

APPENDIX 10-C. NATIONAL NET PRESENT VALUE OF CONSUMER BENEFITS AND EMISSIONS REDUCTIONS USING ALTERNATIVE PRODUCT PRICE FORECASTS

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10-C.1 INTRODUCTION

DOE investigated the impact of different learning rates on the combined net present value (NPV) for the considered TSLs for microwave ovens. The NPV results presented in chapter 10 are based on a learning rate for product prices of 28.9% (the “default” learning rate). DOE considered five sensitivities: (1) a “low learning” rate; (2) a “high learning” rate; (3) a “Microwave only” learning rate, (4) an “AEO 2010 chained price index forecast”, and (5) a “no learning” rate, which assumes constant real prices over the entire forecast period. Refer to appendix 8-E for details on the development of the above learning rates.

DOE derived a price factor index, with 2010 equal to 1, to forecast prices in each future year in the analysis period. The default index value in a given year is a function of the LR and the cumulative production forecast through that year, which is based on the shipments forecast described in chapter 9. Table 10-C.1.1 presents the price factors used to forecast product prices for microwave ovens in each considered sensitivity.

Table 10-C.1.1 Microwave Oven Price Factors

Year	Default Learning LR=28.9%	Low Learning LR=19.2%	High Learning LR=37.0%	MWO Only LR=39.6%	AEO2010 Chained Price Index Forecast	No Learning (constant real prices)
2010	1.000	1.000	1.000	1.000	1.000	1.000
2011	0.981	0.986	0.979	0.968	0.989	1.000
2012	0.963	0.971	0.958	0.938	0.978	1.000
2013	0.946	0.958	0.939	0.909	0.964	1.000
2014	0.930	0.945	0.920	0.883	0.949	1.000
2015	0.914	0.933	0.903	0.859	0.932	1.000
2016	0.900	0.921	0.886	0.837	0.916	1.000
2017	0.886	0.910	0.871	0.817	0.899	1.000
2018	0.873	0.900	0.857	0.799	0.883	1.000
2019	0.861	0.890	0.842	0.781	0.866	1.000
2020	0.848	0.880	0.828	0.763	0.848	1.000
2021	0.836	0.870	0.814	0.745	0.829	1.000
2022	0.823	0.860	0.801	0.728	0.810	1.000
2023	0.812	0.850	0.788	0.711	0.791	1.000
2024	0.800	0.841	0.775	0.696	0.772	1.000
2025	0.790	0.832	0.763	0.681	0.754	1.000
2026	0.779	0.824	0.752	0.667	0.736	1.000
2027	0.770	0.816	0.741	0.654	0.719	1.000
2028	0.760	0.808	0.731	0.642	0.701	1.000
2029	0.751	0.800	0.721	0.630	0.684	1.000
2030	0.742	0.793	0.711	0.618	0.667	1.000
2031	0.733	0.785	0.702	0.607	0.651	1.000
2032	0.725	0.778	0.692	0.596	0.634	1.000
2033	0.716	0.771	0.683	0.585	0.619	1.000
2034	0.708	0.764	0.674	0.575	0.604	1.000
2035	0.700	0.757	0.665	0.565	0.589	1.000
2036	0.692	0.751	0.657	0.555	0.575	1.000
2037	0.685	0.745	0.649	0.546	0.561	1.000
2038	0.678	0.739	0.641	0.537	0.547	1.000
2039	0.670	0.733	0.633	0.529	0.534	1.000
2040	0.663	0.727	0.626	0.521	0.521	1.000
2041	0.657	0.721	0.618	0.513	0.508	1.000
2042	0.650	0.715	0.611	0.505	0.496	1.000
2043	0.643	0.709	0.604	0.497	0.484	1.000

The results presented here combine the NPV of the consumer savings, calculated for each TSL using 3 and 7 percent discount rates, with the present value of the potential economic benefits resulting from reduced CO₂ and NO_x emissions. For these results, the economic benefits from reduced CO₂ emissions were calculated using a SCC value of \$22.3/metric ton in 2010 (in 2010\$) for CO₂, increasing at 3% per year, and a discount rate of 3%. The economic benefits from reduced NO_x emissions were calculated using a value of \$2,537/ton (in 2010\$), which is the average of the low and high values used in DOE's analysis, and either a 3% or 7% discount

rate. See chapter 16 for information regarding the derivation of these values. All results refer to lifetime impacts of products shipped in 2014-2043.

The results presented here are annualized values. DOE used a two-step calculation process to convert the time-series of costs and benefits into annualized values. First, DOE calculated a present value in 2011, the year used for discounting the NPV of total consumer costs and savings, for the time-series of costs and benefits using discount rates of three and seven percent for all costs and benefits except for the value of CO₂ reductions. For the latter, DOE used the discount rate appropriate for each SCC time series. From the present value, DOE then calculated the fixed annual payment over a 30-year period, starting in 2011, that yields the same present value. The fixed annual payment is the annualized value. Although DOE calculated annualized values, this does not imply that the time-series of cost and benefits from which the annualized values were determined would be a steady stream of payments.

10-C.2 MICROWAVE OVEN STANDBY POWER COMBINED NPV RESULTS USING ALTERNATIVE LEARNING RATES

Table 10-C.2.1 Microwave Oven Standby Power: Annualized Present Value of Consumer Impacts (3 Percent Discount Rate) and Annualized Present Value of Monetized Benefits from CO₂ and NO_x Emissions Reductions (3 Percent Discount Rate)

Trial Standard Level		Default Learning LR=28.9%	Low Learning LR=19.2%	High Learning LR=37.0%	MWO Only LR=39.6%	AEO2010 Chained Price Index Forecast	No Learning (constant real prices)
		Billion 2010\$					
1	Incr. Installed Cost	0.002	0.002	0.002	0.002	0.002	0.003
	Operating Cost Savings	0.103	0.103	0.103	0.103	0.103	0.103
	Value of Emissions Reduction	0.019	0.019	0.019	0.019	0.019	0.019
	Net Present Value	0.120	0.120	0.120	0.120	0.120	0.120
2	Incr. Installed Cost	0.007	0.008	0.007	0.006	0.007	0.009
	Operating Cost Savings	0.149	0.149	0.149	0.149	0.149	0.149
	Value of Emissions Reduction	0.027	0.027	0.027	0.027	0.027	0.027
	Net Present Value	0.169	0.169	0.169	0.170	0.170	0.167
3	Incr. Installed Cost	0.022	0.023	0.021	0.019	0.020	0.027
	Operating Cost Savings	0.205	0.205	0.205	0.205	0.205	0.205
	Value of Emissions Reduction	0.038	0.038	0.038	0.038	0.038	0.038
	Net Present Value	0.221	0.220	0.222	0.224	0.222	0.215
4	Incr. Installed Cost	0.079	0.083	0.076	0.068	0.074	0.099
	Operating Cost Savings	0.314	0.314	0.314	0.314	0.314	0.314
	Value of Emissions Reduction	0.058	0.058	0.058	0.058	0.058	0.058
	Net Present Value	0.293	0.288	0.295	0.303	0.298	0.273

Parentheses indicate negative (-) values.

Table 10-C.2.2 Room Air Conditioners: Annualized Present Value of Consumer Impacts (7 Percent Discount Rate) and Annualized Present Value of Monetized Benefits from CO₂ and NO_x Emissions Reductions (Discount Rate of 3% for CO₂ and 7% for NO_x)

Trial Standard Level		Default Learning LR=28.9%	Low Learning LR=19.2%	High Learning LR=37.0%	MWO Only LR=39.6%	AEO2010 Chained Price Index Forecast	No Learning (constant real prices)
		Billion 2010\$					
1	Incr. Installed Cost	0.002	0.002	0.002	0.002	0.002	0.003
	Operating Cost Savings	0.084	0.084	0.084	0.084	0.084	0.084
	Value of Emissions Reduction	0.019	0.019	0.019	0.019	0.019	0.019
	Net Present Value	0.101	0.101	0.101	0.101	0.101	0.100
2	Incr. Installed Cost	0.007	0.007	0.007	0.006	0.007	0.009
	Operating Cost Savings	0.121	0.121	0.121	0.122	0.121	0.121
	Value of Emissions Reduction	0.027	0.027	0.027	0.027	0.027	0.027
	Net Present Value	0.141	0.141	0.142	0.142	0.142	0.140
3	Incr. Installed Cost	0.020	0.021	0.020	0.018	0.019	0.025
	Operating Cost Savings	0.167	0.167	0.167	0.167	0.167	0.167
	Value of Emissions Reduction	0.037	0.037	0.037	0.037	0.037	0.037
	Net Present Value	0.184	0.183	0.184	0.186	0.185	0.179
4	Incr. Installed Cost	0.075	0.078	0.072	0.066	0.071	0.090
	Operating Cost Savings	0.256	0.256	0.256	0.256	0.256	0.256
	Value of Emissions Reduction	0.057	0.057	0.057	0.057	0.057	0.057
	Net Present Value	0.238	0.235	0.241	0.247	0.242	0.223

Parentheses indicate negative (-) values.