

APPENDIX Q. LIFE-CYCLE COST (LCC) AND PAYBACK PERIOD (PBP) RESULTS

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APPENDIX Q. LIFE-CYCLE COST (LCC) AND PAYBACK PERIOD (PBP) RESULTS

Q.1 LIFE-CYCLE COST RESULTS

This section provides the *frequency* and *cumulative* distribution charts of the life-cycle cost (LCC) results for all the efficiency improvement levels analyzed for both product classes of commercial unitary air conditioners: 1) $\geq 65,000$ Btu/h to $<135,000$ Btu/h and 2) $\geq 135,000$ Btu/h to $<240,000$ Btu/h. For details on the methodology used to calculate the LCC and payback period (PBP) refer to Chapter 8.

The sections that follow present the LCC results from the two approaches used to calculate LCC: 1) a monthly approach establishing annual energy costs using electricity prices determined from electric utility tariffs and 2) an hourly approach establishing annual energy costs using electricity prices that may exist assuming all electricity markets are deregulated. For each efficiency level, *frequency* and *cumulative* charts are provided showing the distribution of expected LCC differences from the baseline design.

Q.1.1 Tariff-Based LCC Results

Q.1.1.1 Commercial Unitary Air Conditioners, $\geq 65,000$ Btu/h to $<135,000$ Btu/h

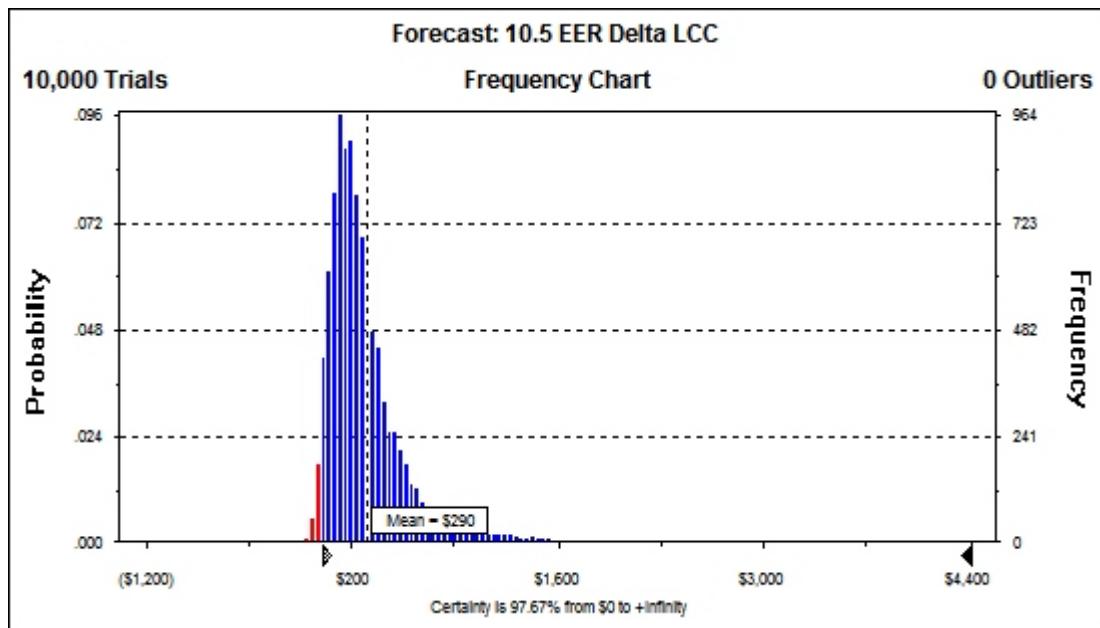


Figure Q.1.1 $\geq 65,000$ Btu/h to $<135,000$ Btu/h, 10.5 EER: Tariff-Based Frequency Chart of LCC Difference

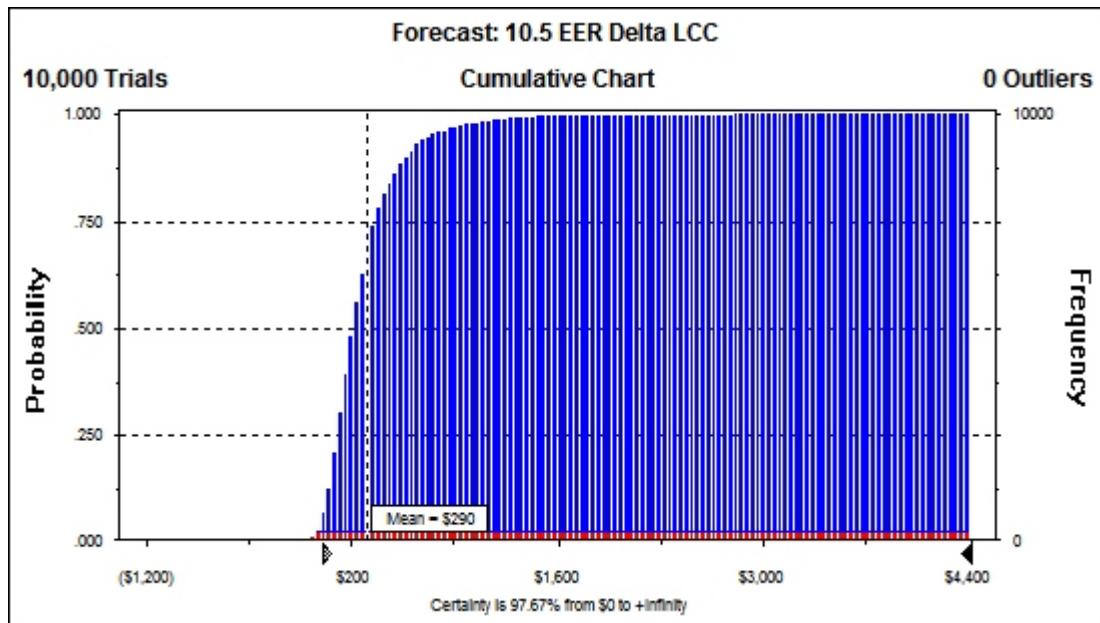


Figure Q.1.2 $\geq 65,000$ Btu/h to $<135,000$ Btu/h, 10.5 EER: Tariff-Based Cumulative Chart of LCC Difference

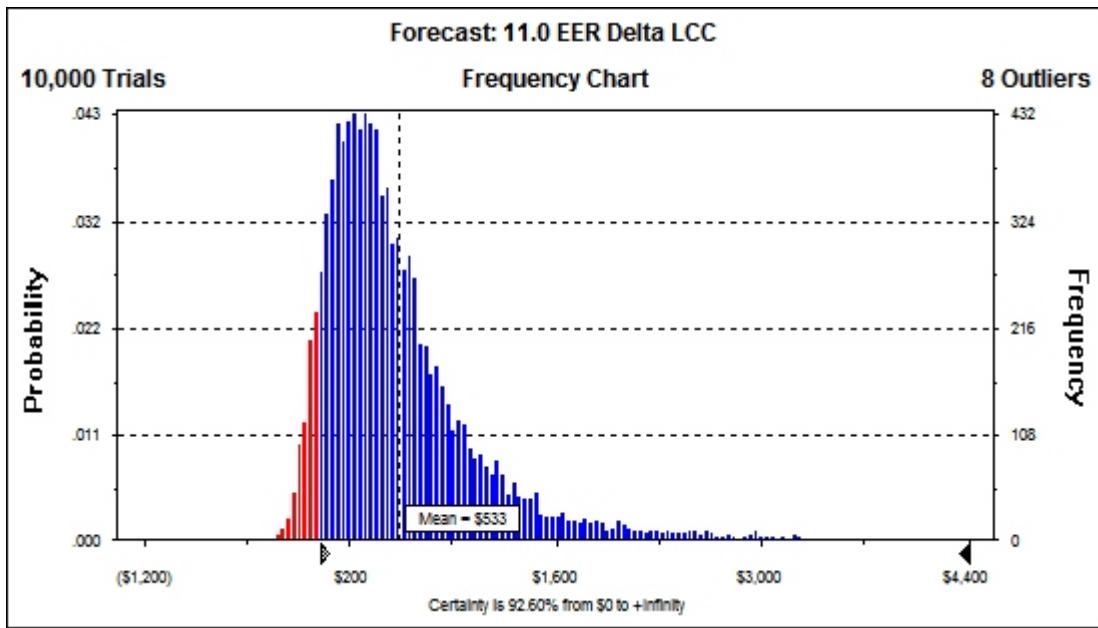


Figure Q.1.3 $\geq 65,000$ Btu/h to $<135,000$ Btu/h, 11.0 EER: Tariff-Based Frequency Chart of LCC Difference

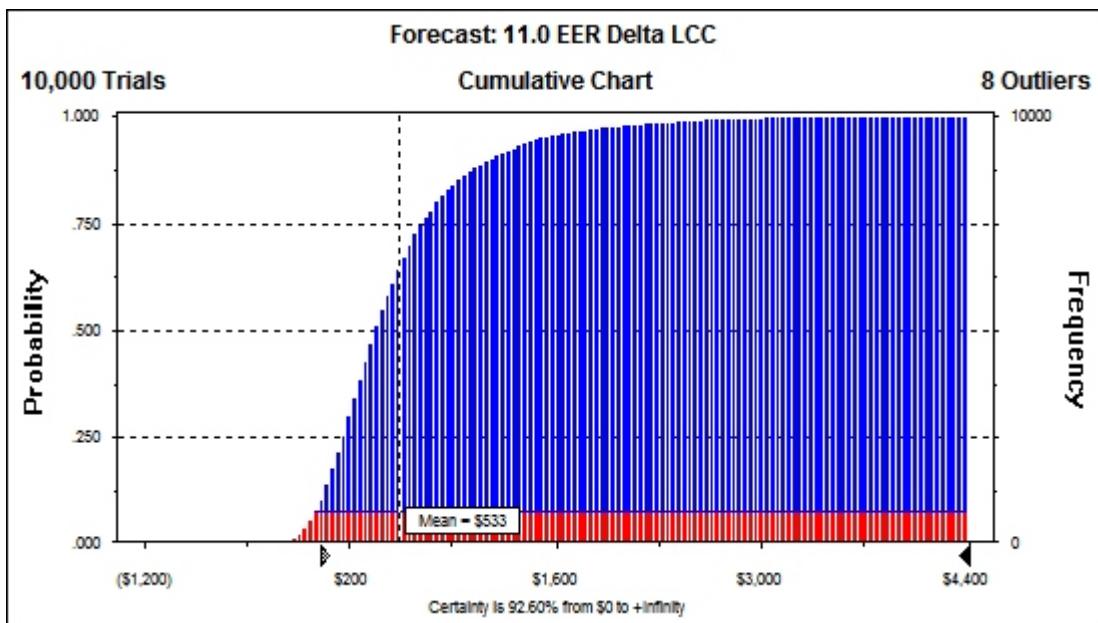


Figure Q.1.4 $\geq 65,000$ Btu/h to $<135,000$ Btu/h, 11.0 EER: Tariff-Based Cumulative Chart of LCC Difference

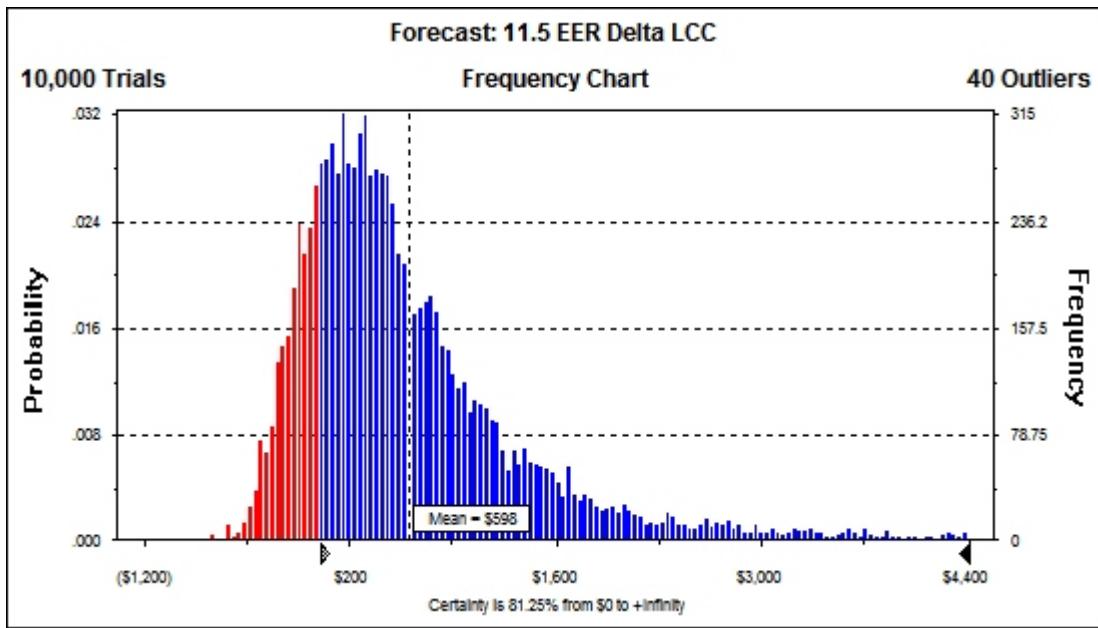


Figure Q.1.5 $\geq 65,000$ Btu/h to $<135,000$ Btu/h, 11.5 EER: Tariff-Based Frequency Chart of LCC Difference

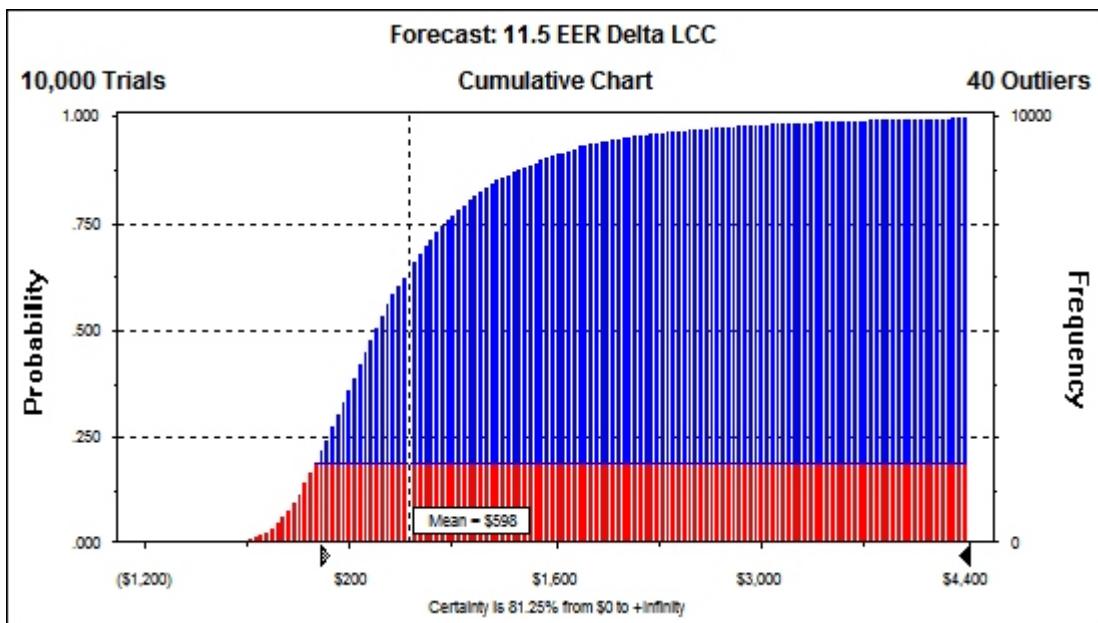


Figure Q.1.6 $\geq 65,000$ Btu/h to $<135,000$ Btu/h, 11.5 EER: Tariff-Based Cumulative Chart of LCC Difference

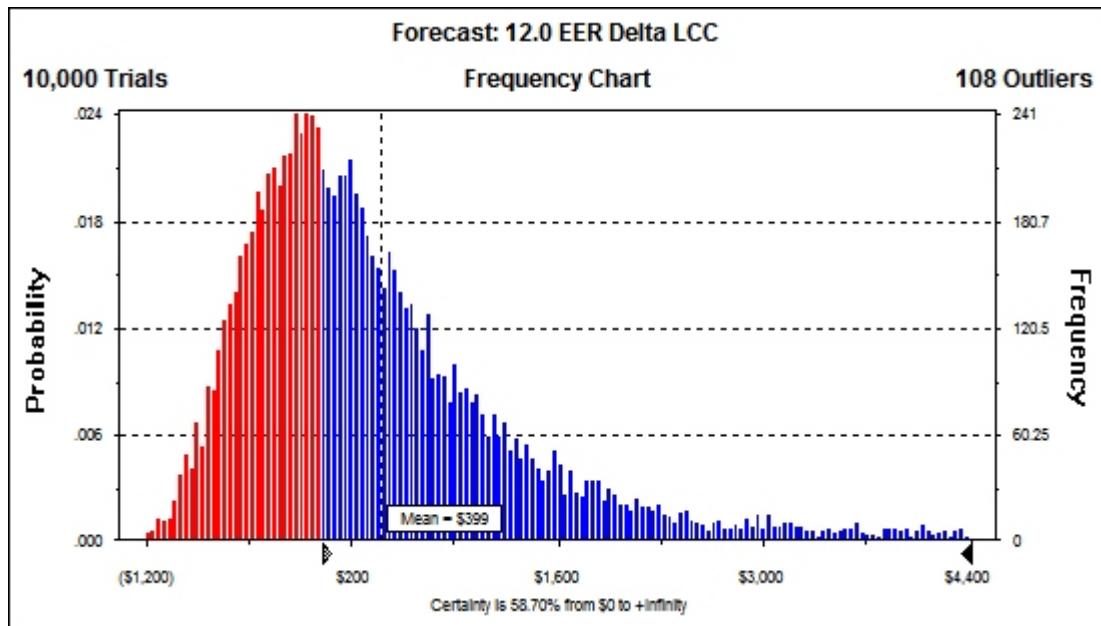


Figure Q.1.7 $\geq 65,000$ Btu/h to $< 135,000$ Btu/h, 12.0 EER: Tariff-Based Frequency Chart of LCC Difference

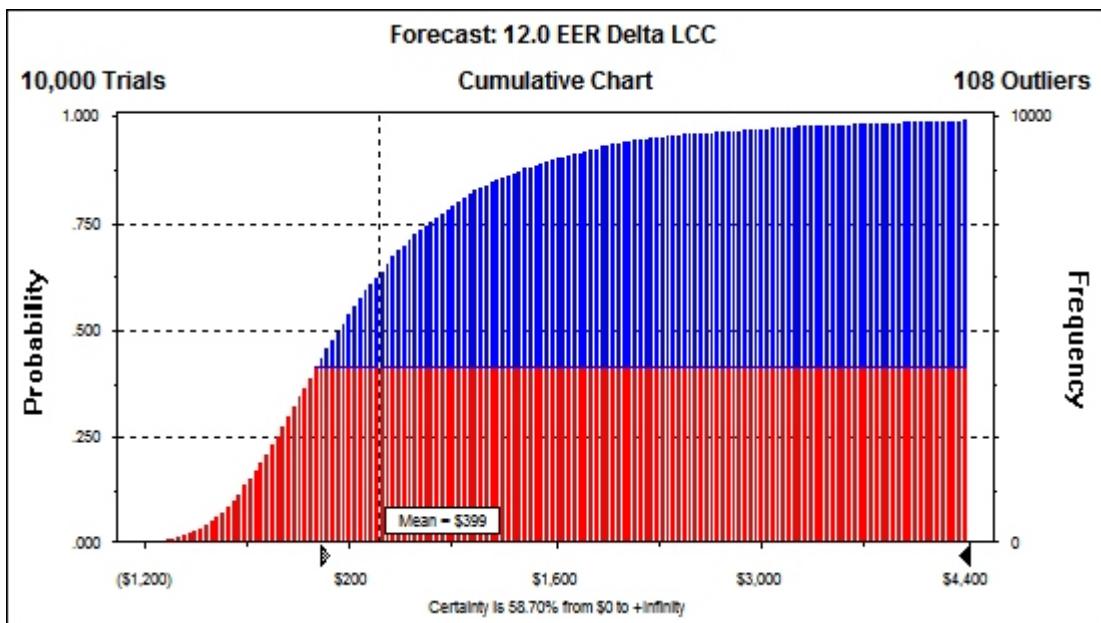


Figure Q.1.8 $\geq 65,000$ Btu/h to $< 135,000$ Btu/h, 12.0 EER: Tariff-Based Cumulative Chart of LCC Difference

Q.1.1.2 Commercial Unitary Air Conditioners, $\geq 135,000$ Btu/h to $<240,000$ Btu/h

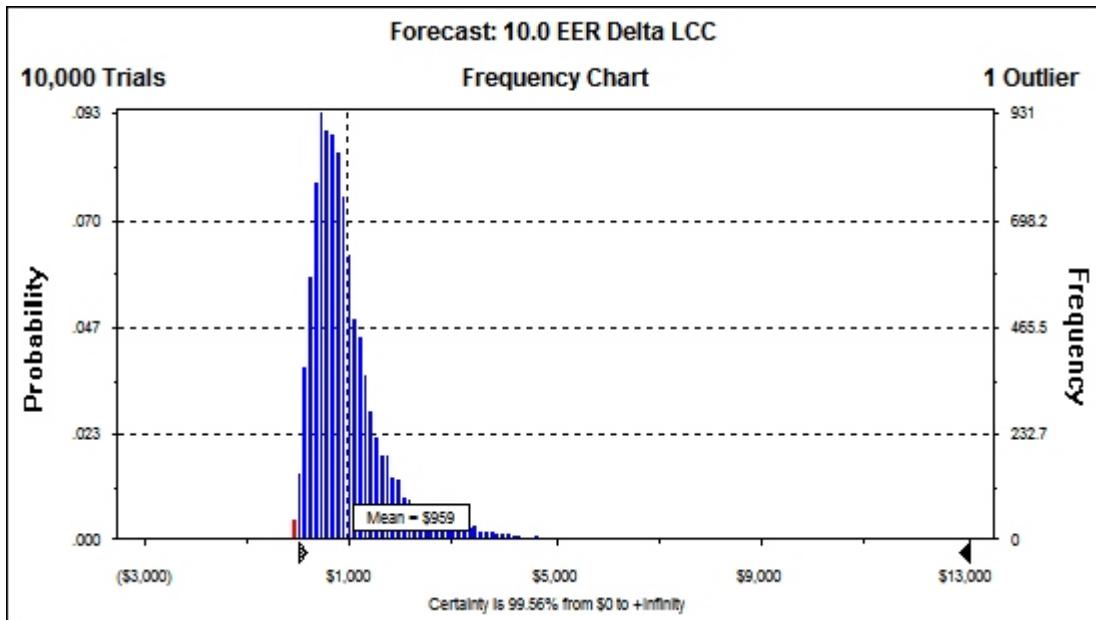


Figure Q.1.9 $\geq 65,000$ Btu/h to $<135,000$ Btu/h, 11.5 EER: Tariff-Based Cumulative Chart of LCC Difference

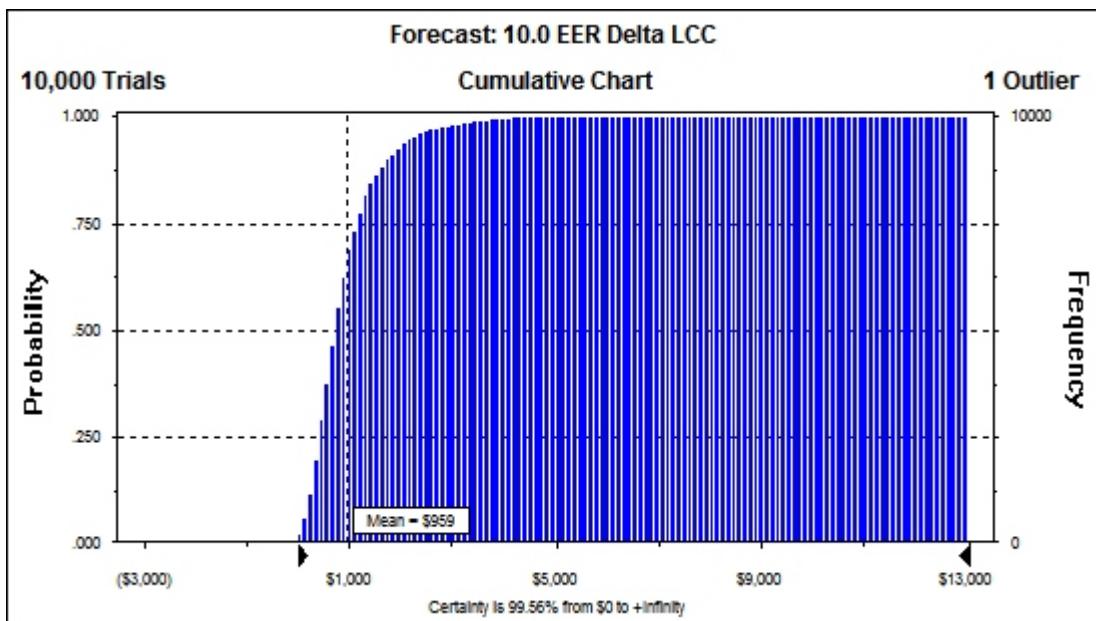


Figure Q.1.10 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 10.0 EER: Tariff-Based Cumulative Chart of LCC Difference

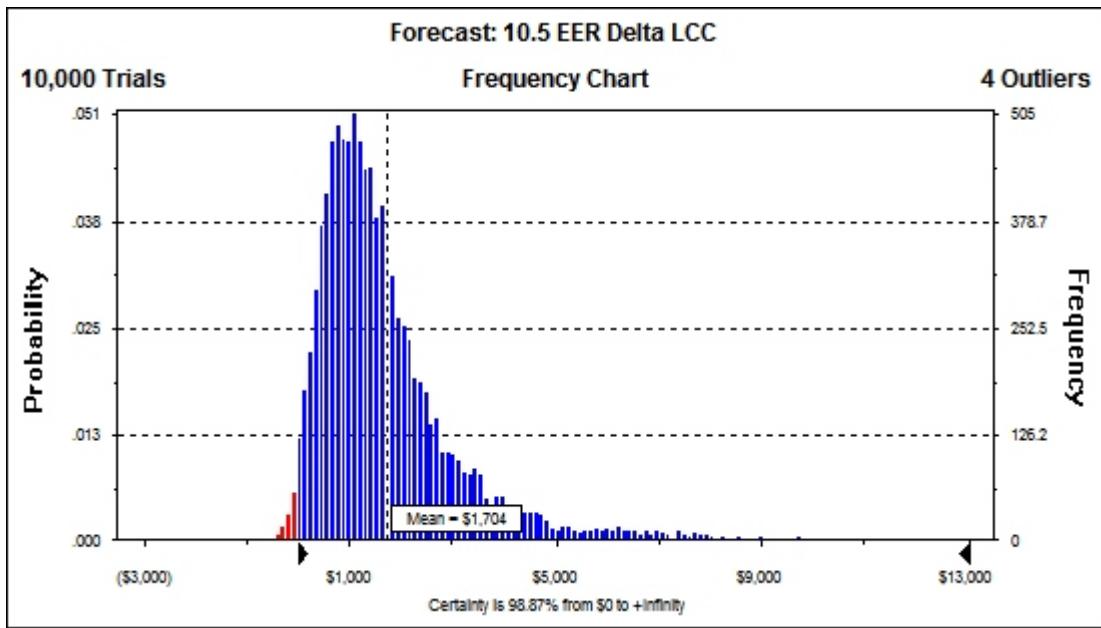


Figure Q.1.11 $\geq 135,000$ Btu/h to $< 240,000$ Btu/h, 10.5 EER: Tariff-Based Frequency Chart of LCC Difference

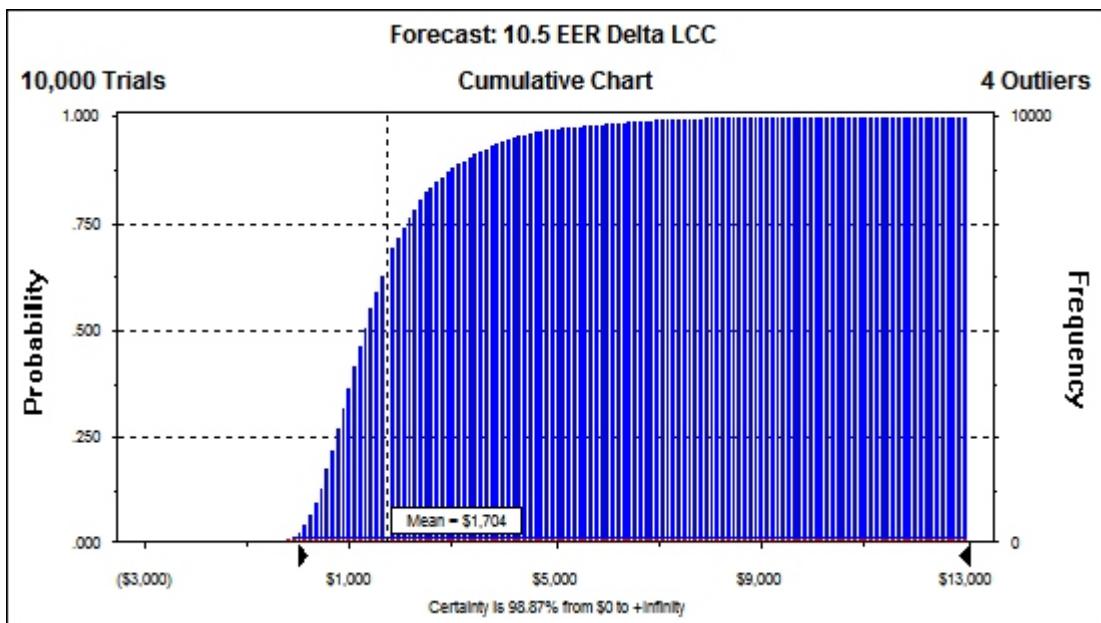


Figure Q.1.12 $\geq 135,000$ Btu/h to $< 240,000$ Btu/h, 10.5 EER: Tariff-Based Cumulative Chart of LCC Difference

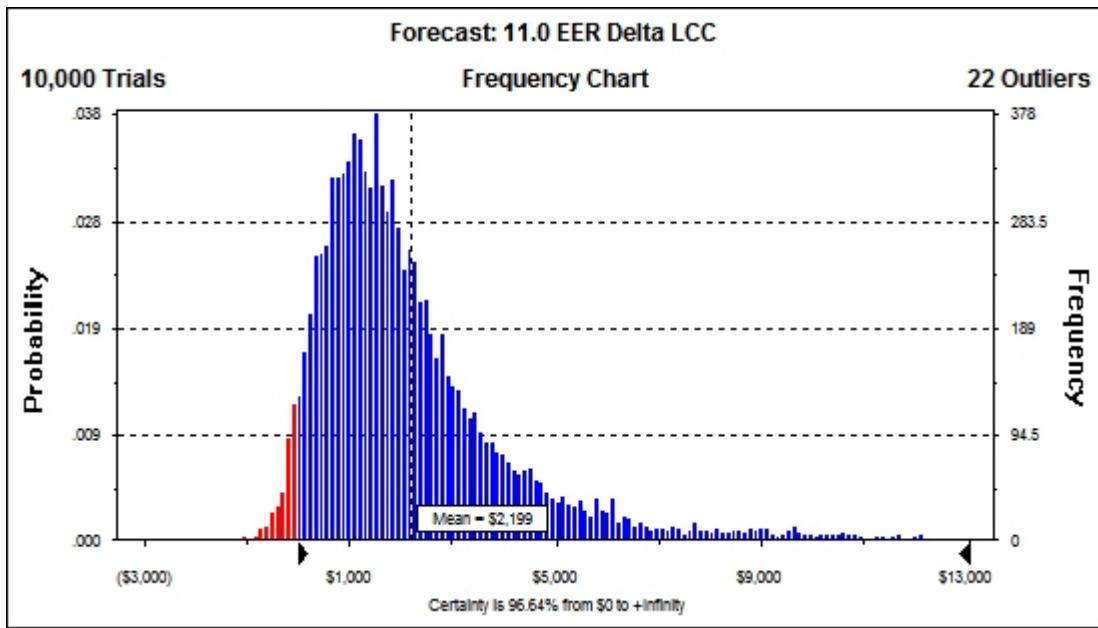


Figure Q.1.13 $\geq 135,000 \text{ Btu/h}$ to $< 240,000 \text{ Btu/h}$, 11.0 EER: Tariff-Based Frequency Chart of LCC Difference

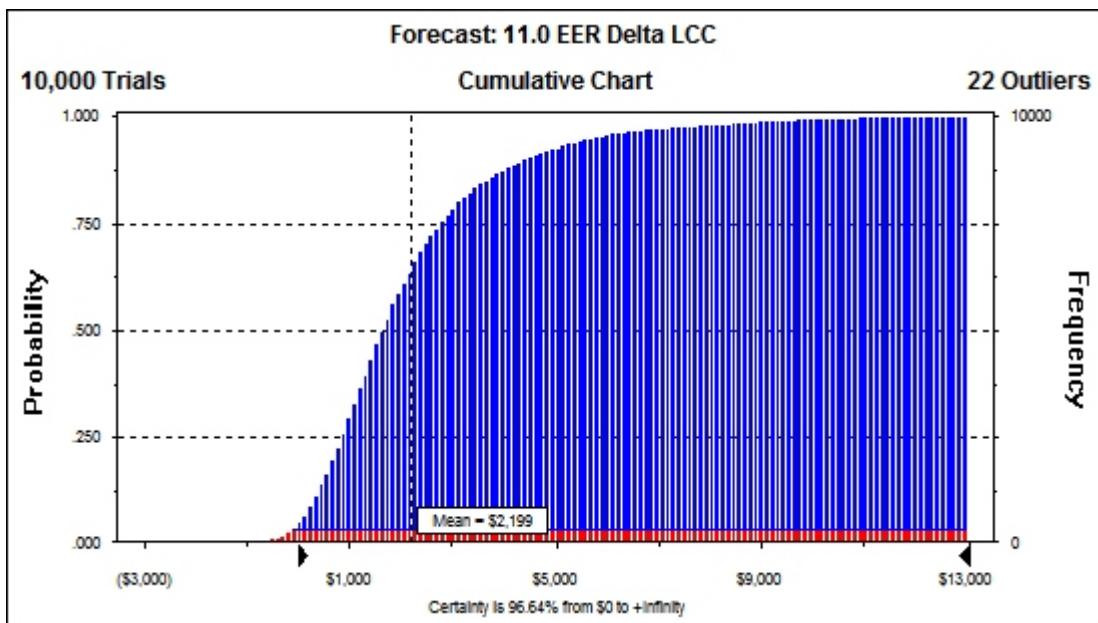


Figure Q.1.14 $\geq 135,000 \text{ Btu/h}$ to $< 240,000 \text{ Btu/h}$, 11.0 EER: Tariff-Based Cumulative Chart of LCC Difference

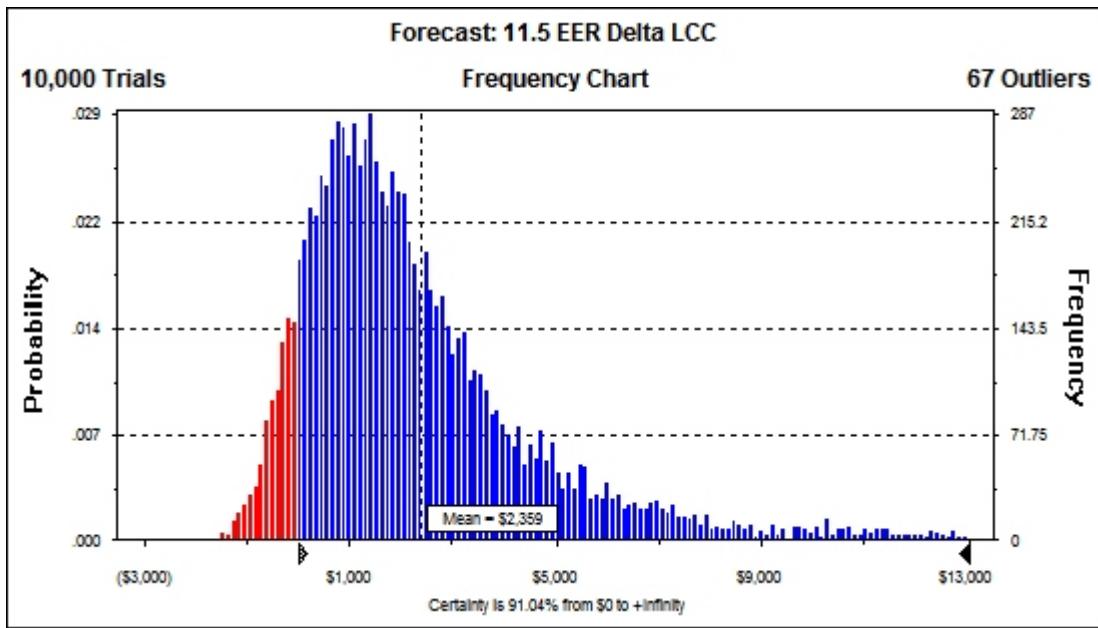


Figure Q.1.15 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 11.5 EER: Tariff-Based Frequency Chart of LCC Difference

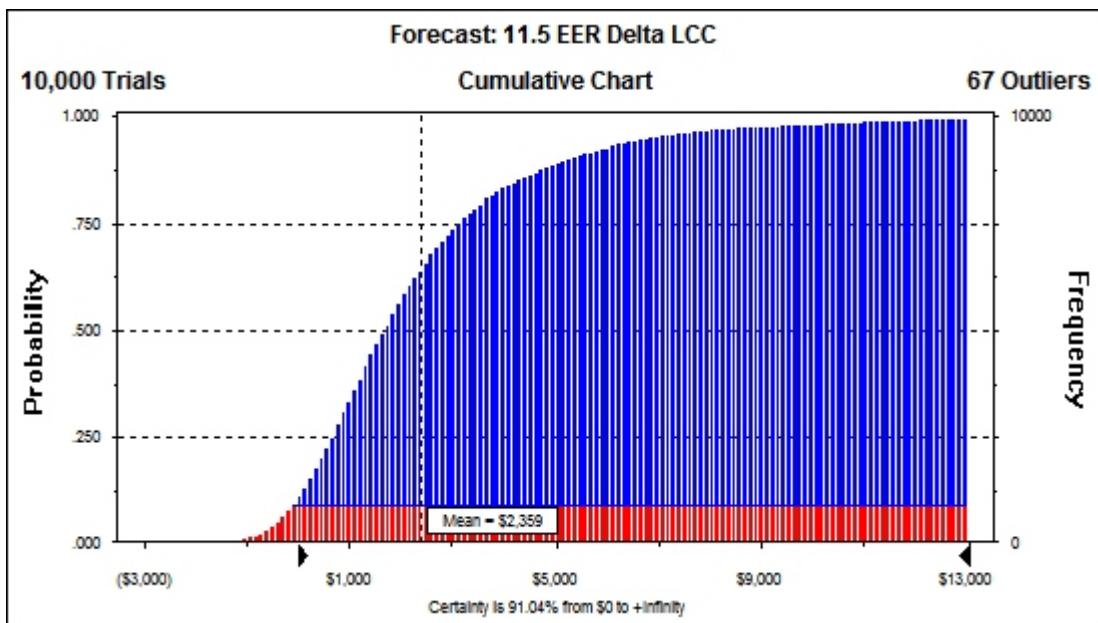


Figure Q.1.16 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 11.5 EER: Tariff-Based Cumulative Chart of LCC Difference

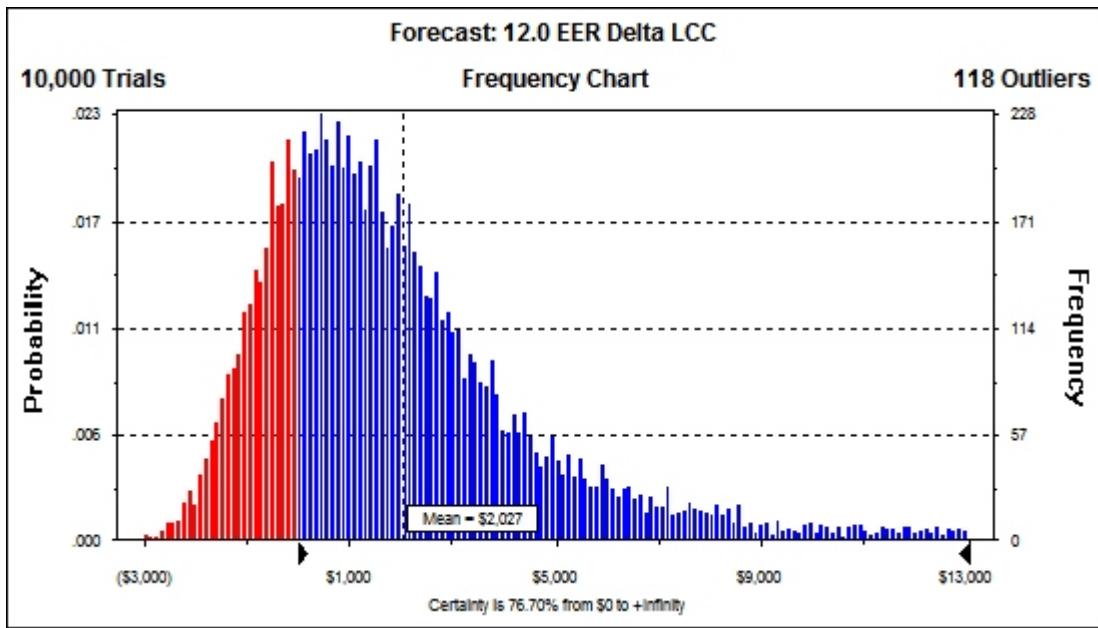


Figure Q.1.17 $\geq 135,000$ Btu/h to $< 240,000$ Btu/h, 12.0 EER: Tariff-Based Frequency Chart of LCC Difference

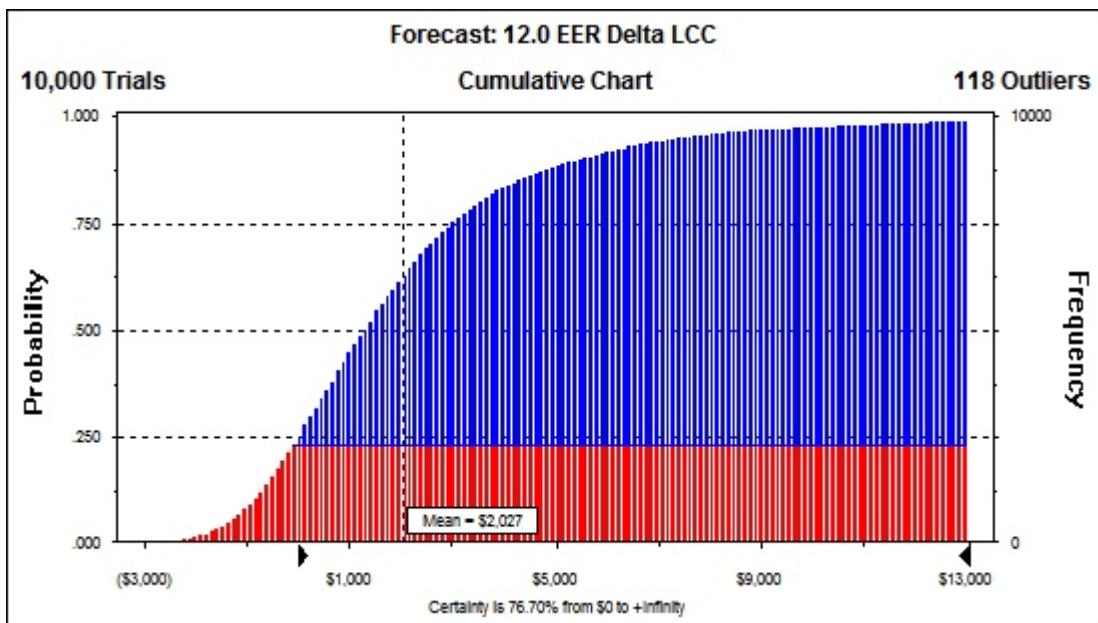


Figure Q.1.18 $\geq 135,000$ Btu/h to $< 240,000$ Btu/h, 12.0 EER: Tariff-Based Cumulative Chart of LCC Difference

Q.1.2 Hourly-Based Results

Q.1.2.1 Commercial Unitary Air Conditioners, $\geq 65,000$ Btu/h to $<135,000$ Btu/h

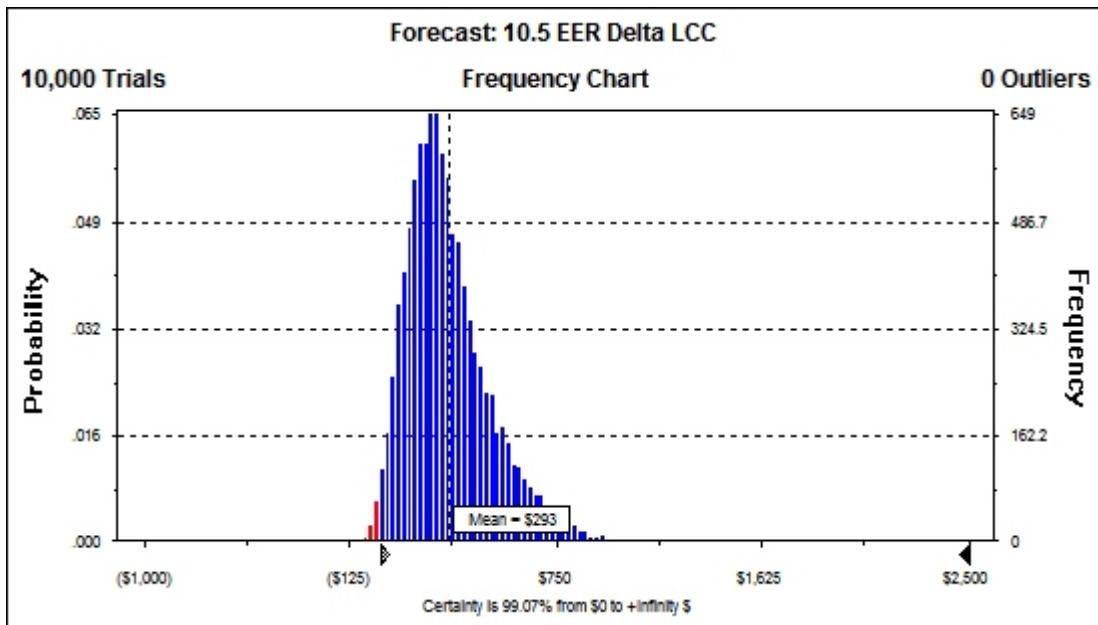


Figure Q.1.19 $\geq 65,000$ Btu/h to $<135,000$ Btu/h, 10.5 EER: Hourly-Based Frequency Chart of LCC Difference

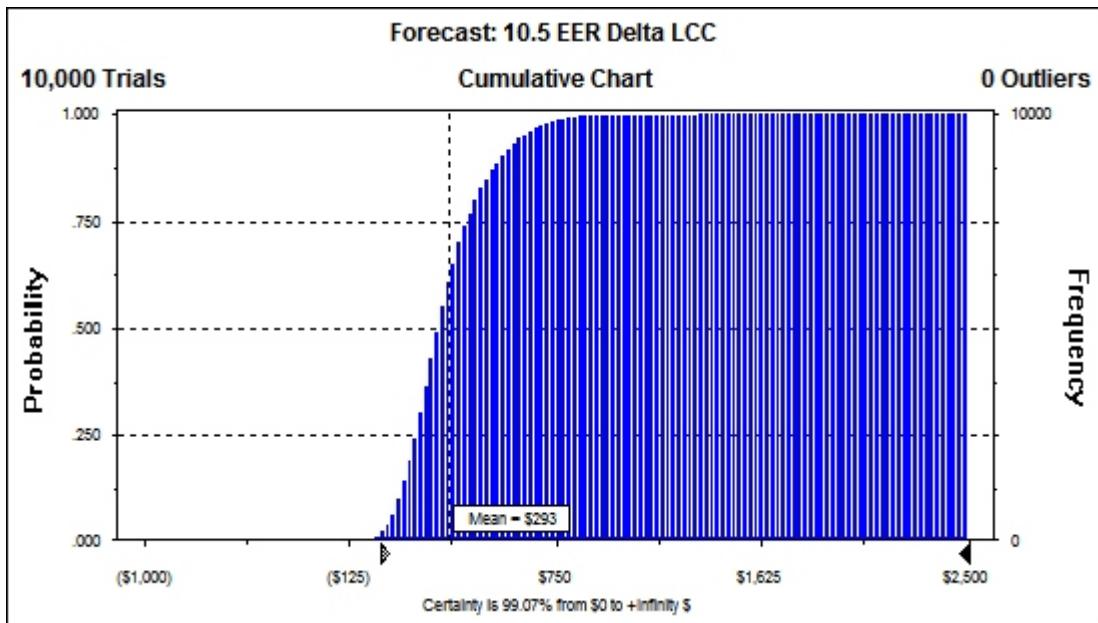


Figure Q.1.20 $\geq 65,000$ Btu/h to $<135,000$ Btu/h, 10.5 EER: Hourly-Based Cumulative Chart of LCC Difference

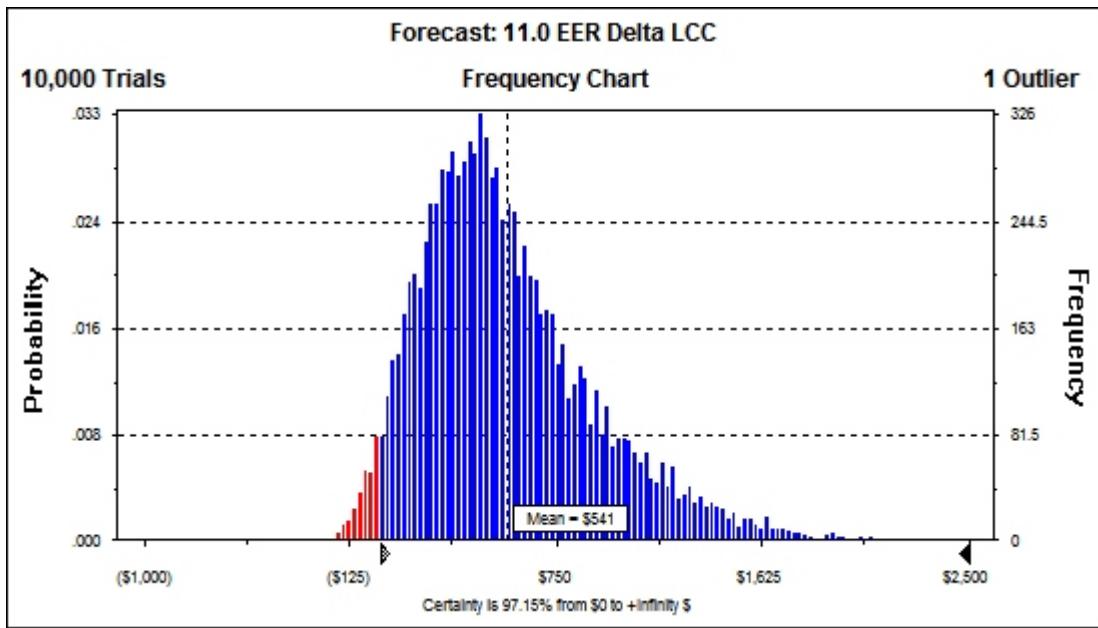


Figure Q.1.21 $\geq 65,000$ Btu/h to $< 135,000$ Btu/h, 11.0 EER: Hourly-Based Frequency Chart of LCC Difference

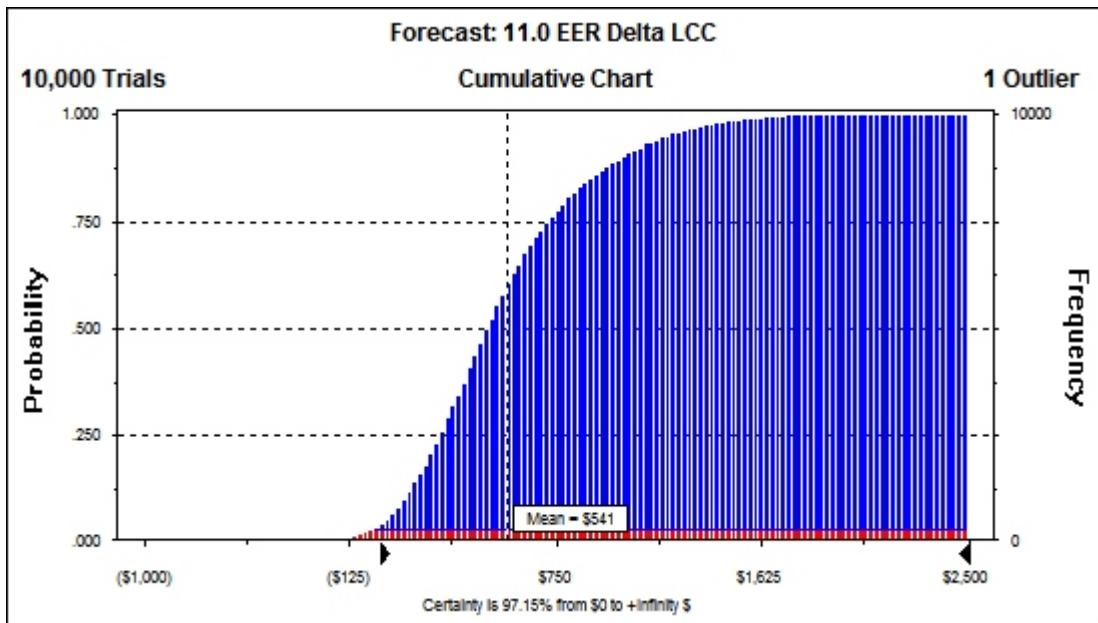


Figure Q.1.22 $\geq 65,000$ Btu/h to $< 135,000$ Btu/h, 11.0 EER: Hourly-Based Cumulative Chart of LCC Difference

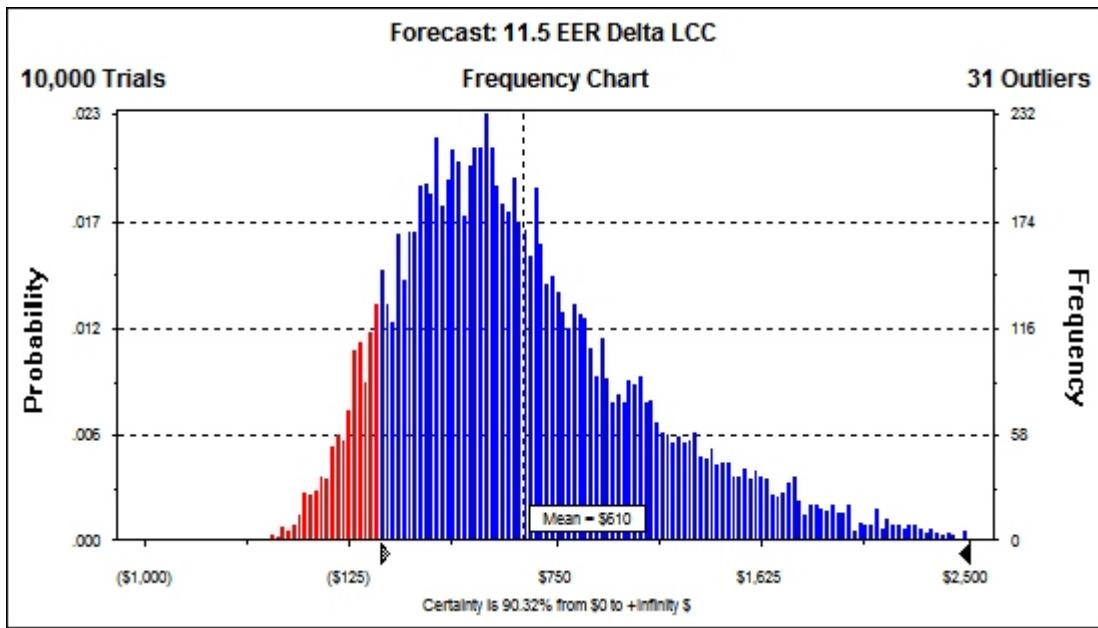


Figure Q.1.23 $\geq 65,000$ Btu/h to $< 135,000$ Btu/h, 11.5 EER: Hourly-Based Frequency Chart of LCC Difference

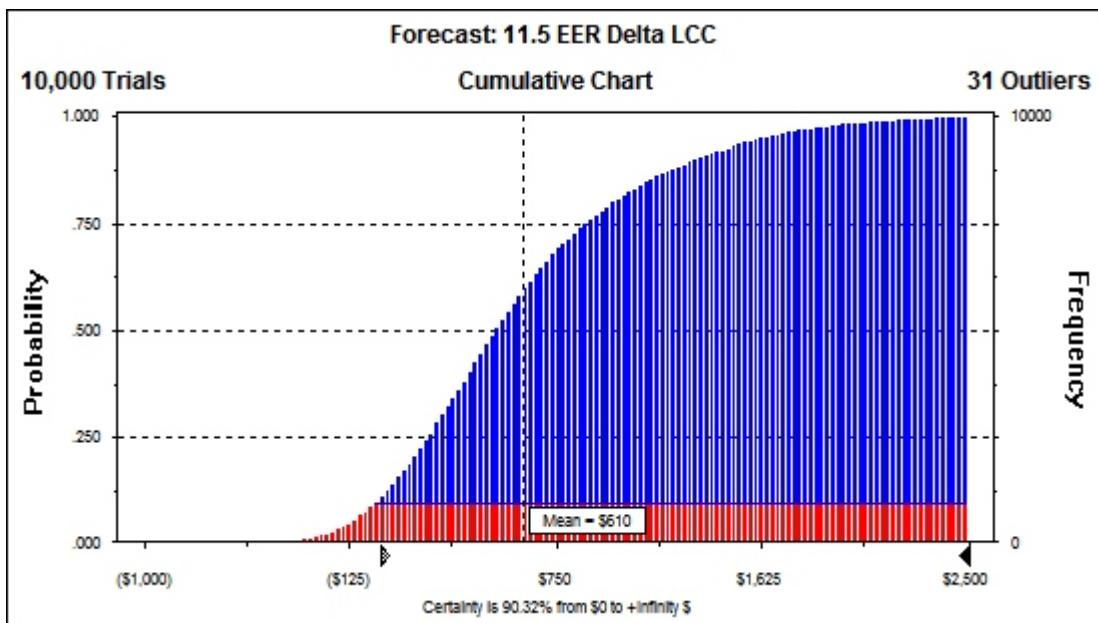


Figure Q.1.24 $\geq 65,000$ Btu/h to $< 135,000$ Btu/h, 11.5 EER: Hourly-Based Cumulative Chart of LCC Difference

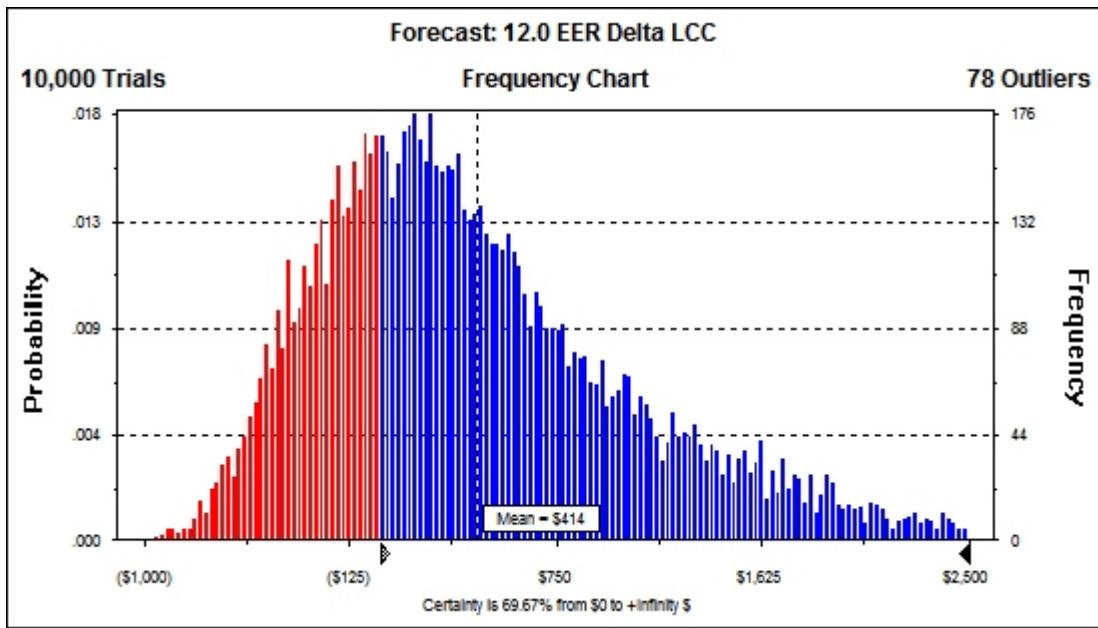


Figure Q.1.25 $\geq 65,000$ Btu/h to $< 135,000$ Btu/h, 12.0 EER: Hourly-Based Frequency Chart of LCC Difference

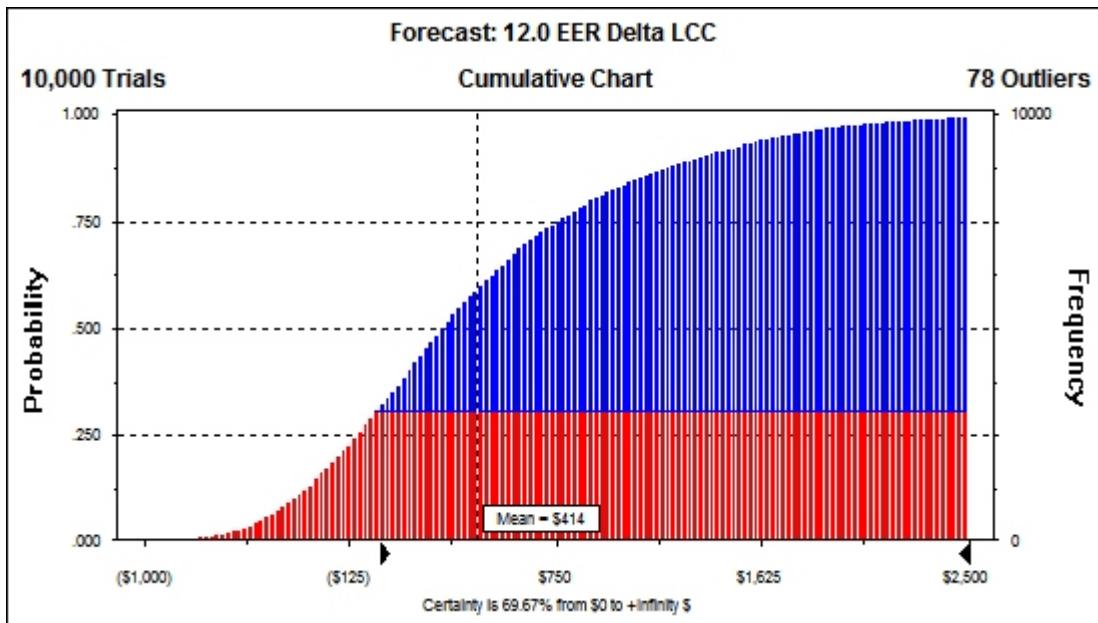


Figure Q.1.26 $\geq 65,000$ Btu/h to $< 135,000$ Btu/h, 12.0 EER: Hourly-Based Cumulative Chart of LCC Difference

Q.1.2.2 Commercial Unitary Air Conditioners, $\geq 135,000$ Btu/h to $<240,000$ Btu/h

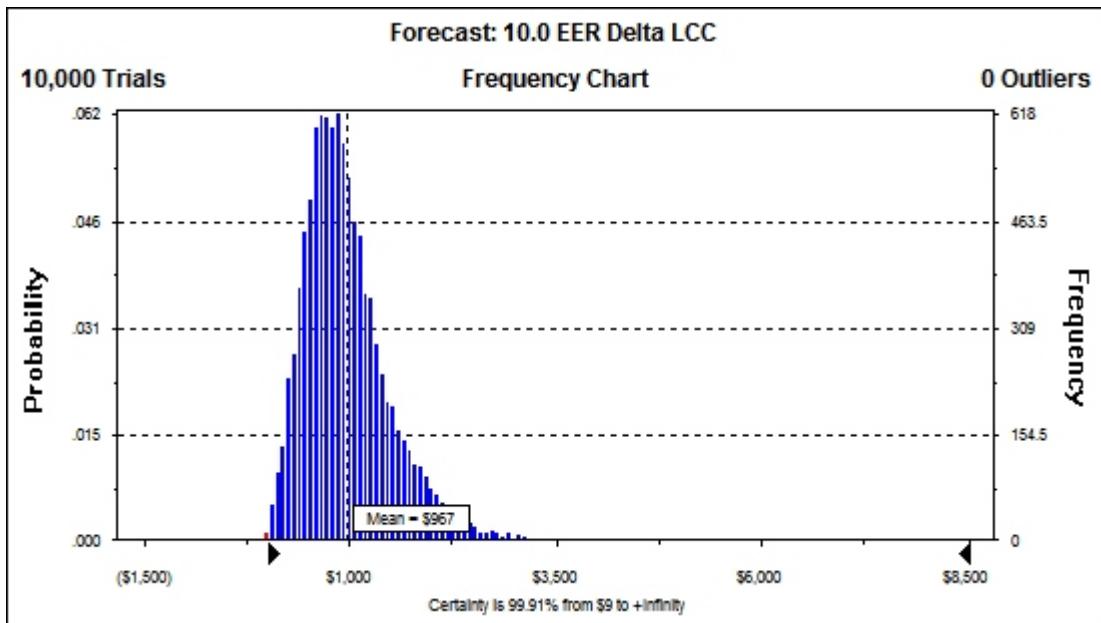


Figure Q.1.27 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 10.0 EER: Hourly-Based Frequency Chart of LCC Difference

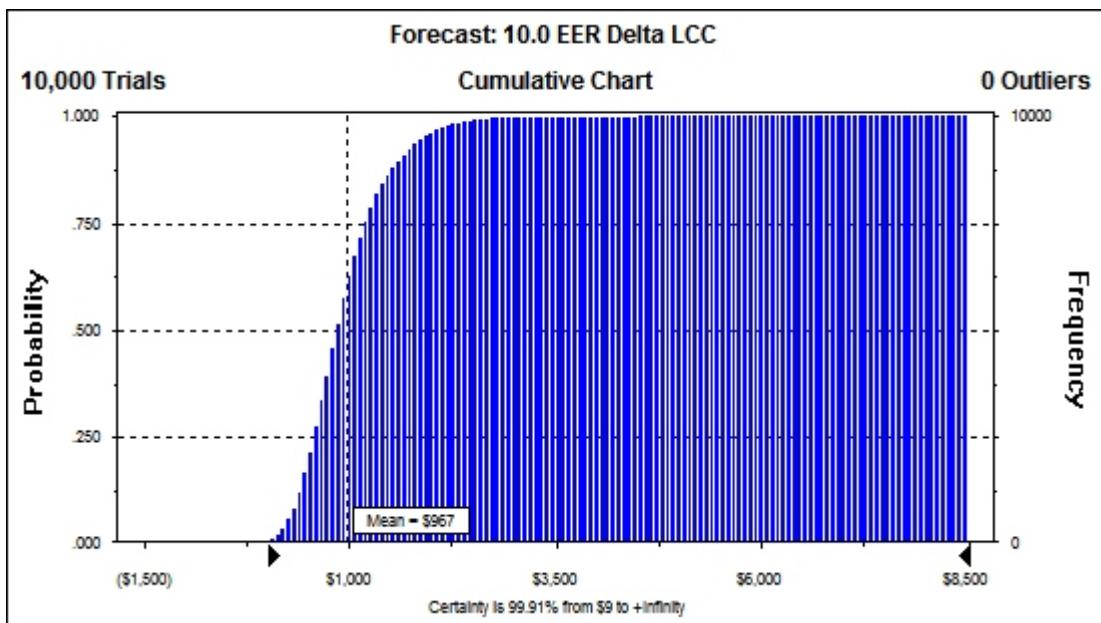


Figure Q.1.28 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 10.0 EER: Hourly-Based Cumulative Chart of LCC Difference

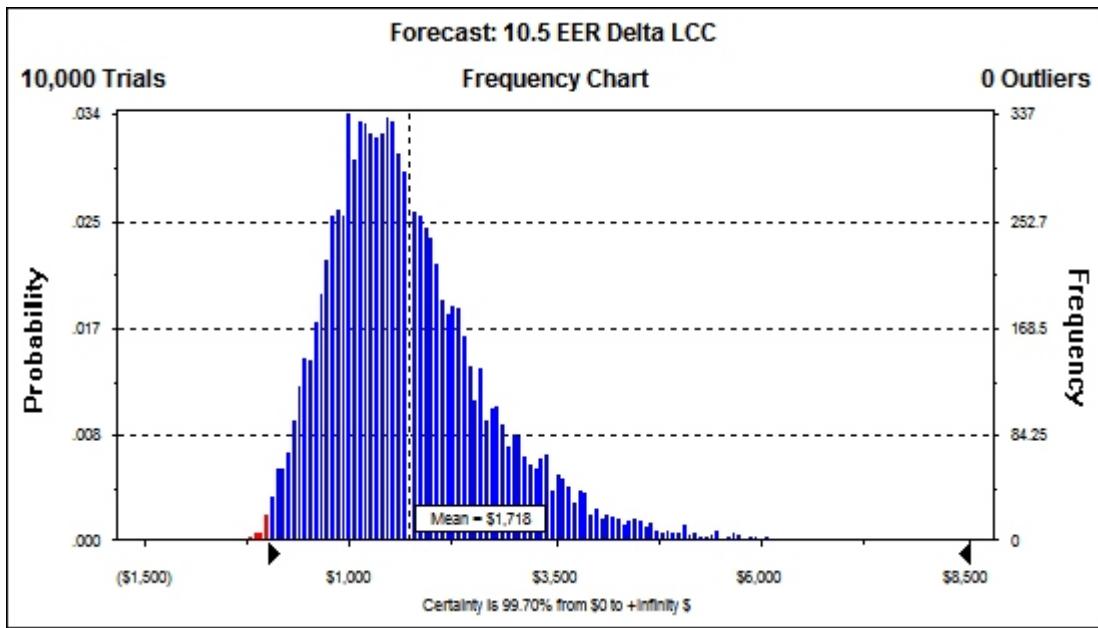


Figure Q.1.29 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 10.5 EER: Hourly-Based Frequency Chart of LCC Difference

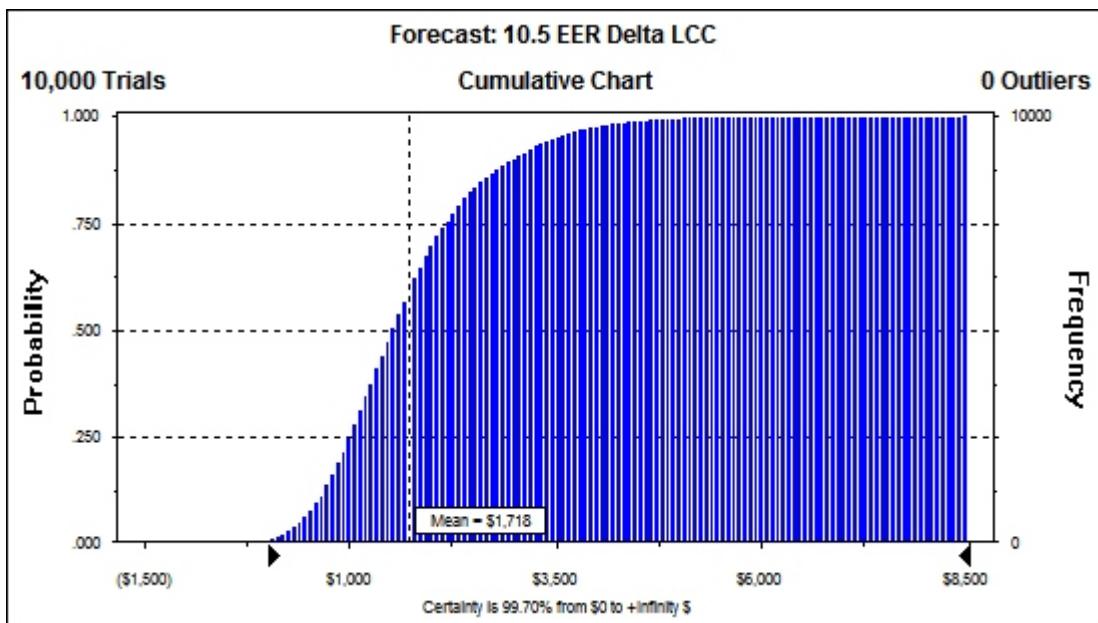


Figure Q.1.30 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 10.5 EER: Hourly-Based Cumulative Chart of LCC Difference

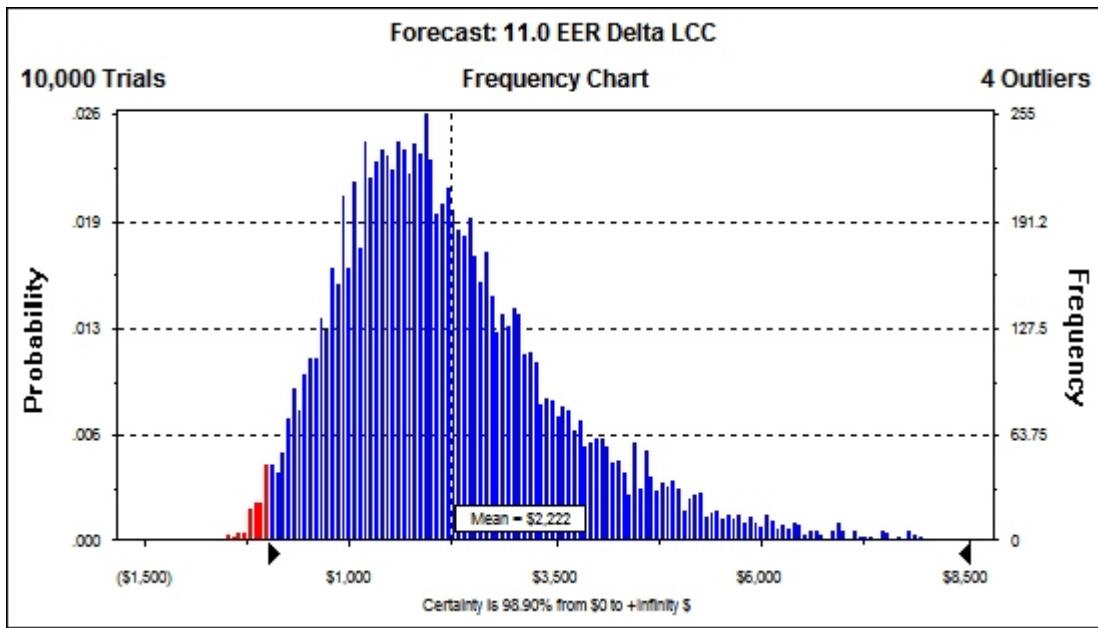


Figure Q.1.31 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 11.0 EER: Hourly-Based Frequency Chart of LCC Difference

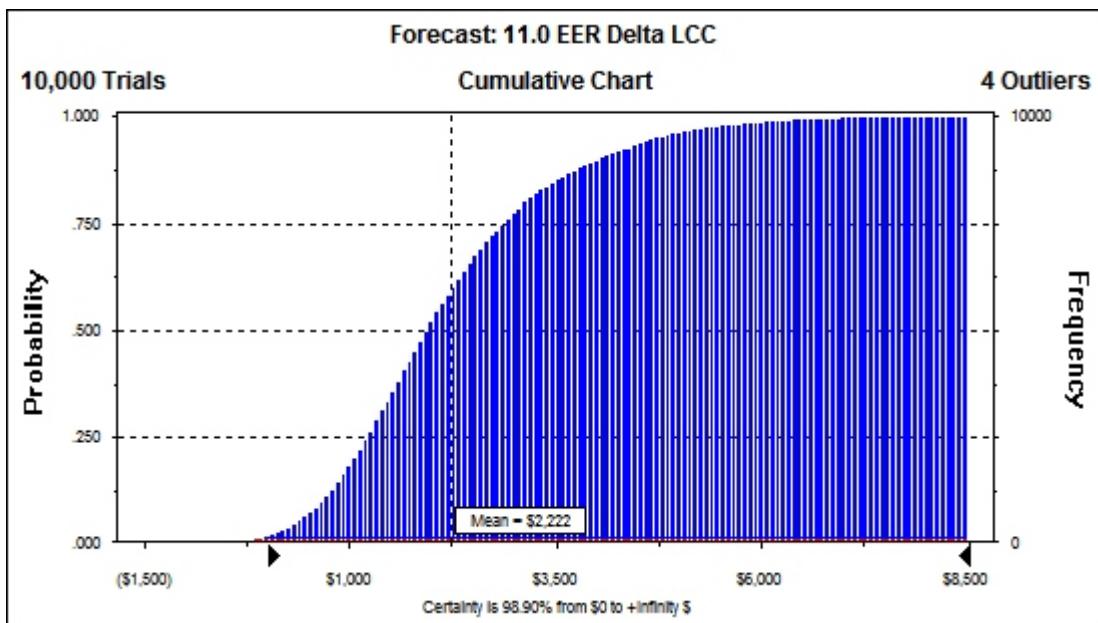


Figure Q.1.32 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 11.0 EER: Hourly-Based Cumulative Chart of LCC Difference

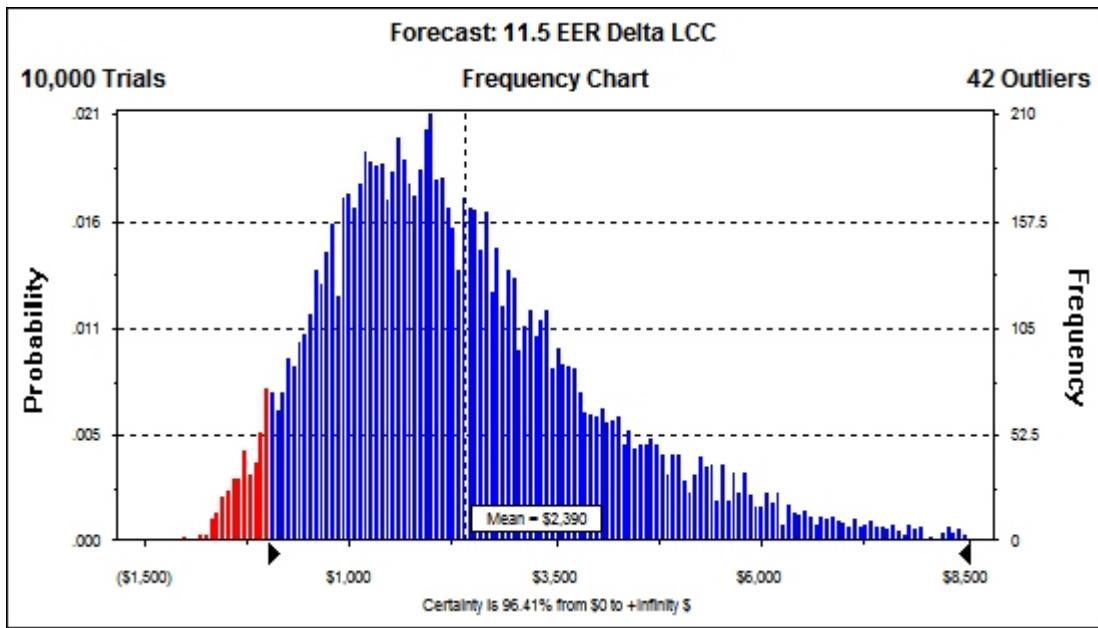


Figure Q.1.33 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 11.5 EER: Hourly-Based Frequency Chart of LCC Difference

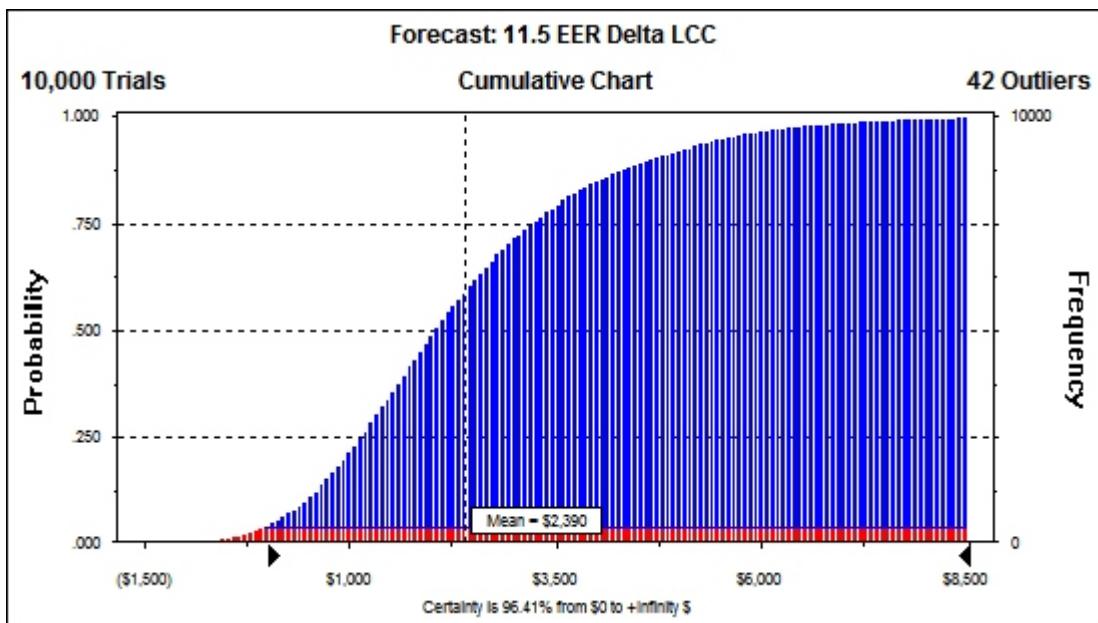


Figure Q.1.34 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 11.5 EER: Hourly-Based Cumulative Chart of LCC Difference

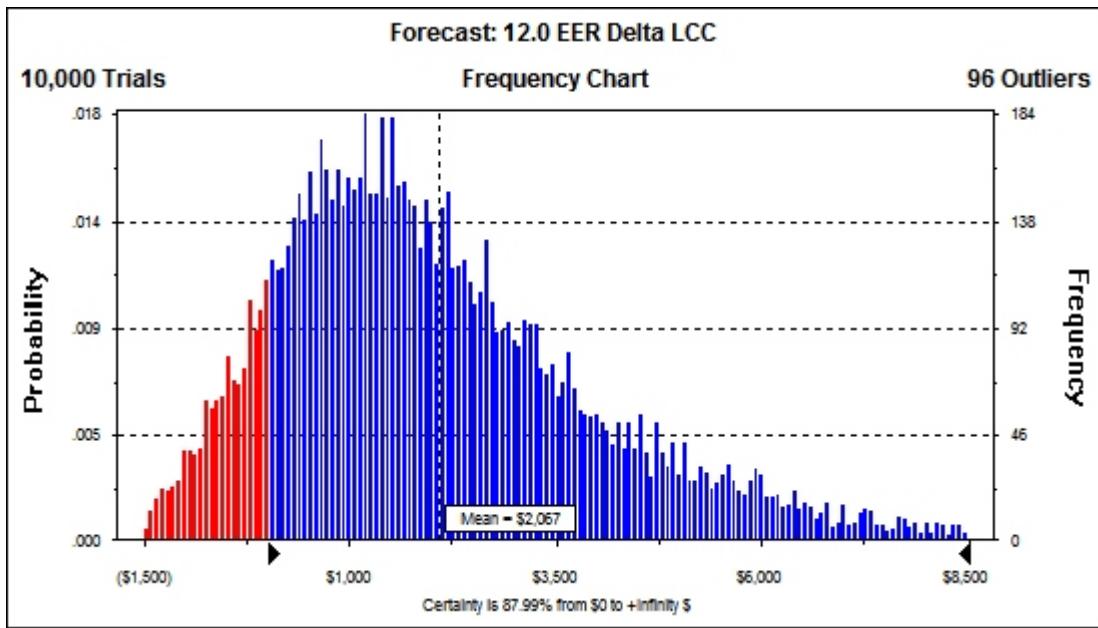


Figure Q.1.35 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 12.0 EER: Hourly-Based Frequency Chart of LCC Difference

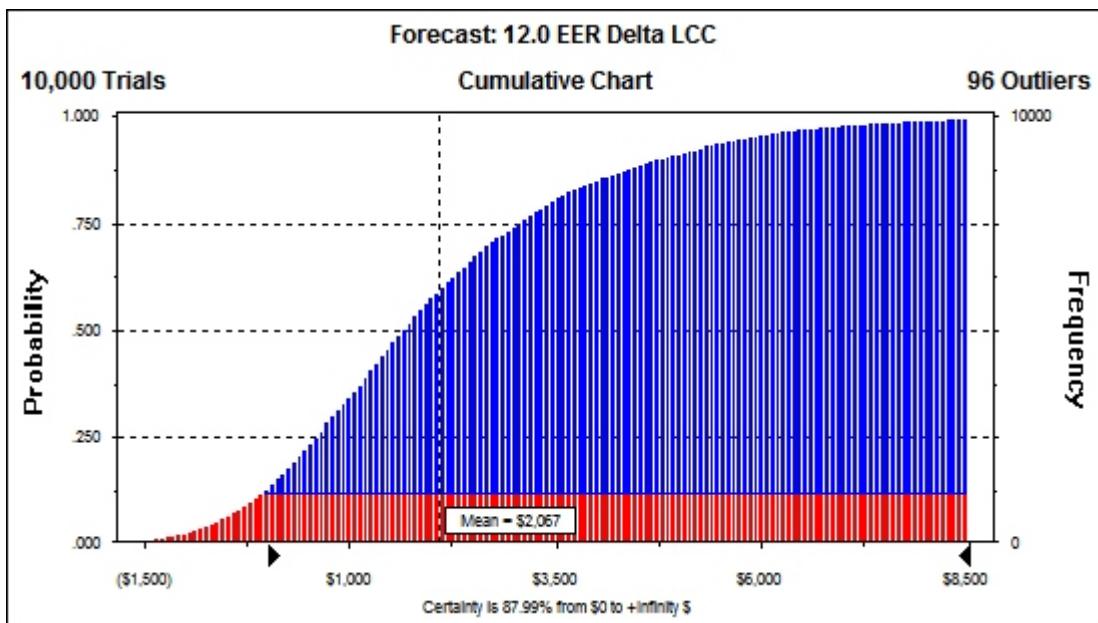


Figure Q.1.36 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 12.0 EER: Hourly-Based Cumulative Chart of LCC Difference

Q.2 PAYBACK PERIOD RESULTS

This section provides the *frequency* charts of the payback period (PBP) results for all the efficiency improvement levels analyzed for both product classes of commercial unitary air conditioners: 1) $\geq 65,000$ Btu/h to $<135,000$ Btu/h and 2) $\geq 135,000$ Btu/h to $<240,000$ Btu/h. For details on the methodology used to calculate the LCC and PBP refer to Chapter 8.

The sections that follow present the PBP results from the two approaches used to calculate PBP: 1) a monthly approach establishing annual energy costs using electricity prices determined from electric utility tariffs and 2) an hourly approach establishing annual energy costs using electricity prices that may exist assuming all electricity markets are deregulated. For each efficiency level, a *frequency* chart is provided showing the distribution of expected PBPs from the baseline design.

Q.2.1 Tariff-Based Results

Q.2.1.1 Commercial Unitary Air Conditioners, $\geq 65,000$ Btu/h to $<135,000$ Btu/h

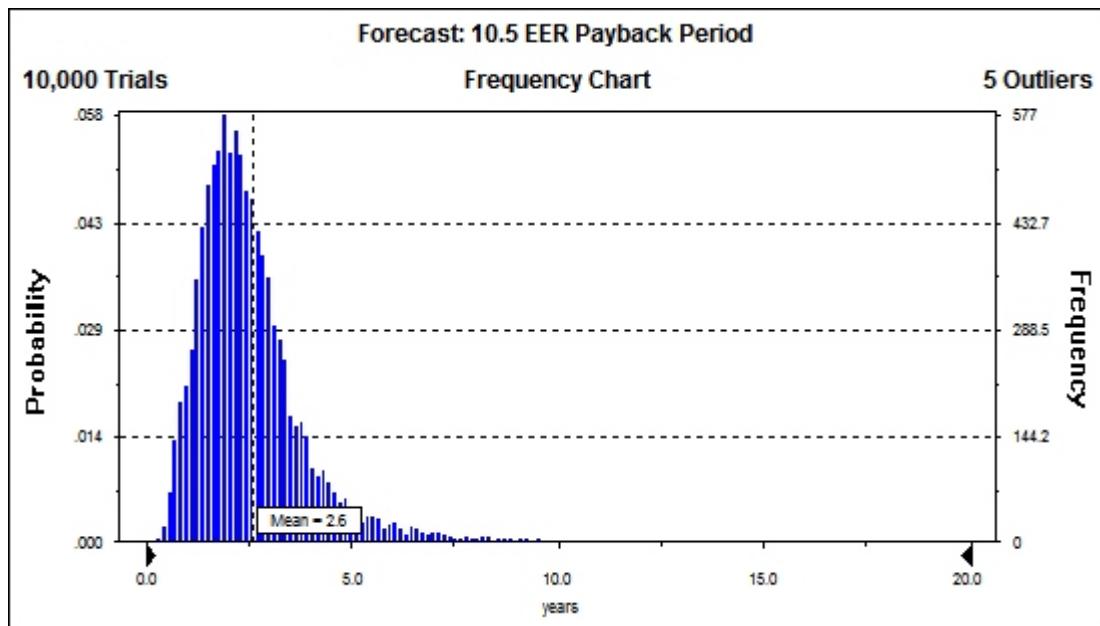


Figure Q.2.1 $\geq 65,000$ Btu/h to $<135,000$ Btu/h, 10.5 EER: Tariff-Based Frequency Chart of PBP

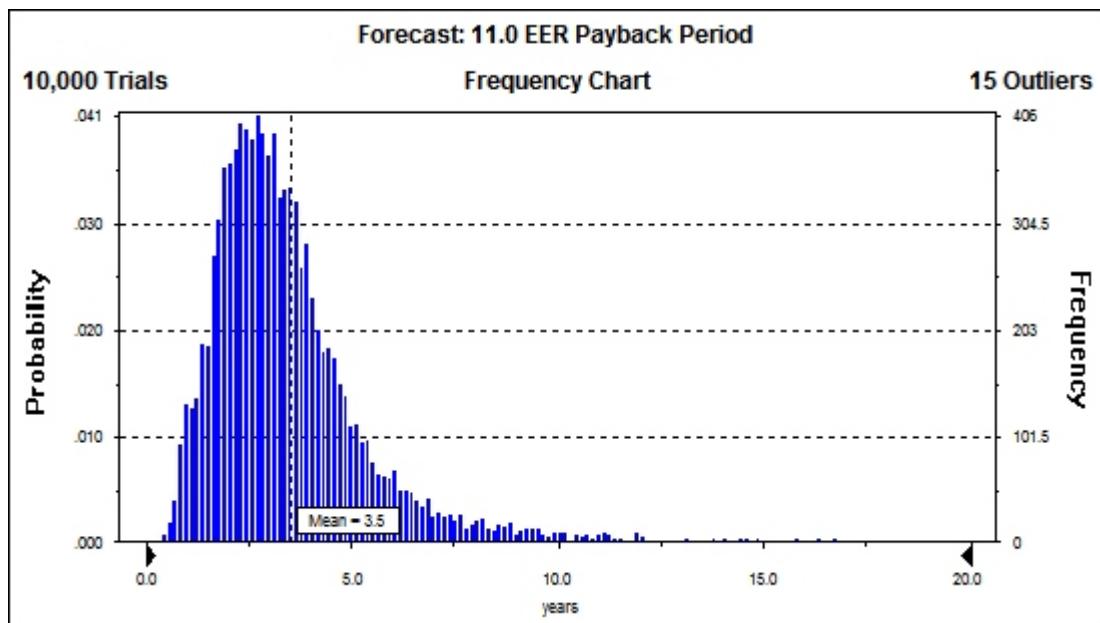


Figure Q.2.2 $\geq 65,000$ Btu/h to $<135,000$ Btu/h, 11.0 EER: Tariff-Based Frequency Chart of PBP

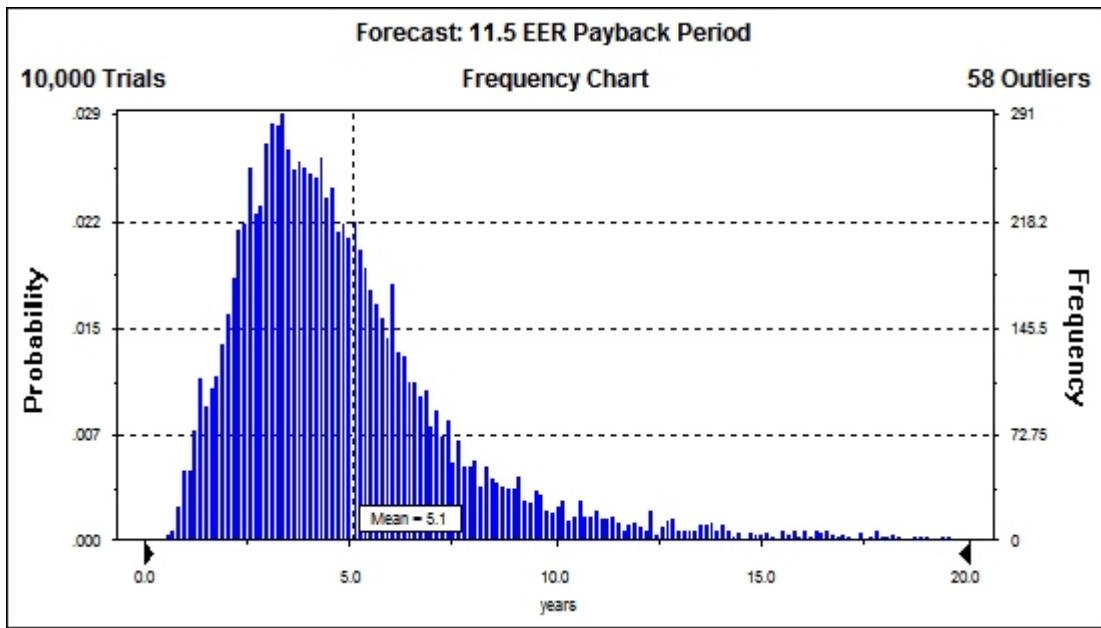


Figure Q.2.3 $\geq 65,000 \text{ Btu/h}$ to $< 135,000 \text{ Btu/h}$, 11.5 EER: Tariff-Based Frequency Chart of PBP

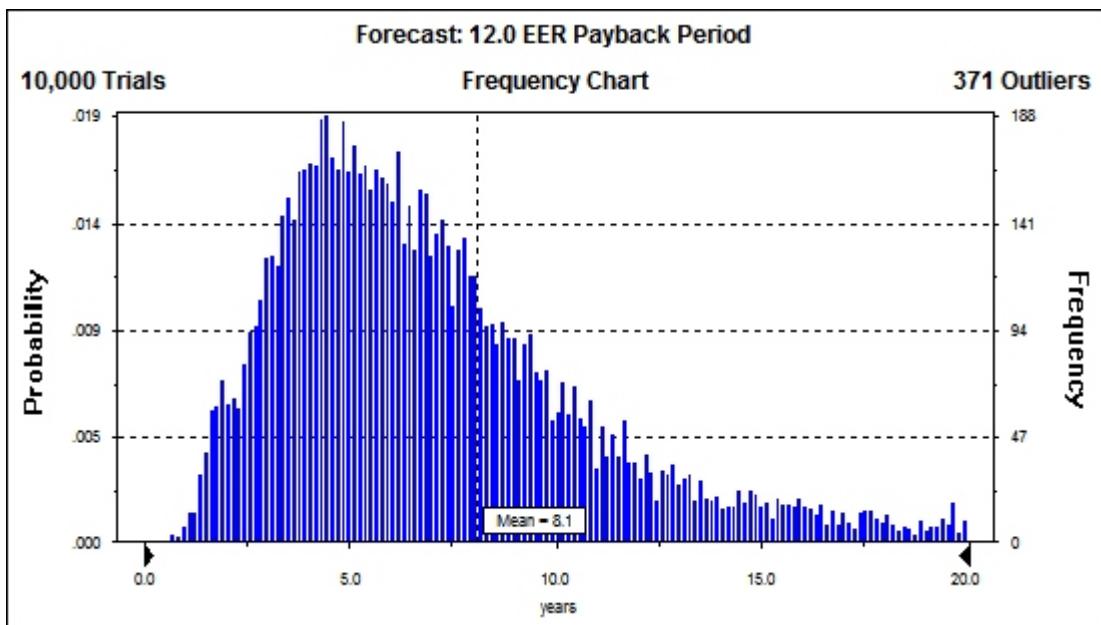


Figure Q.2.4 $\geq 65,000 \text{ Btu/h}$ to $< 135,000 \text{ Btu/h}$, 12.0 EER: Tariff-Based Frequency Chart of PBP

Q.2.1.2 Commercial Unitary Air Conditioners, $\geq 135,000$ Btu/h to $<240,000$ Btu/h

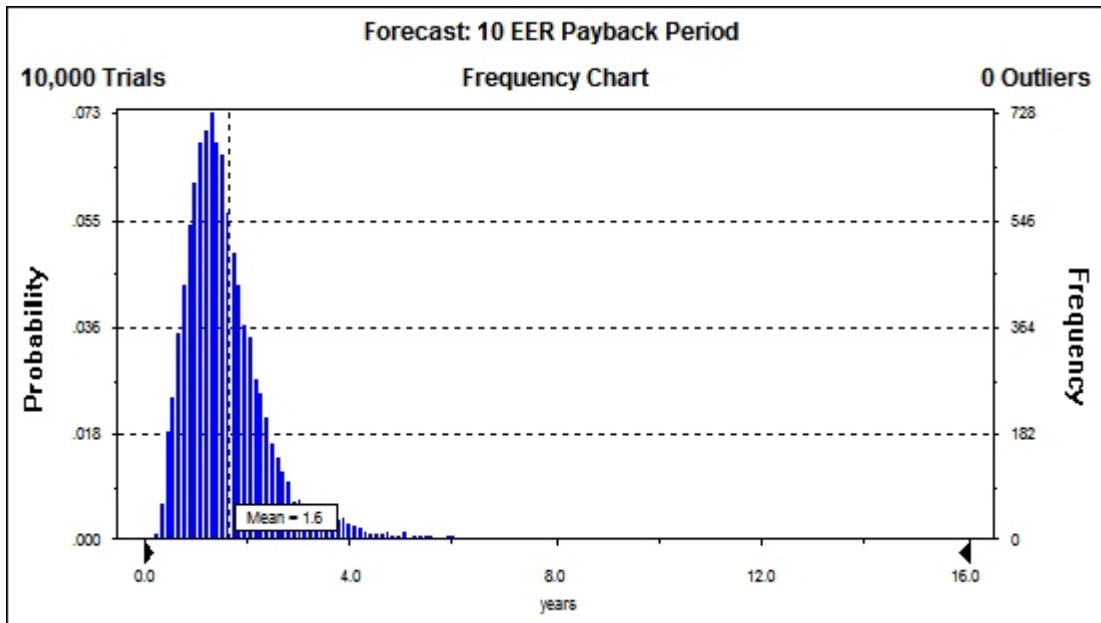


Figure Q.2.5 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 10.0 EER: Tariff-Based Frequency Chart of PBP

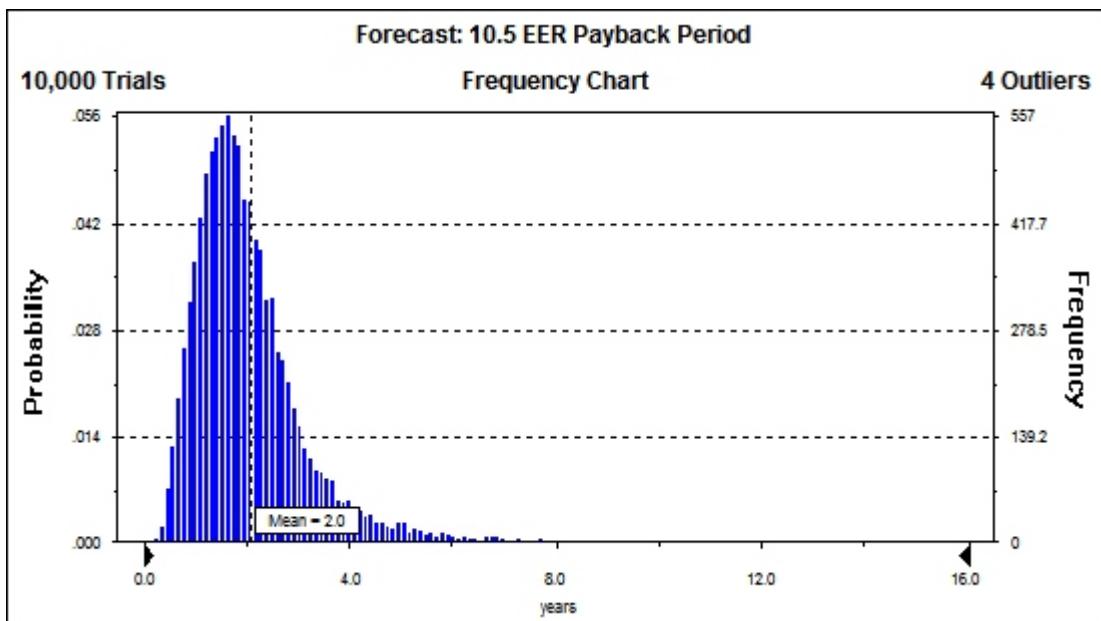


Figure Q.2.6 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 10.5 EER: Tariff-Based Frequency Chart of PBP

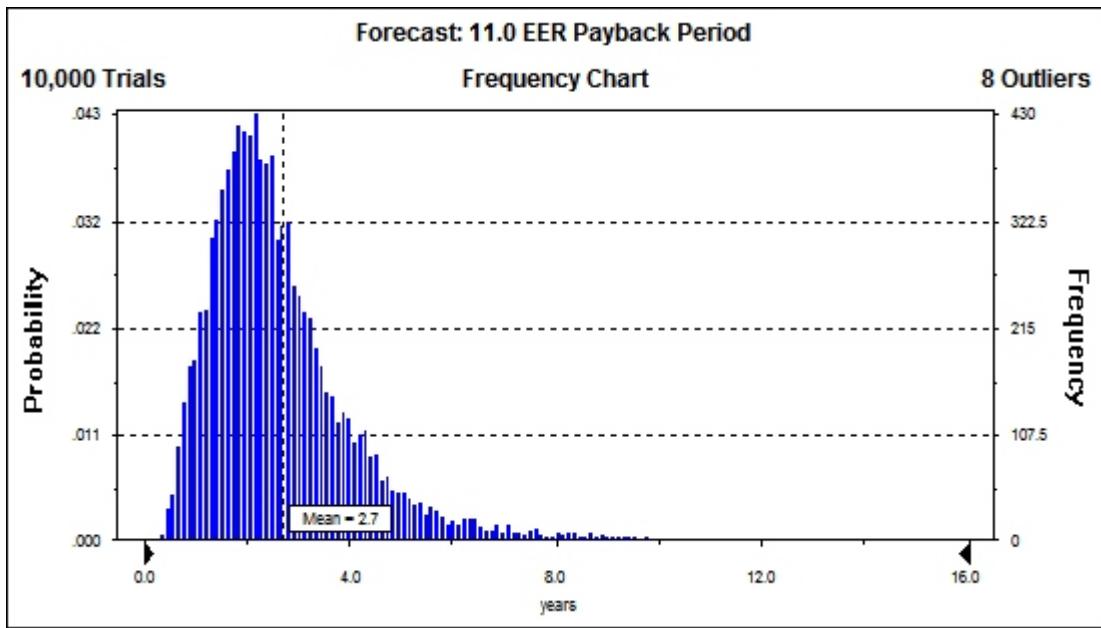


Figure Q.2.7 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 11.0 EER: Tariff-Based Frequency Chart of PBP

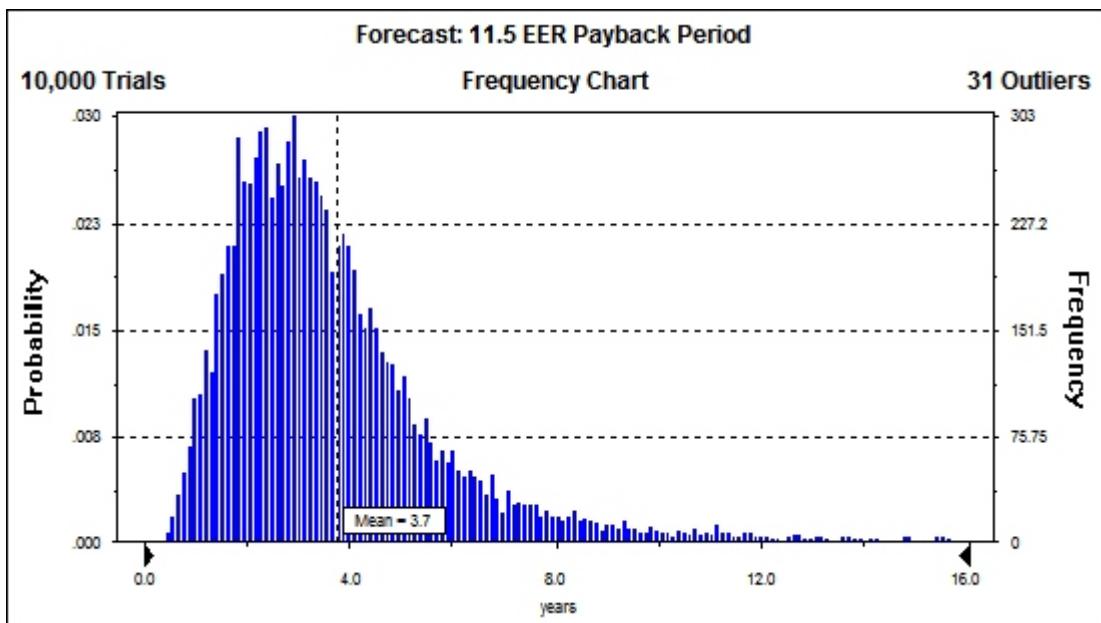


Figure Q.2.8 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 11.5 EER: Tariff-Based Frequency Chart of PBP

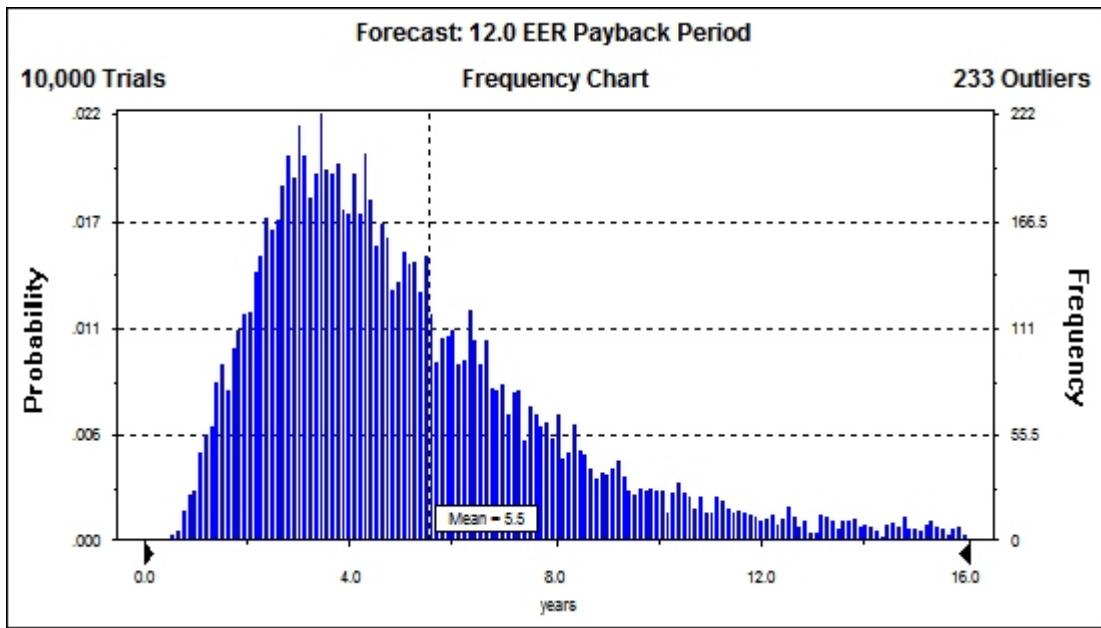


Figure Q.2.9 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 12.0 EER: Tariff-Based Frequency Chart of PBP

Q.2.2 Hourly-Based Results

Q.2.2.1 Commercial Unitary Air Conditioners, $\geq 65,000$ Btu/h to $<135,000$ Btu/h

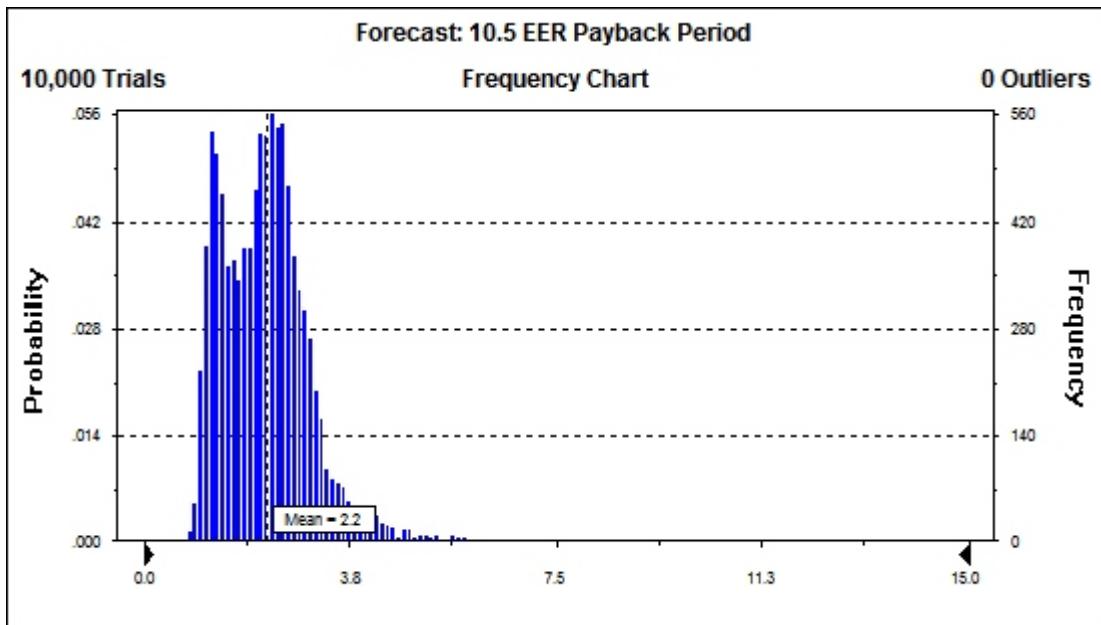


Figure Q.2.10 $\geq 65,000$ Btu/h to $<135,000$ Btu/h, 10.5 EER: Hourly-Based Frequency Chart of PBP

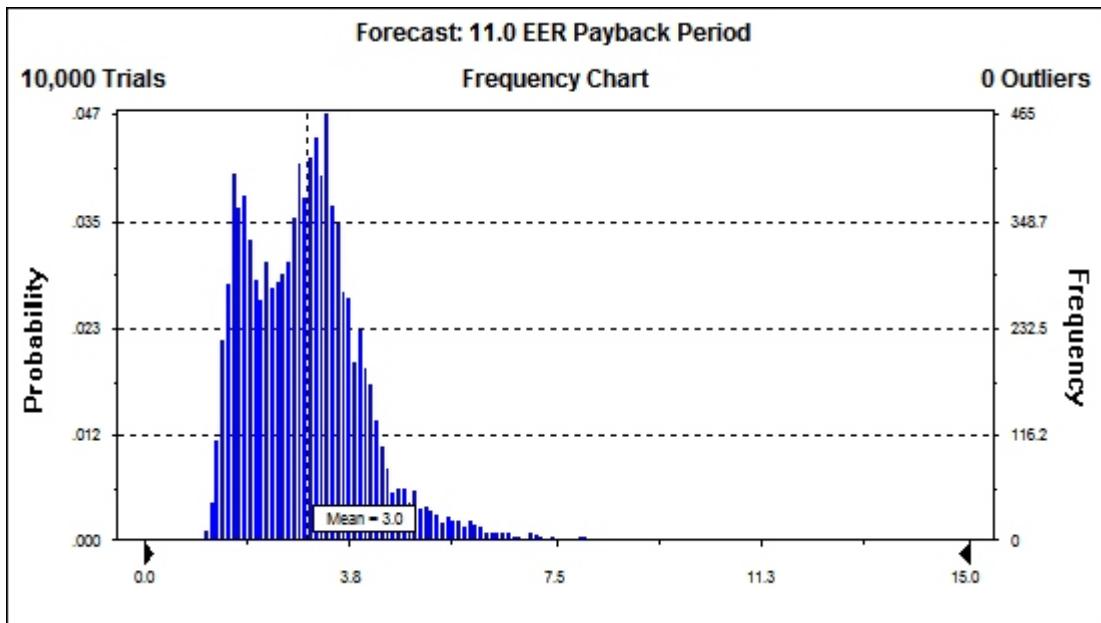


Figure Q.2.11 $\geq 65,000$ Btu/h to $<135,000$ Btu/h, 11.0 EER: Hourly-Based Frequency Chart of PBP

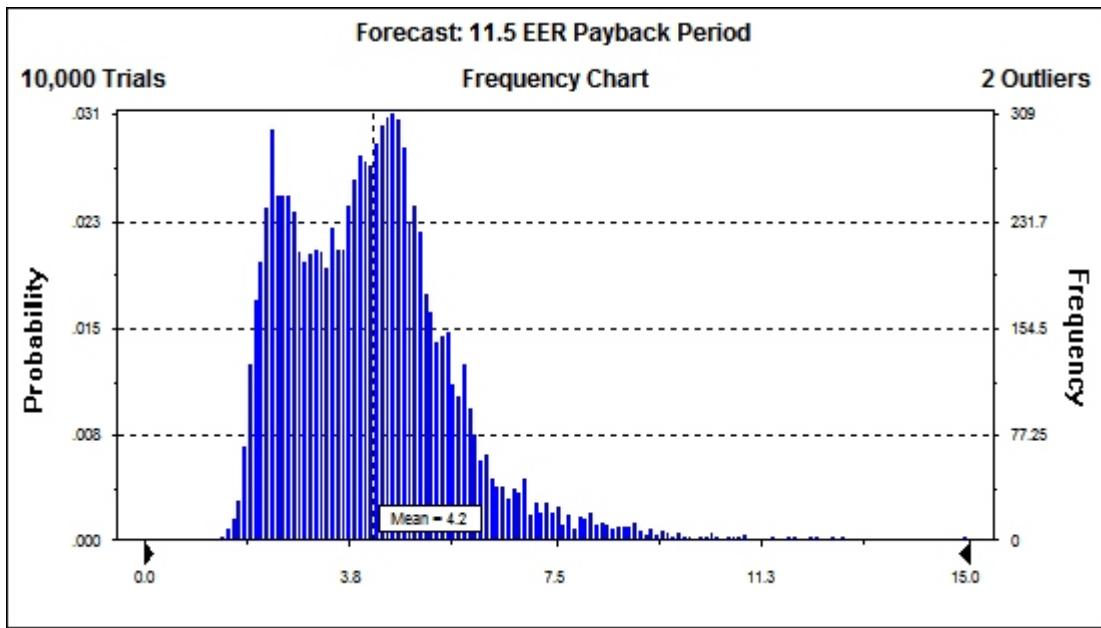


Figure Q.2.12 $\geq 65,000$ Btu/h to $<135,000$ Btu/h, 11.5 EER: Hourly-Based Frequency Chart of PBP

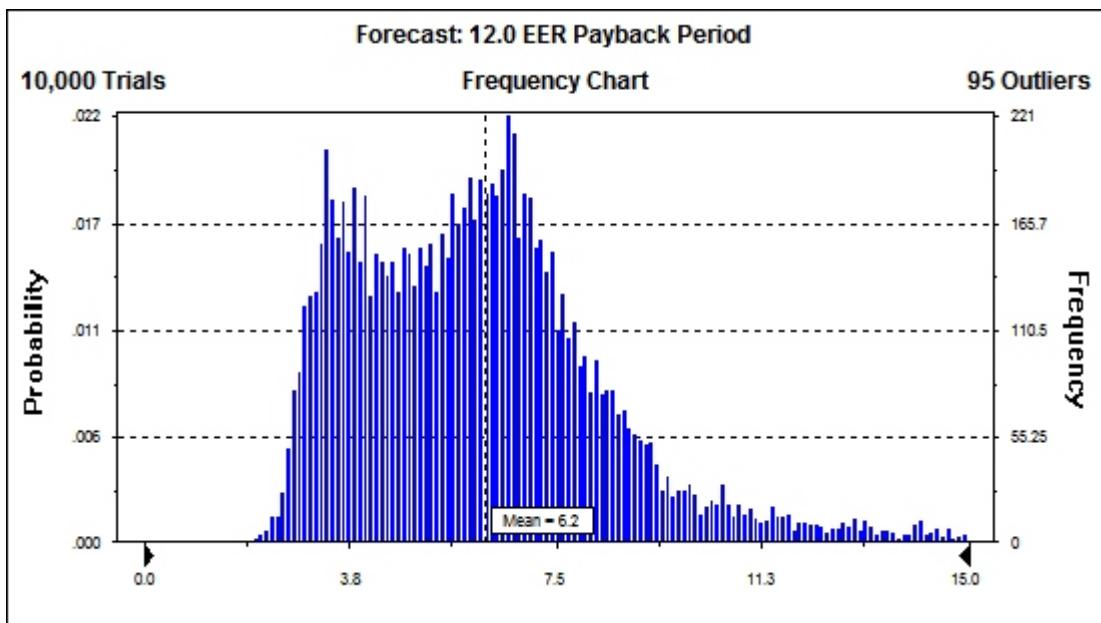


Figure Q.2.13 $\geq 65,000$ Btu/h to $<135,000$ Btu/h, 12.0 EER: Hourly-Based Frequency Chart of PBP

Q.2.2.2 Commercial Unitary Air Conditioners, $\geq 135,000$ Btu/h to $<240,000$ Btu/h

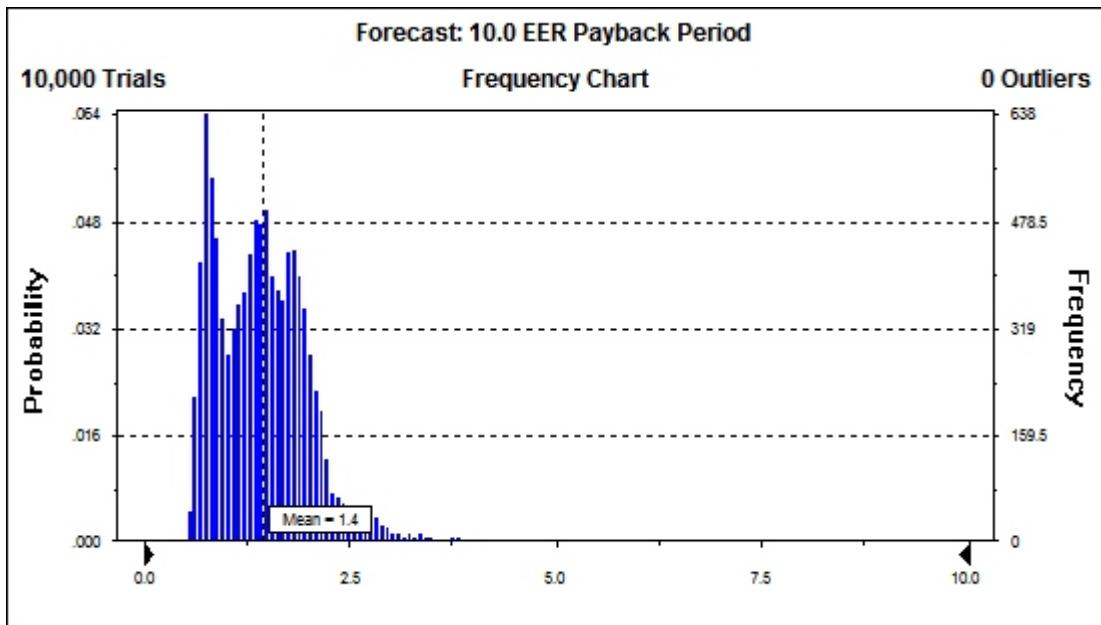


Figure Q.2.14 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 10.0 EER: Hourly-Based Frequency Chart of PBP

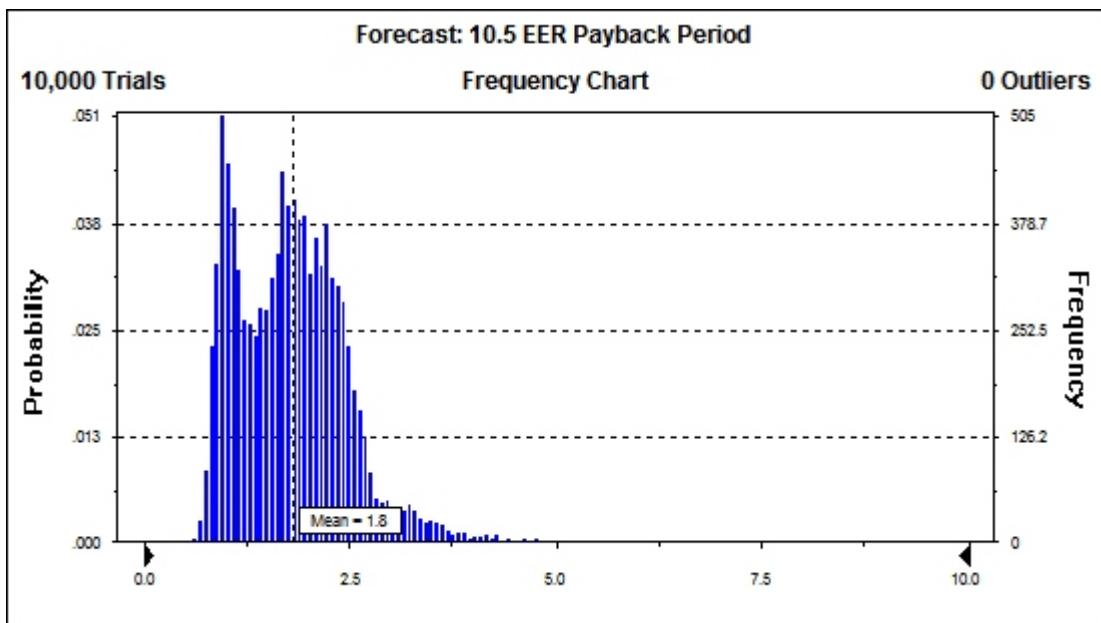


Figure Q.2.15 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 10.5 EER: Hourly-Based Frequency Chart of PBP

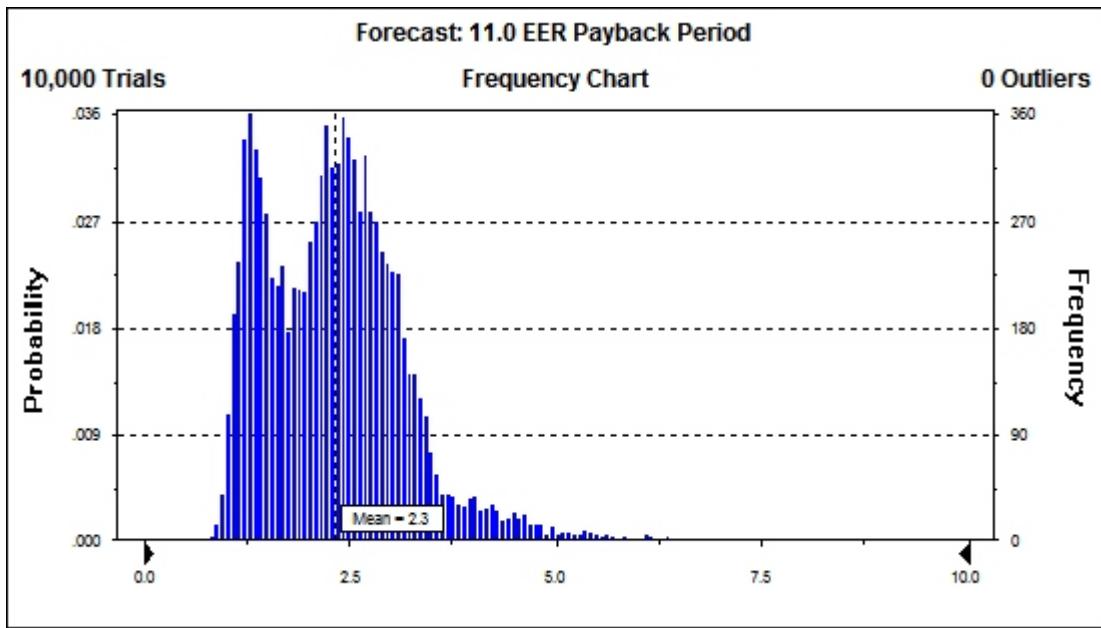


Figure Q.2.16 $\geq 135,000 \text{ Btu/h}$ to $<240,000 \text{ Btu/h}$, 11.0 EER: Hourly-Based Frequency Chart of PBP

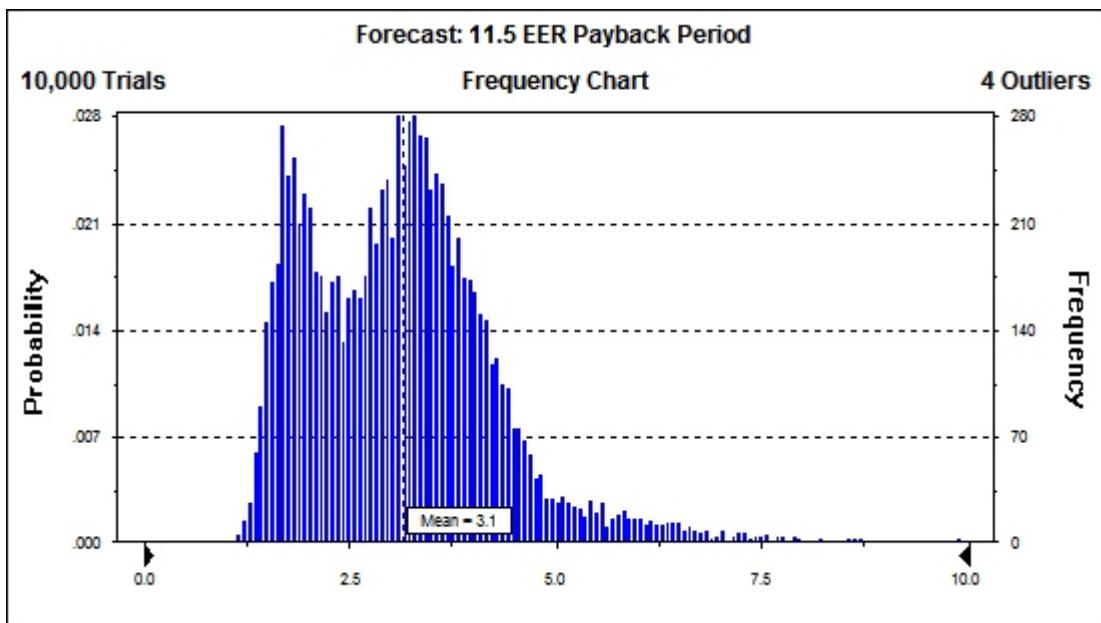


Figure Q.2.17 $\geq 135,000 \text{ Btu/h}$ to $<240,000 \text{ Btu/h}$, 11.5 EER: Hourly-Based Frequency Chart of PBP

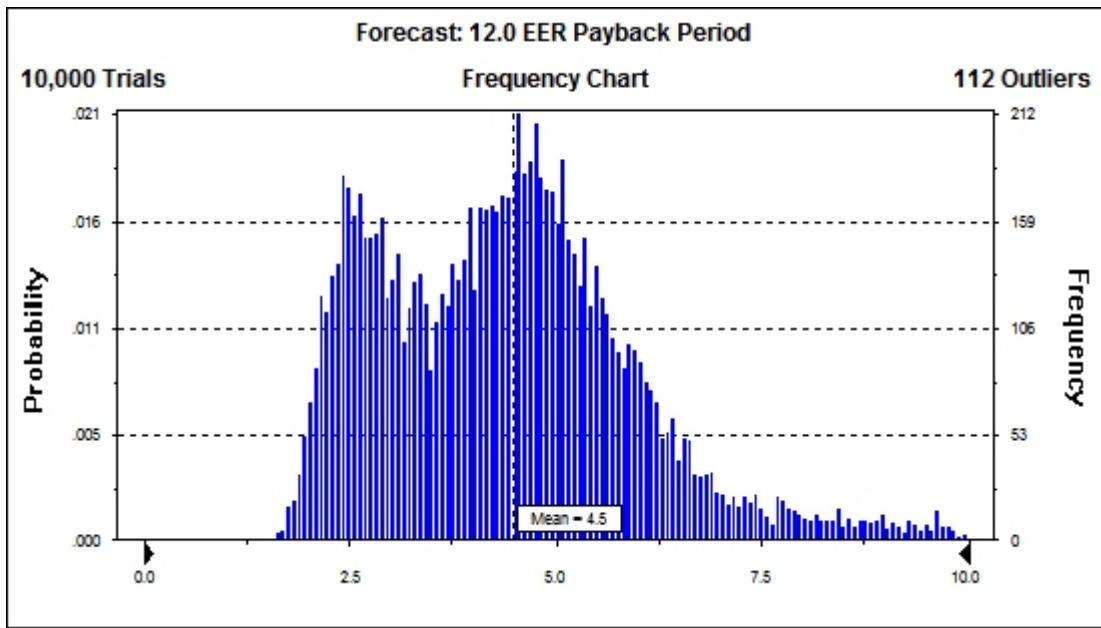


Figure Q.2.18 $\geq 135,000$ Btu/h to $<240,000$ Btu/h, 12.0 EER: Hourly-Based Frequency Chart of PBP