APPENDIX T. BASE CASE AND STANDARDS CASE EFFICIENCY TRENDS

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APPENDIX T. BASE CASE AND STANDARDS CASE EFFICIENCY TRENDS

T.1 INTRODUCTION

This appendix provides the shipment-weighted average energy efficiency ratios (EER) corresponding to the base case historical and forecasted efficiency trends and the standards case forecasted efficiency trends. The base case and standards case represent the projections without and with new standards, respectively. As detailed in Chapter 10 of this TSD, the efficiency trends are necessary for determining historical and forecasted per unit values for the following: annual energy consumption, total annual installed cost, and total annual operating cost. The above value are used in the determination of the national energy savings (NES) and net present value (NPV).

T.2 BASE CASE EFFICIENCY TRENDS

Table T.2.1 shows the annual historical and forecasted shipment-weighted EER values comprising the based case historical and forecasted efficiency trends. There are two sets of values: one for the ≥65,000 Btu/h to <135,000 Btu/h equipment class and the other for the ≥135,000 Btu/h to <240,000 Btu/h equipment class. As described in Chapter 10, the Department developed the base case efficiency trends from a combination of limited historical efficiency for commercial unitary air conditioners and historical efficiency trends for residential central air conditioners.

Table T.2.1 Base Case Historical and Projected Shipment-Weighted Efficiencies

Year	≥65 to <135 kBtu/h *EER*	≥135 to <240 kBtu/h *EER*	Year	≥65 to <135 kBtu/h *EER*	≥135 to <240 kBtu/h *EER*
1976	6.31	5.93	2006	10.17	9.84
1977	6.44	6.06	2007	10.21	9.87
1978	6.56	6.18	2008	10.24	9.90
1979	6.69	6.31	2009	10.27	9.94
1980	6.81	6.44	2010	10.30	9.97
1981	6.94	6.56	2011	10.33	10.00
1982	7.07	6.69	2012	10.37	10.03
1983	7.19	6.81	2013	10.40	10.07
1984	7.32	6.94	2014	10.43	10.10
1985	7.44	7.06	2015	10.46	10.13
1986	7.57	7.19	2016	10.49	10.16
1987	7.69	7.31	2017	10.53	10.19
1988	7.82	7.44	2018	10.56	10.23
1989	7.94	7.56	2019	10.59	10.26
1990	8.07	7.69	2020	10.62	10.29
1991	8.20	7.82	2021	10.65	10.32
1992	8.32	7.94	2022	10.68	10.35
1993	8.45	8.07	2023	10.71	10.38
1994	9.31	8.89	2024	10.74	10.41
1995	9.39	9.00	2025	10.77	10.44
1996	9.47	9.10	2026	10.80	10.47
1997	9.54	9.21	2027	10.83	10.50
1998	9.62	9.32	2028	10.86	10.53
1999	9.70	9.42	2029	10.89	10.56
2000	9.80	9.49	2030	10.92	10.59
2001	10.01	9.68	2031	10.95	10.62
2002	10.04	9.71	2032	10.97	10.65
2003	10.08	9.74	2033	11.00	10.68
2004	10.11	9.77	2034	11.03	10.71
2005	10.14	9.81	2035	11.06	10.74

1976-1993: Efficiency trend estimated from 1982-1991 residential central air conditioner efficiency trend.

1994: Efficiency jump equivalent to percentage jump in residential central air conditioner efficiency in 1992.

1995-2001: Efficiency trend estimated from 1992-1999 residential central air conditioner efficiency trend.

2002-2030: Efficiency trend ½ the growth rate from the 1992-1999 residential central air conditioner efficiency trend.

T.3 STANDARDS CASE EFFICIENCY TRENDS

Table T.3.1 shows the standards case forecasted shipment-weighted EER values for the ≥65,000 Btu/h to <135,000 Btu/h equipment class while Table T.3.2 shows the standards case forecasted shipment-weighted EER values for the ≥135,000 Btu/h to <240,000 Btu/h equipment class. The assumed effective date of new standards is 2008 for all standards cases with the exception of the ASHRAE 90.1-1999 standards case where the effective date is 2004. Thus, shipment-weighted EER values preceding the year 2008 are identical to the EER values in the base case. In the case of the ASHRAE 90.1-1999 standards case, EER values preceding the year 2004 are identical to the EER values in the base case.

Table T.3.1 ≥65,000 Btu/h to <135,000 Btu/h: Forecasted Shipment-Weighted Efficiencies

	Standards Case				
Year	**ASHRAE**	**10.5 EER**	**11.0 EER**	**11.5 EER**	**12.0 EER**
2004	10.43	10.11	10.11	10.11	10.11
2005	10.46	10.14	10.14	10.14	10.14
2006	10.49	10.17	10.17	10.17	10.17
2007	10.52	10.21	10.21	10.21	10.21
2008	10.55	10.70	11.10	11.54	12.00
2009	10.59	10.73	11.13	11.57	12.00
2010	10.62	10.76	11.16	11.61	12.00
2011	10.65	10.80	11.19	11.64	12.00
2012	10.68	10.83	11.23	11.67	12.00
2013	10.71	10.86	11.26	11.70	12.00
2014	10.75	10.89	11.29	11.73	12.00
2015	10.78	10.92	11.32	11.77	12.00
2016	10.81	10.96	11.35	11.80	12.00
2017	10.84	10.99	11.38	11.83	12.00
2018	10.87	11.02	11.42	11.86	12.00
2019	10.90	11.05	11.45	11.89	12.00
2020	10.93	11.08	11.48	11.92	12.00
2021	10.96	11.11	11.51	11.95	12.00
2022	11.00	11.14	11.54	11.98	12.00
2023	11.03	11.17	11.57	12.00	12.00
2024	11.06	11.20	11.60	12.00	12.00
2025	11.09	11.23	11.63	12.00	12.00
2026	11.11	11.26	11.66	12.00	12.00
2027	11.14	11.29	11.69	12.00	12.00
2028	11.17	11.32	11.72	12.00	12.00
2029	11.20	11.35	11.75	12.00	12.00
2030	11.23	11.38	11.78	12.00	12.00
2031	11.26	11.41	11.80	12.00	12.00
2032	11.29	11.44	11.83	12.00	12.00
2033	11.32	11.46	11.86	12.00	12.00
2034	11.35	11.49	11.89	12.00	12.00
2035	11.37	11.52	11.92	12.00	12.00

Table T.3.2 ≥135,000 Btu/h to <240,000 Btu/h: Forecasted Shipment-Weighted Efficiencies

	Standards Case					
Year	**ASHRAE**	**10.0 EER**	**10.5 EER**	**11.0 EER**	**11.5 EER**	**12.0 EER**
2004	10.02	9.77	9.77	9.77	9.77	9.77
2005	10.05	9.81	9.81	9.81	9.81	9.81
2006	10.08	9.84	9.84	9.84	9.84	9.84
2007	10.12	9.87	9.87	9.87	9.87	9.87
2008	10.15	10.34	10.67	11.08	11.53	12.00
2009	10.18	10.37	10.70	11.11	11.57	12.00
2010	10.21	10.40	10.73	11.15	11.60	12.00
2011	10.25	10.44	10.76	11.18	11.63	12.00
2012	10.28	10.47	10.80	11.21	11.66	12.00
2013	10.31	10.50	10.83	11.24	11.70	12.00
2014	10.34	10.53	10.86	11.28	11.73	12.00
2015	10.38	10.57	10.89	11.31	11.76	12.00
2016	10.41	10.60	10.93	11.34	11.79	12.00
2017	10.44	10.63	10.96	11.37	11.83	12.00
2018	10.47	10.66	10.99	11.40	11.86	12.00
2019	10.50	10.69	11.02	11.43	11.89	12.00
2020	10.53	10.72	11.05	11.47	11.92	12.00
2021	10.56	10.76	11.08	11.50	11.95	12.00
2022	10.60	10.79	11.11	11.53	11.98	12.00
2023	10.63	10.82	11.15	11.56	12.00	12.00
2024	10.66	10.85	11.18	11.59	12.00	12.00
2025	10.69	10.88	11.21	11.62	12.00	12.00
2026	10.72	10.91	11.24	11.65	12.00	12.00
2027	10.75	10.94	11.27	11.68	12.00	12.00
2028	10.78	10.97	11.30	11.71	12.00	12.00
2029	10.81	11.00	11.33	11.74	12.00	12.00
2030	10.84	11.03	11.36	11.77	12.00	12.00
2031	10.87	11.06	11.39	11.80	12.00	12.00
2032	10.90	11.09	11.42	11.83	12.00	12.00
2033	10.93	11.12	11.44	11.86	12.00	12.00
2034	10.95	11.15	11.47	11.89	12.00	12.00
2035	10.98	11.17	11.50	11.92	12.00	12.00