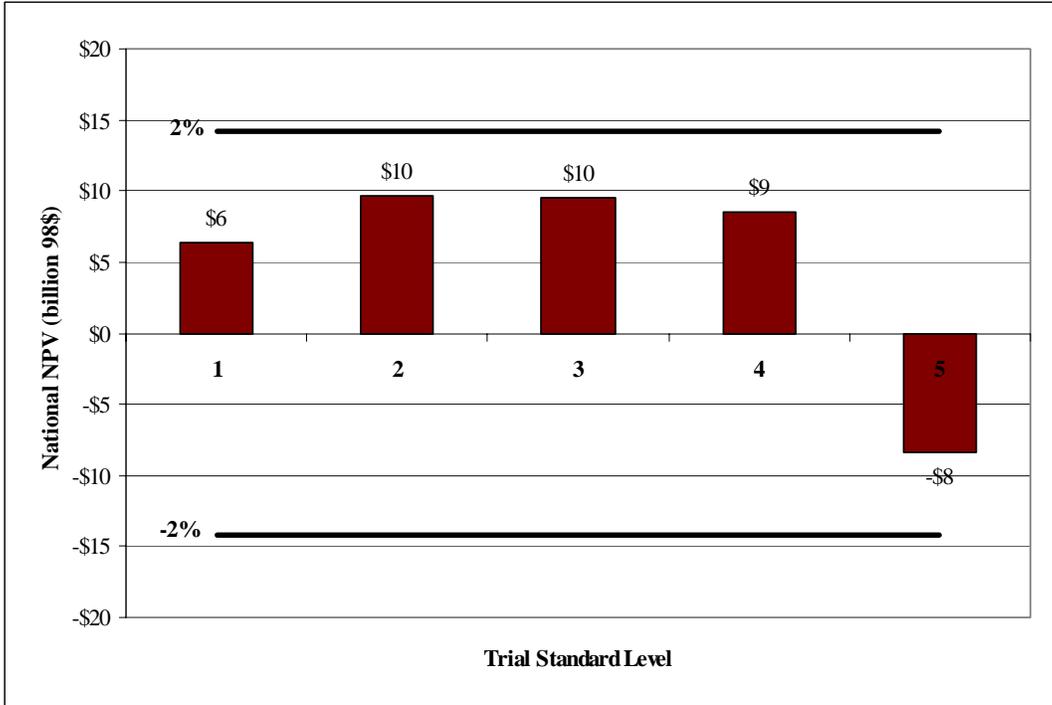


Figure 7.27S Cumulative National NPVs based on Reverse Engineering Manufacturing Costs, NAECA Efficiency Scenario, and 3% Discount Rate Scenario (2006 - 2030)

Table 7.19A Cumulative NPV Results based on Reverse Engineering Manufacturing Costs, Roll-up Efficiency Scenario (2006 - 2030): 3% Discount Rate Scenario

| TSL | Base Case Total <i>billion 98\$</i> | TSL Total <i>billion 98\$</i> | TSL NPV | |
|-----|--|----------------------------------|---------------------|--------------------------------|
| | | | <i>billion 98\$</i> | <i>as % of Base Case Total</i> |
| 1 | \$708 | \$701 | \$7 | 0.9% |
| 2 | \$708 | \$697 | \$11 | 1.6% |
| 3 | \$708 | \$697 | \$11 | 1.6% |
| 4 | \$708 | \$697 | \$11 | 1.5% |
| 5 | \$708 | \$716 | (\$8) | -1.2% |

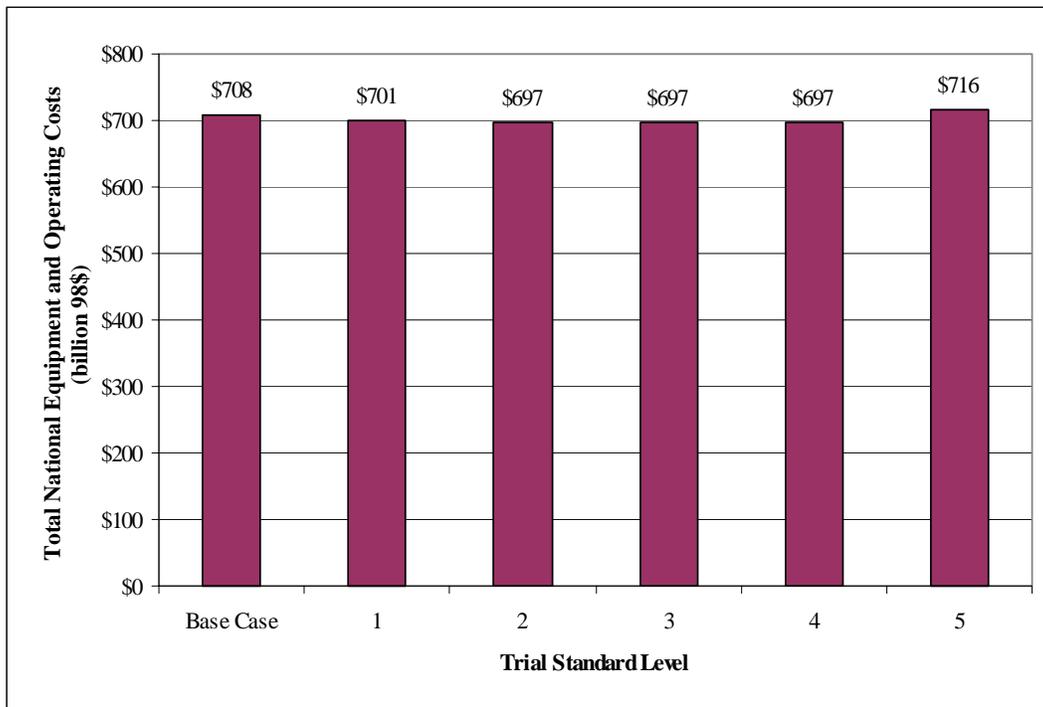


Table 7.26A Cumulative Total National Equipment and Operating Costs based on Reverse Engineering Manufacturing Costs, Roll-up Efficiency Scenario, and 3% Discount Rate Scenario (2006 - 2030)

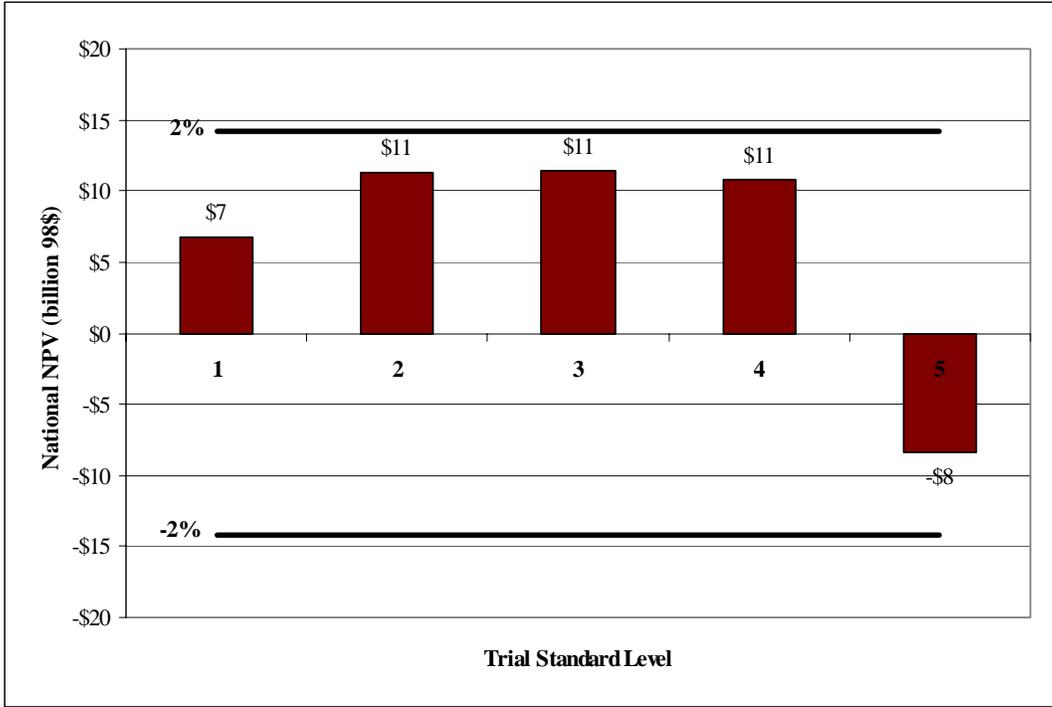


Table 7.27A Cumulative National NPVs based on Reverse Engineering Manufacturing Costs, Roll-up Efficiency Scenario, and 3% Discount Rate Scenario (2006 - 2030)

J.3 SUPPLEMENTAL TABLES TO CHAPTER 8

Table 8.14S Changes in Industry Net Present Value — Reverse Engineering Relative Cost, NAECA Efficiency Mix

| Standard Level | Industry Net Present Value (\$ million) | Change in INPV from Base Case | |
|----------------|--|-------------------------------|---------|
| | | \$ million | percent |
| Base | \$ 1,539 | -- | -- |
| 1 | \$ 1,509 | \$ (30) | -2% |
| 2 | \$ 1,380 | \$ (159) | -10% |
| 3 | \$ 1,368 | \$ (171) | -11% |
| 4 | \$ 1,370 | \$ (169) | -11% |

Table 8.15S Changes in Industry Net Present Value — Reverse Engineering Relative Cost, Roll-up Efficiency Mix

| Standard Level | Industry Net Present Value (\$ million) | Change in INPV from Base Case | |
|----------------|--|-------------------------------|---------|
| | | \$ million | percent |
| Base | \$ 1,539 | -- | -- |
| 1 | \$ 1,379 | \$ (160) | -10% |
| 2 | \$ 1,226 | \$ (313) | -20% |
| 3 | \$ 1,220 | \$ (319) | -21% |
| 4 | \$ 1,236 | \$ (303) | -20% |

Table 8.16S Changes in Industry Net Present Value — Reverse Engineering Relative Cost, Shift Efficiency Mix

| Standard Level | Industry Net Present Value (\$ million) | Change in INPV from Base Case | |
|----------------|---|-------------------------------|---------|
| | | \$ million | percent |
| Base | \$ 1,539 | -- | -- |
| 1 | \$ 1,658 | \$ 119 | 8% |
| 2 | \$ 1,772 | \$ 233 | 15% |
| 3 | \$ 1,776 | \$ 237 | 15% |
| 4 | \$ 1,824 | \$ 285 | 19% |

Table 8.29S Changes in Industry Net Present Value — Lower Operating Cost Subgroup, Reverse Engineering Relative Cost, NAECA Efficiency Scenario

| Standard Level | Industry Net Present Value (\$ million) | Change in INPV from Base Case | |
|----------------|---|-------------------------------|---------|
| | | \$ million | percent |
| Base | \$ 360 | -- | -- |
| 1 | \$ 365 | \$ 5 | 1% |
| 2 | \$ 368 | \$ 8 | 2% |
| 3 | \$ 368 | \$ 8 | 2% |
| 4 | \$ 390 | \$ 30 | 8% |

**Table 8.30S Changes in Industry Net Present Value — Lower Operating Cost Subgroup,
Reverse Engineering Relative Cost, Roll-up Efficiency Mix**

| Standard Level | Industry Net Present Value (\$ million) | Change in INPV from Base Case | |
|----------------|---|-------------------------------|---------|
| | | \$ million | percent |
| Base | \$ 360 | -- | -- |
| 1 | \$ 361 | \$ 1 | 0% |
| 2 | \$ 361 | \$ 1 | 0% |
| 3 | \$ 361 | \$ 1 | 0% |
| 4 | \$ 383 | \$ 23 | 6% |

**Table 8.31S Changes in Industry Net Present Value — Lower Operating Cost Subgroup,
Reverse Engineering Relative Cost, Shift Efficiency Mix**

| Standard Level | Industry Net Present Value (\$ million) | Change in INPV from Base Case | |
|----------------|---|-------------------------------|---------|
| | | \$ million | percent |
| Base | \$ 360 | -- | -- |
| 1 | \$ 370 | \$ 10 | 3% |
| 2 | \$ 383 | \$ 23 | 6% |
| 3 | \$ 391 | \$ 31 | 9% |
| 4 | \$ 413 | \$ 53 | 15% |

Table 8.32S Changes in Industry Net Present Value — Higher Operating Cost Subgroup, Reverse Engineering Relative Cost, NAECA Efficiency Scenario

| Standard Level | Industry Net Present Value (\$ million) | Change in INPV from Base Case | |
|----------------|---|-------------------------------|---------|
| | | \$ million | percent |
| Base | \$ 1,113 | -- | -- |
| 1 | \$ 1,046 | \$ (67) | -6% |
| 2 | \$ 926 | \$ (187) | -17% |
| 3 | \$ 906 | \$ (207) | -19% |
| 4 | \$ 907 | \$ (206) | -19% |

Table 8.33S Changes in Industry Net Present Value — Higher Operating Cost Subgroup, Reverse Engineering Relative Cost, Roll-up Efficiency Mix

| Standard Level | Industry Net Present Value (\$ million) | Change in INPV from Base Case | |
|----------------|---|-------------------------------|---------|
| | | \$ million | percent |
| Base | \$ 1,113 | -- | -- |
| 1 | \$ 938 | \$ (175) | -16% |
| 2 | \$ 793 | \$ (320) | -29% |
| 3 | \$ 775 | \$ (338) | -30% |
| 4 | \$ 790 | \$ (323) | -29% |

Table 8.34S Changes in Industry Net Present Value — Higher Operating Cost Subgroup, Reverse Engineering Relative Cost, Shift Efficiency Mix

| Standard Level | Industry Net Present Value (\$ million) | Change in INPV from Base Case | |
|----------------|---|-------------------------------|---------|
| | | \$ million | percent |
| Base | \$ 1,113 | -- | -- |
| 1 | \$ 1,174 | \$ 61 | 5% |
| 2 | \$ 1,235 | \$ 122 | 11% |
| 3 | \$ 1,267 | \$ 154 | 14% |
| 4 | \$ 1,299 | \$ 186 | 17% |

Table 8.35S Changes in ROIC in 2011 — Lower Operating Cost Subgroup

| Standard Level | Reverse Engineering NAECA | | Reverse Engineering Roll-up | | Reverse Engineering Shift | |
|----------------|-----------------------------------|--------------------------|-----------------------------------|--------------------------|-----------------------------------|--------------------------|
| | Return on Invested Capital (ROIC) | Change in ROIC from Base | Return on Invested Capital (ROIC) | Change in ROIC from Base | Return on Invested Capital (ROIC) | Change in ROIC from Base |
| Base | 13.2% | -- | 13.2% | -- | 13.2% | -- |
| 1 | 13.6% | 3% | 13.5% | 2% | 13.9% | 5% |
| 2 | 13.4% | 2% | 13.2% | 0% | 14.1% | 7% |
| 3 | 13.5% | 2% | 13.2% | 0% | 14.1% | 7% |
| 4 | 13.6% | 3% | 13.4% | 2% | 14.3% | 8% |

Table 8.36S Changes in ROIC in 2011 — Higher Operating Cost Subgroup

| Standard Level | Reverse Engineering NAECA | | Reverse Engineering Roll-up | | Reverse Engineering Shift | |
|----------------|-----------------------------------|--------------------------|-----------------------------------|--------------------------|-----------------------------------|--------------------------|
| | Return on Invested Capital (ROIC) | Change in ROIC from Base | Return on Invested Capital (ROIC) | Change in ROIC from Base | Return on Invested Capital (ROIC) | Change in ROIC from Base |
| Base | 13.0% | -- | 13.0% | -- | 13.0% | -- |
| 1 | 12.2% | -6% | 10.7% | -18% | 14.0% | 8% |
| 2 | 10.2% | -22% | 8.5% | -35% | 14.4% | 11% |
| 3 | 10.0% | -23% | 8.4% | -35% | 14.2% | 9% |
| 4 | 9.7% | -25% | 8.4% | -35% | 14.1% | 8% |

J.4 SUPPLEMENTAL TABLES TO CHAPTER 10

Table 10.3S Split A/C: LCC Result Comparisons between Low-Income Households and Overall Sample based on Reverse Engineering Manufacturing Costs

| Efficiency SEER | Low-Income Households | | | | | All Households and Commercial Buildings | | | | |
|-----------------|-----------------------|-------------------------|-------------------|-------------------|-----------------|---|-------------------------|-------------------|-------------------|-----------------|
| | Average LCC | Avg LCC (Savings) Costs | Net Savings (>2%) | No Signif. Impact | Net Costs (>2%) | Average LCC | Avg LCC (Savings) Costs | Net Savings (>2%) | No Signif. Impact | Net Costs (>2%) |
| 10 | \$4,906 | - | - | - | - | \$5,170 | - | - | - | - |
| 11 | \$4,855 | (\$51) | 21% | 74% | 5% | \$5,095 | (\$75) | 28% | 70% | 2% |
| 12 | \$4,841 | (\$65) | 28% | 38% | 34% | \$5,057 | (\$113) | 35% | 40% | 25% |
| 13 | \$4,863 | (\$43) | 26% | 24% | 50% | \$5,057 | (\$113) | 34% | 27% | 39% |
| 18 | \$5,176 | \$270 | 17% | 6% | 77% | \$5,307 | \$137 | 25% | 7% | 68% |

Table 10.4S Split Heat Pump: LCC Result Comparisons between Low-Income Households and Overall Sample based on Reverse Engineering Manufacturing Costs

| Efficiency SEER | Low-Income Households | | | | | All Households and Commercial Buildings | | | | |
|-----------------|-----------------------|-------------------------|-------------------|-------------------|-----------------|---|-------------------------|-------------------|-------------------|-----------------|
| | Average LCC | Avg LCC (Savings) Costs | Net Savings (>2%) | No Signif. Impact | Net Costs (>2%) | Average LCC | Avg LCC (Savings) Costs | Net Savings (>2%) | No Signif. Impact | Net Costs (>2%) |
| 10 | \$8,965 | - | - | - | - | \$9,679 | - | - | - | - |
| 11 | \$8,836 | (\$129) | 26% | 74% | 0% | \$9,470 | (\$209) | 40% | 60% | 0% |
| 12 | \$8,742 | (\$223) | 44% | 56% | 0% | \$9,314 | (\$365) | 58% | 42% | 0% |
| 13 | \$8,780 | (\$185) | 39% | 49% | 12% | \$9,307 | (\$372) | 52% | 42% | 6% |
| 18 | \$9,389 | \$424 | 15% | 10% | 75% | \$9,720 | \$41 | 28% | 15% | 57% |

Table 10.5S Package A/C: LCC Result Comparisons between Low-Income Households and Overall Sample based on Reverse Engineering Manufacturing Costs

| Efficiency SEER | Low-Income Households | | | | | All Households and Commercial Buildings | | | | |
|-----------------|-----------------------|-------------------------|-------------------|-------------------|-----------------|---|-------------------------|-------------------|-------------------|-----------------|
| | Average LCC | Avg LCC (Savings) Costs | Net Savings (>2%) | No Signif. Impact | Net Costs (>2%) | Average LCC | Avg LCC (Savings) Costs | Net Savings (>2%) | No Signif. Impact | Net Costs (>2%) |
| 10 | \$5,327 | - | - | - | - | \$5,629 | - | - | - | - |
| 11 | \$5,272 | (\$55) | 21% | 77% | 2% | \$5,551 | (\$78) | 27% | 72% | 1% |
| 12 | \$5,202 | (\$125) | 34% | 52% | 14% | \$5,466 | (\$163) | 40% | 51% | 9% |
| 13 | \$5,364 | \$37 | 21% | 18% | 61% | \$5,600 | (\$29) | 28% | 20% | 52% |
| 18 | \$5,704 | \$377 | 15% | 5% | 80% | \$5,905 | \$276 | 21% | 6% | 73% |

Table 10.6S Package Heat Pump: LCC Result Comparisons between Low-Income Households and Overall Sample based on Reverse Engineering Manufacturing Costs

| Efficiency SEER | Low-Income Households | | | | | All Households and Commercial Buildings | | | | |
|-----------------|-----------------------|-------------------------|-------------------|-------------------|-----------------|---|-------------------------|-------------------|-------------------|-----------------|
| | Average LCC | Avg LCC (Savings) Costs | Net Savings (>2%) | No Signif. Impact | Net Costs (>2%) | Average LCC | Avg LCC (Savings) Costs | Net Savings (>2%) | No Signif. Impact | Net Costs (>2%) |
| 10 | \$9,149 | - | - | - | - | \$9,626 | - | - | - | - |
| 11 | \$9,031 | (\$118) | 24% | 76% | 0% | \$9,419 | (\$207) | 39% | 61% | 0% |
| 12 | \$8,884 | (\$265) | 52% | 48% | 0% | \$9,205 | (\$421) | 66% | 34% | 0% |
| 13 | \$9,001 | (\$148) | 36% | 44% | 20% | \$9,273 | (\$353) | 50% | 38% | 12% |
| 18 | \$9,433 | \$284 | 20% | 14% | 66% | \$9,460 | (\$166) | 37% | 15% | 48% |

J.5 SUPPLEMENTAL TABLES TO CHAPTER 11

Table 11.2S Standard Level 1 Forecast based on Reverse Engineering Manufacturing Costs, NAECA Efficiency Scenario

| NEMS-BRS Results: | | | | | | Difference from AEO2000 Reference | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|--|-------------|-------------|-------------|-------------|-------------|---------------|-------------|
| | 2000 | 2005 | 2010 | 2015 | 2020 | | | | | | | Extrapolation | |
| | | | | | | | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| <i>Residential Sector Energy Consumption</i> | | | | | | <i>Residential Sector Energy Consumption</i> | | | | | | | |
| Electricity Sales (TWh) | 1,185 | 1,281 | 1,375 | 1,454 | 1,539 | Electricity Sales (TWh) | 0.0 | 0.0 | -4.3 | -9.8 | -14.4 | -17.5 | -19.5 |
| <i>Total U.S. Electric Generation</i> | | | | | | <i>Total U.S. Electric Generation</i> | | | | | | | |
| Coal (TWh) | 1,930 | 2,127 | 2,171 | 2,249 | 2,341 | Coal (TWh) | 0.0 | 0.0 | -1.1 | -2.3 | -6.1 | -6.1 | -6.1 |
| Gas (TWh) | 601 | 717 | 998 | 1,289 | 1,467 | Gas (TWh) | 0.0 | 0.0 | -3.0 | -8.3 | -9.1 | -9.1 | -9.1 |
| Petroleum (TWh) | 90 | 68 | 53 | 47 | 45 | Petroleum (TWh) | 0.0 | 0.0 | -0.5 | 0.2 | 0.9 | 0.9 | 0.9 |
| Nuclear (TWh) | 688 | 674 | 627 | 511 | 427 | Nuclear (TWh) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (TWh) | 389 | 411 | 429 | 437 | 447 | Renewables (TWh) | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| Total (TWh) | 3,698 | 3,997 | 4,278 | 4,533 | 4,727 | Total (TWh) | 0.0 | 0.0 | -4.6 | -10.2 | -14.3 | -14.3 | -14.3 |
| <i>Installed Generating Capacity</i> | | | | | | <i>Installed Generating Capacity</i> | | | | | | | |
| Coal (GW) | 315.3 | 310.6 | 310.7 | 315.6 | 325.2 | Coal (GW) | 0.0 | 0.0 | 0.0 | -0.2 | -0.8 | -0.8 | -0.8 |
| Other Fossil (GW) | 274.8 | 334.0 | 404.2 | 458.0 | 501.9 | Other Fossil (GW) | 0.0 | 0.0 | -0.5 | -3.8 | -5.7 | -5.7 | -5.7 |
| Nuclear (GW) | 97.5 | 93.4 | 84.1 | 67.4 | 57.0 | Nuclear (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (GW) | 94.7 | 98.5 | 101.7 | 103.8 | 105.7 | Renewables (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total (GW) | 782.3 | 836.5 | 900.6 | 944.8 | 989.8 | Total (GW) | 0.0 | 0.0 | -0.6 | -4.0 | -6.5 | -6.5 | -6.5 |

Table 11.3S Standard Level 2 Forecast based on Reverse Engineering Manufacturing Costs, NAECA Efficiency Scenario

| NEMS-BRS Results: | | | | | | Difference from AEO2000 Reference | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|--|-------------|-------------|-------------|-------------|-------------|---------------|-------------|
| | 2000 | 2005 | 2010 | 2015 | 2020 | | | | | | | Extrapolation | |
| | | | | | | | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| <i>Residential Sector Energy Consumption</i> | | | | | | <i>Residential Sector Energy Consumption</i> | | | | | | | |
| Electricity Sales (TWh) | 1,185 | 1,281 | 1,371 | 1,447 | 1,527 | Electricity Sales (TWh) | 0.0 | 0.0 | -7.6 | -17.3 | -25.6 | -31.0 | -34.6 |
| <i>Total U.S. Electric Generation</i> | | | | | | <i>Total U.S. Electric Generation</i> | | | | | | | |
| Coal (TWh) | 1,930 | 2,127 | 2,169 | 2,247 | 2,337 | Coal (TWh) | 0.0 | 0.0 | -2.6 | -4.2 | -10.3 | -10.3 | -10.3 |
| Gas (TWh) | 601 | 717 | 997 | 1,283 | 1,460 | Gas (TWh) | 0.0 | 0.0 | -4.4 | -13.9 | -15.7 | -15.7 | -15.7 |
| Petroleum (TWh) | 90 | 68 | 53 | 47 | 45 | Petroleum (TWh) | 0.0 | 0.0 | -1.0 | 0.2 | 1.3 | 1.3 | 1.3 |
| Nuclear (TWh) | 688 | 674 | 627 | 511 | 427 | Nuclear (TWh) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (TWh) | 389 | 411 | 429 | 437 | 447 | Renewables (TWh) | 0.0 | 0.0 | 0.0 | 0.2 | -0.1 | -0.1 | -0.1 |
| Total (TWh) | 3,698 | 3,997 | 4,275 | 4,525 | 4,716 | Total (TWh) | 0.0 | 0.0 | -7.9 | -17.7 | -24.8 | -24.8 | -24.8 |
| <i>Installed Generating Capacity</i> | | | | | | <i>Installed Generating Capacity</i> | | | | | | | |
| Coal (GW) | 315.3 | 310.6 | 310.7 | 315.4 | 324.7 | Coal (GW) | 0.0 | 0.0 | 0.0 | -0.4 | -1.3 | -1.3 | -1.3 |
| Other Fossil (GW) | 274.8 | 334.0 | 403.8 | 455.5 | 498.3 | Other Fossil (GW) | 0.0 | 0.0 | -0.9 | -6.3 | -9.3 | -9.3 | -9.3 |
| Nuclear (GW) | 97.5 | 93.4 | 84.1 | 67.4 | 57.0 | Nuclear (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (GW) | 94.7 | 98.5 | 101.7 | 103.8 | 105.7 | Renewables (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total (GW) | 782.3 | 836.5 | 900.3 | 942.2 | 985.7 | Total (GW) | 0.0 | 0.0 | -0.9 | -6.6 | -10.6 | -10.6 | -10.6 |

Table 11.4S Standard Level 3 Forecast based on Reverse Engineering Manufacturing Costs, NAECA Efficiency Scenario

| NEMS-BRS Results: | | | | | | Difference from AEO2000 Reference | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|--|-------------|-------------|-------------|-------------|-------------|---------------|-------------|
| | 2000 | 2005 | 2010 | 2015 | 2020 | | | | | | | Extrapolation | |
| | | | | | | | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| <i>Residential Sector Energy Consumption</i> | | | | | | <i>Residential Sector Energy Consumption</i> | | | | | | | |
| Electricity Sales (TWh) | 1,185 | 1,281 | 1,370 | 1,444 | 1,523 | Electricity Sales (TWh) | 0.0 | 0.0 | -8.8 | -20.1 | -29.7 | -36.1 | -40.3 |
| <i>Total U.S. Electric Generation</i> | | | | | | <i>Total U.S. Electric Generation</i> | | | | | | | |
| Coal (TWh) | 1,930 | 2,127 | 2,169 | 2,246 | 2,335 | Coal (TWh) | 0.0 | 0.0 | -3.0 | -4.9 | -12.0 | -12.0 | -12.0 |
| Gas (TWh) | 601 | 717 | 996 | 1,281 | 1,458 | Gas (TWh) | 0.0 | 0.0 | -5.1 | -16.1 | -18.2 | -18.2 | -18.2 |
| Petroleum (TWh) | 90 | 68 | 53 | 47 | 45 | Petroleum (TWh) | 0.0 | 0.0 | -1.2 | 0.3 | 1.5 | 1.5 | 1.5 |
| Nuclear (TWh) | 688 | 674 | 627 | 511 | 427 | Nuclear (TWh) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (TWh) | 389 | 411 | 429 | 437 | 447 | Renewables (TWh) | 0.0 | 0.0 | 0.0 | 0.2 | -0.1 | -0.1 | -0.1 |
| Total (TWh) | 3,698 | 3,997 | 4,274 | 4,522 | 4,712 | Total (TWh) | 0.0 | 0.0 | -9.2 | -20.6 | -28.8 | -28.8 | -28.8 |
| <i>Installed Generating Capacity</i> | | | | | | <i>Installed Generating Capacity</i> | | | | | | | |
| Coal (GW) | 315.3 | 310.6 | 310.7 | 315.4 | 324.5 | Coal (GW) | 0.0 | 0.0 | 0.0 | -0.4 | -1.5 | -1.5 | -1.5 |
| Other Fossil (GW) | 274.8 | 334.0 | 403.7 | 454.5 | 496.8 | Other Fossil (GW) | 0.0 | 0.0 | -1.0 | -7.3 | -10.8 | -10.8 | -10.8 |
| Nuclear (GW) | 97.5 | 93.4 | 84.1 | 67.4 | 57.0 | Nuclear (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (GW) | 94.7 | 98.5 | 101.7 | 103.8 | 105.7 | Renewables (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total (GW) | 782.3 | 836.5 | 900.1 | 941.1 | 983.9 | Total (GW) | 0.0 | 0.0 | -1.1 | -7.7 | -12.4 | -12.4 | -12.4 |

Table 11.5S Standard Level 4 Forecast based on Reverse Engineering Manufacturing Costs, NAECA Efficiency Scenario

| NEMS-BRS Results: | | | | | | Difference from AEO2000 Reference | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|--|-------------|-------------|-------------|-------------|---------------|-------------|-------------|
| | 2000 | 2005 | 2010 | 2015 | 2020 | | | | | | Extrapolation | | |
| | | | | | | | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| <i>Residential Sector Energy Consumption</i> | | | | | | <i>Residential Sector Energy Consumption</i> | | | | | | | |
| Electricity Sales (TWh) | 1,185 | 1,281 | 1,368 | 1,439 | 1,516 | Electricity Sales (TWh) | 0.0 | 0.0 | -10.9 | -24.9 | -36.9 | -44.9 | -50.2 |
| <i>Total U.S. Electric Generation</i> | | | | | | <i>Total U.S. Electric Generation</i> | | | | | | | |
| Coal (TWh) | 1,930 | 2,127 | 2,171 | 2,245 | 2,332 | Coal (TWh) | 0.0 | 0.0 | -1.1 | -5.8 | -14.7 | -14.7 | -14.7 |
| Gas (TWh) | 601 | 717 | 992 | 1,277 | 1,454 | Gas (TWh) | 0.0 | 0.0 | -8.7 | -20.3 | -22.5 | -22.5 | -22.5 |
| Petroleum (TWh) | 90 | 68 | 53 | 47 | 46 | Petroleum (TWh) | 0.0 | 0.0 | -1.0 | 0.5 | 2.0 | 2.0 | 2.0 |
| Nuclear (TWh) | 688 | 674 | 627 | 511 | 427 | Nuclear (TWh) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (TWh) | 389 | 411 | 429 | 437 | 447 | Renewables (TWh) | 0.0 | 0.0 | -0.2 | 0.5 | 0.0 | 0.0 | 0.0 |
| Total (TWh) | 3,698 | 3,997 | 4,272 | 4,518 | 4,706 | Total (TWh) | 0.0 | 0.0 | -11.0 | -25.2 | -35.2 | -35.2 | -35.2 |
| <i>Installed Generating Capacity</i> | | | | | | <i>Installed Generating Capacity</i> | | | | | | | |
| Coal (GW) | 315.3 | 310.6 | 310.7 | 315.3 | 324.1 | Coal (GW) | 0.0 | 0.0 | 0.0 | -0.5 | -1.9 | -1.9 | -1.9 |
| Other Fossil (GW) | 274.8 | 334.0 | 403.4 | 452.5 | 494.0 | Other Fossil (GW) | 0.0 | 0.0 | -1.3 | -9.3 | -13.6 | -13.6 | -13.6 |
| Nuclear (GW) | 97.5 | 93.4 | 84.1 | 67.4 | 57.0 | Nuclear (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (GW) | 94.7 | 98.5 | 101.7 | 103.8 | 105.7 | Renewables (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total (GW) | 782.3 | 836.5 | 899.8 | 939.0 | 980.8 | Total (GW) | 0.0 | 0.0 | -1.4 | -9.8 | -15.5 | -15.5 | -15.5 |

Figure 11.6S Standard Level 5 Forecast based on Reverse Engineering Manufacturing Costs, NAECA Efficiency Scenario

| NEMS-BRS Results: | | | | | | Difference from AEO2000 Reference | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|--|-------------|-------------|-------------|-------------|-------------|---------------|-------------|
| | 2000 | 2005 | 2010 | 2015 | 2020 | | | | | | | Extrapolation | |
| | | | | | | | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| <i>Residential Sector Energy Consumption</i> | | | | | | <i>Residential Sector Energy Consumption</i> | | | | | | | |
| Electricity Sales (TWh) | 1,185 | 1,281 | 1,358 | 1,416 | 1,480 | Electricity Sales (TWh) | 0.0 | 0.0 | -20.6 | -48.0 | -72.7 | -89.7 | -100.8 |
| <i>Total U.S. Electric Generation</i> | | | | | | <i>Total U.S. Electric Generation</i> | | | | | | | |
| Coal (TWh) | 1,930 | 2,127 | 2,169 | 2,240 | 2,320 | Coal (TWh) | 0.0 | 0.0 | -3.1 | -11.4 | -26.7 | -26.7 | -26.7 |
| Gas (TWh) | 601 | 717 | 986 | 1,261 | 1,437 | Gas (TWh) | 0.0 | 0.0 | -15.0 | -36.3 | -38.6 | -38.6 | -38.6 |
| Petroleum (TWh) | 90 | 68 | 52 | 47 | 42 | Petroleum (TWh) | 0.0 | 0.0 | -1.8 | 0.4 | -2.2 | -2.2 | -2.2 |
| Nuclear (TWh) | 688 | 674 | 627 | 511 | 427 | Nuclear (TWh) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (TWh) | 389 | 411 | 429 | 437 | 448 | Renewables (TWh) | 0.0 | 0.0 | -0.2 | 0.3 | 0.5 | 0.5 | 0.5 |
| Total (TWh) | 3,698 | 3,997 | 4,263 | 4,496 | 4,674 | Total (TWh) | 0.0 | 0.0 | -20.1 | -47.0 | -67.0 | -67.0 | -67.0 |
| <i>Installed Generating Capacity</i> | | | | | | <i>Installed Generating Capacity</i> | | | | | | | |
| Coal (GW) | 315.3 | 310.6 | 310.6 | 314.8 | 322.4 | Coal (GW) | 0.0 | 0.0 | -0.1 | -1.0 | -3.6 | -3.6 | -3.6 |
| Other Fossil (GW) | 274.8 | 334.0 | 402.4 | 445.0 | 482.4 | Other Fossil (GW) | 0.0 | 0.0 | -2.3 | -16.8 | -25.2 | -25.2 | -25.2 |
| Nuclear (GW) | 97.5 | 93.4 | 84.1 | 67.4 | 57.0 | Nuclear (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (GW) | 94.7 | 98.5 | 101.7 | 103.8 | 105.6 | Renewables (GW) | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 | -0.1 |
| Total (GW) | 782.3 | 836.5 | 898.8 | 931.0 | 967.5 | Total (GW) | 0.0 | 0.0 | -2.4 | -17.8 | -28.8 | -28.8 | -28.8 |

Table 11.7S Standard Level 4 Roll-up Forecast based on Reverse Engineering Manufacturing Costs

| NEMS-BRS Results: | | | | | | Difference from AEO2000 Reference | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|--|-------------|-------------|-------------|-------------|-------------|---------------|-------------|
| | 2000 | 2005 | 2010 | 2015 | 2020 | | | | | | | Extrapolation | |
| | | | | | | | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| <i>Residential Sector Energy Consumption</i> | | | | | | <i>Residential Sector Energy Consumption</i> | | | | | | | |
| Electricity Sales (TWh) | 1,185 | 1,281 | 1,368 | 1,440 | 1,517 | Electricity Sales (TWh) | 0.0 | 0.0 | -10.6 | -24.2 | -35.8 | -43.6 | -48.7 |
| <i>Total U.S. Electric Generation</i> | | | | | | <i>Total U.S. Electric Generation</i> | | | | | | | |
| Coal (TWh) | 1,930 | 2,127 | 2,170 | 2,245 | 2,332 | Coal (TWh) | 0.0 | 0.0 | -1.7 | -5.9 | -14.9 | -14.9 | -14.9 |
| Gas (TWh) | 601 | 717 | 993 | 1,277 | 1,454 | Gas (TWh) | 0.0 | 0.0 | -7.8 | -19.9 | -22.1 | -22.1 | -22.1 |
| Petroleum (TWh) | 90 | 68 | 53 | 47 | 46 | Petroleum (TWh) | 0.0 | 0.0 | -1.2 | 0.2 | 2.0 | 2.0 | 2.0 |
| Nuclear (TWh) | 688 | 674 | 627 | 511 | 427 | Nuclear (TWh) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (TWh) | 389 | 411 | 429 | 437 | 447 | Renewables (TWh) | 0.0 | 0.0 | -0.2 | 0.4 | 0.0 | 0.0 | 0.0 |
| Total (TWh) | 3,698 | 3,997 | 4,272 | 4,518 | 4,706 | Total (TWh) | 0.0 | 0.0 | -11.0 | -25.3 | -34.9 | -34.9 | -34.9 |
| <i>Installed Generating Capacity</i> | | | | | | <i>Installed Generating Capacity</i> | | | | | | | |
| Coal (GW) | 315.3 | 310.6 | 310.7 | 315.3 | 324.1 | Coal (GW) | 0.0 | 0.0 | 0.0 | -0.5 | -1.9 | -1.9 | -1.9 |
| Other Fossil (GW) | 274.8 | 334.0 | 403.4 | 452.7 | 494.1 | Other Fossil (GW) | 0.0 | 0.0 | -1.3 | -9.1 | -13.5 | -13.5 | -13.5 |
| Nuclear (GW) | 97.5 | 93.4 | 84.1 | 67.4 | 57.0 | Nuclear (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (GW) | 94.7 | 98.5 | 101.7 | 103.8 | 105.7 | Renewables (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total (GW) | 782.3 | 836.5 | 899.8 | 939.2 | 980.8 | Total (GW) | 0.0 | 0.0 | -1.4 | -9.6 | -15.5 | -15.5 | -15.5 |

Table 11.8S Standard Level 4 Shift Forecast based on Reverse Engineering Manufacturing Costs

| NEMS-BRS Results: | | | | | | Difference from AEO2000 Reference | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|--|-------------|-------------|-------------|-------------|-------------|---------------|-------------|
| | 2000 | 2005 | 2010 | 2015 | 2020 | | 2000 | 2005 | 2010 | 2015 | 2020 | Extrapolation | |
| | | | | | | | | | | | | 2025 | 2030 |
| <i>Residential Sector Energy Consumption</i> | | | | | | <i>Residential Sector Energy Consumption</i> | | | | | | | |
| Electricity Sales (TWh) | 1,185 | 1,281 | 1,367 | 1,437 | 1,513 | Electricity Sales (TWh) | 0.0 | 0.0 | -11.8 | -27.1 | -40.2 | -49.1 | -54.9 |
| <i>Total U.S. Electric Generation</i> | | | | | | <i>Total U.S. Electric Generation</i> | | | | | | | |
| Coal (TWh) | 1,930 | 2,127 | 2,169 | 2,245 | 2,331 | Coal (TWh) | 0.0 | 0.0 | -2.7 | -6.2 | -16.0 | -16.0 | -16.0 |
| Gas (TWh) | 601 | 717 | 993 | 1,276 | 1,452 | Gas (TWh) | 0.0 | 0.0 | -7.7 | -21.4 | -23.8 | -23.8 | -23.8 |
| Petroleum (TWh) | 90 | 68 | 53 | 47 | 46 | Petroleum (TWh) | 0.0 | 0.0 | -1.3 | 0.3 | 2.0 | 2.0 | 2.0 |
| Nuclear (TWh) | 688 | 674 | 627 | 511 | 427 | Nuclear (TWh) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (TWh) | 389 | 411 | 429 | 437 | 447 | Renewables (TWh) | 0.0 | 0.0 | -0.1 | 0.3 | 0.0 | 0.0 | 0.0 |
| Total (TWh) | 3,698 | 3,997 | 4,271 | 4,516 | 4,703 | Total (TWh) | 0.0 | 0.0 | -11.8 | -26.9 | -37.8 | -37.8 | -37.8 |
| <i>Installed Generating Capacity</i> | | | | | | <i>Installed Generating Capacity</i> | | | | | | | |
| Coal (GW) | 315.3 | 310.6 | 310.7 | 315.2 | 323.9 | Coal (GW) | 0.0 | 0.0 | 0.0 | -0.6 | -2.1 | -2.1 | -2.1 |
| Other Fossil (GW) | 274.8 | 334.0 | 403.4 | 452.1 | 493.2 | Other Fossil (GW) | 0.0 | 0.0 | -1.3 | -9.7 | -14.4 | -14.4 | -14.4 |
| Nuclear (GW) | 97.5 | 93.4 | 84.1 | 67.4 | 57.0 | Nuclear (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (GW) | 94.7 | 98.5 | 101.7 | 103.8 | 105.6 | Renewables (GW) | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 | -0.1 |
| Total (GW) | 782.3 | 836.5 | 899.8 | 938.5 | 979.7 | Total (GW) | 0.0 | 0.0 | -1.4 | -10.3 | -16.6 | -16.6 | -16.6 |

**Table 11.9S Standard Level 4 Low Economic Growth Forecast based on Reverse Engineering Manufacturing Costs,
NAECA Efficiency Scenario**

| NEMS-BRS Results: | | | | | | Difference from AEO2000 Lmac Reference | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|---|-------------|-------------|-------------|-------------|-------------|---------------|-------------|
| | 2000 | 2005 | 2010 | 2015 | 2020 | | 2000 | 2005 | 2010 | 2015 | 2020 | Extrapolation | |
| | | | | | | | | | | | | 2025 | 2030 |
| <i>Residential Sector Energy Consumption</i> | | | | | | <i>Residential Sector Energy Consumption</i> | | | | | | | |
| Electricity Sales (TWh) | 1,183 | 1,275 | 1,356 | 1,414 | 1,469 | Electricity Sales (TWh) | 0.0 | 0.0 | -10.4 | -23.8 | -35.8 | -44.6 | -50.6 |
| <i>Total U.S. Electric Generation</i> | | | | | | <i>Total U.S. Electric Generation</i> | | | | | | | |
| Coal (TWh) | 1,923 | 2,105 | 2,131 | 2,170 | 2,208 | Coal (TWh) | 0.0 | 0.0 | -2.9 | -2.1 | -7.6 | -7.6 | -7.6 |
| Gas (TWh) | 591 | 683 | 933 | 1,178 | 1,311 | Gas (TWh) | 0.0 | 0.0 | -7.4 | -21.9 | -26.2 | -26.2 | -26.2 |
| Petroleum(TWh) | 85 | 60 | 42 | 39 | 35 | Petroleum(TWh) | 0.0 | 0.0 | -0.8 | 0.5 | 0.8 | 0.8 | 0.8 |
| Nuclear (TWh) | 688 | 674 | 627 | 511 | 428 | Nuclear (TWh) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (TWh) | 388 | 409 | 425 | 433 | 441 | Renewables (TWh) | 0.0 | 0.0 | 0.1 | 0.1 | -0.4 | -0.4 | -0.4 |
| Total (TWh) | 3,675 | 3,931 | 4,158 | 4,331 | 4,423 | Total (TWh) | 0.0 | 0.0 | -11.0 | -23.4 | -33.2 | -33.2 | -33.2 |
| <i>Installed Generating Capacity</i> | | | | | | <i>Installed Generating Capacity</i> | | | | | | | |
| Coal (GW) | 315.3 | 309.6 | 308.0 | 309.4 | 310.8 | Coal (GW) | 0.0 | 0.0 | 0.0 | -0.1 | -0.6 | -0.6 | -0.6 |
| Other Fossil (GW) | 275.0 | 325.3 | 387.7 | 426.1 | 458.7 | Other Fossil (GW) | 0.0 | 0.0 | -1.3 | -8.8 | -13.9 | -13.9 | -13.9 |
| Nuclear (GW) | 97.5 | 93.4 | 84.1 | 67.4 | 57.0 | Nuclear (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (GW) | 94.7 | 98.3 | 101.2 | 103.0 | 104.4 | Renewables (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total (GW) | 782.5 | 826.6 | 881.0 | 905.8 | 930.9 | Total (GW) | 0.0 | 0.0 | -1.3 | -9.0 | -14.5 | -14.5 | -14.5 |

**Table 11.10S Standard Level 4 High Economic Growth Forecast based on Reverse Engineering Manufacturing Costs,
NAECA Efficiency Scenario**

| NEMS-BRS Results: | | | | | | Difference from AEO2000 Hmac Reference | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|---|-------------|-------------|-------------|-------------|-------------|---------------|-------------|
| | 2000 | 2005 | 2010 | 2015 | 2020 | | 2000 | 2005 | 2010 | 2015 | 2020 | Extrapolation | |
| | | | | | | | | | | | | 2025 | 2030 |
| <i>Residential Sector Energy Consumption</i> | | | | | | <i>Residential Sector Energy Consumption</i> | | | | | | | |
| Electricity Sales (TWh) | 1,183 | 1,286 | 1,379 | 1,460 | 1,544 | Electricity Sales (TWh) | 0.0 | 0.0 | -11.6 | -26.2 | -38.6 | -47.0 | -52.6 |
| <i>Total U.S. Electric Generation</i> | | | | | | <i>Total U.S. Electric Generation</i> | | | | | | | |
| Coal (TWh) | 1,937 | 2,159 | 2,230 | 2,368 | 2,601 | Coal (TWh) | 0.0 | 0.0 | -1.4 | -11.3 | -28.1 | -28.1 | -28.1 |
| Gas (TWh) | 615 | 762 | 1,063 | 1,357 | 1,468 | Gas (TWh) | 0.0 | -0.4 | -9.2 | -16.2 | -9.9 | -9.9 | -9.9 |
| Petroleum(TWh) | 95 | 83 | 74 | 65 | 70 | Petroleum(TWh) | 0.0 | 0.0 | -1.6 | 0.4 | 1.8 | 1.8 | 1.8 |
| Nuclear (TWh) | 688 | 674 | 627 | 510 | 440 | Nuclear (TWh) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (TWh) | 389 | 414 | 435 | 446 | 459 | Renewables (TWh) | 0.0 | 0.0 | -0.1 | 0.0 | -0.3 | -0.3 | -0.3 |
| Total (TWh) | 3,724 | 4,092 | 4,429 | 4,746 | 5,037 | Total (TWh) | 0.0 | -0.4 | -12.3 | -27.1 | -36.5 | -36.5 | -36.5 |
| <i>Installed Generating Capacity</i> | | | | | | <i>Installed Generating Capacity</i> | | | | | | | |
| Coal (GW) | 315.3 | 311.2 | 315.4 | 329.8 | 358.5 | Coal (GW) | 0.0 | 0.0 | 0.0 | -1.1 | -3.5 | -3.5 | -3.5 |
| Other Fossil (GW) | 274.8 | 340.1 | 426.3 | 481.9 | 516.7 | Other Fossil (GW) | 0.0 | 0.0 | -1.6 | -9.8 | -12.5 | -12.5 | -12.5 |
| Nuclear (GW) | 97.5 | 93.4 | 84.1 | 67.4 | 58.7 | Nuclear (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (GW) | 94.9 | 99.1 | 102.7 | 105.1 | 107.5 | Renewables (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total (GW) | 782.5 | 843.8 | 928.5 | 984.3 | 1,041.4 | Total (GW) | 0.0 | 0.0 | -1.6 | -10.8 | -16.0 | -16.0 | -16.0 |

Table 11.7A Standard Level 4 Roll-up Forecast based on ARI Mean Manufacturing Costs

| NEMS-BRS Results: | | | | | | Difference from AEO2000 Reference | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|--|-------------|-------------|-------------|-------------|-------------|---------------|-------------|
| | 2000 | 2005 | 2010 | 2015 | 2020 | | | | | | | Extrapolation | |
| | | | | | | | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| <i>Residential Sector Energy Consumption</i> | | | | | | <i>Residential Sector Energy Consumption</i> | | | | | | | |
| Electricity Sales (TWh) | 1,185 | 1,281 | 1,369 | 1,440 | 1,518 | Electricity Sales (TWh) | 0.0 | 0.0 | -10.4 | -23.8 | -35.4 | -43.3 | -48.4 |
| <i>Total U.S. Electric Generation</i> | | | | | | <i>Total U.S. Electric Generation</i> | | | | | | | |
| Coal (TWh) | 1,930 | 2,127 | 2,172 | 2,246 | 2,333 | Coal (TWh) | 0.0 | 0.0 | -0.3 | -5.5 | -14.2 | -14.2 | -14.2 |
| Gas (TWh) | 601 | 717 | 992 | 1,278 | 1,455 | Gas (TWh) | 0.0 | 0.0 | -8.7 | -19.1 | -21.2 | -21.2 | -21.2 |
| Petroleum (TWh) | 90 | 68 | 53 | 47 | 46 | Petroleum (TWh) | 0.0 | 0.0 | -0.7 | 0.3 | 1.6 | 1.6 | 1.6 |
| Nuclear (TWh) | 688 | 674 | 627 | 511 | 427 | Nuclear (TWh) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (TWh) | 389 | 411 | 429 | 437 | 447 | Renewables (TWh) | 0.0 | 0.0 | -0.3 | 0.3 | 0.0 | 0.0 | 0.0 |
| Total (TWh) | 3,698 | 3,997 | 4,273 | 4,519 | 4,707 | Total (TWh) | 0.0 | 0.0 | -10.0 | -24.0 | -33.8 | -33.8 | -33.8 |
| <i>Installed Generating Capacity</i> | | | | | | <i>Installed Generating Capacity</i> | | | | | | | |
| Coal (GW) | 315.3 | 310.6 | 310.7 | 315.3 | 324.2 | Coal (GW) | 0.0 | 0.0 | 0.0 | -0.5 | -1.8 | -1.8 | -1.8 |
| Other Fossil (GW) | 274.8 | 334.0 | 403.4 | 453.0 | 494.5 | Other Fossil (GW) | 0.0 | 0.0 | -1.3 | -8.8 | -13.1 | -13.1 | -13.1 |
| Nuclear (GW) | 97.5 | 93.4 | 84.1 | 67.4 | 57.0 | Nuclear (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (GW) | 94.7 | 98.5 | 101.7 | 103.8 | 105.7 | Renewables (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total (GW) | 782.3 | 836.5 | 899.9 | 939.5 | 981.3 | Total (GW) | 0.0 | 0.0 | -1.3 | -9.3 | -15.0 | -15.0 | -15.0 |

Table 11.8A Standard Level 4 Shift Forecast based on ARI Mean Manufacturing Costs

| NEMS-BRS Results: | | | | | | Difference from AEO2000 Reference | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|--|-------------|-------------|-------------|-------------|---------------|-------------|-------------|
| | 2000 | 2005 | 2010 | 2015 | 2020 | | | | | | Extrapolation | | |
| | | | | | | | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| <i>Residential Sector Energy Consumption</i> | | | | | | <i>Residential Sector Energy Consumption</i> | | | | | | | |
| Electricity Sales (TWh) | 1,185 | 1,281 | 1,368 | 1,438 | 1,513 | Electricity Sales (TWh) | 0.0 | 0.0 | -11.4 | -26.5 | -39.6 | -48.6 | -54.5 |
| <i>Total U.S. Electric Generation</i> | | | | | | <i>Total U.S. Electric Generation</i> | | | | | | | |
| Coal (TWh) | 1,930 | 2,127 | 2,171 | 2,244 | 2,331 | Coal (TWh) | 0.0 | 0.0 | -0.7 | -6.5 | -16.0 | -16.0 | -16.0 |
| Gas (TWh) | 601 | 717 | 992 | 1,276 | 1,452 | Gas (TWh) | 0.0 | 0.0 | -9.5 | -21.1 | -23.7 | -23.7 | -23.7 |
| Petroleum (TWh) | 90 | 68 | 53 | 47 | 46 | Petroleum (TWh) | 0.0 | 0.0 | -1.1 | 0.2 | 2.1 | 2.1 | 2.1 |
| Nuclear (TWh) | 688 | 674 | 627 | 511 | 427 | Nuclear (TWh) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (TWh) | 389 | 411 | 429 | 437 | 447 | Renewables (TWh) | 0.0 | 0.0 | -0.2 | 0.4 | 0.0 | 0.0 | 0.0 |
| Total (TWh) | 3,698 | 3,997 | 4,272 | 4,516 | 4,703 | Total (TWh) | 0.0 | 0.0 | -11.5 | -27.0 | -37.5 | -37.5 | -37.5 |
| <i>Installed Generating Capacity</i> | | | | | | <i>Installed Generating Capacity</i> | | | | | | | |
| Coal (GW) | 315.3 | 310.6 | 310.7 | 315.2 | 323.9 | Coal (GW) | 0.0 | 0.0 | 0.0 | -0.6 | -2.1 | -2.1 | -2.1 |
| Other Fossil (GW) | 274.8 | 334.0 | 403.3 | 452.2 | 493.3 | Other Fossil (GW) | 0.0 | 0.0 | -1.4 | -9.6 | -14.3 | -14.3 | -14.3 |
| Nuclear (GW) | 97.5 | 93.4 | 84.1 | 67.4 | 57.0 | Nuclear (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (GW) | 94.7 | 98.5 | 101.7 | 103.8 | 105.7 | Renewables (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total (GW) | 782.3 | 836.5 | 899.8 | 938.7 | 979.9 | Total (GW) | 0.0 | 0.0 | -1.4 | -10.1 | -16.4 | -16.4 | -16.4 |

**Table 11.9A Standard Level 4 Low Economic Growth Forecast based on ARI Mean Manufacturing Costs,
NAECA Efficiency Scenario**

| NEMS-BRS Results: | | | | | | Difference from AEO2000 Lmac Reference | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|---|-------------|-------------|-------------|-------------|-------------|---------------|-------------|
| | 2000 | 2005 | 2010 | 2015 | 2020 | | 2000 | 2005 | 2010 | 2015 | 2020 | Extrapolation | |
| | | | | | | | | | | | | 2025 | 2030 |
| <i>Residential Sector Energy Consumption</i> | | | | | | <i>Residential Sector Energy Consumption</i> | | | | | | | |
| Electricity Sales (TWh) | 1,183 | 1,275 | 1,356 | 1,415 | 1,470 | Electricity Sales (TWh) | 0.0 | 0.0 | -10.1 | -23.4 | -35.4 | -44.3 | -50.4 |
| <i>Total U.S. Electric Generation</i> | | | | | | <i>Total U.S. Electric Generation</i> | | | | | | | |
| Coal (TWh) | 1,923 | 2,105 | 2,132 | 2,170 | 2,209 | Coal (TWh) | 0.0 | 0.0 | -1.8 | -2.4 | -7.1 | -7.1 | -7.1 |
| Gas (TWh) | 591 | 683 | 932 | 1,179 | 1,312 | Gas (TWh) | 0.0 | 0.0 | -7.9 | -20.6 | -25.4 | -25.4 | -25.4 |
| Petroleum(TWh) | 85 | 60 | 42 | 39 | 35 | Petroleum(TWh) | 0.0 | 0.0 | -0.6 | 0.5 | 0.5 | 0.5 | 0.5 |
| Nuclear (TWh) | 688 | 674 | 627 | 511 | 428 | Nuclear (TWh) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (TWh) | 388 | 409 | 425 | 433 | 441 | Renewables (TWh) | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 | -0.1 |
| Total (TWh) | 3,675 | 3,931 | 4,159 | 4,332 | 4,424 | Total (TWh) | 0.0 | 0.0 | -10.3 | -22.5 | -32.2 | -32.2 | -32.2 |
| <i>Installed Generating Capacity</i> | | | | | | <i>Installed Generating Capacity</i> | | | | | | | |
| Coal (GW) | 315.3 | 309.6 | 308.0 | 309.4 | 310.8 | Coal (GW) | 0.0 | 0.0 | 0.0 | -0.1 | -0.6 | -0.6 | -0.6 |
| Other Fossil (GW) | 275.0 | 325.3 | 387.7 | 426.4 | 459.2 | Other Fossil (GW) | 0.0 | 0.0 | -1.3 | -8.5 | -13.4 | -13.4 | -13.4 |
| Nuclear (GW) | 97.5 | 93.4 | 84.1 | 67.4 | 57.0 | Nuclear (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (GW) | 94.7 | 98.3 | 101.2 | 103.0 | 104.4 | Renewables (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total (GW) | 782.5 | 826.6 | 881.0 | 906.2 | 931.5 | Total (GW) | 0.0 | 0.0 | -1.3 | -8.6 | -13.9 | -13.9 | -13.9 |

**Table 11.10A Standard Level 4 High Economic Growth Forecast based on ARI Mean Manufacturing Costs,
NAECA Efficiency Scenario**

| NEMS-BRS Results: | | | | | | Difference from AEO2000 Hmac Reference | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|---|-------------|-------------|-------------|-------------|-------------|---------------|-------------|
| | 2000 | 2005 | 2010 | 2015 | 2020 | | 2000 | 2005 | 2010 | 2015 | 2020 | Extrapolation | |
| | | | | | | | | | | | | 2025 | 2030 |
| <i>Residential Sector Energy Consumption</i> | | | | | | <i>Residential Sector Energy Consumption</i> | | | | | | | |
| Electricity Sales (TWh) | 1,183 | 1,286 | 1,380 | 1,460 | 1,545 | Electricity Sales (TWh) | 0.0 | 0.0 | -11.4 | -25.8 | -38.2 | -46.6 | -52.3 |
| <i>Total U.S. Electric Generation</i> | | | | | | <i>Total U.S. Electric Generation</i> | | | | | | | |
| Coal (TWh) | 1,937 | 2,159 | 2,229 | 2,368 | 2,601 | Coal (TWh) | 0.0 | 0.0 | -2.1 | -11.1 | -27.8 | -27.8 | -27.8 |
| Gas (TWh) | 615 | 762 | 1,064 | 1,358 | 1,469 | Gas (TWh) | 0.0 | -0.4 | -8.2 | -15.1 | -8.8 | -8.8 | -8.8 |
| Petroleum (TWh) | 95 | 83 | 74 | 65 | 70 | Petroleum (TWh) | 0.0 | 0.0 | -1.8 | 0.0 | 1.5 | 1.5 | 1.5 |
| Nuclear (TWh) | 688 | 674 | 627 | 510 | 440 | Nuclear (TWh) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (TWh) | 389 | 414 | 435 | 446 | 459 | Renewables (TWh) | 0.0 | 0.0 | -0.1 | 0.0 | -0.2 | -0.2 | -0.2 |
| Total (TWh) | 3,724 | 4,092 | 4,429 | 4,747 | 5,039 | Total (TWh) | 0.0 | -0.4 | -12.2 | -26.2 | -35.4 | -35.4 | -35.4 |
| <i>Installed Generating Capacity</i> | | | | | | <i>Installed Generating Capacity</i> | | | | | | | |
| Coal (GW) | 315.3 | 311.2 | 315.4 | 329.9 | 358.6 | Coal (GW) | 0.0 | 0.0 | 0.0 | -1.0 | -3.4 | -3.4 | -3.4 |
| Other Fossil (GW) | 274.8 | 340.1 | 426.5 | 482.0 | 517.1 | Other Fossil (GW) | 0.0 | 0.0 | -1.4 | -9.7 | -12.1 | -12.1 | -12.1 |
| Nuclear (GW) | 97.5 | 93.4 | 84.1 | 67.4 | 58.7 | Nuclear (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewables (GW) | 94.9 | 99.1 | 102.7 | 105.1 | 107.5 | Renewables (GW) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total (GW) | 782.5 | 843.8 | 928.7 | 984.4 | 1,041.8 | Total (GW) | 0.0 | 0.0 | -1.4 | -10.7 | -15.6 | -15.6 | -15.6 |

J.6 SUPPLEMENTAL TABLES AND FIGURES TO CHAPTER 12

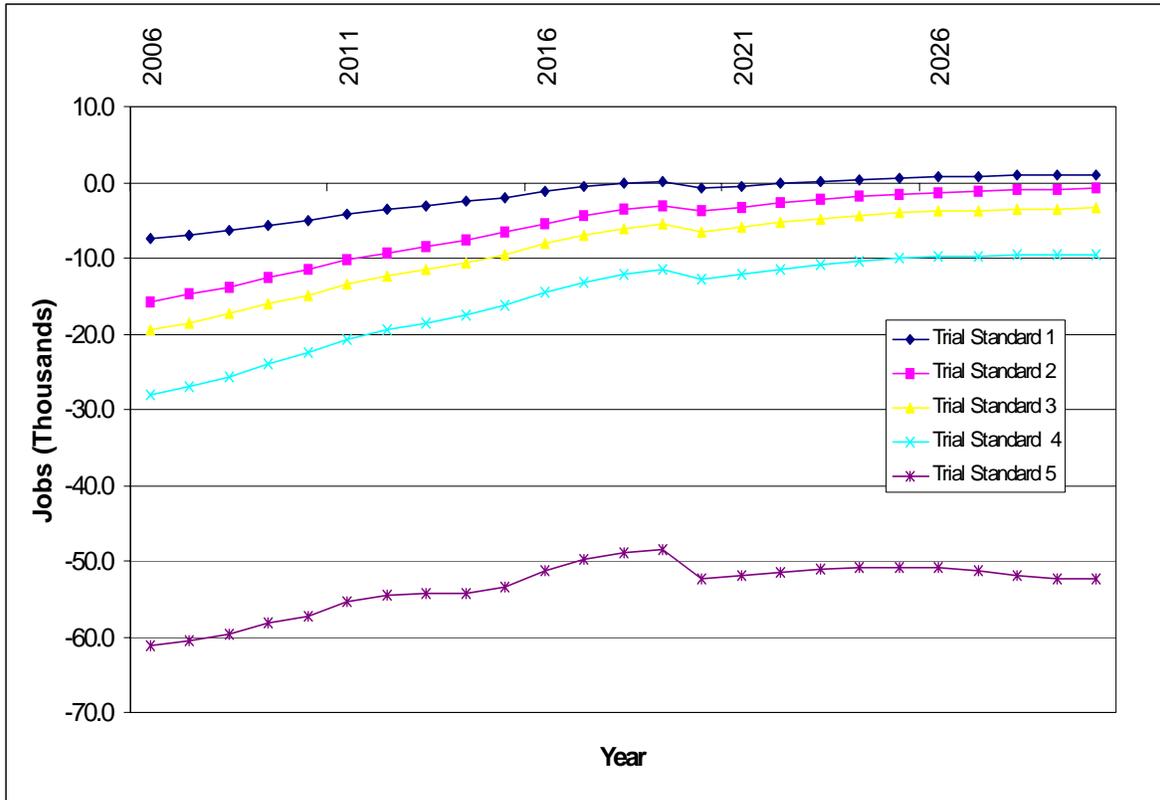


Figure 12.1S Net National Employment Impacts

Table 12.1S Net National Change in Jobs

| Trial Standard Level | 2010 (thousands) | 2020 (thousands) | 2030 (thousands) |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| 1 | -4.9 | -0.8 | 1.0 |
| 2 | -11.5 | -3.8 | -0.9 |
| 3 | -14.9 | -6.5 | -3.4 |
| 4 | -22.6 | -12.8 | -9.5 |
| 5 | -57.3 | -52.4 | -52.5 |

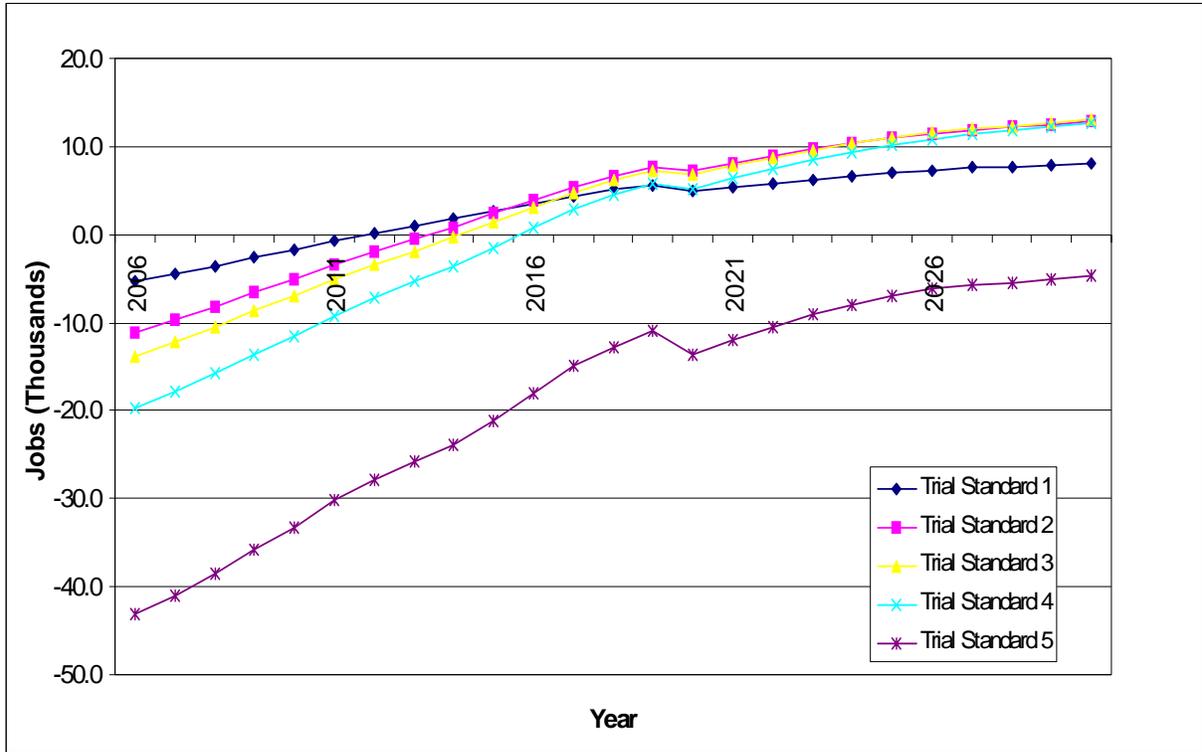


Figure 12.2S Employment Impacts of Consumer Savings

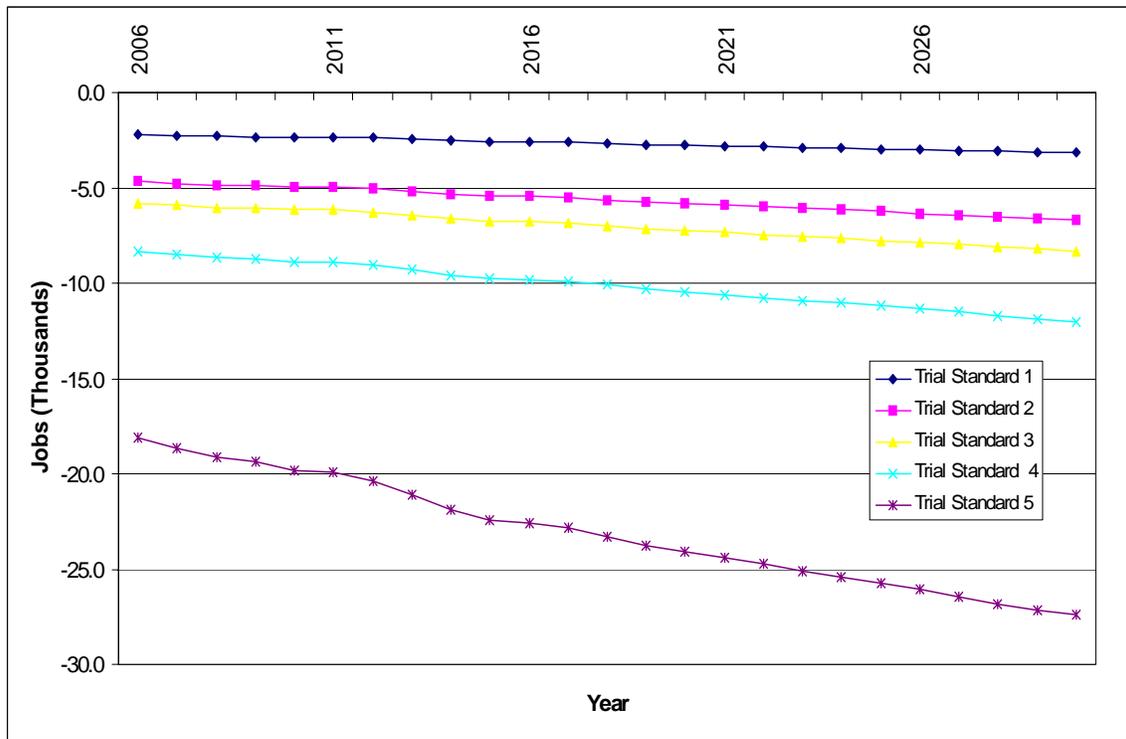


Figure 12.3S Economic Impacts of Changes in Equipment Cost

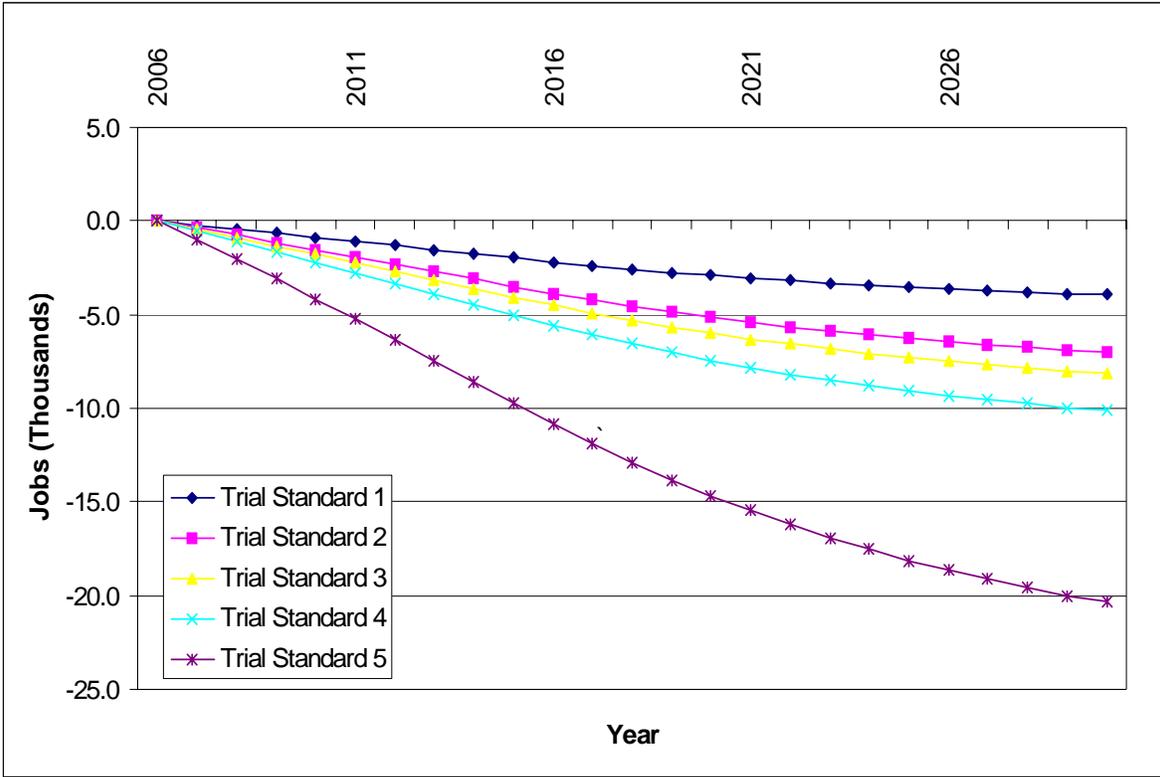


Figure 12.4S Economic Impacts of Changes in Utility Savings

J.7 SUPPLEMENTAL FIGURES TO APPENDIX E

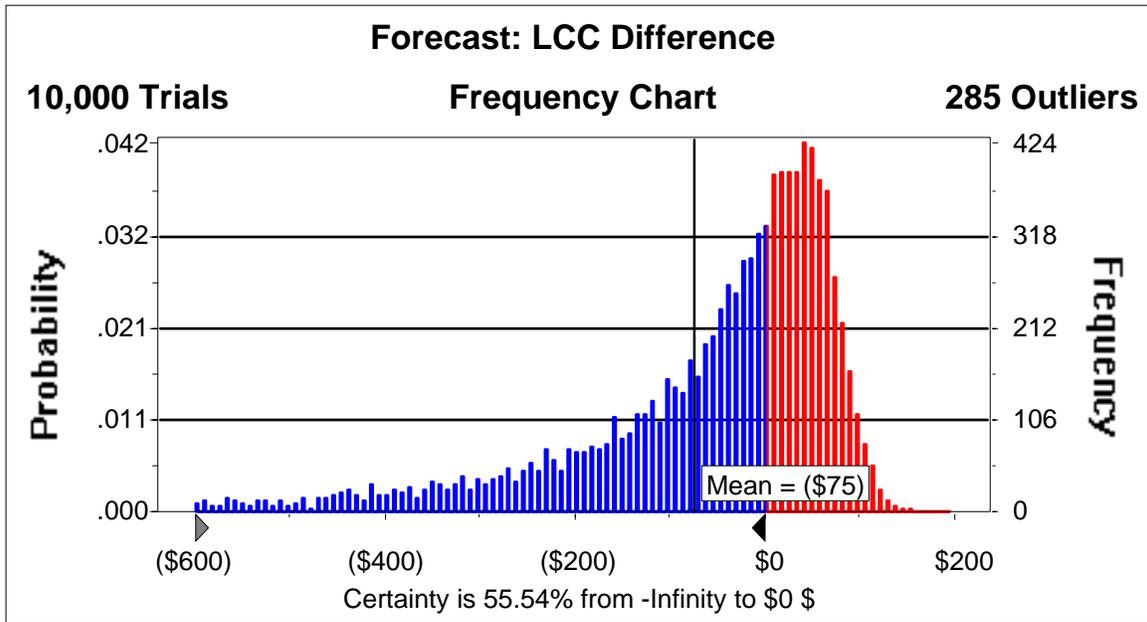


Figure E.1S Split A/C, 11 SEER: Frequency Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

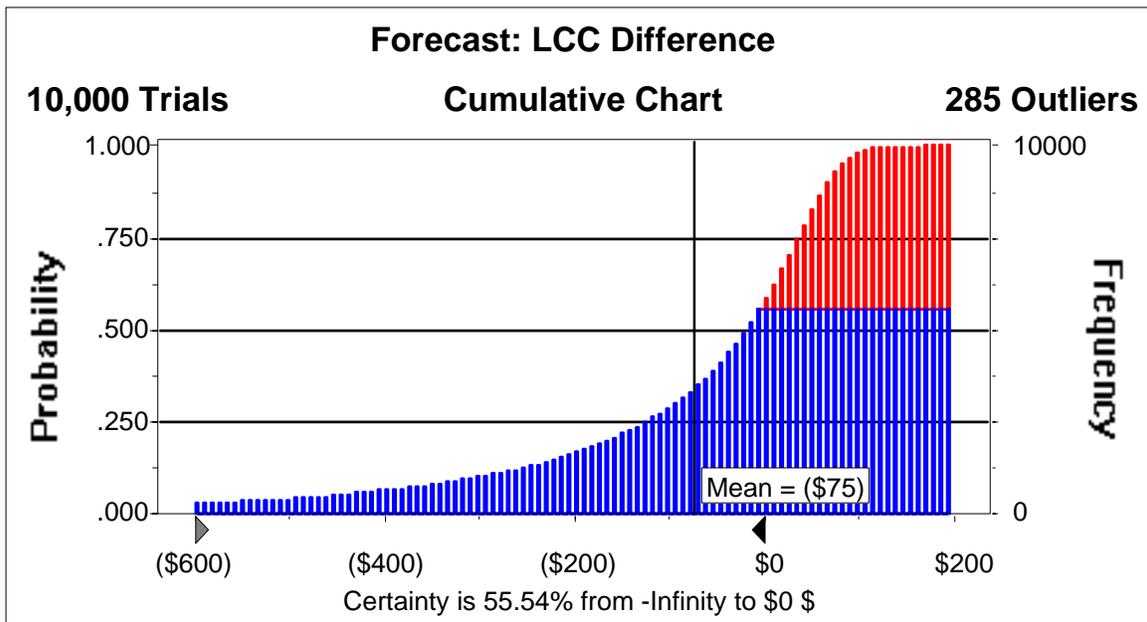


Figure E.2S Split A/C, 11 SEER: Cumulative Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

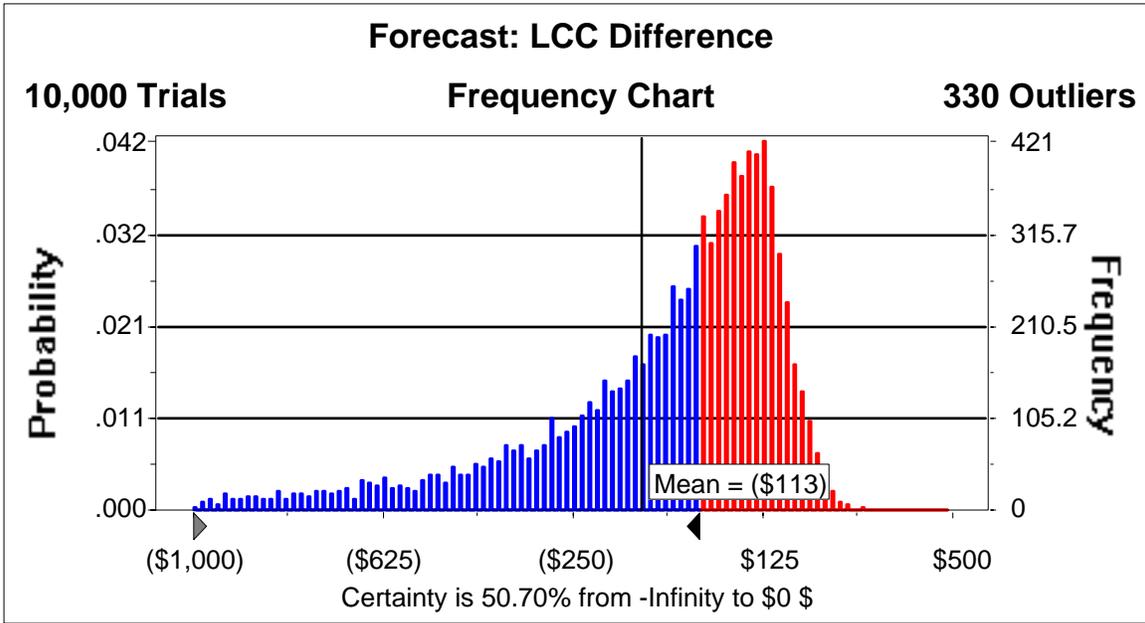


Figure E.3S Split A/C, 12 SEER: Frequency Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

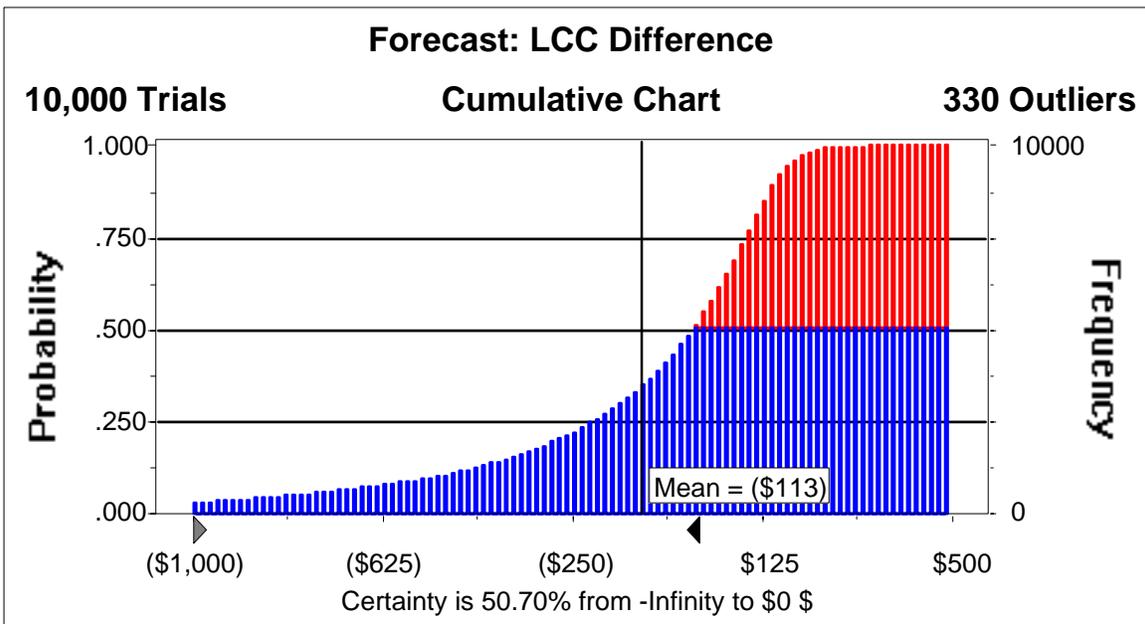


Figure E.4S Split A/C, 12 SEER: Cumulative Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

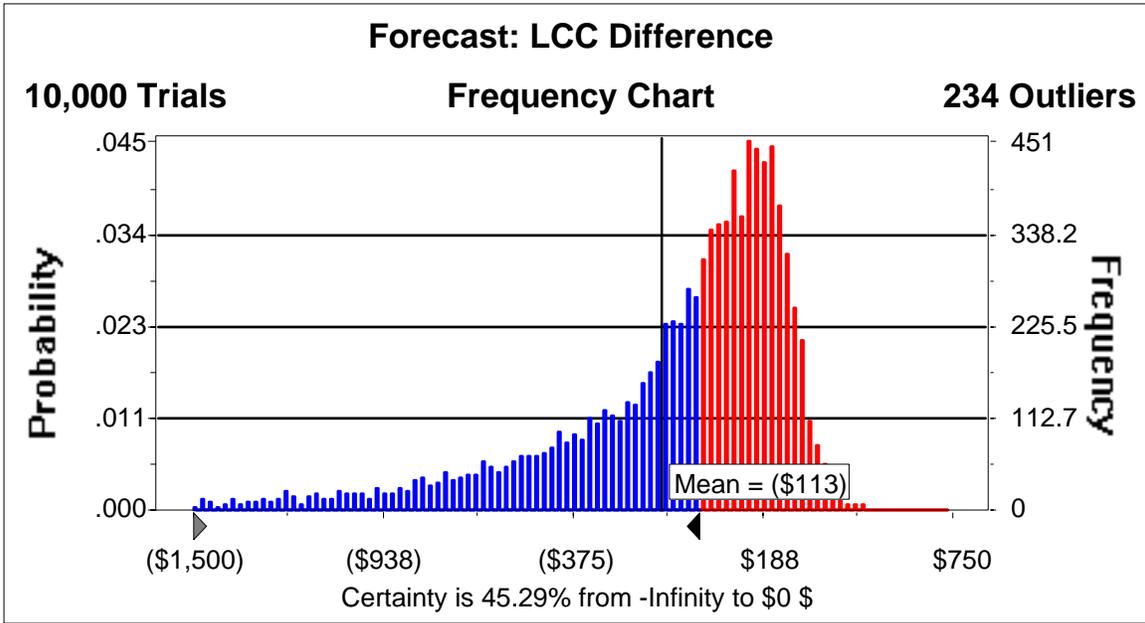


Figure E.5S Split A/C, 13 SEER: Frequency Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

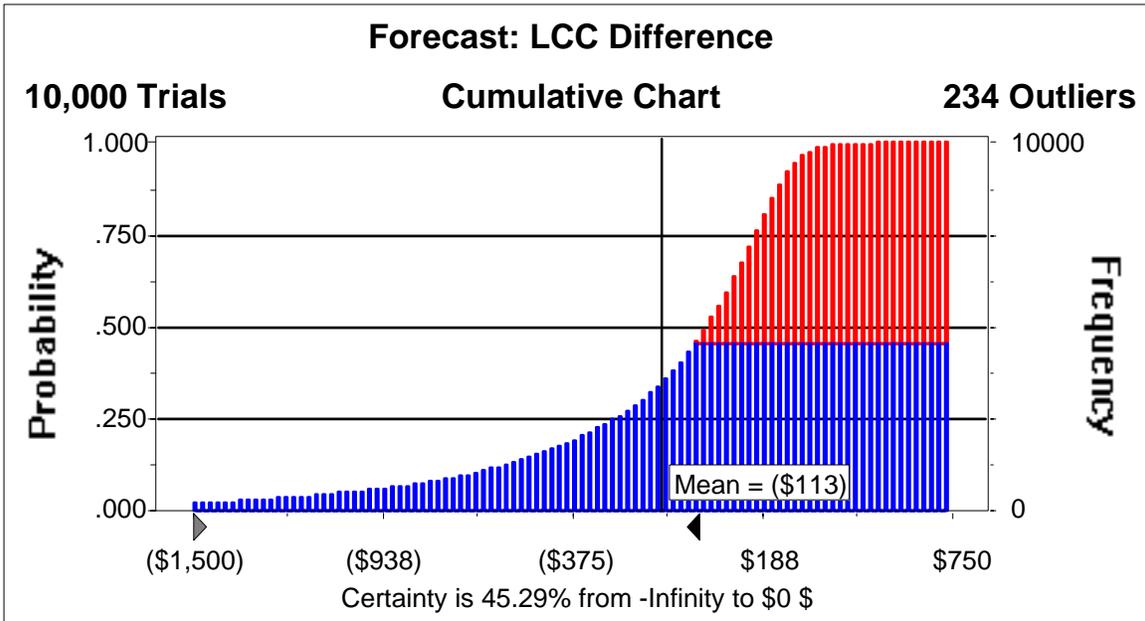


Figure E.6S Split A/C, 13 SEER: Cumulative Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

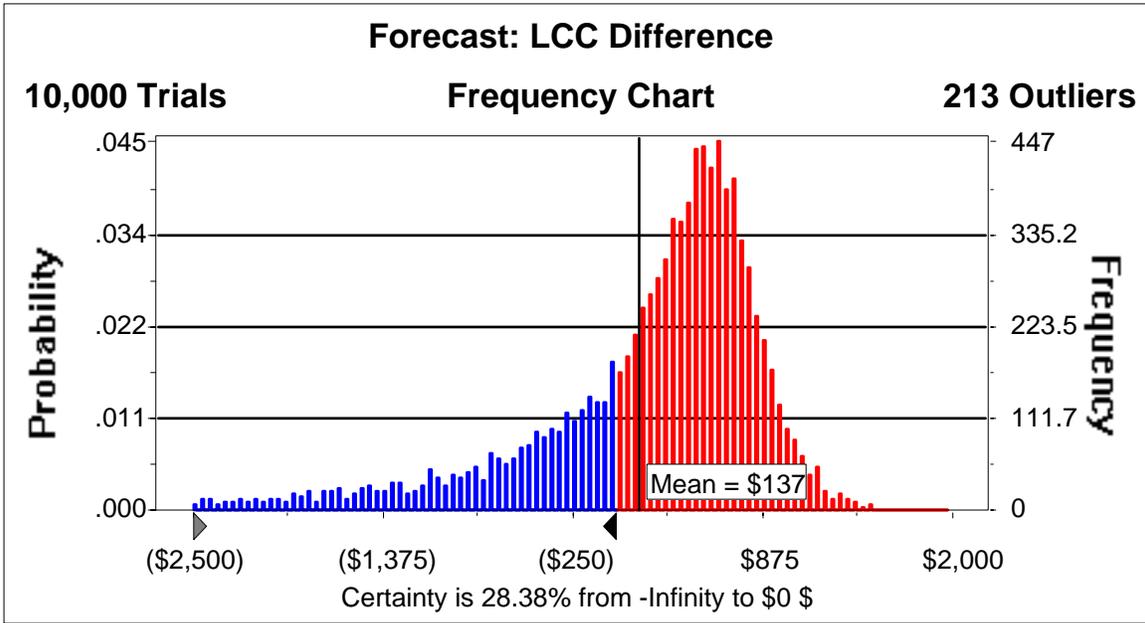


Figure E.7S Split A/C, 18 SEER: Frequency Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

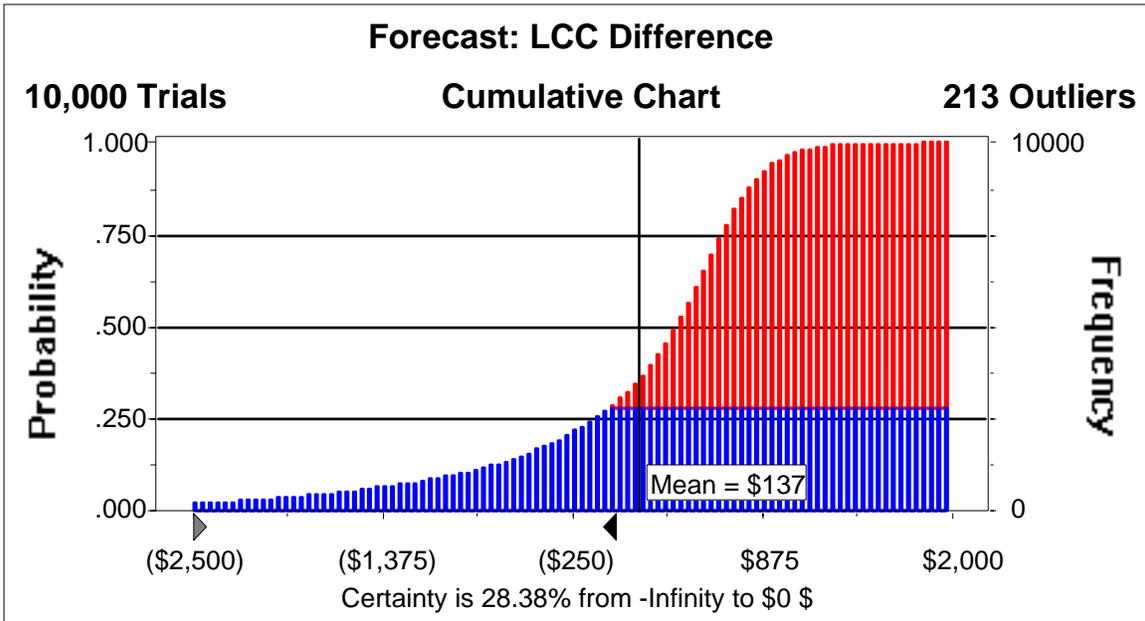


Figure E.8S Split A/C, 18 SEER: Cumulative Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

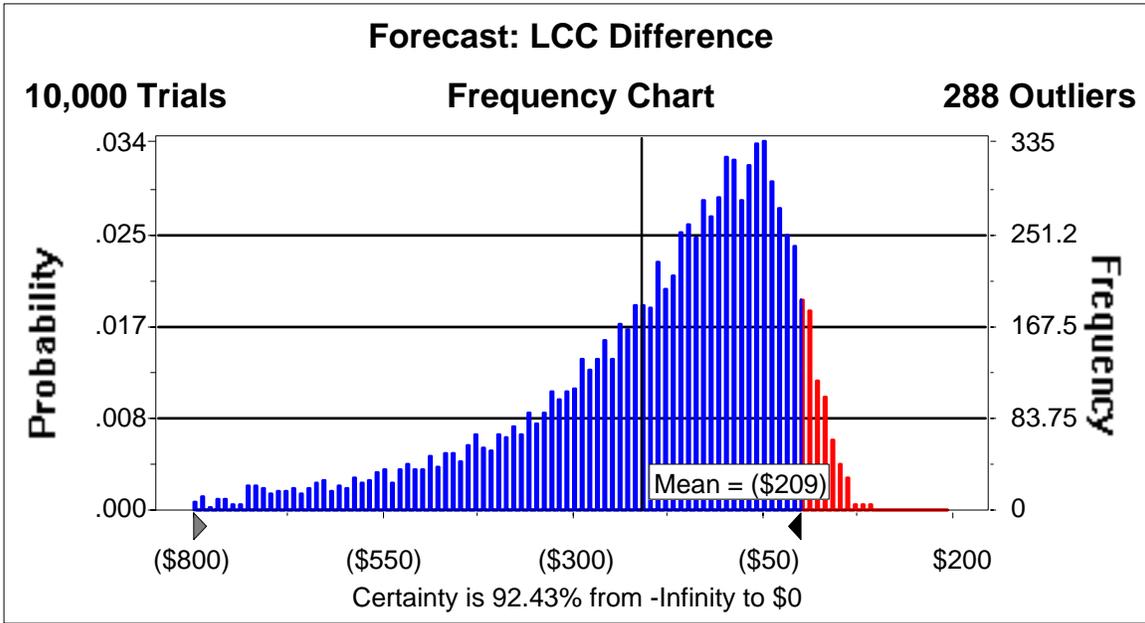


Figure E.9S Split HP, 11 SEER: Frequency Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

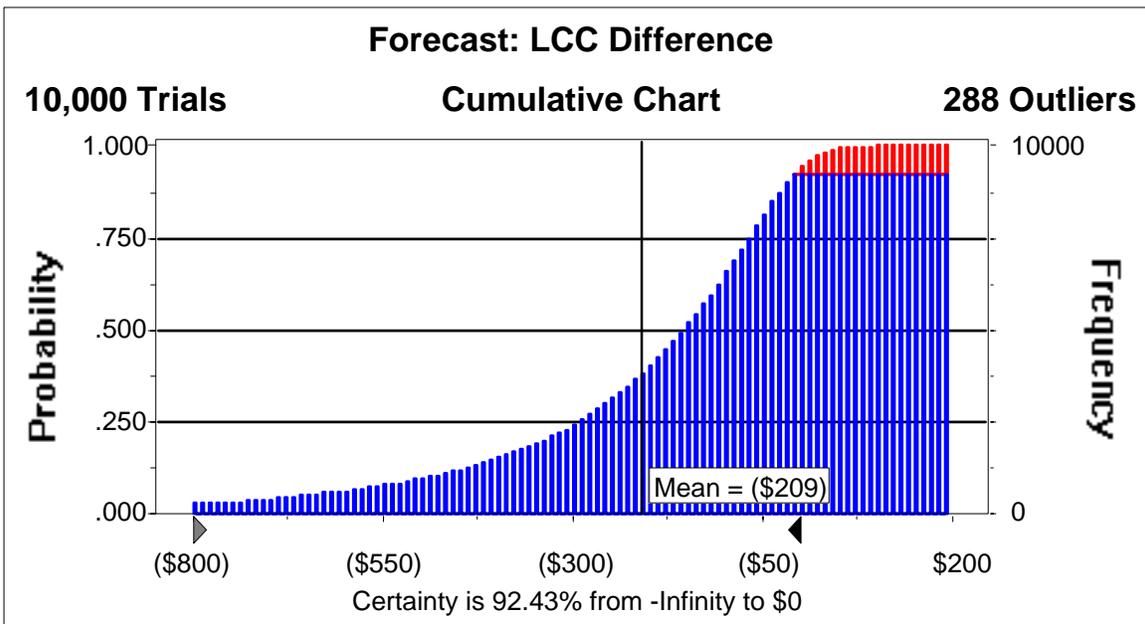


Figure E.10S Split HP, 11 SEER: Cumulative Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

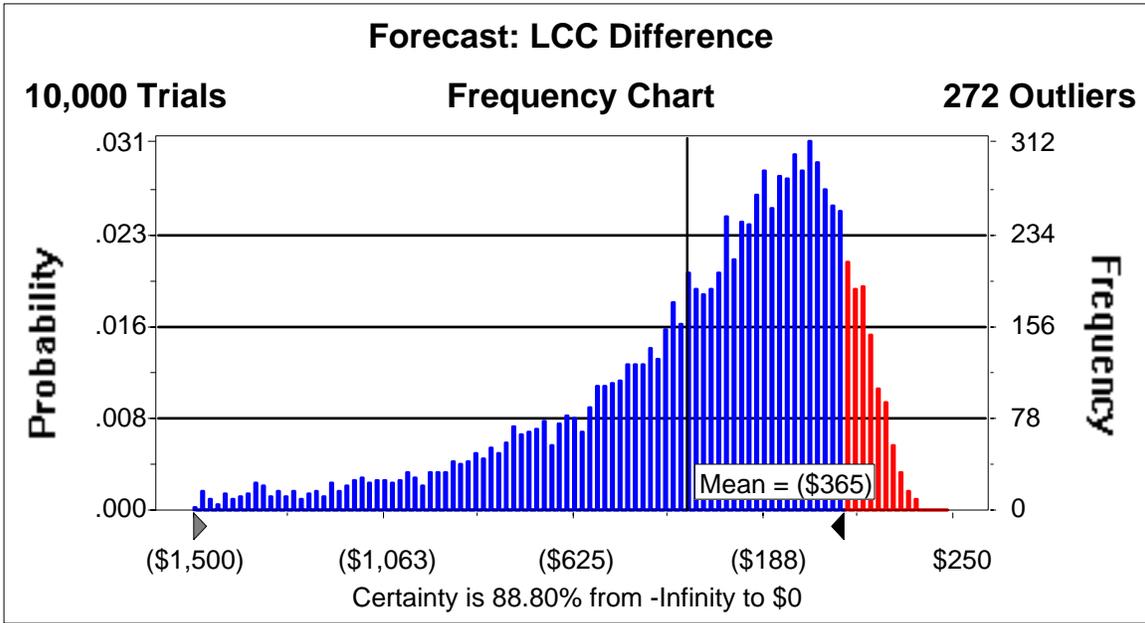


Figure E.11S Split HP, 12 SEER: Frequency Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

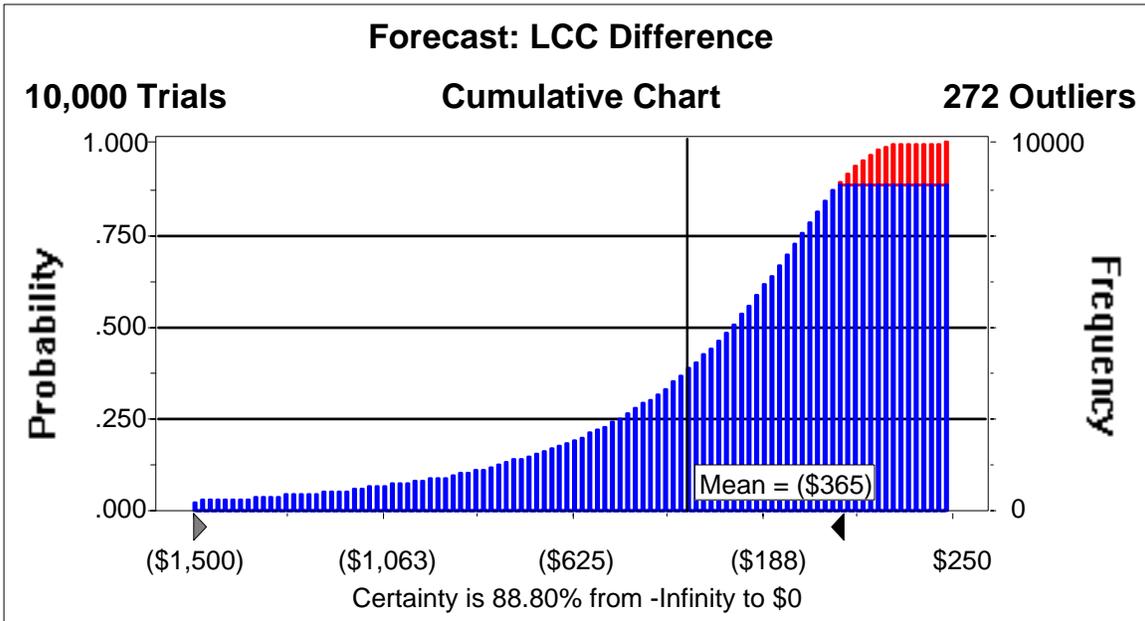


Figure E.12S Split HP, 12 SEER: Cumulative Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

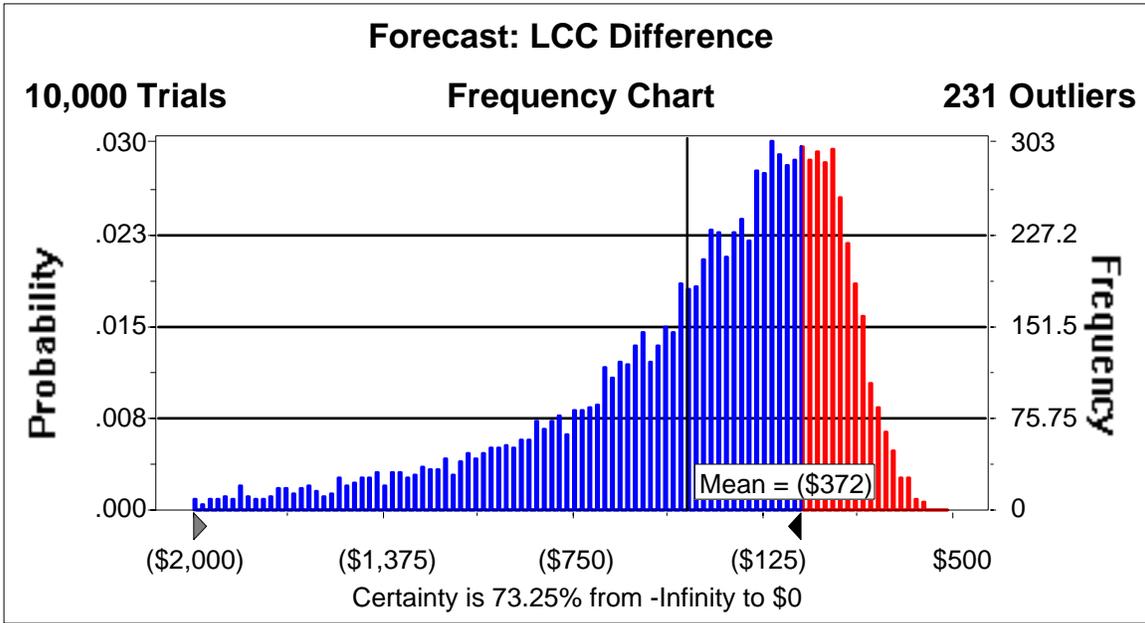


Figure E.13S Split HP, 13 SEER: Frequency Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

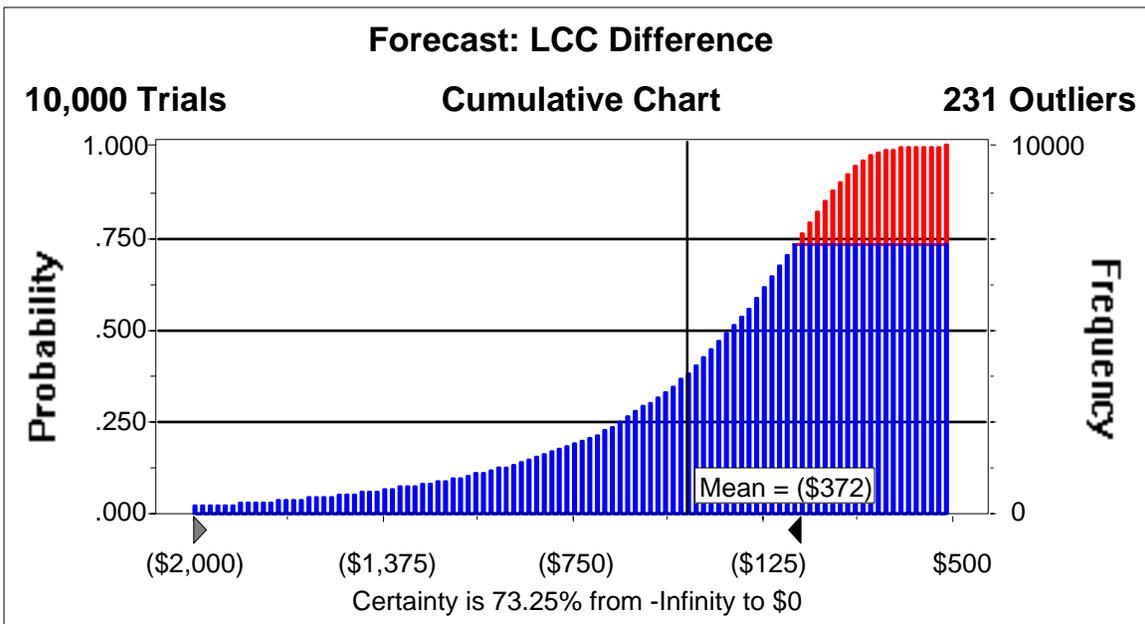


Figure E.14S Split HP, 13 SEER: Cumulative Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

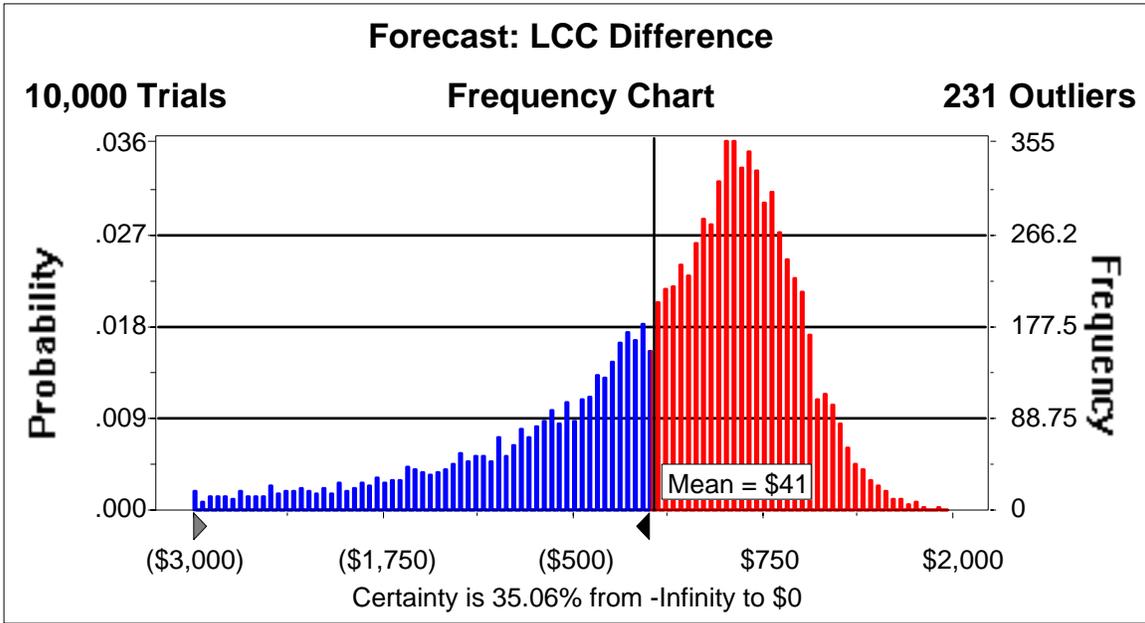


Figure E.15S Split HP, 18 SEER: Frequency Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

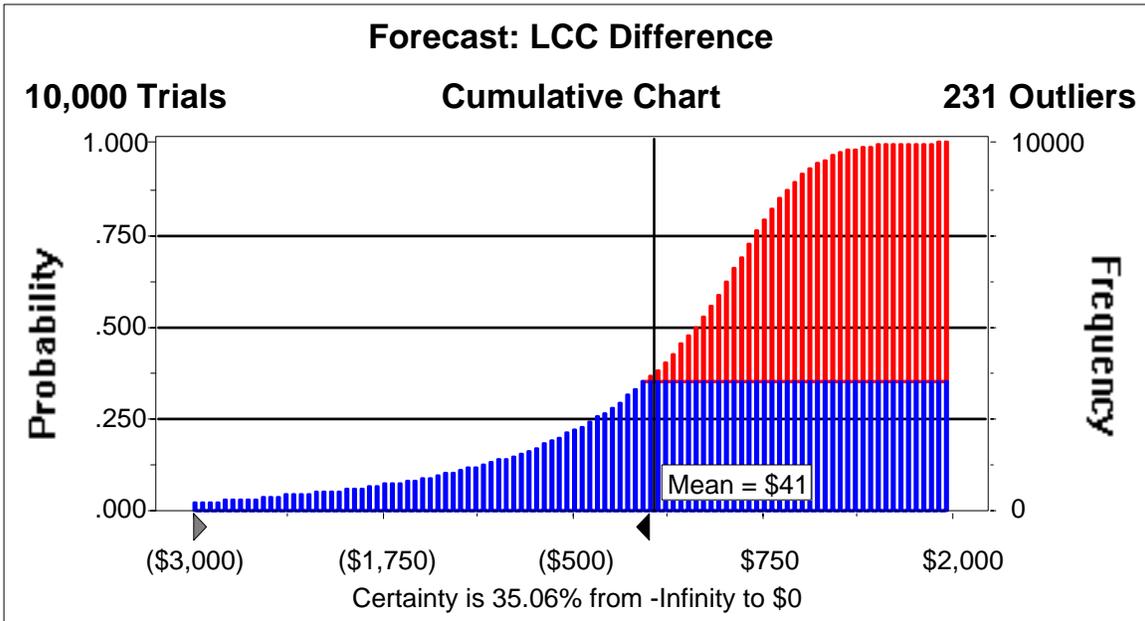


Figure E.16S Split HP, 18 SEER: Cumulative Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

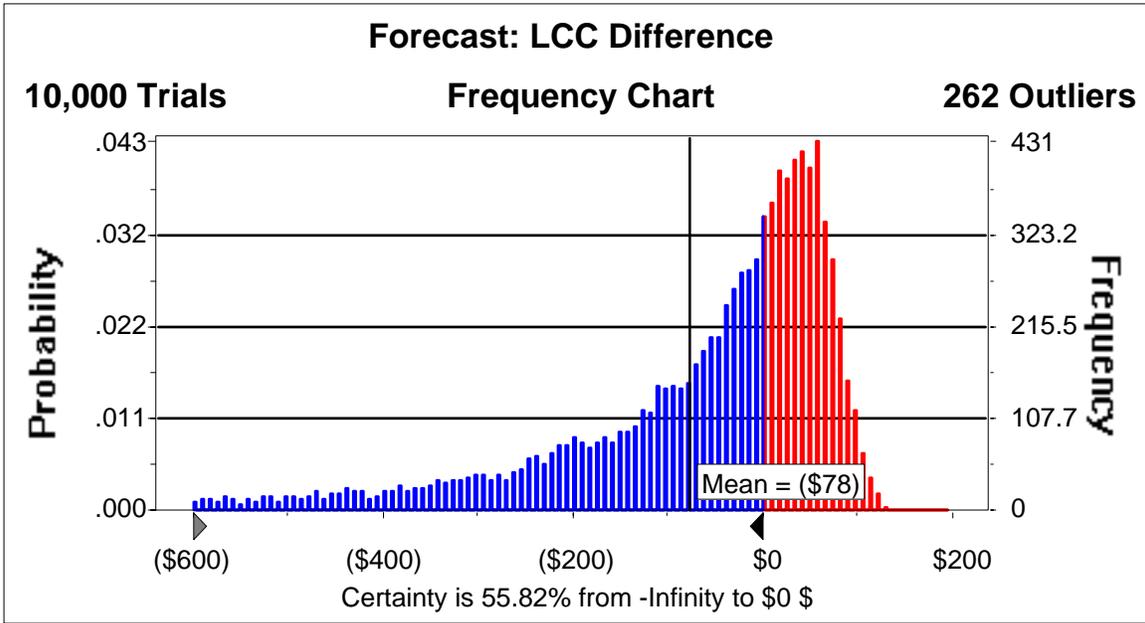


Figure E.17S Single Package A/C, 11 SEER: Frequency Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

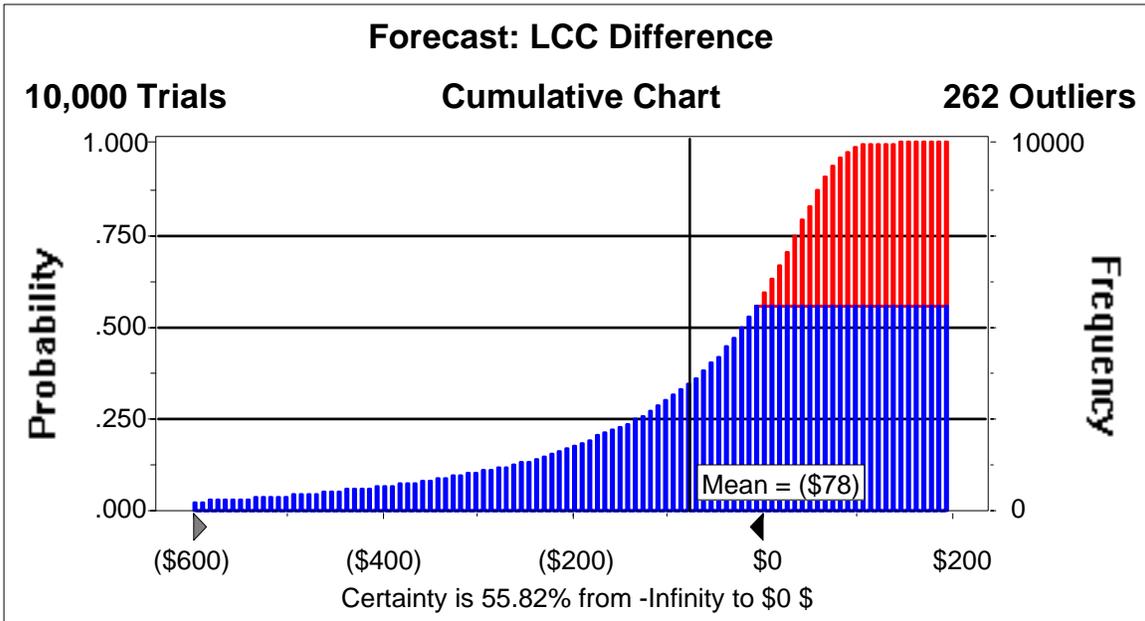


Figure E.18S Single Package A/C, 11 SEER: Cumulative Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

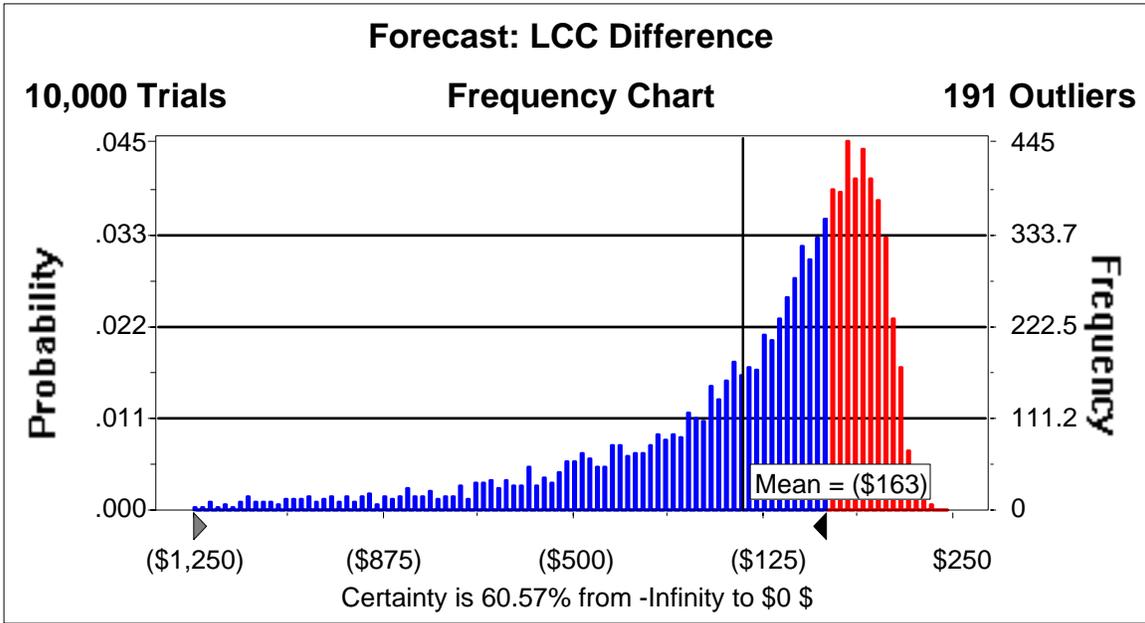


Figure E.19S Single Package A/C, 12 SEER: Frequency Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

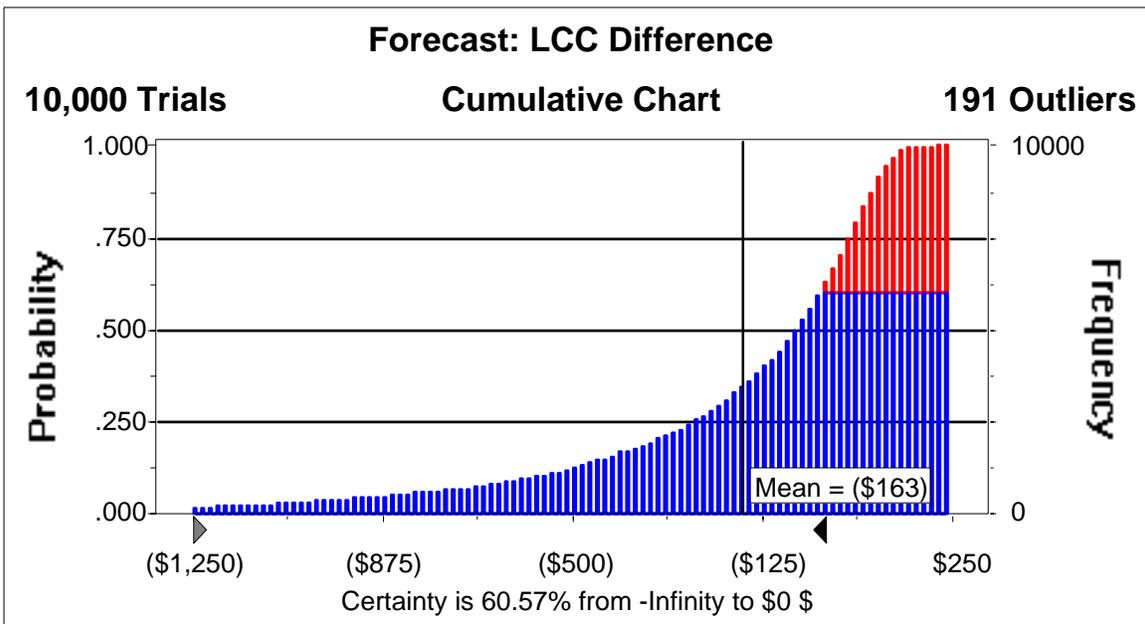


Figure E.20S Single Package A/C, 12 SEER: Cumulative Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

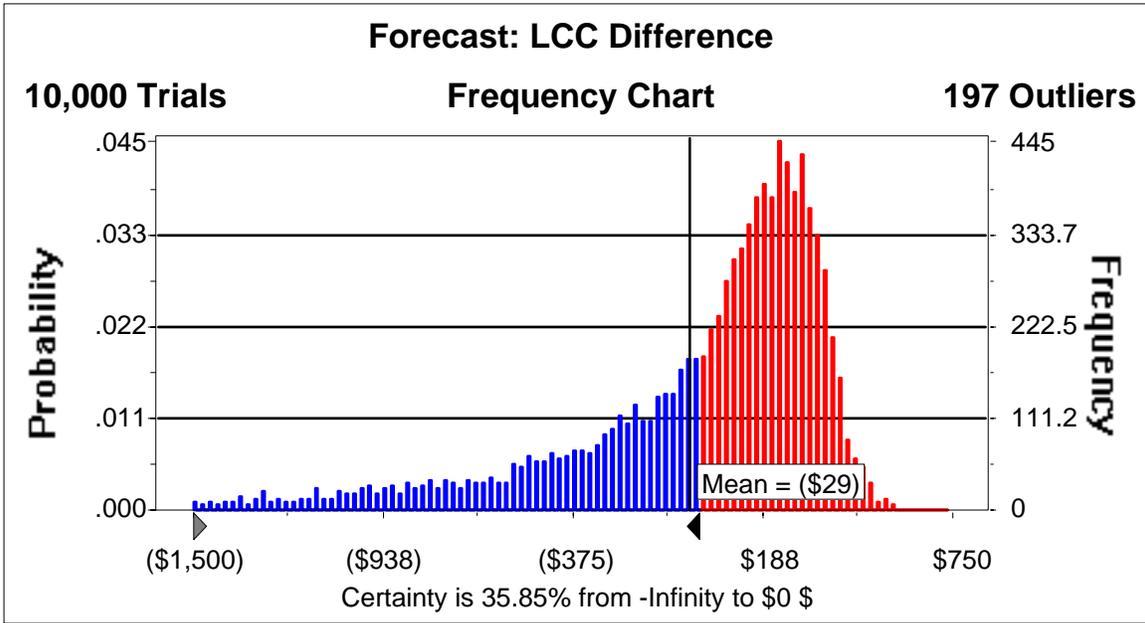


Figure E.21S Single Package A/C, 13 SEER: Frequency Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

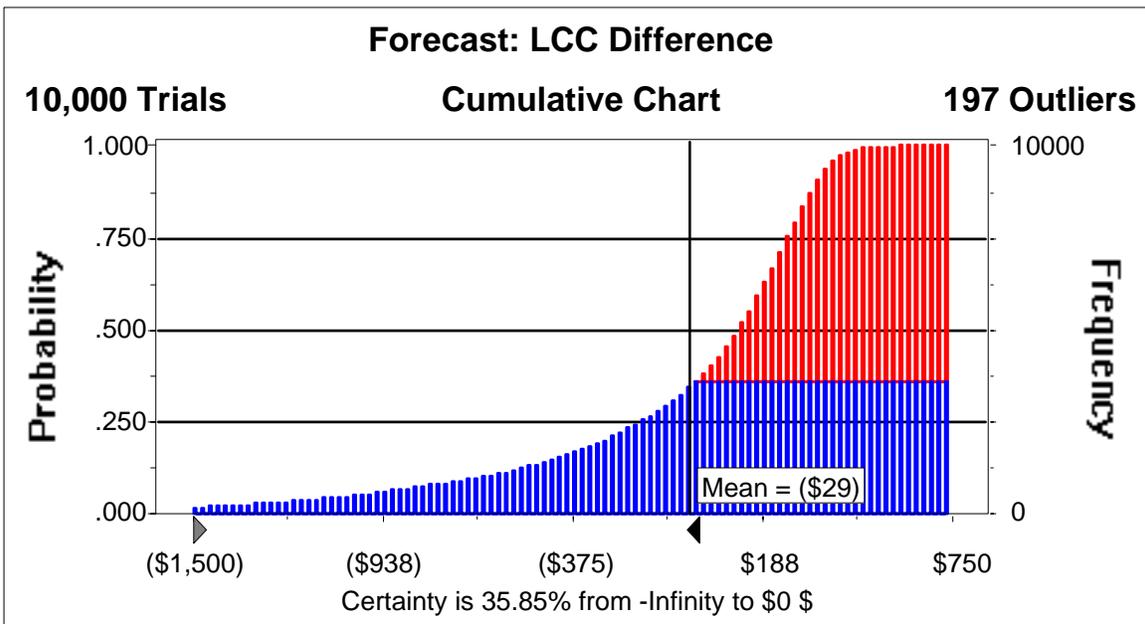


Figure E.22S Single Package A/C, 13 SEER: Cumulative Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

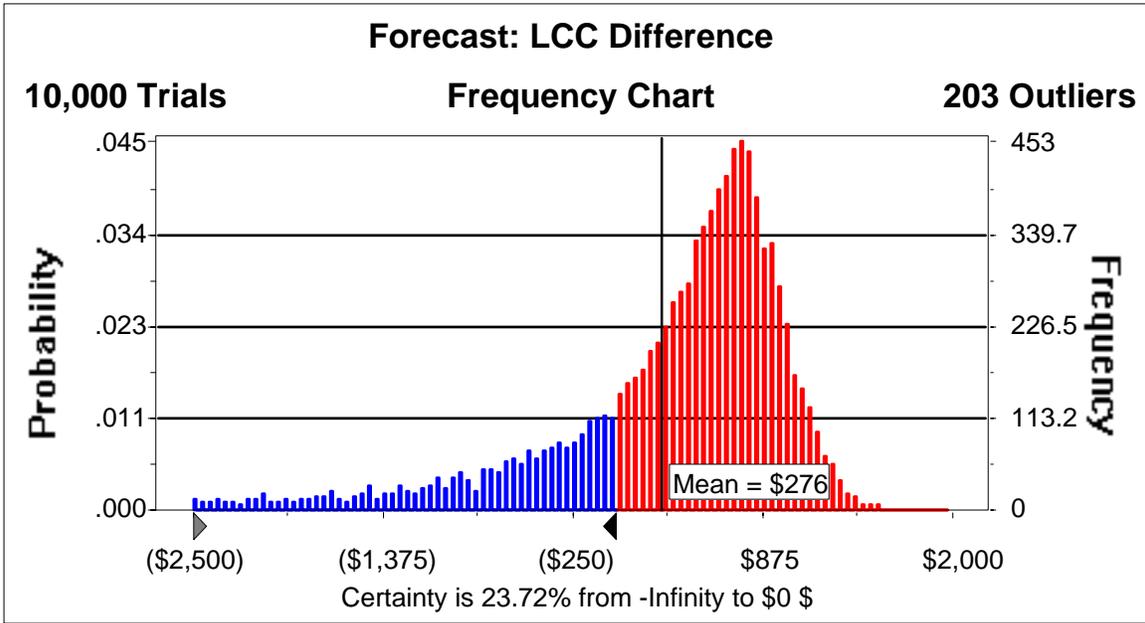


Figure E.23S Single Package A/C, 18 SEER: Frequency Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

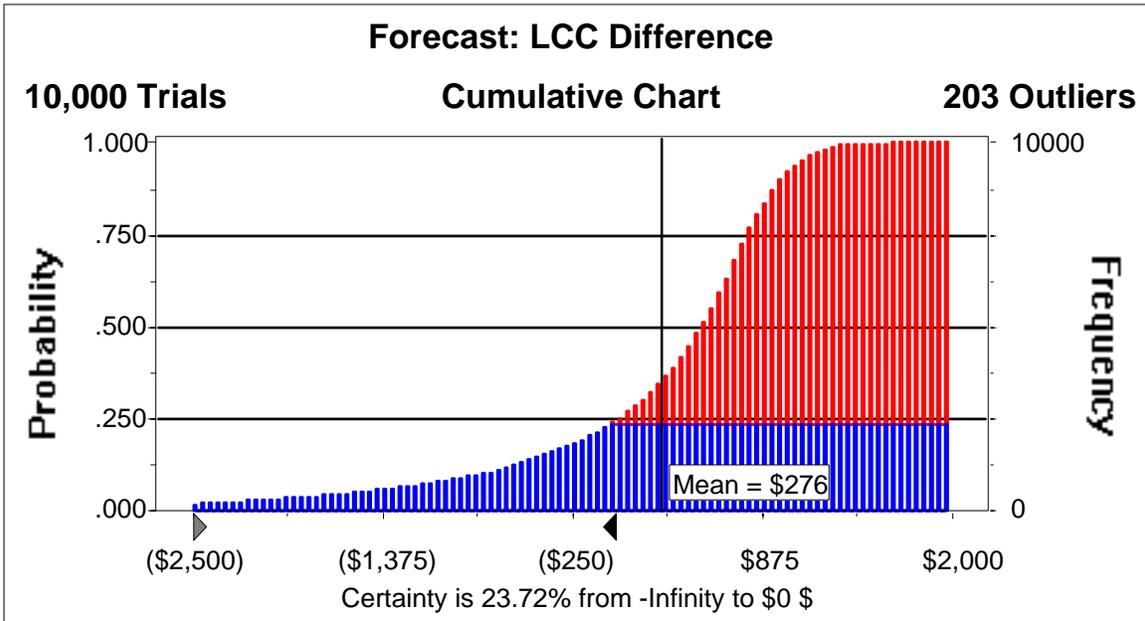


Figure E.24S Single Package A/C, 18 SEER: Cumulative Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

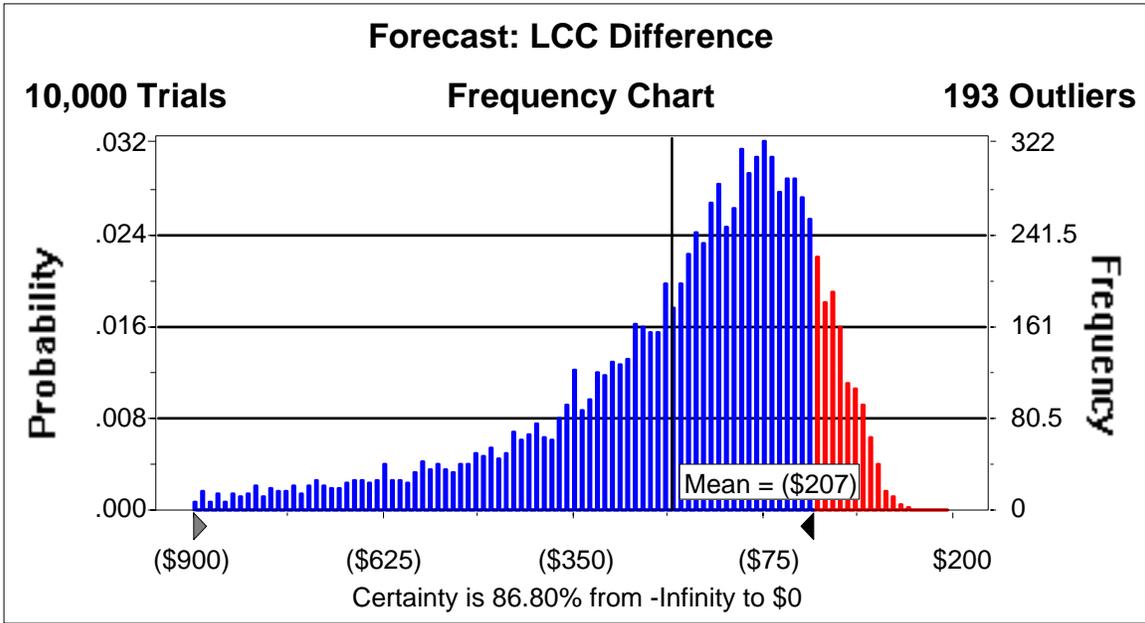


Figure E.25S Single Package HP, 11 SEER: Frequency Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

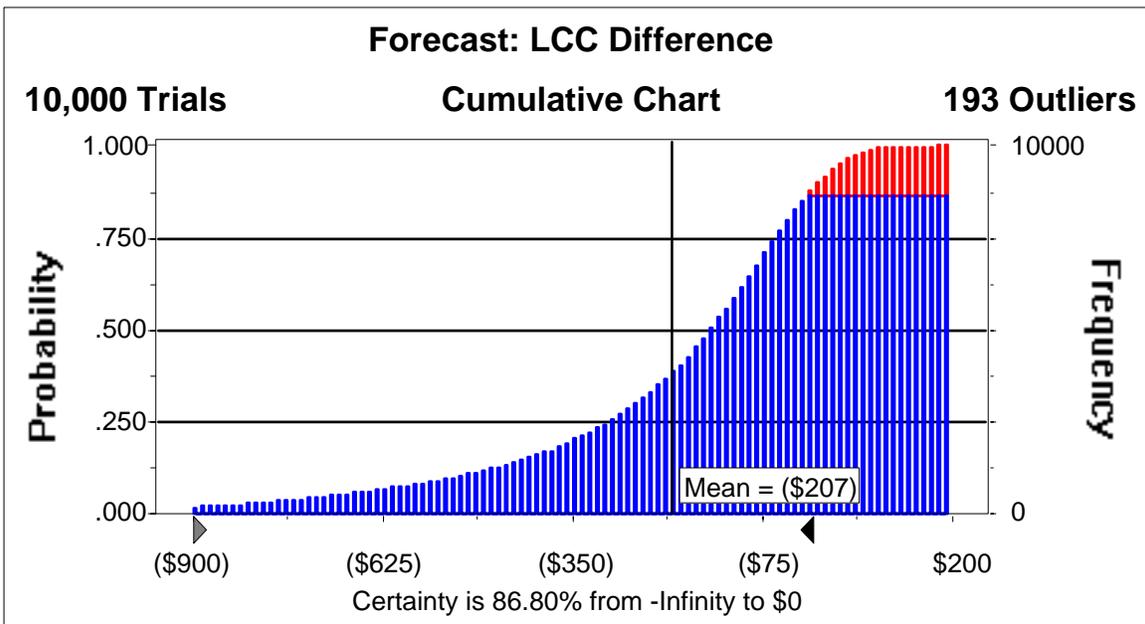


Figure E.26S Single Package HP, 11 SEER: Cumulative Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

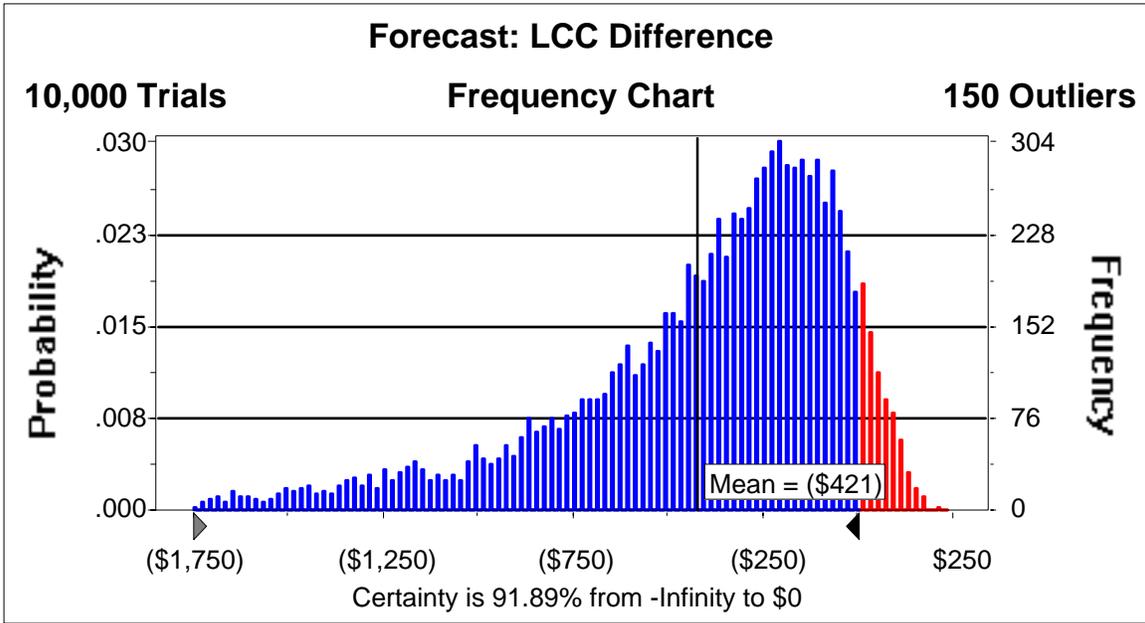


Figure E.27S Single Package HP, 12 SEER: Frequency Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

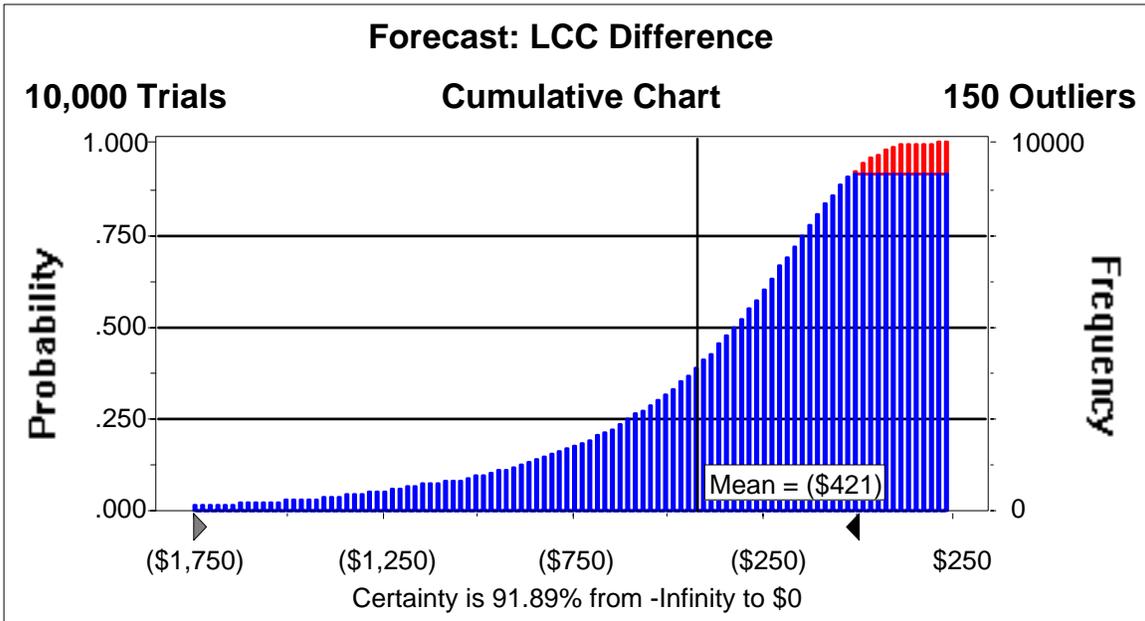


Figure E.28S Single Package HP, 12 SEER: Cumulative Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

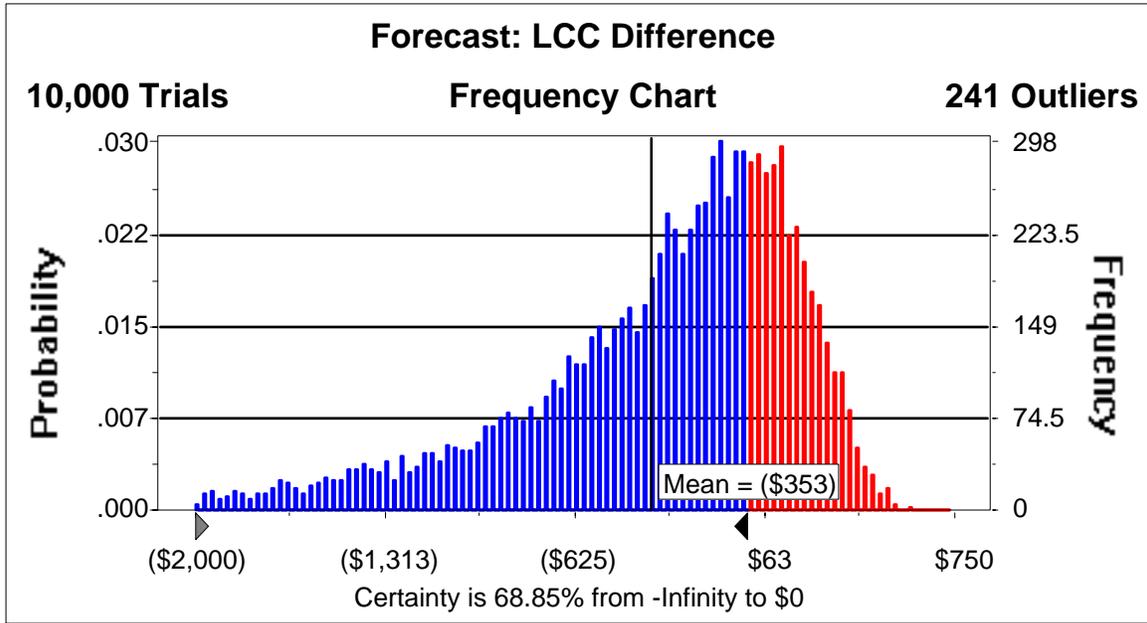


Figure E.29S Single Package HP, 13 SEER: Frequency Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

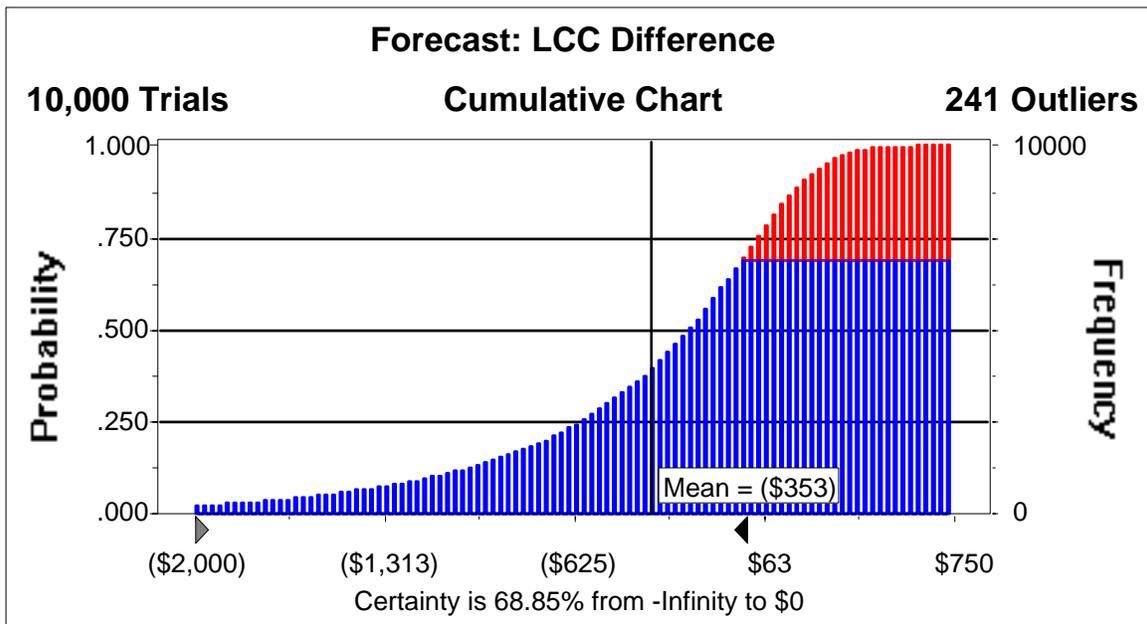


Figure E.30S Single Package HP, 13 SEER: Cumulative Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

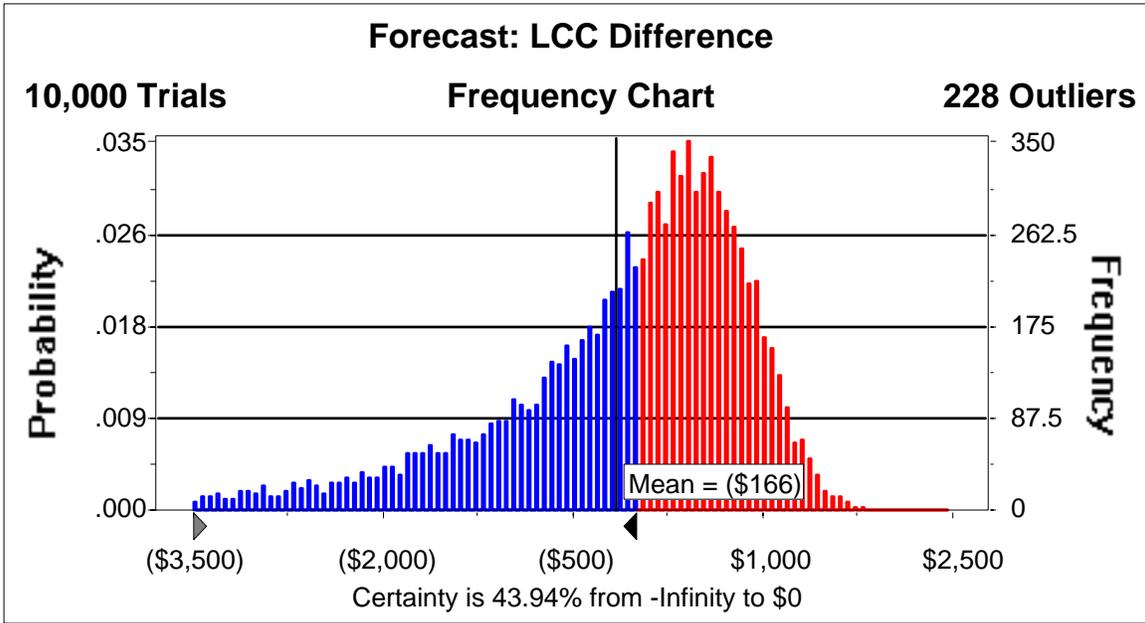


Figure E.31S Single Package HP, 18 SEER: Frequency Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

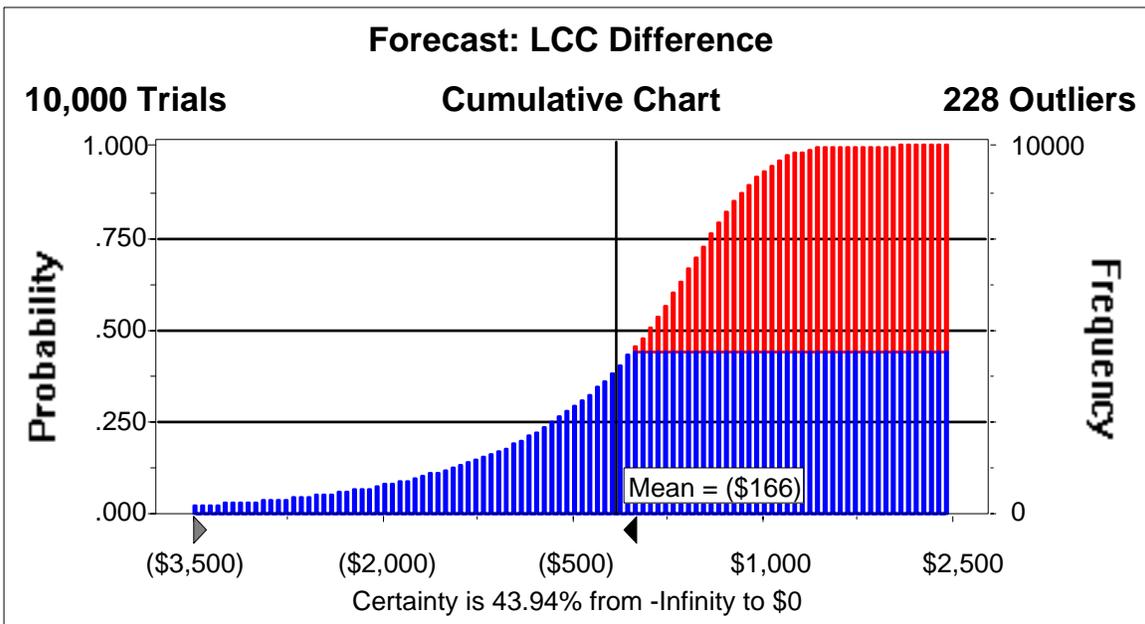


Figure E.32S Single Package HP, 18 SEER: Cumulative Chart of LCC Difference based on Reverse Engineering Manufacturing Costs

J.8 SUPPLEMENTAL TABLES AND FIGURES TO APPENDIX F

Table F.1.1S Split A/C, 11 SEER: Energy Savings based on Rev Eng Manufacturing Costs

| | Energy Saving in Quads | | | | |
|-----------|------------------------|------|------|------|------|
| | Total | Elec | Gas | Oil | LPG |
| from 2006 | | | | | |
| to 2010 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 |
| to 2020 | 0.45 | 0.45 | 0.00 | 0.00 | 0.00 |
| to 2030 | 1.05 | 1.05 | 0.00 | 0.00 | 0.00 |

Table F.1.2S Split A/C, 11 SEER: Costs and Net Present Value based on Rev Eng Manufacturing Costs

| CAC/HP Standards in 2006: | 11 SEER |
|---|-------------|
| Cost and Net Present Values (in billion 1998\$) | |
| Cumulative for Split A/C Purchased from 2006 to 2030 | |
| Discounted at 7% to year 1998 | |
| Total Operating Savings | 3.23 |
| Total Equipment Cost | 2.56 |
| Net Present Benefit | 0.68 |
| Benefit/Cost Ratio | 1.26 |

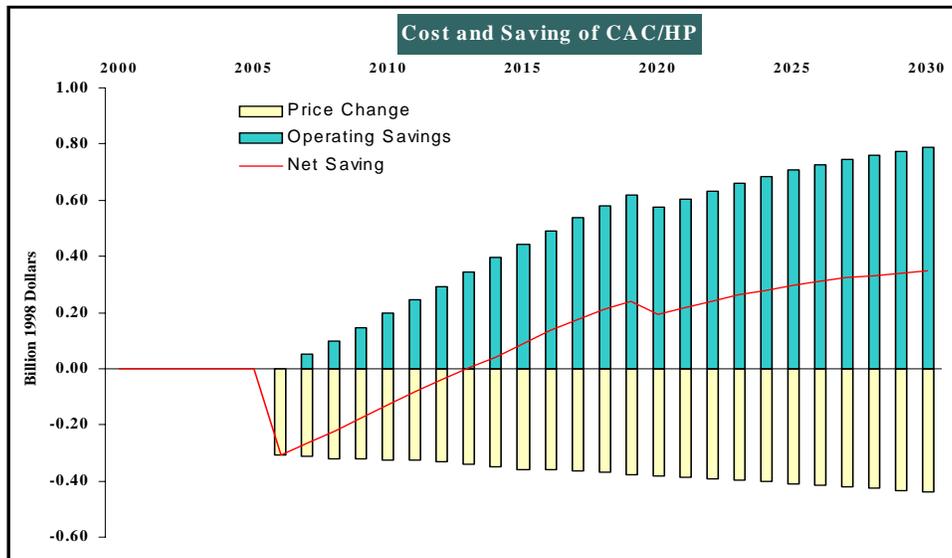


Figure F.1S Split A/C, 11 SEER: Annual Savings and Costs based on Reverse Engineering Manufacturing Costs

Table F.2.1S Split A/C, 12 SEER: Energy Savings based on Rev Eng Manufacturing Costs

| | Energy Saving in Quads | | | | |
|-----------|------------------------|------|------|------|------|
| | Total | Elec | Gas | Oil | LPG |
| from 2006 | | | | | |
| to 2010 | 0.12 | 0.12 | 0.00 | 0.00 | 0.00 |
| to 2020 | 0.79 | 0.79 | 0.00 | 0.00 | 0.00 |
| to 2030 | 1.84 | 1.84 | 0.00 | 0.00 | 0.00 |

Table F.2.2S Split A/C, 12 SEER: Costs and Net Present Value based on Rev Eng Manufacturing Costs

| CAC/HP Standards in 2006: | 12 SEER |
|---|-------------|
| Cost and Net Present Values (in billion 1998\$) | |
| Cumulative for Split A/C Purchased from 2006 to 2030 | |
| Discounted at 7% to year 1998 | |
| Total Operating Savings | 5.84 |
| Total Equipment Cost | 5.48 |
| Net Present Benefit | 0.36 |
| Benefit/Cost Ratio | 1.07 |

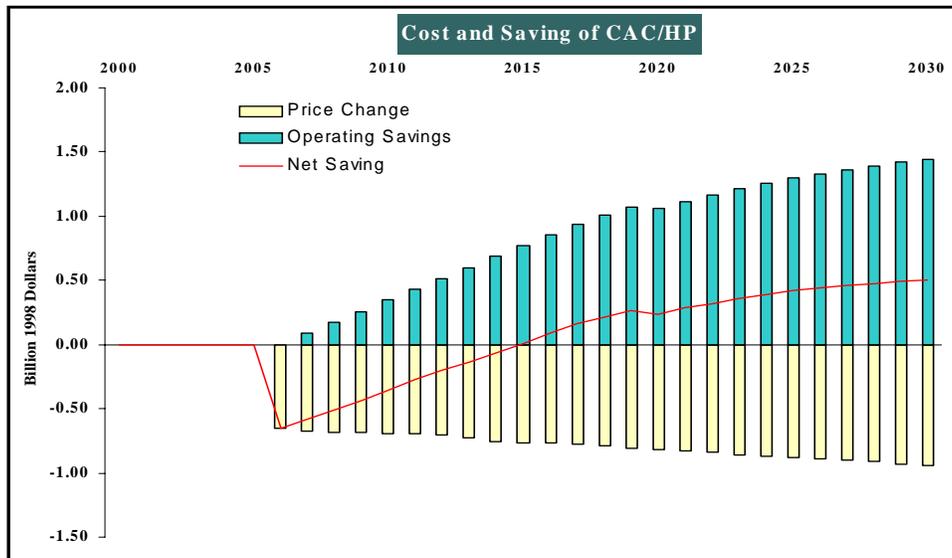


Figure F.2S Split A/C, 12 SEER: Annual Savings and Costs based on Reverse Engineering Manufacturing Costs

Table F.3.1S Split A/C, 13 SEER: Energy Savings based on Rev Eng Manufacturing Costs

| | Energy Saving in Quads | | | | |
|-----------|------------------------|------|------|------|------|
| | Total | Elec | Gas | Oil | LPG |
| from 2006 | | | | | |
| to 2010 | 0.16 | 0.16 | 0.00 | 0.00 | 0.00 |
| to 2020 | 1.11 | 1.11 | 0.00 | 0.00 | 0.00 |
| to 2030 | 2.60 | 2.60 | 0.00 | 0.00 | 0.00 |

Table F.3.2S Split A/C, 13 SEER: Costs and Net Present Value based on Rev Eng Manufacturing Costs

| CAC/HP Standards in 2006: | 13 SEER |
|---|--------------|
| Cost and Net Present Values (in billion 1998\$) | |
| Cumulative for Split A/C Purchased from 2006 to 2030 | |
| Discounted at 7% to year 1998 | |
| Total Operating Savings | 8.19 |
| Total Equipment Cost | 8.68 |
| Net Present Benefit | -0.50 |
| Benefit/Cost Ratio | 0.94 |

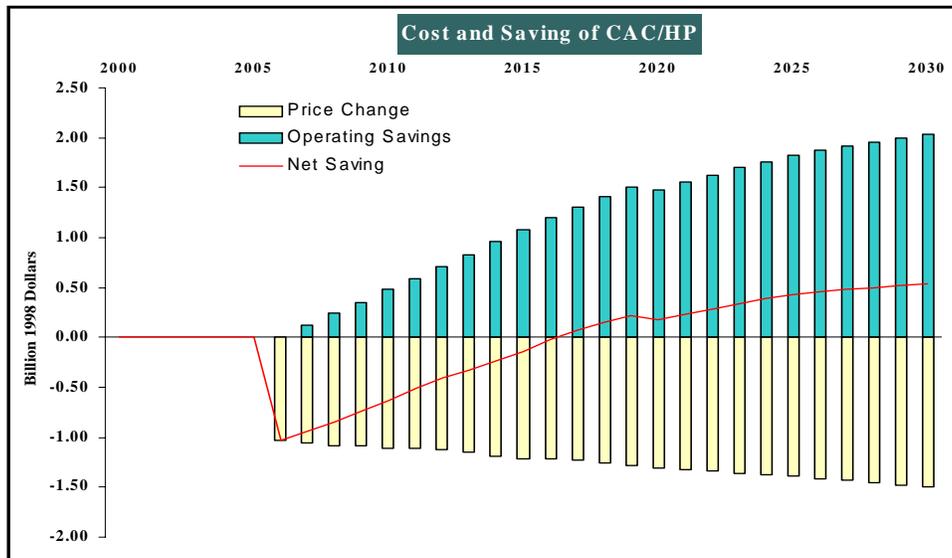


Figure F.3S Split A/C, 13 SEER: Annual Savings and Costs based on Reverse Engineering Manufacturing Costs

Table F.4.1S Split A/C, 18 SEER: Energy Savings based on Rev Eng Manufacturing Costs

| | Energy Saving in Quads | | | | |
|-----------|------------------------|------|------|------|------|
| | Total | Elec | Gas | Oil | LPG |
| from 2006 | | | | | |
| to 2010 | 0.30 | 0.30 | 0.00 | 0.00 | 0.00 |
| to 2020 | 2.09 | 2.09 | 0.00 | 0.00 | 0.00 |
| to 2030 | 5.00 | 5.00 | 0.00 | 0.00 | 0.00 |

Table F.4.2S Split A/C, 18 SEER: Costs and Net Present Value based on Rev Eng Manufacturing Costs

| CAC/HP Standards in 2006: | 18 SEER |
|---|--------------|
| Cost and Net Present Values (in billion 1998\$) | |
| Cumulative for Split A/C Purchased from 2006 to 2030 | |
| Discounted at 7% to year 1998 | |
| Total Operating Savings | 11.77 |
| Total Equipment Cost | 18.43 |
| Net Present Benefit | -6.67 |
| Benefit/Cost Ratio | 0.64 |

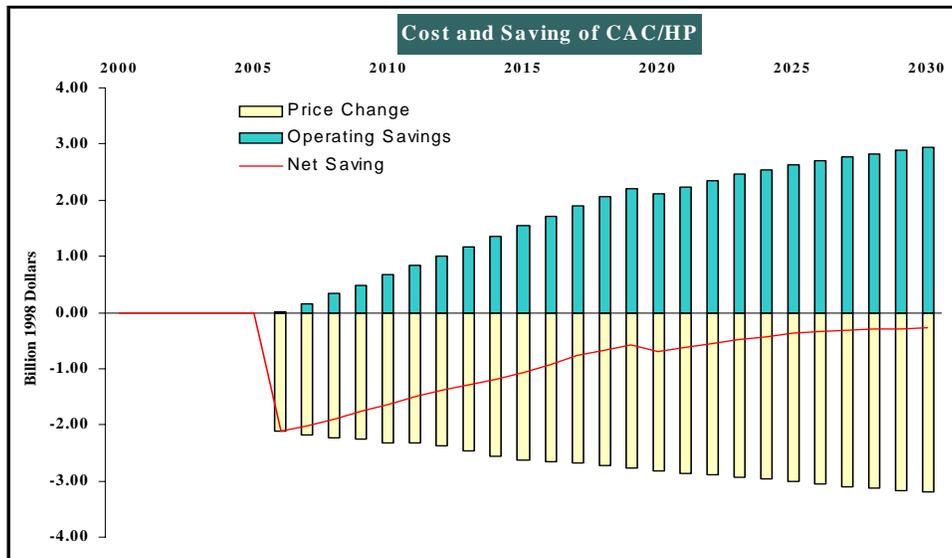


Figure F.4S Split A/C, 18 SEER: Annual Savings and Costs based on Reverse Engineering Manufacturing Costs

Table F.5.1S Split HP, 11 SEER: Energy Savings based on Rev Eng Manufacturing Costs

| | Energy Saving in Quads | | | | |
|-----------|------------------------|------|------|------|------|
| | Total | Elec | Gas | Oil | LPG |
| from 2006 | | | | | |
| to 2010 | 0.03 | 0.03 | 0.00 | 0.00 | 0.00 |
| to 2020 | 0.19 | 0.19 | 0.00 | 0.00 | 0.00 |
| to 2030 | 0.45 | 0.45 | 0.00 | 0.00 | 0.00 |

Table F.5.2S Split HP, 11 SEER: Costs and Net Present Value based on Rev Eng Manufacturing Costs

| CAC/HP Standards in 2006: | 11 SEER |
|--|-------------|
| Cost and Net Present Values (in billion 1998\$) | |
| Cumulative for Split HP Purchased from 2006 to 2030 | |
| Discounted at 7% to year 1998 | |
| Total Operating Savings | 1.18 |
| Total Equipment Cost | 0.48 |
| Net Present Benefit | 0.70 |
| Benefit/Cost Ratio | 2.47 |

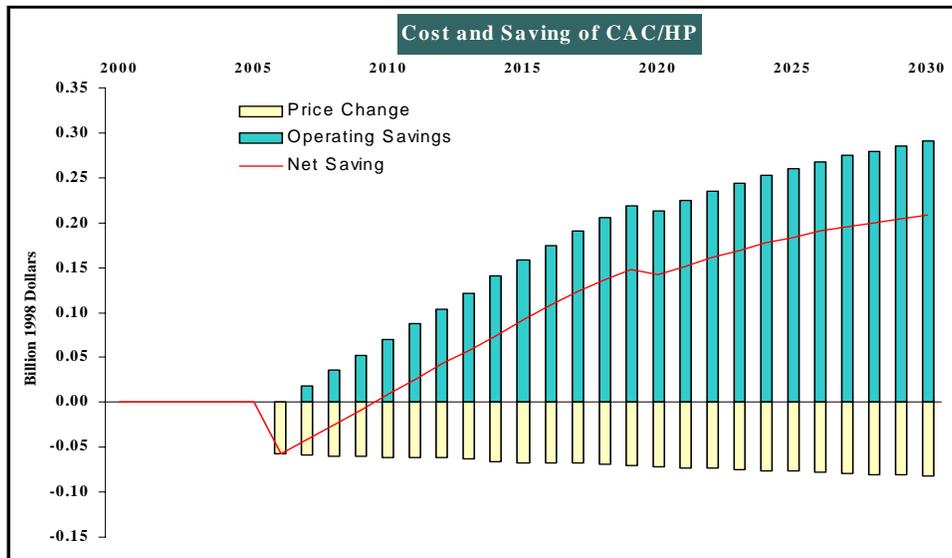


Figure F.5S Split HP, 11 SEER: Annual Savings and Costs based on Reverse Engineering Manufacturing Costs

Table F.6.1S Split HP, 12 SEER: Energy Savings based on Rev Eng Manufacturing Costs

| | Energy Saving in Quads | | | | |
|-----------|------------------------|------|------|------|------|
| | Total | Elec | Gas | Oil | LPG |
| from 2006 | | | | | |
| to 2010 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 |
| to 2020 | 0.35 | 0.35 | 0.00 | 0.00 | 0.00 |
| to 2030 | 0.82 | 0.82 | 0.00 | 0.00 | 0.00 |

Table F.6.2S Split HP, 12 SEER: Costs and Net Present Value based on Rev Eng Manufacturing Costs

| CAC/HP Standards in 2006: | 12 SEER |
|--|-------------|
| Cost and Net Present Values (in billion 1998\$) | |
| Cumulative for Split HP Purchased from 2006 to 2030 | |
| Discounted at 7% to year 1998 | |
| Total Operating Savings | 2.18 |
| Total Equipment Cost | 1.08 |
| Net Present Benefit | 1.09 |
| Benefit/Cost Ratio | 2.01 |

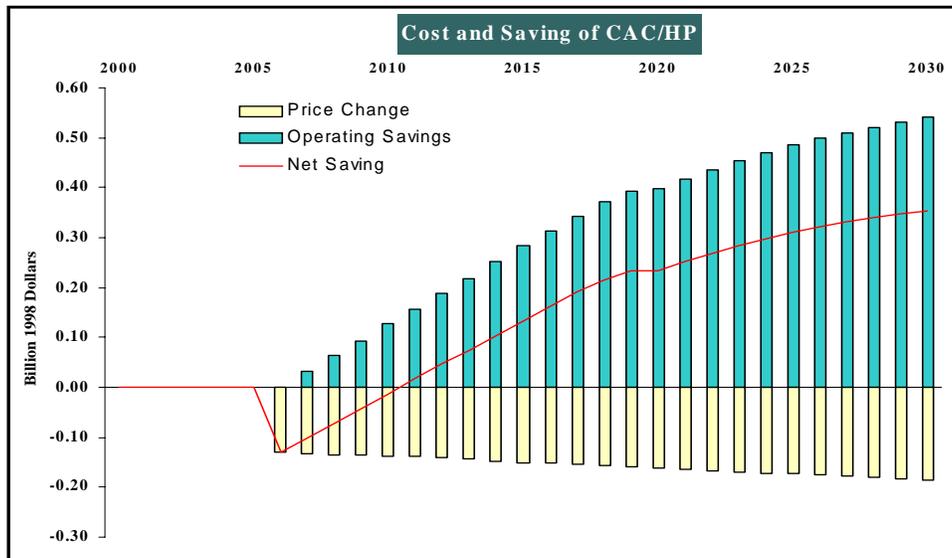


Figure F.6S Split HP, 12 SEER: Annual Savings and Costs based on Reverse Engineering Manufacturing Costs

Table F.7.1S Split HP, 13 SEER: Energy Savings based on Rev Eng Manufacturing Costs

| | Energy Saving in Quads | | | | |
|-----------|------------------------|------|------|------|------|
| | Total | Elec | Gas | Oil | LPG |
| from 2006 | | | | | |
| to 2010 | 0.08 | 0.08 | 0.00 | 0.00 | 0.00 |
| to 2020 | 0.53 | 0.53 | 0.00 | 0.00 | 0.00 |
| to 2030 | 1.24 | 1.24 | 0.00 | 0.00 | 0.00 |

Table F.7.2S Split HP, 13 SEER: Costs and Net Present Value based on Rev Eng Manufacturing Costs

| CAC/HP Standards in 2006: | 13 SEER |
|--|-------------|
| Cost and Net Present Values (in billion 1998\$) | |
| Cumulative for Split HP Purchased from 2006 to 2030 | |
| Discounted at 7% to year 1998 | |
| Total Operating Savings | 3.29 |
| Total Equipment Cost | 2.53 |
| Net Present Benefit | 0.76 |
| Benefit/Cost Ratio | 1.30 |

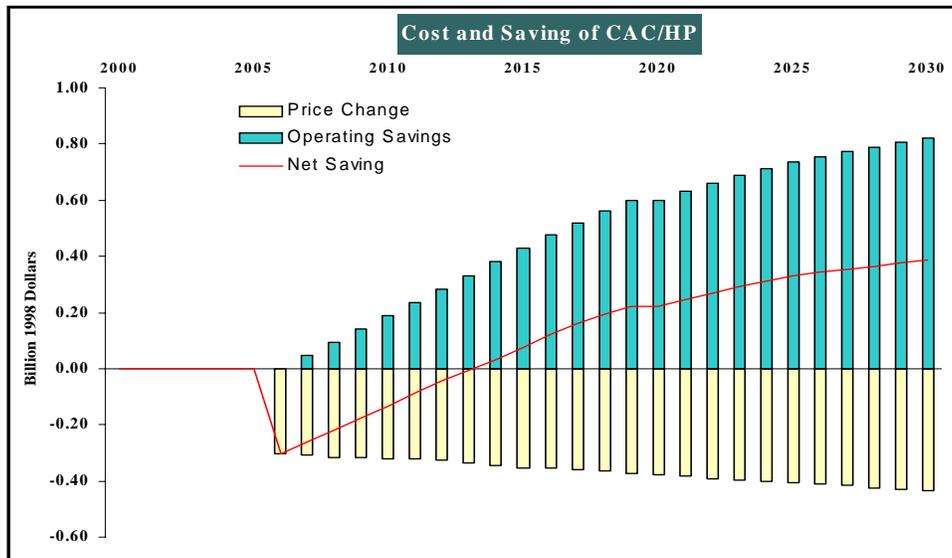


Figure F.7S Split HP, 13 SEER: Annual Savings and Costs based on Reverse Engineering Manufacturing Costs

Table F.8.1S Split HP, 18 SEER: Energy Savings based on Rev Eng Manufacturing Costs

| | Energy Saving in Quads | | | | |
|-----------|------------------------|------|------|------|------|
| | Total | Elec | Gas | Oil | LPG |
| from 2006 | | | | | |
| to 2010 | 0.16 | 0.16 | 0.00 | 0.00 | 0.00 |
| to 2020 | 1.09 | 1.09 | 0.00 | 0.00 | 0.00 |
| to 2030 | 2.60 | 2.60 | 0.00 | 0.00 | 0.00 |

Table F.8.2S Split A/C, 18 SEER: Costs and Net Present Value based on Rev Eng Manufacturing Costs

| CAC/HP Standards in 2006: | 18 SEER |
|--|--------------|
| Cost and Net Present Values (in billion 1998\$) | |
| Cumulative for Split HP Purchased from 2006 to 2030 | |
| Discounted at 7% to year 1998 | |
| Total Operating Savings | 5.15 |
| Total Equipment Cost | 7.49 |
| Net Present Benefit | -2.34 |
| Benefit/Cost Ratio | 0.69 |

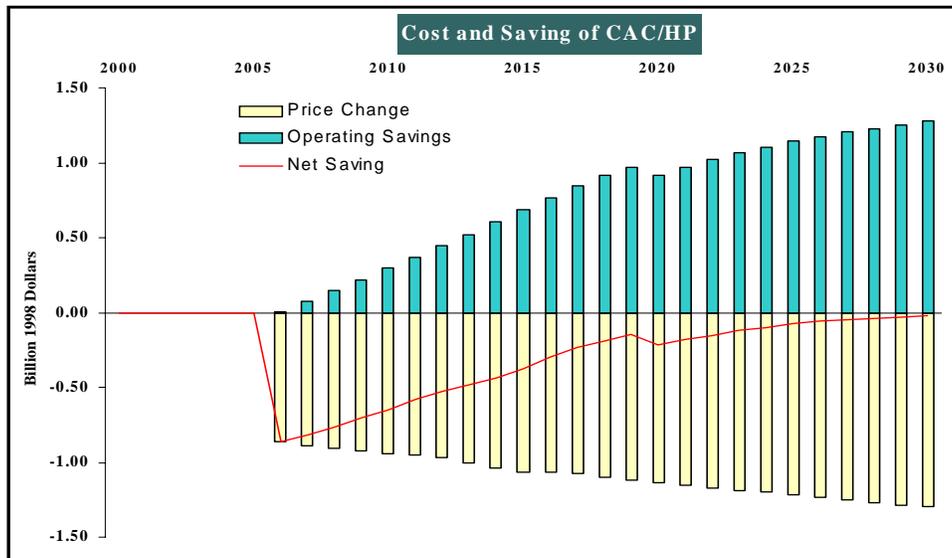


Figure F.8S Split HP, 18 SEER: Annual Savings and Costs based on Reverse Engineering Manufacturing Costs

Table F.9.1S Pack. A/C, 11 SEER: Energy Savings based on Rev Eng Manufacturing Costs

| | Energy Saving in Quads | | | | |
|-----------|------------------------|------|------|------|------|
| | Total | Elec | Gas | Oil | LPG |
| from 2006 | | | | | |
| to 2010 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 |
| to 2020 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 |
| to 2030 | 0.13 | 0.13 | 0.00 | 0.00 | 0.00 |

Table F.9.2S Pack. A/C, 11 SEER: Costs and Net Present Value based on Rev Eng Manufacturing Costs

| CAC/HP Standards in 2006: | 11 SEER |
|---|-------------|
| Cost and Net Present Values (in billion 1998\$) | |
| Cumulative for Package A/C Purchased from 2006 to 2030 | |
| Discounted at 7% to year 1998 | |
| Total Operating Savings | 0.42 |
| Total Equipment Cost | 0.30 |
| Net Present Benefit | 0.12 |
| Benefit/Cost Ratio | 1.39 |

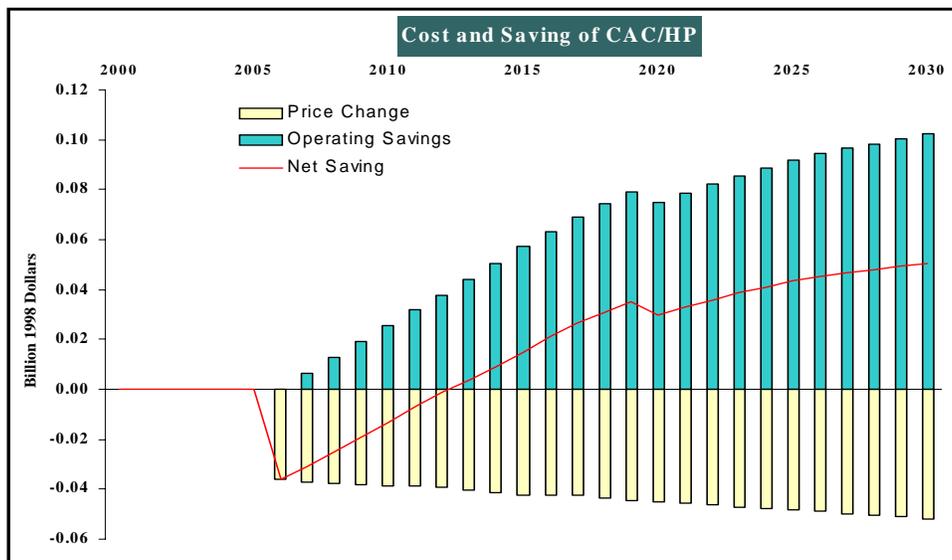


Figure F.9S Package A/C, 11 SEER: Annual Savings and Costs based on Reverse Engineering Manufacturing Costs

Table F.10.1S Pack. A/C, 12 SEER: Energy Savings based on Rev Eng Manufacturing Costs

| | Energy Saving in Quads | | | | |
|-----------|------------------------|------|------|------|------|
| | Total | Elec | Gas | Oil | LPG |
| from 2006 | | | | | |
| to 2010 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 |
| to 2020 | 0.10 | 0.10 | 0.00 | 0.00 | 0.00 |
| to 2030 | 0.23 | 0.23 | 0.00 | 0.00 | 0.00 |

Table F.10.2S Pack. A/C, 12 SEER: Costs and Net Present Value based on Rev Eng Manufacturing Costs

| CAC/HP Standards in 2006: | 12 SEER |
|---|-------------|
| Cost and Net Present Values (in billion 1998\$) | |
| Cumulative for Package A/C Purchased from 2006 to 2030 | |
| Discounted at 7% to year 1998 | |
| Total Operating Savings | 0.72 |
| Total Equipment Cost | 0.52 |
| Net Present Benefit | 0.20 |
| Benefit/Cost Ratio | 1.39 |

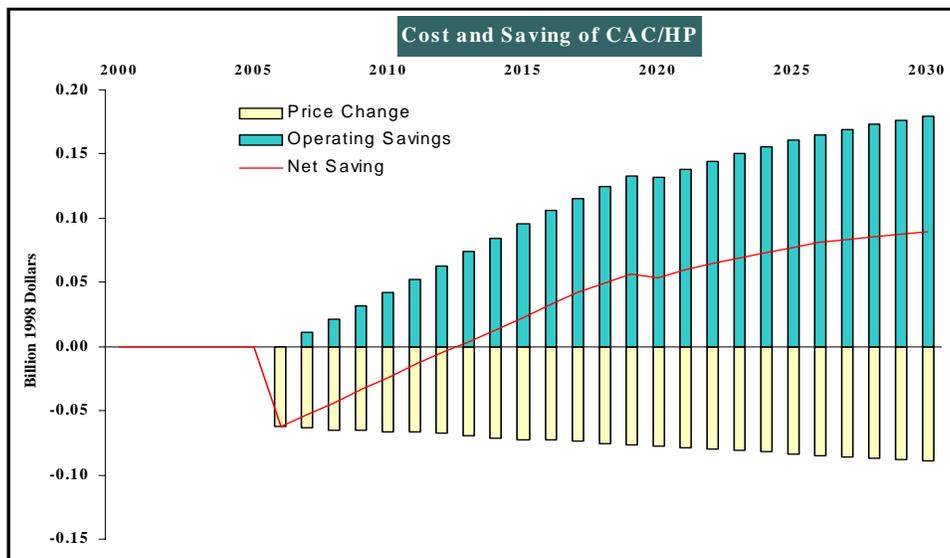


Figure F.10S Package A/C, 12 SEER: Annual Savings and Costs based on Reverse Engineering Manufacturing Costs

Table F.11.1S Pack. A/C, 13 SEER: Energy Savings based on Rev Eng Manufacturing Costs

| | Energy Saving in Quads | | | | |
|-----------|------------------------|------|------|------|------|
| | Total | Elec | Gas | Oil | LPG |
| from 2006 | | | | | |
| to 2010 | 0.02 | 0.02 | 0.00 | 0.00 | 0.00 |
| to 2020 | 0.13 | 0.13 | 0.00 | 0.00 | 0.00 |
| to 2030 | 0.31 | 0.31 | 0.00 | 0.00 | 0.00 |

Table F.11.2S Pack. A/C, 13 SEER: Costs and Net Present Value based on Rev Eng Manufacturing Costs

| CAC/HP Standards in 2006: | 13 SEER |
|---|--------------|
| Cost and Net Present Values (in billion 1998\$) | |
| Cumulative for Package A/C Purchased from 2006 to 2030 | |
| Discounted at 7% to year 1998 | |
| Total Operating Savings | 0.98 |
| Total Equipment Cost | 1.28 |
| Net Present Benefit | -0.30 |
| Benefit/Cost Ratio | 0.77 |

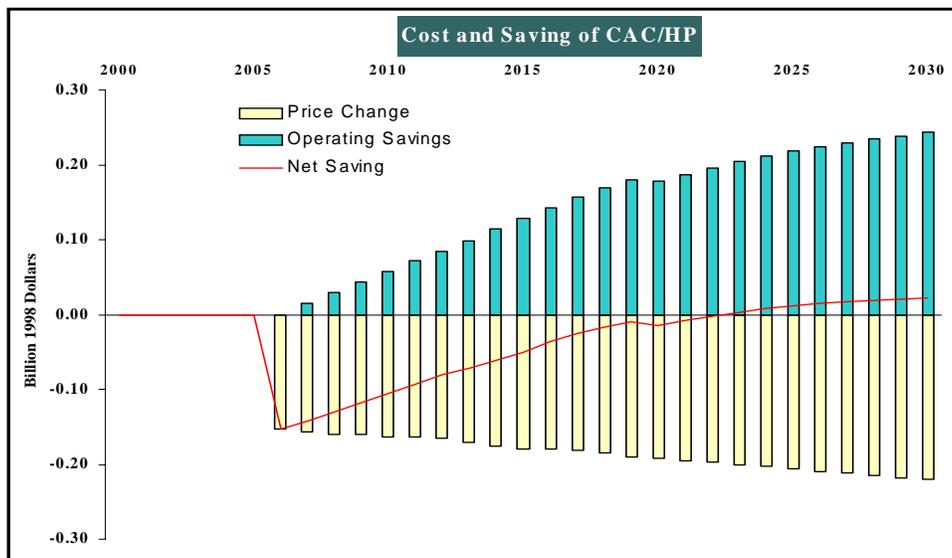


Figure F.11S Package A/C, 13 SEER: Annual Savings and Costs based on Reverse Engineering Manufacturing Costs

Table F.12.1S Pack. A/C, 18 SEER: Energy Savings based on Rev Eng Manufacturing Costs

| | Energy Saving in Quads | | | | |
|-----------|------------------------|------|------|------|------|
| | Total | Elec | Gas | Oil | LPG |
| from 2006 | | | | | |
| to 2010 | 0.03 | 0.03 | 0.00 | 0.00 | 0.00 |
| to 2020 | 0.24 | 0.24 | 0.00 | 0.00 | 0.00 |
| to 2030 | 0.58 | 0.58 | 0.00 | 0.00 | 0.00 |

Table F.12.2S Pack. A/C, 18 SEER: Costs and Net Present Value based on Rev Eng Manufacturing Costs

| CAC/HP Standards in 2006: | 18 SEER |
|---|--------------|
| Cost and Net Present Values (in billion 1998\$) | |
| Cumulative for Package A/C Purchased from 2006 to 2030 | |
| Discounted at 7% to year 1998 | |
| Total Operating Savings | 1.31 |
| Total Equipment Cost | 2.39 |
| Net Present Benefit | -1.09 |
| Benefit/Cost Ratio | 0.55 |

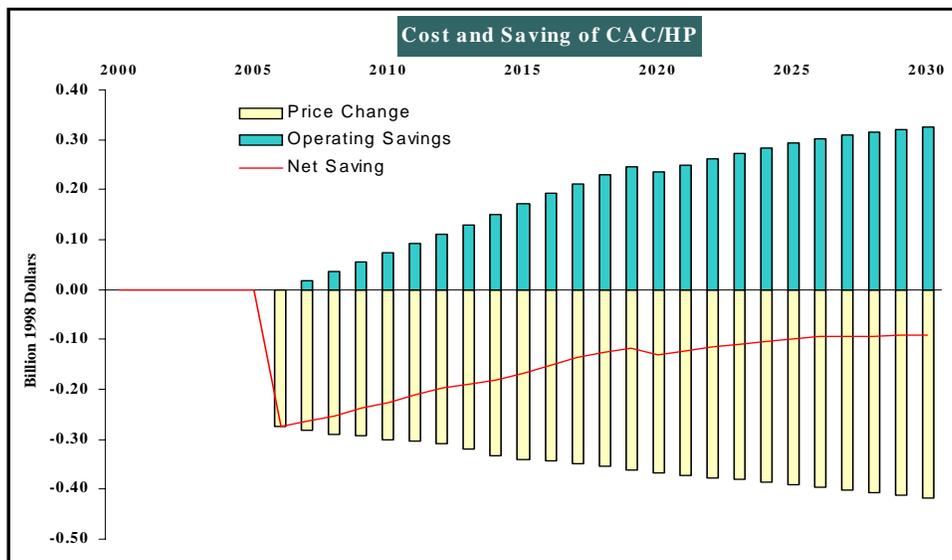


Figure F.12S Package A/C, 18 SEER: Annual Savings and Costs based on Reverse Engineering Manufacturing Costs

Table F.13.1S Pack. HP, 11 SEER: Energy Savings based on Rev Eng Manufacturing Costs

| | Energy Saving in Quads | | | | |
|-----------|------------------------|------|------|------|------|
| | Total | Elec | Gas | Oil | LPG |
| from 2006 | | | | | |
| to 2010 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| to 2020 | 0.03 | 0.03 | 0.00 | 0.00 | 0.00 |
| to 2030 | 0.07 | 0.07 | 0.00 | 0.00 | 0.00 |

Table F.13.2S Pack. HP, 11 SEER: Costs and Net Present Value based on Rev Eng Manufacturing Costs

| CAC/HP Standards in 2006: | 11 SEER |
|--|-------------|
| Cost and Net Present Values (in billion 1998\$) | |
| Cumulative for Package HP Purchased from 2006 to 2030 | |
| Discounted at 7% to year 1998 | |
| Total Operating Savings | 0.19 |
| Total Equipment Cost | 0.10 |
| Net Present Benefit | 0.09 |
| Benefit/Cost Ratio | 1.88 |

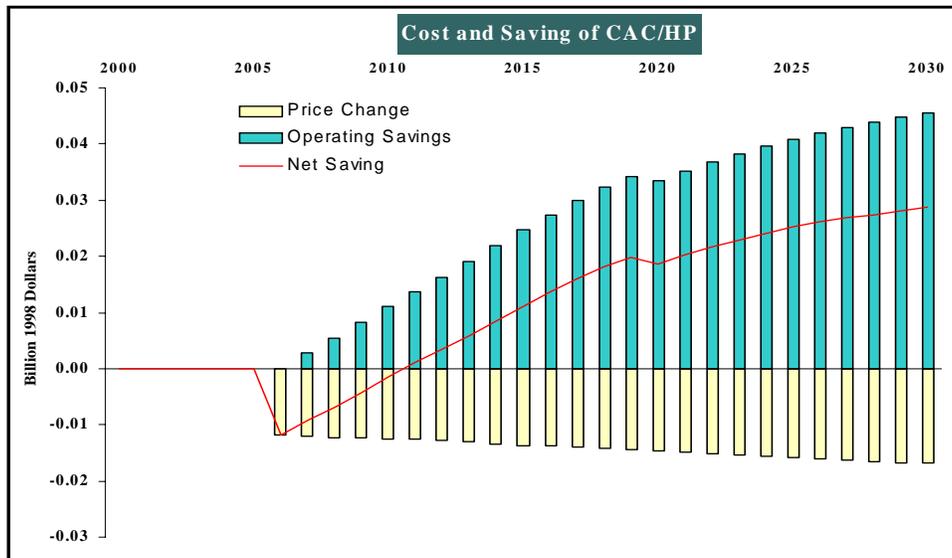


Figure F.13S Package HP, 11 SEER: Annual Savings and Costs based on Reverse Engineering Manufacturing Costs

Table F.14.1S Pack. HP, 12 SEER: Energy Savings based on Rev Eng Manufacturing Costs

| | Energy Saving in Quads | | | | |
|-----------|------------------------|------|------|------|------|
| | Total | Elec | Gas | Oil | LPG |
| from 2006 | | | | | |
| to 2010 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 |
| to 2020 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 |
| to 2030 | 0.12 | 0.12 | 0.00 | 0.00 | 0.00 |

Table F.14.2S Pack. HP, 12 SEER: Costs and Net Present Value based on Rev Eng Manufacturing Costs

| CAC/HP Standards in 2006: | 12 SEER |
|--|-------------|
| Cost and Net Present Values (in billion 1998\$) | |
| Cumulative for Package HP Purchased from 2006 to 2030 | |
| Discounted at 7% to year 1998 | |
| Total Operating Savings | 0.33 |
| Total Equipment Cost | 0.16 |
| Net Present Benefit | 0.17 |
| Benefit/Cost Ratio | 2.07 |

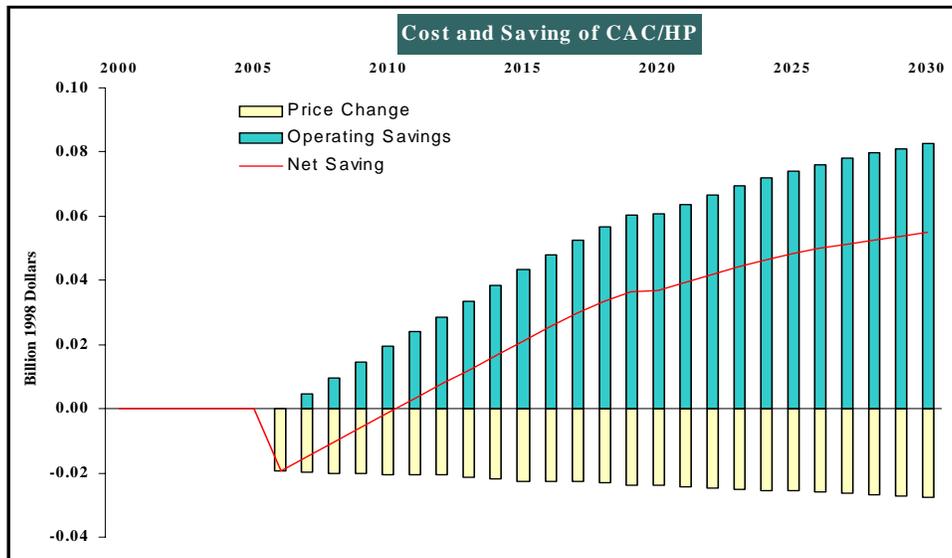


Figure F.14S Package HP, 12 SEER: Annual Savings and Costs based on Reverse Engineering Manufacturing Costs

Table F.15.1S Pack. HP, 13 SEER: Energy Savings based on Rev Eng Manufacturing Costs

| | Energy Saving in Quads | | | | |
|-----------|------------------------|------|------|------|------|
| | Total | Elec | Gas | Oil | LPG |
| from 2006 | | | | | |
| to 2010 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 |
| to 2020 | 0.08 | 0.08 | 0.00 | 0.00 | 0.00 |
| to 2030 | 0.19 | 0.19 | 0.00 | 0.00 | 0.00 |

Table F.15.2S Pack. HP, 13 SEER: Costs and Net Present Value based on Rev Eng Manufacturing Costs

| CAC/HP Standards in 2006: | 13 SEER |
|--|-------------|
| Cost and Net Present Values (in billion 1998\$) | |
| Cumulative for Package HP Purchased from 2006 to 2030 | |
| Discounted at 7% to year 1998 | |
| Total Operating Savings | 0.49 |
| Total Equipment Cost | 0.46 |
| Net Present Benefit | 0.03 |
| Benefit/Cost Ratio | 1.06 |

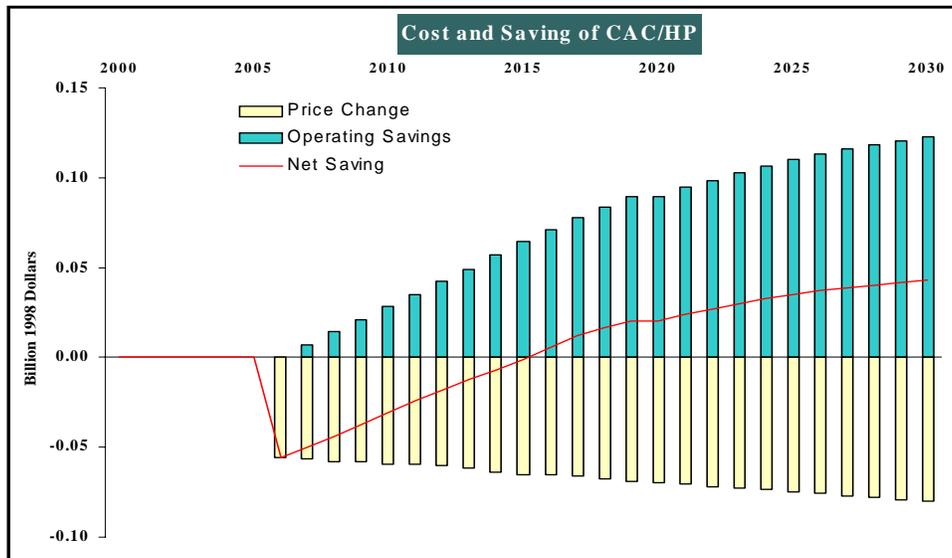


Figure F.15S Package HP, 13 SEER: Annual Savings and Costs based on Reverse Engineering Manufacturing Costs

Table F.16.1S Pack. HP, 18 SEER: Energy Savings based on Rev Eng Manufacturing Costs

| | Energy Saving in Quads | | | | |
|-----------|------------------------|------|------|------|------|
| | Total | Elec | Gas | Oil | LPG |
| from 2006 | | | | | |
| to 2010 | 0.02 | 0.02 | 0.00 | 0.00 | 0.00 |
| to 2020 | 0.15 | 0.15 | 0.00 | 0.00 | 0.00 |
| to 2030 | 0.37 | 0.37 | 0.00 | 0.00 | 0.00 |

Table F.16.2S Pack. HP, 18 SEER: Costs and Net Present Value based on Rev Eng Manufacturing Costs

| CAC/HP Standards in 2006: | 18 SEER |
|--|--------------|
| Cost and Net Present Values (in billion 1998\$) | |
| Cumulative for Package HP Purchased from 2006 to 2030 | |
| Discounted at 7% to year 1998 | |
| Total Operating Savings | 0.76 |
| Total Equipment Cost | 0.98 |
| Net Present Benefit | -0.23 |
| Benefit/Cost Ratio | 0.77 |

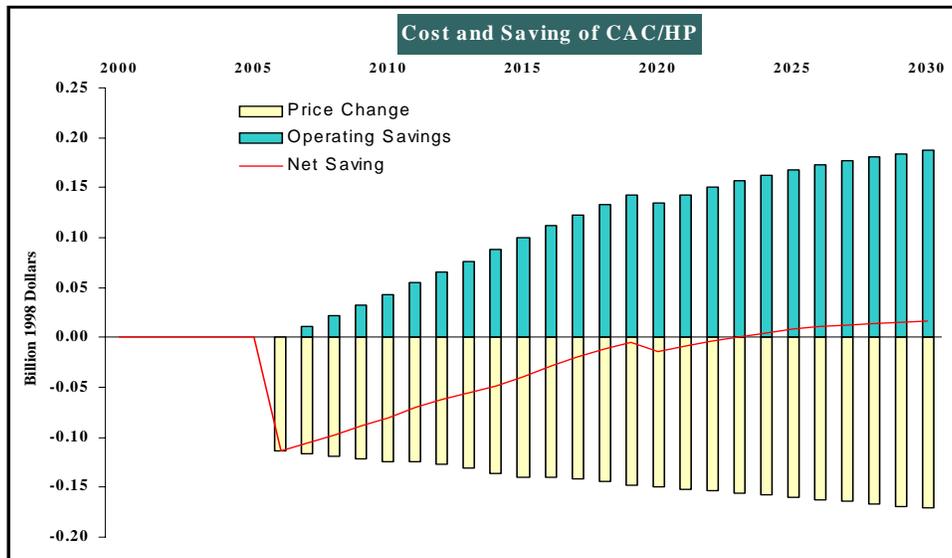


Figure F.16S Package HP, 18 SEER: Annual Savings and Costs based on Reverse Engineering Manufacturing Costs