CHAPTER 6. MARKUPS FOR EQUIPMENT PRICE DETERMINATION

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 6. MARKUPS FOR EQUIPMENT PRICE DETERMINATION

6.1 INTRODUCTION

One of the most important inputs to the life-cycle cost and payback period analysis and the national impact analysis is the projected installed cost of the automatic commercial ice makers. Installed cost includes equipment purchase price and installation costs. The U.S. Department of Energy (DOE) projects the equipment purchase price by using multipliers called "markups" that are applied to the manufacturer production cost (MPC) to estimate the customer purchase price of the equipment. The manufacturer markup, projected as part of the engineering analysis (chapter 5 of the preliminary technical support document), converts the MPC into manufacturer selling price (MSP). Distribution channel markups are also applied to the MSP based on the distribution channels through which customers currently purchase the equipment. DOE determined that customers purchase automatic commercial ice makers through three major distribution channels:

Manufacturer → Customer (**National Account Channel**)

Manufacturer → Wholesaler → Customer (**Wholesaler Channel**)

Manufacturer → Wholesaler → Mechanical Contractor → Customer (**Contractor Channel**)

The three distribution channels can also be viewed as a single-step (national accounts) channel, a two-step (wholesaler) channel, and a three or more step (contractor) channel. DOE recognizes, based on input received at the Framework public meeting, that customers frequently rely on third parties—dealers or contractors—for installation and repair work because customers rely on the equipment and cannot be in a situation where their equipment is not operating,[1] though mechanical contractors, specifically, are not commonly used. Thus, DOE has retained the contractor channel as a proxy for the three-step chain. DOE seeks additional data from stakeholders concerning appropriate markups for the third step of the contractor channel. (See the TSD Executive Summary.)

In addition to the manufacturer markup and distribution channel markups, sales tax on the equipment is the final markup that determines the customer purchase price of the equipment. Sales tax varies by the state in which the equipment is installed.

DOE calculated an aggregate average markup value for each distribution channel. DOE then weight-averaged the three distribution channel markup values using the market share of each distribution channel to obtain weighted average distribution channel markups (see section 6.2.3 for market share estimates). Based on suggestions from stakeholders at the Framework public meeting, DOE used the same weighted average distribution channel markup values for all automatic commercial ice-making (ACIM) equipment classes.

DOE calculated a weighted average sales tax using the population of each state as the corresponding weight. DOE then multiplied the weighted average sales tax by the weighted average distribution channel markups to estimate overall distribution channel markup values for automatic commercial ice makers.

This chapter presents DOE's methodology for calculating the three distribution channel markups, weighted average sales tax, and overall distribution channel markups.

6.2 BASELINE, INCREMENTAL, AND OVERALL MARKUPS

Baseline markups are the markups that convert the MSP of equipment at the baseline efficiency level (Efficiency Level 1) to customer purchase price. Incremental markups are markups that convert the projected increase in MSP of equipment at Efficiency Level 2 or higher to a projected increase in customer purchase price compared to the price of equipment at Efficiency Level 1. Overall markups include the weighted average values of markups based on the estimated market share for each distribution channel and the sales tax.

6.2.1 Baseline Markups

If the baseline equipment is sold through the national account channel, the following equation defines the estimated equipment price:

$$EQP_{NATL\ ACCT\ BASE} = MFG_{BASE} \times MU_{NATL\ ACCT\ BASE} \times (1 + ST)$$

Eq. 6.1

Where:

MFG_{BASE} = MSP of baseline equipment ($/unit),
$EQP_{NATL\ ACCNT\ BASE}$ = national account price to the customer of baseline equipment ($/unit),
$MU_{NATL\ ACCT\ BASE}$ = national account markup on baseline equipment, and
ST = weighted average sales tax rate.

If the baseline equipment is sold through the wholesaler channel:

$$EQP_{WHOLE\ BASE} = MFG_{BASE} \times MU_{WHOLE\ BASE} \times (1 + ST)$$

Eq. 6.2

Where:

$EQP_{WHOLE\ BASE}$ = wholesaler price of baseline equipment ($/unit), and
$MU_{WHOLE\ BASE}$ = wholesaler markup on baseline equipment.

If the baseline equipment is sold to a customer through the contractor channel:

$$EQP_{MECH\ CONT\ BASE} = MFG_{BASE} \times MU_{WHOLE\ BASE} \times MU_{MECH\ CONT\ BASE} \times (1 + ST)$$

Eq. 6.3

Where:

$EQP_{MECH\ CONT\ BASE}$ = mechanical contractor price of baseline equipment ($/unit), and
$MU_{MECH\ CONT\ BASE}$ = mechanical contractor markup on baseline equipment.

6.2.2 Incremental Markups

Incremental markups are cost multipliers that relate increments in the MSP of equipment at higher efficiency levels to the corresponding increments in customer purchase price. DOE projects the increment in MSP of equipment at higher efficiency levels by subtracting the MSP of equipment at the baseline efficiency level (MFG_{BASE}) from the projected MSP of equipment at higher efficiency levels:

$$MFG_{INCR} = MFG_{HIGHER\ EFF\ LEVEL} - MFG_{BASE} \quad \textbf{Eq. 6.4}$$

Where:

MFG_{INCR} = projected increment in MSP of higher efficiency equipment ($/unit), and
$MFG_{HIGHER\ EFF\ LEVEL}$ = projected MSP of equipment at higher efficiency level ($/unit).

If the equipment is sold through the national account channel, DOE projects the increase in equipment price using the following equation:

$$EQP_{NATL\ ACCT\ INCR} = MFG_{INCR} \times MU_{NATL\ ACCT\ INCR} \times (1 + ST) \quad \textbf{Eq. 6.5}$$

Where:

$EQP_{NATL\ ACCNT\ INCR}$ = projected increment in customer purchase price to the national account customer ($/unit), and
$MU_{NATL\ ACCT\ INCR}$ = national account incremental markup.

If the customer acquires the higher efficiency equipment through the wholesaler or contractor channels:

$$EQP_{WHOLE\ INCR} = MFG_{INCR} \times MU_{WHOLE\ INCR} \times (1 + ST) \quad \textbf{Eq. 6.6}$$

Where:

$EQP_{WHOLE\ INCR}$ = projected incremental wholesaler price ($/unit), and
$MU_{WHOLE\ INCR}$ = incremental wholesaler markup.

$$EQP_{MECH\ CONT\ INCR} = MFG_{INCR} \times MU_{WHOLE\ INCR} \times MU_{MECH\ CONT\ INCR} \times (1 + ST) \quad \textbf{Eq. 6.7}$$

Where:

$EQP_{MECH\ CONT\ INCR}$ = projected incremental mechanical contractor price ($/unit), and
$MU_{MECH\ CONT\ INCR}$ = incremental mechanical contractor markup.

6.2.3 Distribution-Channel Market Shares

Table 6.2.1 provides the estimated market shares for the three distribution channels for automatic commercial ice makers used for the preliminary analysis. DOE used these distribution channel market shares to estimate overall markups. DOE obtained the market shares from U.S. Census Bureau data for the commercial refrigeration equipment sector, of which automatic commercial ice makers comprise one of the component product lines. Stakeholders at the Framework public meeting indicated that the majority of automatic commercial ice makers are purchased through a three-step distribution channel, consistent with the estimates listed in the table.

Table 6.2.1 Distribution Channel Market Shares for Baseline and Higher Efficiency Level Automatic Commercial Ice Makers

	National Account Channel	Wholesaler Channel	Contractor Channel
Automatic Commercial Ice Makers, All	6%	32%	62%

Source: U.S. Census Bureau, *Sector 42: EC0742SXSB01: Wholesale Trade: Subject Series - Misc Subjects: Sales by Class of Customer for the United States: 2007, data for NAICS code 423740, Refrigeration equipment and supplies merchant wholesalers*. Downloaded March 4, 2011.

6.2.4 Overall Markups

DOE estimated overall markup values separately for both baseline and incremental markups by combining the weighted-average sales tax with the weighted-average distribution channel markups. DOE estimated overall baseline markup values using:

$$EQP_{CUST\ BASE} = MFG_{BASE} \times (WT_{NATL\ ACCT\ BASE} \times MU_{NATL\ ACCT\ BASE} + WT_{WHOLE\ BASE} \times MU_{WHOLE\ BASE} + WT_{MECH\ CONT\ BASE} \times MU_{WHOLE\ BASE} \times MU_{MECH\ CONT\ BASE}) \times (1 + ST)$$

$$= MFG_{BASE} \times MU_{OVERALL\ BASE} \qquad \textbf{Eq. 6.8}$$

Where:

$EQP_{CUST\ BASE}$ = customer purchase price for baseline equipment ($/unit),
$WT_{NATL\ ACCNT\ BASE}$ = estimated market share of baseline equipment sold through national account channel (%),
$WT_{WHOLE\ BASE}$ = estimated market share of baseline equipment sold through wholesaler channel (%),
$WT_{MECH\ CONT\ BASE}$ = estimated market share of baseline equipment sold through contractor channel (%), and
$MU_{OVERALL\ BASE}$ = estimated overall baseline markup.

DOE projected overall incremental markups using:

$$EQP_{CUST\ INCR} = MFG_{INCR} \times (WT_{NATL\ ACCT\ INCR} \times MU_{NATL\ ACCT\ INCR} + WT_{WHOLE\ INCR} \times MU_{WHOLE\ INCR} + WT_{MECH\ CONT\ INCR} \times MU_{WHOLE\ INCR} \times MU_{MECH\ CONT\ INCR}) \times (1 + ST)$$

$$= MFG_{INCR} \times MU_{OVERALL\ INCR}$$

Eq. 6.9

Where:

$EQP_{CUST\ INCR}$ = projected increment in customer purchase price of equipment at a higher efficiency level compared to baseline equipment ($/unit),
$WT_{NATL\ ACCNT\ INCR}$ = projected market share of higher efficiency level equipment sales through national account channel (%),
$WT_{WHOLE\ INCR}$ = projected market share of higher efficiency level equipment sales through wholesaler channel (%),
$WT_{MECH\ CONT\ INCR}$ = projected market share of higher efficiency level equipment sales through contractor channel (%), and
$MU_{OVERALL\ INCR}$ = overall incremental markup.

$$EQP_{CUST} = EQP_{CUST\ BASE} + EQP_{CUST\ INCR}$$

Eq. 6.10

DOE used the overall baseline and overall incremental markups to estimate the baseline customer price ($EQP_{CUST\ BASE}$) and to project the incremental customer price ($EQP_{CUST\ INCR}$). For a particular piece of equipment at a higher efficiency level, the projected total price of that equipment to the customer (EQP_{CUST}) is the sum of the baseline customer price ($EQP_{CUST\ BASE}$) and the projected incremental customer price ($EQP_{CUST\ INCR}$).

6.3 BASIC ASSUMPTIONS USED TO ESTIMATE WHOLESALER AND MECHANICAL CONTRACTOR MARKUPS

DOE based the wholesaler markups on industry balance sheet data and based the mechanical contractor markups on U.S. Census Bureau data for the plumbing, heating, and air conditioning (PHAC) industry.[2] DOE obtained the industry balance sheet data from the Heating, Air-conditioning & Refrigeration Distributors International (HARDI), the trade association representing wholesalers of refrigeration and heating, ventilating, and air conditioning (HVACR) equipment.[3] DOE compiled the U.S. Census Bureau PHAC data following the same format as used for the balance sheet data for wholesalers. These balance sheets itemize the costs incurred by firms that supply and install PHAC equipment. DOE estimated the wholesaler and mechanical contractor markups based on three key assumptions about ACIM costs:

1. The balance sheets accurately represent the various average costs incurred by firms distributing and installing automatic commercial ice makers.
2. The wholesaler and contractor costs can be divided between (a) costs that vary in proportion to the MSP (variable costs) and (b) costs that do not vary with MSP (fixed costs).
3. Wholesaler and contractor prices vary in proportion to the wholesaler and contractor costs included in the balance sheets.

The basis for the first assumption is that the industry balance sheets itemize costs incurred by a firm by a number of cost categories, including direct costs to purchase or install the equipment, operating labor and occupancy costs, and other operating costs and profit. Although wholesalers and contractors tend to handle multiple equipment lines (including refrigerators, freezers, beverage dispensers, and other related equipment), the data provide the most credible available information for ACIM distribution costs.

The basis for the second assumption is that firms must incur some costs regardless of the cost of the goods being sold—costs such as sales, accounting and management staff, office expenses, depreciation, and many other operating costs do not vary with the MSP. For purposes of this analysis, DOE refers to these costs as fixed. Other costs, such as uncollectable accounts, bad debts, and profit margins, vary as a function of the total cost of sales, including the cost of goods sold. For purposes of this analysis, DOE refers to these costs as variable.

The basis for the third assumption is that the HVACR wholesaler and contractor industry is competitive, while customer demand for ACIM equipment is assumed to be inelastic (*i.e.*, the demand is not expected to decrease significantly with an increase in price of equipment). The large number of HVACR firms listed in the 2007 economic census indicates the competitive nature of the market. For example, there are more than 700 HVACR manufacturers,[4] 1,300 wholesalers of refrigeration equipment,[5] 36,000 commercial and institutional building contractors,[6] and 91,000 HVAC contractors[7] listed in the 2007 census. Following standard economic theory, competitive firms facing inelastic demand either set prices in line with costs or quickly go out of business.[8]

6.4 ESTIMATION OF WHOLESALER MARKUPS

Annually, HARDI conducts a confidential survey of its member firms in which wholesalers report median data. For what they describe as a typical distributor, HARDI disaggregates revenues into categories, including direct cost of goods sold (equipment (MSP), materials, fuels, and contracted services), labor costs, occupancy costs, other operating costs, and profit. Appendix 6A presents the data for a typical HARDI distributor in terms of specific types of expenses within these categories. Table 6.4.1 summarizes these expenses in units of expenses per dollar of sales revenue and revenue per dollar of goods sold. As shown in the first column of Table 6.4.1, the direct cost of equipment sold represents $0.734 per dollar of sales revenue. In other words, for every $1.00 the typical wholesaler takes in as sales revenue, it pays $0.734 in direct costs. Labor expenses account for $0.161 per dollar of sales revenue, occupancy expenses account for $0.038, other operating expenses account for $0.054, and profit accounts for $0.013 per dollar sales revenue.

Table 6.4.1 Typical Wholesaler Expenses and Markups

Description	Wholesale Firm Expenses or Revenue	
	Per Dollar Sales Revenue	Per Dollar Cost of Goods Sold
Direct Cost of Equipment Sales: Cost of goods sold	$0.734	$1.000
Labor Expenses: Salaries and benefits	$0.161	$0.219
Occupancy Expenses: Rent, maintenance, and utilities	$0.038	$0.052
Other Operating Expenses: Depreciation, advertising, and insurance	$0.054	$0.074
Profit	$0.013	$0.018
Baseline Markup ($MU_{WHOLE\ BASE}$): Revenue per dollar cost of goods sold *		**1.362**
Incremental Markup ($MU_{WHOLE\ INCR}$): Increased revenue per dollar increase cost of goods sold*		**1.091**

Source: Heating, Air-conditioning & Refrigeration Distributors International. 2010. *2010 Profit Report (2009 Data)*.
* Numbers are rounded and may not add up to the totals.

The last column of Table 6.4.1 shows the data converted from costs per dollar revenue into revenue per dollar cost of goods sold. DOE performed this conversion by dividing each cost category in the first data column of Table 6.4.1 by $0.734 (*i.e.*, equipment expenditure per dollar revenue). The data in this column show that, for every $1.00 the wholesaler spends on equipment costs, the wholesaler earns $1.00 in sales revenue to cover the equipment cost, $0.22 to cover labor costs, $0.05 to cover occupancy expenses, $0.07 for other operating expenses, and $0.02 in profits. This totals to $1.36 in sales revenue earned for every $1.00 spent on equipment costs. Therefore, the wholesaler baseline markup ($MU_{WHOLE\ BASE}$) is 1.36 ($1.36 ÷ $1.00).

DOE also used the data in the last column of Table 6.4.1 to estimate the incremental markups. The total incremental markup depends on which of the costs in Table 6.4.1 are variable and which are fixed. For example, for a $1.00 increase in the manufacturer equipment price, if all of the other costs scale with the MSP (*i.e.*, all costs are variable), the increase in wholesaler price will be $1.36, implying that the incremental markup is 1.36, or the same as the baseline markup. However, if none of the other costs is variable, then a $1.00 increase in the MSP will lead to a $1.00 increase in the wholesaler price, for an incremental markup of 1.0. DOE assumed that the labor and occupancy costs will be fixed and that the other operating costs and profit will scale with the MSP (*i.e.*, be variable). In this case, for a $1.00 increase in the MSP, the wholesaler price will increase by $1.09. Therefore, the wholesaler incremental markup ($MU_{WHOLE\ INCR}$) is 1.09 ($1.09 ÷ $1.00). See appendix 6A for additional details and data used for markup calculations.

6.5 ESTIMATION OF MECHANICAL CONTRACTOR MARKUPS

DOE derived markups for mechanical contractors from U.S. Census Bureau data for PHAC contractors. This sector includes establishments primarily engaged in installing and servicing PHAC equipment, which may include installations, additions, alterations, maintenance, and repairs. The U.S. Census Bureau data for the PHAC sector include detailed statistics for establishments with payrolls, similar to the data reported by HARDI for wholesalers. The primary difference is that the U.S. Census Bureau reports itemized revenues and expenses for the PHAC industry as a whole in total dollars, rather than in typical values for the average or representative business. Because of this, DOE assumed that the total dollar values that the U.S. Census Bureau reported, once converted to percentages, represent revenues and expenses for the average or typical contracting business. Table 6.5.1 summarizes the typical expenses for mechanical contractors. The first data column of Table 6.5.1 lists expenses per dollar sales revenue (appendix 6A contains the full set of data). The direct cost of sales represents about

$0.678 per dollar sales revenue to the mechanical contractor. Labor expenses account for $0.175 per dollar sales revenue, occupancy expenses account for $0.022 per dollar sales revenue, other operating expenses account for $0.039, and profit makes up $0.086 per dollar sales revenue.

Table 6.5.1 Typical Mechanical Contractor Expenses and Markups

Description	Mechanical Contractor Firm Expenses or Revenue	
	Per Dollar Sales Revenue	Per Dollar Cost of Goods Sold
Direct Cost of Equipment Sales: Cost of goods sold	$0.678	$1.000
Labor Expenses: Salaries (indirect) and benefits	$0.175	$0.258
Occupancy Expense: Rent, maintenance, and utilities	$0.022	$0.032
Other Operating Expenses: Depreciation, advertising, and insurance	$0.039	$0.058
Net Profit Before Taxes	$0.086	$0.127
Baseline Markup ($MU_{MECH\ CONT\ BASE}$): Revenue per dollar cost of goods sold *		**1.475**
Incremental Markup ($MU_{MECH\ CONT\ INCR}$): Increased revenue per dollar increase cost of goods sold*		**1.184**

Sources: U.S. Census Bureau. 2007. *Plumbing, Heating, and Air-Conditioning Contractors. Sector 23: 238220. Construction: Geographic Area Series: Detailed Statistics for Establishments: 2007;* DOE estimates.
* Numbers are rounded and may not add up to the totals.

DOE converted these expenses per dollar sales into revenue per dollar cost of goods sold by dividing each figure in the first data column by $0.678. The data in the last column of Table 6.5.1 show that, for every $1.00 the mechanical contractor spends on equipment costs, the typical mechanical contractor earns $1.00 in sales revenue to cover the equipment cost, $0.26 to cover labor costs, $0.03 to cover occupancy expenses, $0.06 for other operating expenses, and $0.13 in profits. This totals $1.47 in sales revenue earned for every $1.00 spent on equipment costs. This results in a mechanical contractor baseline markup ($MU_{MECH\ CONT\ BASE}$) of 1.47 ($1.47÷ $1.00).

DOE was also able to use the data in the last column in Table 6.5.1 to estimate the incremental markups by separating the fixed and variable costs. For example, if all of the other costs scale with the equipment price (*i.e.*, all costs are variable), the increase in mechanical contractor price will be $1.47, an incremental markup of 1.47, or the same as the baseline markup. However, if none of the other costs are variable, then a $1.00 increase in the equipment price will lead to a $1.00 increase in the mechanical contractor price, for an incremental markup of 1.0. DOE assumed the labor and occupancy costs are fixed and the other operating costs and profit scale with the equipment price (*i.e.*, are variable). In this case, for a $1.00 increase in the equipment price, the typical mechanical contractor price will increase by $1.18, giving a mechanical contractor incremental markup ($MU_{MECH\ CONT\ INCR}$) of 1.18 ($1.18 ÷ $1.00).

Mechanical contractor costs differ in various regions of the country depending on availability of labor, cost of living, and union versus non-union workforce. Because many mechanical contractor costs differ systematically by state, DOE characterized the markups developed from U.S. Census Bureau data with a probability distribution based on a state-by-state analysis of U.S. Census Bureau data for PHAC contractors. The state-by-state analysis provided a distribution on the relative markups of mechanical contractors in the United States.

Appendix 6A provides the state markup data that DOE used to characterize the mechanical contractor baseline and incremental markups. DOE used the state-level markup data in combination with state-level electricity and water prices in the LCC and PBP analyses to

provide additional granularity in the analysis of whether customers are better or worse off at the efficiency levels analyzed in this rulemaking.

6.6 ESTIMATION OF NATIONAL ACCOUNT MARKUPS

National accounts are generally large accounts—large enough to circumvent the wholesaler channel and negotiate directly with, and purchase directly from, manufacturers to achieve significantly lower equipment prices. The manufacturers, in turn, must cover additional expenses related to the distribution of the equipment, but gain in terms of negotiating agreed-upon sales volumes with each national account.

To estimate the price savings realized from equipment purchased through the national account distribution chain, DOE assumed that the resulting equipment price increase is one half of that realized from distribution through the wholesaler channel. In other words, if the price markup resulting from the wholesaler markups is $100, the national account markup is $50. Because DOE does not have data suggesting typical values for the actual national account markup, it chose a value halfway between the MSP and the wholesaler markup.

For example, using a baseline MSP of $1,000 for an automatic commercial ice maker delivered to a restaurant, and a baseline wholesaler markup of 1.36, the resulting baseline customer equipment price for sales through a wholesaler (without sales taxes) is $1,360 ($1,000 × 1.36). The dollar value increase due to the above distribution channel markups is $360 ($1,360 - $1,000). Under the assumption that national account customers realize equipment price increases equal to one half of that through the wholesaler distribution channel, the dollar value of the estimated equipment price increase under the national account is $180. The resulting equipment price is $1,180 ($180 + $1,000), which results in a national account baseline markup of 1.18 ($1,180 ÷ $1,000). Using a value of 1.09 for the wholesaler incremental markup and a similar calculation results in a total national account incremental markup of 1.046 ($1,046 ÷ $1,000).

6.7 SALES TAX

Sales tax includes state and local sales taxes that are applied to the customer price of automatic commercial ice makers. The sales tax is a multiplicative factor that increases the customer equipment price by an amount equal to MSP plus markups multiplied by the sales tax rate. DOE derived sales tax rates from the Sales Tax Clearinghouse.[9] Table 6.7.1 lists tax rates by state. DOE applied the state-level combined tax rate to the estimated value of state-level ACIM shipments to obtain the total purchase cost to a customer located in a given state.

Sales tax rates range from zero to 9.45 percent, with a mean value of 6.25 percent. DOE applied sales taxes to the customer equipment price irrespective of the distribution channel or the state in which the customer is located. For the national impact analysis and other national-level analyses, DOE calculated a weighted-average, national-level sales tax rate by multiplying the relative population of each state by the tax rates listed in Table 6.7.1. The weighted-average, national-level sales tax rate is 7.26 percent.

Table 6.7.1 Combined State and Local Sales Tax Rates

State	Sales Tax	State	Sales Tax	State	Sales Tax
Alabama	8.25%	Kentucky	6.00%	North Dakota	5.85%
Alaska	1.40%	Louisiana	8.75%	Ohio	6.80%
Arizona	8.15%	Maine	5.00%	Oklahoma	8.20%
Arkansas	8.20%	Maryland	6.00%	Oregon	0.00%
California	9.20%	Massachusetts	6.25%	Pennsylvania	6.40%
Colorado	6.40%	Michigan	6.00%	Rhode Island	7.00%
Connecticut	6.00%	Minnesota	7.20%	South Carolina	7.15%
Delaware	0.00%	Mississippi	7.00%	South Dakota	5.50%
Dist. of Col.	6.00%	Missouri	7.25%	Tennessee	9.45%
Florida	6.65%	Montana	0.00%	Texas	8.05%
Georgia	6.95%	Nebraska	6.00%	Utah	6.70%
Hawaii	4.35%	Nevada	7.85%	Vermont	6.05%
Idaho	6.05%	New Hampshire	0.00%	Virginia	5.00%
Illinois	8.20%	New Jersey	6.95%	Washington	8.80%
Indiana	7.00%	New Mexico	6.55%	West Virginia	6.00%
Iowa	6.85%	New York	8.45%	Wisconsin	5.45%
Kansas	8.05%	North Carolina	7.85%	Wyoming	5.35%

Source: The Sale Tax Clearinghouse, www.thestc.com/STrates.stm.

6.8 OVERALL MARKUPS

Table 6.8.1 presents the baseline markup values for each distribution channel and the overall baseline markup values used for automatic commercial ice makers. Table 6.8.2 presents the incremental markup values for each distribution channel and the overall incremental markup values. Note that the markups shown for wholesaler/contractor represent the product of the wholesaler chain and contractor chain markups (i.e., they are the product of two terms shown separately in the equations in section 6.2).

Table 6.8.1 Baseline Markups by Distribution Channel and Overall Weighted Average Markup, Including the Weighted Average Sales Tax Multiplier

	Wholesaler	Wholesaler/ Contractor	National Account (Mfg Direct)	Overall Markup
Channel Mult	1.3624	2.0086	1.1812	1.7522
Sales Tax	1.0726	1.0726	1.0726	1.0726
Overall Multiplier	1.4613	2.1544	1.2670	1.8794

Table 6.8.2 Incremental Markups by Distribution Channel and Overall Weighted Average Markup, Including the Weighted Average Sales Tax Multiplier

	Wholesaler	Wholesaler/ Contractor	National Account (Mfg Direct)	Overall Markup
Channel Mult	1.0913	1.2925	1.0456	1.2133
Sales Tax	1.0726	1.0726	1.0726	1.0726
Overall Multiplier	1.1705	1.3863	1.1216	1.3014

DOE used the overall markups to estimate the customer price of baseline and higher efficiency equipment. For example, if the MSP of a baseline self-contained unit is $1,000, DOE

obtained the customer purchase price for this baseline equipment by multiplying the MSP by the overall markup value of 1.8794, or $1,879.40. If the incremental MSP of the equipment at a higher efficiency level is $100, then DOE obtained the incremental customer purchase price of this equipment by multiplying the MSP by the overall incremental markup of 1.3014 to obtain an incremental customer purchase price of $130.14. The customer purchase price of this higher efficiency equipment is the sum of the baseline price and the increment, or $2,009.52 ($1,879.40 + $130.14).

REFERENCES

1. U.S. Department of Energy, Transcripts: Public Meeting on Energy Conservation Standard Framework Document for Automatic Commercial Ice-Makers, December 16, 2010, pp. 165–167. Washington, D.C. <http://www1.eere.energy.gov/buildings/appliance_standards/commercial/pdfs/acim_framework_public_meeting_transcript_12_16_2010.pdf>

2. U.S. Census Bureau. *2007 Economic Census, Release Date: 11/24/2009. Sector 23: EC0723A1: Construction: Geographic Area Series: Detailed Statistics for Establishments: 2007*. (Last accessed May 28, 2010.) <http://factfinder.census.gov/servlet/IBQTable?_bm=y&-ds_name=EC0723A1&-NAICS2007=238220&-_lang=en.>

3. Heating, Airconditioning & Refrigeration Distributors International. *2010 Profit Report (2009 Data)*. 2010. Columbus, OH.

4. U.S. Census Bureau. *2007 Economic Census, Release Date: 10/30/2009, Sector 31: EC0731I1: Manufacturing: Industry Series: Detailed Statistics by Industry for the United States: 2007*. Air-Conditioning, Refrigeration, and Forced Air Heating Manufacturing. (Last accessed March 2, 2011.) <http://factfinder.census.gov/servlet/IBQTable?_bm=y&-fds_name=EC0700A1&-geo_id=&-_skip=300&-ds_name=EC0731I1&-_lang=en >

5. U.S. Census Bureau. *2007 Economic Census, Release Date: 11/24/2009, Sector 42: EC0742I1: Wholesale Trade: Industry Series: Preliminary Summary Statistics for the United States: 2007*. HVAC equip. merchant wholesalers. (Last accessed March 2, 2011.) <http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-ds_name=EC0742I1&-_lang=en>

6. U.S. Census Bureau. *2007 Economic Census, Release Date: 8/14/2009, Construction: Industry Series: Preliminary Detailed Statistics for Establishments: 2007*. Total of New single-family general contractors, New multifamily housing construction (except operative builders), New housing operative builders residential, and Residential remodelers; Commercial and institutional building construction. (Last accessed March 2, 2011.) <http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-fds_name=EC0700A1&-ds_name=EC0723I1&-_lang=en.>

7. U.S. Census Bureau. *2007 Economic Census, Release Date: 8/14/2009, Sector 23: EC0723I1: Construction: Industry Series, Preliminary Detailed Statistics for Establishments: 2007*. Plumbing, heating, and air-conditioning contractors. (Last accessed March 2, 2011.) <http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-ds_name=EC0723I1&-_lang=en>

8. Pindyck, R. and Rubinfeld, D. *Microeconomics.* s.l. : Prentice Hall, 2000.

9. The Sale Tax Clearinghouse. *State sales tax rates along with average combined city and county rates*. (Last accessed June 10, 2011.) <www.thestc.com/STrates.stm>