

CHAPTER 11. CONSUMER SUBGROUP ANALYSIS

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CHAPTER 11. CONSUMER SUBGROUP ANALYSIS

11.1 INTRODUCTION

Chapter 8 describes the life-cycle cost (LCC) and payback period (PBP) analyses that examine impacts of energy conservation standards on the U.S. population. In analyzing the potential impact of new or amended standards on residential consumers, DOE further evaluates the impact on identifiable groups of consumers (i.e., subgroups) that may be disproportionately affected by a national standard level. The consumer subgroup analysis evaluates impacts by analyzing the LCC and PBPs for subgroups of residential consumers.

For both standard and compact dishwashers, DOE identified two consumer subgroups that warranted further study: (a) households composed of people 65 years of age or older (senior-only); and (b) households at or below the poverty line (low-income).

DOE determined the impact on consumer subgroups for standard and compact dishwashers using the LCC spreadsheet model, which allows for the examination of particular consumer subgroups. DOE has the ability to use the LCC spreadsheet Model to analyze the LCC for any subgroup by sampling only the data that apply to that subgroup (Chapter 8 explains in detail the inputs to the model used in determining LCC and PBPs). As described in section 11.3, the energy use and energy price characteristics of the two subgroups (senior-only and low-income) differ from those for the general population.

This chapter describes the subgroup identification in further detail and gives the results of the LCC and PBP analyses for the considered subgroups.

11.2 SUBGROUPS DEFINITION

11.2.1 Senior-Only Households

Senior-only households have occupants who are all at least 65 years of age. Based on the DOE Energy Information Administration (EIA)'s Residential Energy Consumption Survey of 2005 (RECS), senior-only households comprise 17 percent of the country's households.¹

11.2.2 Low-Income Households

As defined in the RECS survey, low-income households are considered to be those at or below the "poverty line." The "poverty line" varies with household size, head of household age, and family income. Table 11.2.1 summarizes the income level baselines for selecting low-income households from the RECS sample. The RECS survey classifies 15 percent of the country's households as low-income.

Table 11.2.1 RECS 2005 Definitions of Low-Income Households by Yearly Income

Household Size	Average Income \$		
	48 Contiguous States and D.C.	Alaska	Hawaii
1	9,570	11,950	11,010
2	12,830	16,030	14,760
3	16,090	20,100	18,510
4	19,350	24,190	22,260
5	22,610	28,270	26,010
6	25,870	32,350	29,760
7	29,130	36,430	33,510
8	32,390	40,510	37,260
9	35,650	44,590	41,010
10	38,910	48,670	44,760
11	42,170	52,750	48,510
12	45,430	56,830	52,260
13	48,690	60,910	56,010
14	51,950	64,990	59,760
15	55,210	69,070	63,510

11.3 INPUTS TO CONSUMER SUBGROUP ANALYSIS

DOE performed the consumer subgroup analysis by analyzing the LCC and PBP of senior-only and low-income households with the spreadsheet models used for the LCC and PBP analysis.

Table 11.3.1 summarizes the household populations, while Table 11.3.2 and Table 11.3.3 summarize the weighted-average annual energy use for the households analyzed in the consumer subgroup analyses. These values are compared against the weighted-average values for the national sample.

Table 11.3.1 Household Population

	Count	Sum
National	2,480	64,729,484
Senior-Only	194	4,156,036
Senior-Only %	7.8	6.4
Low-Income	350	9,723,536
Low-Income %	14.1	15.0

Table 11.3.2 Weighted-Average Annual Electricity Use for Standard-Sized Dishwashers

Efficiency Level	All Households	Senior-Only	Low-Income
	<u>kWh/year</u>		
Baseline	211	169	202
EL1	195	161	190
EL2	196	160	185
EL3	201	164	185
EL4	150	123	142
EL5	145	118	127

Table 11.3.3 Weighted-Average Annual Electricity Use for Compact Dishwashers

Efficiency Level	All Households	Senior-Only	Low-Income
	<u>kWh/year</u>		
Baseline	160	128	151
EL1	144	120	137
EL2	107	89	100

11.4 RESULTS

Table 11.4.1 through Table 11.4.4 summarize the subgroup results for standard and compact dishwashers. The LCC results provide the average installed price; average lifetime operating cost (discounted); average life-cycle cost; average life-cycle cost savings; the percentage of consumers that are burdened with net costs, realize net savings, or are not impacted; and the median payback period.

11.4.1 Senior-Only Households

Table 11.4.1 Standard-Sized Dishwashers: LCC and PBP Results for Senior-Only Households

Level	Life-Cycle Cost <u>2010\$</u>			Life-Cycle Cost Savings				Payback Period Median <u>years</u>
	Average Installed Price	Average Operating Cost	Average LCC	Average Savings <u>2010\$</u>	% Households with			
					Net Cost	No Impact*	Net Benefit	
Baseline	630	397	1,027	NA	0	100	0	NA
1	656	366	1,022	0	2	96	1	7.2
2	674	342	1,016	2	16	71	13	13.3
3	726	324	1,050	-19	54	38	8	42.3
4	734	261	996	24	36	20	44	8.5
5	745	191	936	78	29	9	62	5.7

* “No impact” means that the base case product assigned to the household has greater efficiency than the level indicated, so the household is not affected.

Table 11.4.2 Compact Dishwashers: LCC and PBP Results for Senior-Only Households

Level	Life-Cycle Cost <u>2010\$</u>			Life-Cycle Cost Savings				Payback Period Median <u>years</u>
	Average Installed Price	Average Operating Cost	Average LCC	Average Savings <u>2010\$</u>	% Households with			
					Net Cost	No Impact*	Net Benefit	
Baseline	621	288	910	NA	0	100	0	NA
1	623	249	871	9	8	76	16	0.4
2	638	170	808	41	7	50	43	2.7

* “No impact” means that the base case product assigned to the household has greater efficiency than the level indicated, so the household is not affected.

11.4.2 Low-Income Households

Table 11.4.3 Standard-Sized Dishwashers: LCC and PBP Results for Low-Income Households

Level	Life-Cycle Cost <u>2010</u> \$			Life-Cycle Cost Savings				Payback Period Median <u>years</u>
	Average Installed Price	Average Operating Cost	Average LCC	Average Savings <u>2010</u> \$	% Households with			
					Net Cost	No Impact*	Net Benefit	
Baseline	630	402	1,032	NA	0	100	0	NA
1	655	370	1,025	0	2	96	1	5.6
2	674	344	1,018	3	16	71	13	13.6
3	725	325	1,050	-17	53	38	9	41.4
4	734	263	997	26	39	20	41	9.1
5	744	189	933	84	32	9	59	6.0

* “No impact” means that the base case product assigned to the household has greater efficiency than the level indicated, so the household is not affected.

Table 11.4.4 Compact Dishwashers: LCC and PBP Results for Low-Income Households

Level	Life-Cycle Cost <u>2010</u> \$			Life-Cycle Cost Savings				Payback Period Median <u>years</u>
	Average Installed Price	Average Operating Cost	Average LCC	Average Savings <u>2010</u> \$	% Households with			
					Net Cost	No Impact*	Net Benefit	
Baseline	621	292	913	NA	0	100	0	NA
1	622	250	872	10	9	76	15	0.3
2	637	170	807	43	8	50	42	3.3

* “No impact” means that the base case product assigned to the household has greater efficiency than the level indicated, so the household is not affected.

REFERENCES

1. U.S. Department of Energy–Energy Information Administration. *Residential Energy Consumption Survey: 2005 Public Use Data Files*. Washington, DC. (Last accessed July 10, 2012.) <<http://www.eia.gov/emeu/recs/recspubuse05/pubuse05.html>>