Consortium for Energy Efficiency

Super Efficient Home Appliances Initiative

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1 Introduction

The Super-Efficient Home Appliances (SEHA) Initiative seeks to transform the residential appliance markets in the United States and Canada by addressing key barriers to increased sales of super-efficient products. The Initiative leverages the existing ENERGY STAR® program and brand, and offers specifications with performance thresholds or tiers that meet and exceed the ENERGY STAR level for the various appliance categories covered. These specifications provide Initiative participants a common foundation for designing local or regional programs to enhance consumer awareness and increase demand for super-efficient products. During the specification development and revision processes, CEE relies on industry input to help ensure that specifications are robust and reasonable. Once these specifications are finalized, they help motivate manufacturers, distributors, and retailers to develop and market products that qualify for the designated efficiency levels and meet consumer demand for energy efficiency.

2 Background

In 1993, CEE began to promote super-efficient clothes washers through the CEE National Clothes Washer Initiative. Working with efficiency programs, public interest groups and government agencies, CEE formulated and endorsed a super-efficient clothes washer specification. In response to this collective effort, three major domestic appliance manufacturers began production on washers meeting the energy criteria.

Bolstered by the success of the National Clothes Washer Initiative and the emergence of the ENERGY STAR brand in 1995, CEE expanded its Clothes Washer Initiative to include refrigerators, dishwashers, and room air conditioners, thereby creating the Super-Efficient Home Appliances (SEHA) Initiative. A companion initiative to the ENERGY STAR appliance program, the SEHA Initiative was designed to promote highly efficient ENERGY STAR appliances, or those that met efficiency levels above the ENERGY STAR level. After 18 months of extensive research and industry outreach, CEE developed efficiency specifications for the appliances covered under the SEHA Initiative and launched it in June 1998. Since the inception of the SEHA Initiative, CEE has expanded to include Canadian members in addition to those in the U.S. The SEHA Initiative has simultaneously expanded its scope to include the Canadian appliance market.

The SEHA specifications were, and continue to be, designed to identify the most energy-efficient products within each appliance category. Efficiency programs can use these super-efficient CEE tiers in their programs to build a demand for higher efficiency among consumers and to encourage manufacturers to create products to meet that demand. While the ENERGY STAR appliance program was initially focused on educating and marketing efficiency to consumers, SEHA worked behind the scenes, targeting manufacturers for outreach and education in an effort to

encourage them to increase the efficiency of their products. Efficiency programs participating in the SEHA Initiative offered retailer training, financial incentives and consumer education programs to help achieve this end.
In 2000, DOE refocused the emphasis of the ENERGY STAR appliance program to the new construction and major renovation markets. In the retail market place, most consumers make purchases at the time of appliance failure and spend little time researching energy-saving brands. Recognizing this, ENERGY STAR began targeting remodelers, builders and designers, and new home buyers, and began encouraging appropriate magazines to feature the ENERGY STAR brand. Over time, the market has expanded in response to these coordinated efforts. CEE has continued to focus primarily on manufacturers, and has been able to increase the tier levels for all appliance categories. In turn, efficiency programs have remained cost effective and CEE efficiency specifications have stayed relevant in the market.

3 SEHA Initiative Description

The SEHA Initiative seeks to support the ENERGY STAR appliance program and to help CEE members in the U.S. and Canada to identify and promote super-efficient products above ENERGY STAR. In doing so, CEE expects to see an increase in sales of super-efficient products, an increase in participation in the ENERGY STAR program by members that have an interest in promoting energy-efficient appliances, and an increase in the manufacture and sale of super-efficient appliances. To accomplish this goal, CEE has established relationships with DOE and the ENERGY STAR program, as well as with appliance manufacturers and the appliance industry association, the Association of Home Appliance Manufacturers (AHAM). CEE has also developed the Appliance Strategic Plan (available at www.cee1.org/resid/seha/seha-plan.php3) as a component of the Initiative in an effort to lay out in further detail CEE's approach to transforming the appliance market.

3.1 Initiative Scope

Currently, the CEE SEHA Initiative addresses four appliance product categories:

- Clothes washers
- Dishwashers
- Refrigerators
- Room Air Conditioners

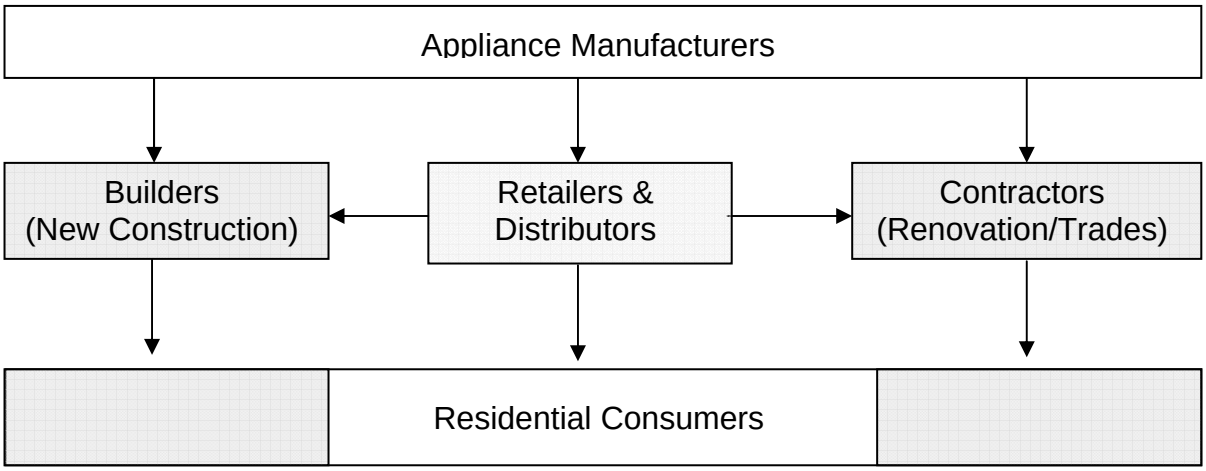
More detail on each of these products categories can be found in the Appliance Market Information and Specifications section below.

The diagram below provides a basic illustration of the flow of products between market players in the appliance market. The Initiative targets appliance manufacturers, distributors, retailers and residential consumers. In general, CEE has focused on manufacturers and consumers through its specifications, which are primarily used by efficiency incentive programs, or rebate programs. Since many CEE members that participate in the SEHA Initiative work closely with local and national distributors and retailers, CEE is exploring whether and how to work with

these groups at a national level, to supplement the work that the ENERGY STAR program already does with this market group.

Though ENERGY STAR works with builders (new home construction) and contractors (home renovation and appliance trades), the SEHA Initiative has not historically targeted these groups. For some time, CEE has been exploring the whole house work area, and new construction in particular, and the builder segment of the appliance market could be addressed in this area.

Appliance Market: Basic Structure and Flow of Products



Energy and water efficiency programs, both of which are eligible to participate in the SEHA Initiative, can focus on impacting any or all of these players. More information on efficiency program design is provided below.

Different motivations drive each of these appliance market players, some of them overlapping (see table below). The SEHA Initiative tries to find common ground between these different market players, and to leverage any commonalities in a way that benefits and promotes energy efficiency.

Market Player Motivations

Manufacturers	Retailers & Distributors	Consumers
1. Increase profits	1. Increase profits	1. Keep costs – initial and operating – low
2. Increase market share	2. Increase market share	2. Maintain desired quality
3. Gain competitive advantage	3. Gain competitive advantage	3. Obtain desired features and utility

4. Build customer loyalty 5. Comply with standards and rules	4. Build customer loyalty	4. Take into account societal impacts, including environmental

3.2 Barriers to Market Transformation

Energy and water efficiency programs may choose to implement any of several potential approaches to address barriers to super-efficiency in their local markets. In the table below, barriers and possible interventions are summarized. Potential messages for conveying the benefits of super-efficiency are also listed.

Market Barriers and Possible Efficiency Program Interventions and Messages

Primary Barriers	Possible Interventions	Possible Messages
Initial purchase price	▪ Consumer education ▪ Incentives ▪ Marketing and promotion ▪ Retail training	▪ Financial o Reduced energy bills o Money in your pocket ▪ Environmental o Conserve resources o Improve air quality ▪ Emotional ▪ Innovative o Latest technology o Technological superiority
Benefits of super-efficiency misunderstood by sales personnel; super-efficiency viewed as an additional cost, not valued by consumers as much as other features	▪ Retail training ▪ Consumer education ▪ Marketing and promotion	▪ Financial o Reduced energy bills o Money in your pocket ▪ Environmental o Conserve resources o Improve air quality ▪ Emotional ▪ Innovative o Latest technology o Technological superiority
Limited flexibility in purchasing super-efficient products because they are packaged as a luxury feature for high-end products with other expensive features	▪ Convey consumer purchasing criteria and importance of efficiency to retailers/manufacturers	▪ Financial o More product choice o Higher profit margins ▪ Environmental o Conserve resources o Improve air quality

Secondary Barriers	Possible Interventions	Possible Messages
Intimidation caused by new/unfamiliar technology	▪ Consumer education ▪ Efficiency program endorsements ▪ Increased warranty	▪ Financial o Reduced energy bills o Money in your pocket ▪ Environmental o Conserve resources o Improve air quality ▪ Emotional ▪ Technological o More time flexibility with same quality
Limited range of products and number of manufacturers offering super-efficient products	▪ Promote CEE participant efforts to manufacturers and retailers, emphasize competitive opportunities ▪ Differentiate products by efficiency tiers ▪ National press and PR ▪ Retailer buy-down for stocking super-efficient products	▪ Financial o More product choice o Higher profit margins ▪ Historical o Help programs continue past success ▪ Innovative o Latest technology o Technological superiority ▪ Environmental o Conserve resources o Improve air quality
Unclear FTC label or absence of label	▪ Participate in process to revise FTC label ▪ Participate in CEE forum to discuss potential changes to the label and their implications ▪ Develop consensus comments through CEE	▪ Financial o Easier to communicate and sell efficiency features and benefits o Higher profit margins

3.3 Initiative Goals

The SEHA Initiative has two primary goals. They are:

1. To facilitate efficiency programs in their efforts to increase the sale and market share of super-efficient appliances; and,
2. To complement the efforts of the ENERGY STAR program to increase sale and market share of ENERGY STAR-qualified appliances.

The Initiative's core components are appliance specifications with super-efficient performance levels that use the ENERGY STAR program as a platform. These super-efficient tiers serve as bases for energy efficiency programs to promote super-efficient products. Differentiated efficiency levels also provide many ancillary benefits and opportunities, such as:

- Giving Initiative participants the ability to exercise third party technical credibility in a high profile environment;
- Providing consumers a relative basis to decipher product performance;
- Setting clear, national targets for manufacturers when they design and engineer super-efficient products;
- Producing leveraged market transformation impacts through the promotion of common specifications by efficiency programs across the U.S. and Canada;
- Allowing Initiative participants and partners to benefit from affiliation with high performance and technical superiority; and,
- Helping manufacturers benefit from third party promotion of their products.

In addition to developing common specifications for use in promoting super-efficient appliances, the Initiative provides a series of supplemental products and services that include or could include:

- A forum for sharing lessons learned about super-efficient appliance promotion and for suggesting Initiative enhancements, as appropriate;
- Communication to manufacturers, distributors, and/or retailers summarizing national efforts under the Initiative;
- Qualifying products list for each efficiency tier, as needed;
- Initiative information kits;
- National coordination of Initiative evaluation;
- Participation in the process for developing and revising ENERGY STAR specifications by coordinating the collective interests of CEE members;
- Public promotion of the Initiative and coordination with the ENERGY STAR program's efforts;
- A super-efficient sales training component to complement DOE materials;
- Marketing concept templates;
- A set of "best practices" for maximizing distributor and retailer relationships; and
- Identification of consumer segment profiles, related benefits messages, and suggested media for conveying such messages.

3.4 Specification Development Process

CEE efficiency specifications and tier levels for appliances and other products are developed through an iterative process involving CEE members, manufacturers and other stakeholders. In the appropriate CEE committee (in the case of the SEHA Initiative, the CEE Residential Appliances Committee), members evaluate possible tier levels, giving consideration to a variety of factors, including:

- The technological potential of a given product, based on current knowledge and research;
- The distribution of efficiency performance for currently available products, and the resulting energy savings potential;
- Operating variances due to regional influences;
- Regional variances in energy costs;
- Incremental product costs to achieve increased efficiencies;

- New federal efficiency standards;
- Manufacturer lead times; and,
- The current ENERGY STAR level for a product, if it exists, and any planned revisions to the ENERGY STAR specification. Coordinating CEE specifications with ENERGY STAR specifications is a priority for CEE.

In general, ENERGY STAR performance levels make up the first of at least two tiers in each product category. Intermediate tiers are developed, if appropriate, at levels of significant performance improvement, with the highest tier including only the top performing models.

When the CEE committee agrees on a specification proposal, CEE distributes it to industry and other relevant stakeholders for review and comment. Upon receipt of these comments, the committee considers them and then modifies the specification proposal as members deem appropriate. The committee has the option to hold several comment periods for industry and other stakeholders. Once the committee is comfortable with the specification proposal, CEE staff submits it to the CEE Board for their consideration. Further revisions to CEE specifications occur as needed, at the discretion of the CEE committee, CEE staff and/or the CEE Board.

3.5 Potential Efficiency Program Approaches

There are a number of potential approaches to conveying the value of super-efficiency to consumers, using a variety of media. Successful approaches tend to emphasize the benefits of super-efficiency, rather than simply the feature itself. This sort of message is more likely to resonate more strongly with specific consumer motivations, and requires little to no consumer interpretation. Programs have also had success when they recognize and appeal to retailer, distributor, and manufacturer motivations within local program designs (see the Market Players and Barriers to the Market sections for information on general retailer, distributor, and manufacturer motivations).

Many efficiency programs have developed partnerships in addition to those that some have with retailers, distributors, and manufacturers. In particular, energy and water efficiency programs have partnered in several regions, and have successfully developed joint incentive programs.

Most, if not all, efficiency programs use the ENERGY STAR program as a platform in their appliances programs. The ENERGY STAR brand is valuable, and consumers associate ENERGY STAR products with efficiency. Recently, ENERGY STAR has partnered with CEE to investigate how best to differentiate at levels above ENERGY STAR, and has tested a “Save More” approach with consumers. CEE will keep its members abreast of any developments in this research.

3.5.1 Program Summaries

Annual summaries of CEE member appliances program activity can be found on the CEE web site at http://www.cee1.org/resrc/prog-sum.php3. CEE members can use these summaries to learn how their counterparts are promoting super efficiency and to help inform their own program design. Manufacturers and others also use these summaries to stay up-to-date on efficiency program activity.

3.6 Communicating with Manufacturers and Retailers

Since the inception of the SEHA Initiative, CEE has worked to develop a cooperative relationship with the appliance industry. Thus far, CEE has focused its efforts on manufacturers and the Association of Home Appliance Manufacturers (AHAM), the U.S. appliance industry association. The primary opportunity for CEE to communicate with industry is during CEE appliance specification revision processes, when CEE requests comments from industry on specification proposals (see the Specification Development section above). CEE also interacts on a monthly basis with dishwasher and clothes washer manufacturers in order to populate the CEE qualifying products lists for these appliances.

CEE is currently investigating whether and how to expand the CEE relationship with appliance retailers. Though CEE members frequently work with retailers at local and regional levels, CEE has not undertaken any work with them at the national level. CEE will determine whether there is a role for CEE to work with retailers to complement the work already being done by members at a local level and by DOE and the ENERGY STAR program at the national level.

3.7 Evaluation Plan

As detailed above, the SEHA initiative seeks to increase the market share of super-efficient appliances across the U.S. and Canada. CEE evaluates the Initiative from time to time, just as DOE evaluates the ENERGY STAR program and CEE members regularly evaluate their local and regional appliance programs. In the shorter term, CEE has tried to track data for various metrics for all of its initiatives. For appliances, sources of this data may include: AHAM, Air-conditioning and Refrigeration Institute (ARI), North American Retail Dealers Association (NARDA), Appliance magazine, DOE, CEE members, manufacturers, distributors, and retailers. Elements of CEE's evaluation and data-tracking may include the following.

3.7.1 Measures of National Results

- Percentage of national consumers exposed to super-efficient messages
- Percentage of national retail sales represented by participating retailers
- Number of manufacturers producing qualifying product
- Percentage of sales personnel training in selling super-efficient products
- Availability of super-efficiency as an option (number of models)
- Increase in floor/shelve space

- Increase in prime floor space
- Increase in sales of super-efficient products
- Relative percentage of sales of super-efficient products sold through participating service territories

3.7.2 Impact on Barriers

- Consumer recognition of the multiple benefits associated with energy efficiency
- Feature/product availability (average waiting period to receive desired unit)
- Number of models meeting CEE specifications
- Change in rank order of consumer purchasing criteria
- Percentage of sales personnel trained in super-efficiency and the effectiveness of this training
- Consumer feedback and perception of the Initiative
- Consumer perception of efficiency program services

3.7.3 Local measures of Impact

- Stocking and inventory practices of retailers
- Increased sales of super-efficient products

4 Appliance Market Information and Specifications

Based on data made available by Appliance magazine in 2005, appliances covered by the SEHA initiative (clothes washers, dishwashers, refrigerators and room air conditioners) accounted for 19.4 percent of total residential energy use. Over 2005, an estimated total of 38.7 millions units of SEHA-covered appliances were shipped in the U.S. Four major manufacturers – Whirlpool, GE, Electrolux and Maytag – produce 92 percent of appliances on the market, with Whirlpool producing the largest percentage (34%).

4.1 Clothes Washers

4.1.1 Market Information

According to the 2009 U.S. Census Bureau American Housing Survey, approximately 93 million households have a clothes washer. Based on the estimate of number of U.S. households from U.S. Census Bureau American Community Survey in 2008, this represents roughly 82 percent of households. In 2009, approximately 7.86 million clothes washers were shipped for sale, according to the Association of Home Appliance Manufacturers. Clothes washers use approximately 120 kWh per year per unit, and represent 0.9 percent of total residential electricity use across the U.S., according to the Energy Information Administration. The average life span of a clothes washer is 11 years, according to Appliance Magazine.

Based on ENERGY STAR market share data from 2009, 48.5 percent of clothes washers sold in that year were ENERGY STAR brand models. Based on data collected by CEE, as of March 2010, approximately 24 brands and 381 models meet

the current CEE specification. Qualified models are broken out by CEE tier in the table below.

Level	MEF	WF	Number of Models	Number of Mfrs	Number of Brands
Tier 1	2.0	6.0	128	16	23
Tier 2	2.2	4.5	151	11	16
Tier 3	2.4	4.0	102	5	7

4.1.2 Potential Savings

Clothes washers meeting the CEE specification can save as much as 443 kWh per unit annually over the 2011 federal standard. Maximum potential water savings are estimated to be 6,468 gallons per unit annually. Energy and water savings by CEE tier are in the table below. These estimates were calculated using a 3.0 ft^3 capacity estimate, 392 cycles per year, and baseline water factor of 9.5 (11,172 gallons) per year.

Level	MEF	WF	kWh/yr Savings	Gal/yr Savings
Tier 1	2.0	6.0	345	4,116
Tier 2	2.2	4.5	399	5,880
Tier 3	2.4	4.0	443	6,468

4.1.3 Efficiency Parameters

As of 2001, CEE has used **Modified Energy Factor (MEF)** and **Water Factor (WF)** to qualify models for the CEE clothes washer specification. Prior to 2001, CEE used the efficiency metrics Energy Factor (EF) and Remaining Moisture Content (RMC) to rate Clothes Washers. EF and RMC are embedded in the MEF and WF metrics.

MEF is a measure of the energy consumption of the total laundry cycle (washing and drying) normalized by capacity. It indicates how many cubic feet of laundry can be washed and dried with one kWh of electricity. As MEF increases, efficiency increases. Water Factor indicates the number of gallons of water needed for each cubic foot of laundry. A lower number indicates lower consumption and a more efficient use of water.

4.1.4 Efficiency Specification

The CEE clothes washer specification is summarized below. The federal standard and ENERGY STAR level are included as well. For full CEE specification details, see the CEE web site at www.cee1.org/resid/seha/rwsh/reswash_specs.pdf.

Efficiency Level	MEF	WF
Federal standard	1.26	9.5
ENERGY STAR	2.0	6.0
Tier 1	2.0	6.0
Tier 2	2.2	4.5
Tier 3	2.4	4.0

Effective January 1, 2011

4.1.5 Qualifying Products List

CEE updates its Residential Clothes Washer Qualifying Products List on a monthly basis, typically around the 15th of each month although the exact date will vary. The list contains models that qualify for the CEE specification, sorted by CEE tier. Manufacturers must submit the necessary data—including MEF, WF and qualifying CEE tier for a given product—to CEE in order for a product to be listed. The list can be found on the CEE website at www.cee1.org/resid/seha/rwsh/rwsh-prod.pdf.

4.2 Dishwashers

4.2.1 Market Information

According to the preliminary results from the 2009 Residential Energy Consumption Survey (RECS) fielded by the Energy Information Administration (EIA), 67.4 million households use a dishwasher, representing 59% of all homes. In addition, in 2010, 7 million dishwashers were shipped for sale. On average dishwashers consume 512 kWh per household annually and represent 2.5 percent of total residential electricity use across the U.S., according to 2001 EIA data. In 2005, Appliance magazine estimated the average lifetime of a dishwasher at 11 years.

Standard Dishwashers

A standard dishwasher has eight or more place settings. In 2011, 53 percent of standard models available met or exceeded the CEE Tier 1 Energy Factor (EF) level of 0.75. The numbers of models and brands are broken out by CEE tier in the table below.

Level	EF	Maximum kWh/year	Gallons per Cycle	Number of Models	Number of Brands
Tier 1	0.75	295	4.25	132	22

Compact Dishwashers
A compact dishwasher has fewer than eight place settings. The market for compact dishwashers is likely small relative to standard dishwashers. According to DOE, it is a fraction of the total dishwasher market, probably less than one percent. In its analyses, CEE has used a conservative estimate for the compact dishwasher market size of 0.5 percent.

By this estimate, the number of dishwashers sold in 2008 totals approximately 300,000. Similarly based on an estimated 10 percent market penetration of machines at or above 1.00 EF, the number of compact dishwashers on the market meeting CEE Tier 1 totals approximately 30,000.

In February 2009 there were 28 compact dishwashers on the market in the U.S. and Canada, 26 of which met CEE Tier 1, as shown in the table below.

Level	EF	Maximum kWh/year	Gallons per Cycle	Number of Models	Number of Mfrs	Number of Brands
Tier 1	1.00	222	3.5	26	5	7

4.2.2 Potential Energy Savings

Standard Dishwashers
Potential savings are calculated based the 2010 federal standard level of 355 kWh/yr. The January 1, 2007 ENERGY STAR level (EF of 0.65) is used because as of 2007 average market penetration at that level had reached an average of 77 percent. Potential savings by CEE tier are shown in the table below.

Level	EF	Maximum kWh/year	Savings Above 2010 Federal Standard	
			Per Unit (kWh/ year)	Aggregate* (MWh/ year)
Tier 1	0.75	295	60	210,000

* Aggregate savings based on market-size estimates mentioned in the Market Information section above.

Compact Dishwashers
Potential savings in the table below are calculated above the compact dishwasher federal standard of 0.62 EF and the 2010 federal standard of 260 kWh/yr.

Level	EF	Maximum kWh/year	Savings Above 2010 Federal Standard	
			Per Unit (kWh/ year)	Aggregate* (MWh/ year)
Tier 1	1.00	222	25	763

* Aggregate savings based on market-size estimates mentioned in the Market Information section above.

4.2.3 Potential Water Savings

Standard Dishwashers

CEE recently added a water requirement to its dishwasher specification to enhance savings and create additional opportunities for CEE members to work cooperatively with water efficiency programs. The potential water savings are calculated based on the baselines of the 2010 federal standard level of 6.5 gallons/cycle. Potential savings by CEE tier are shown in the table below. The gallons saved per year estimates were calculated using 215 cycles per year.

Level	Water Efficiency (gallons/cycle)	Gallons Per Cycle Saved Over Federal Standard	Gallons Saved Per Year	Aggregate Gallons Saved Per Year (in millions)
Tier 1	4.25	2.25	484	1.69

Compact Dishwashers

Potential water savings in the table below are calculated from comparison against the 2010 compact dishwasher federal standard of 4.5 gallons/cycle. The gallons saved per year estimates were calculated using 215 cycles per year.

Level	Water Efficiency (gallons/cycle)	Gallons Per Cycle Saved Over Federal Standard	Gallons Saved Per Year
Tier 1	3.5	1.0	215

4.2.4 Efficiency Parameters

CEE uses **Energy Factor (EF)** and a **maximum annual kWh requirement** to qualify models for the CEE dishwasher specification. EF is the number of cycles a dishwasher can run with 1 kWh of electricity. The maximum annual kWh requirement is intended to limit dishwasher standby power use to 1 W annually.

4.2.5 Efficiency Specification

The CEE dishwasher specification is summarized below. For full CEE specification details, see the CEE web site at www.cee1.org/resid/seha/dishw/dw-spec.pdf.

Efficiency Level	Energy Factor (EF)	Maximum Annual kWh	Maximum Gallons Per Cycle
Standard Dishwashers (8 or more place settings)			
Tier 1	0.75	295	4.25

Compact Dishwashers (fewer than 8 place settings)			
Tier 1	1.00	222	3.5

Effective January 20, 2011

4.2.6 Qualifying Products List

CEE updates its Residential Dishwasher Qualifying Products List on a monthly basis, typically around the 15th of each month although the exact date will vary. The list contains models that qualify for the CEE specification, sorted by CEE tier. Manufacturers must submit the necessary data—including EF, annual kWh per year, gallons per cycle and qualifying CEE tier for a given product—to CEE in order for a product to be listed. The list can be found on the CEE website at www.cee1.org/resid/seha/dishw/dw-prod.pdf.

4.3 Refrigerators

4.3.1 Market Information

According to the 2001 Residential Energy Consumption Survey (RECS) fielded by the Energy Information Administration (EIA), 106.8 million households in the United States have refrigerators. According to 2005 Appliance magazine data, 99 percent of households had a standard refrigerator and 17 percent had compact refrigerators. Similarly, in 2005, 11.1 million standard refrigerators and 2.8 million compact refrigerators were shipped for sale. According to EIA, the average refrigerator uses 1,239 kWh per unit annually and 1,462 kWh per household annually, and refrigerators represent 13.7 percent of total residential electricity use across the U.S. Appliance magazine estimates the average lifespan of standard refrigerator to be 14 years, and the life span of a compact refrigerator to be 10 years.

Mid- and Full-Size Refrigerators

Mid- and full-size refrigerators have capacities larger than or equal to 7.75 ft^3. According to 2005 DOE sales data, ENERGY STAR refrigerators (including compact refrigerators) have an average market penetration of around 35%. Model availability at the current CEE tiers as of June 2006 is shown in the table below.

Level	% > Fed. Std.	Number of Models	Number of Brands	Number of Mfrs
Tier 1	20	127	11	8
Tier 2	25	13	6	6
Tier 3	30	5	3	3

Compact Refrigerators

Compact refrigerators have capacities smaller than 7.75 ft^3. CEE staff examined model availability data for compact refrigerators in November 2005 and June 2006. As the table below demonstrates, in June 2006 there were 104 compact refrigerator models available that at least met the current ENERGY STAR level, 16 of which

met various levels above ENERGY STAR. This is 17 more models than were available in November 2005.

Level	% > Fed. Std.	Number of Models	Number of Brands	Number of Mfrs
Tier 1	20	81	16	11
Tier 2	25	7	7	7
Tier 3	30	8	4	4

4.3.2 Potential Savings

Mid- and Full-Size Refrigerators

The table below shows the average annual energy savings for mid-and full-size refrigerators units at the different efficiency levels.

Level	% > Fed. Std.	kWh/yr Savings
Tier 1	20	125
Tier 2	25	151
Tier 3	30	167

Compact Refrigerators

The table below shows the average annual energy savings above the federal standard for compact refrigerator units at the different efficiency levels.

Level	% > Fed. Std.	kWh/yr Savings
Tier 1	20	83
Tier 2	25	103
Tier 3	30	131

4.3.3 Efficiency Parameters

The federal standard for refrigerators is determined by their volume and configuration. Each category of refrigerator has a different energy equation which determines the standard in **kWh per year.** Due in part to the complexity of the standard, both CEE and ENERGY STAR simplify our specifications by specifying a **percent above the federal standard for** our tier levels. For more information on the federal standard for refrigerators you can visit the Office of Energy Efficiency and Renewable Energy web site at www.eere.energy.gov/buildings/appliance_standards/residential/pdfs/refrig_final.pdf

4.3.4 Efficiency Specification

The CEE refrigerator specification is summarized below. The ENERGY STAR level for mid- and full-size models is 15% above the federal standard. The

ENERGY STAR level for compact models is 20% above the federal standard, and is consistent with CEE Tier 1. For full CEE specification details, see the CEE web site at www.cee1.org/resid/seha/refrig/refrig-spec.pdf.

Efficiency Level	Percent Above Federal Standard	
	Compact Refrigerators (< 7.75 ft^3)	Mid- and Full-Size Refrigerators (≥ 7.75 ft^e)
ENERGY STAR	20	15
Tier 1		20
Tier 2	25	25
Tier 3	30	30

Effective January 1, 2007

4.3.5 Qualifying Products List

CEE does not currently maintain a qualifying products list for refrigerators. Refrigerator data can be found on the ENERGY STAR web site at www.energystar.gov/index.cfm?c=refrig.pr_refrigerators

4.4 Room Air Conditioners

4.4.1 Market Information

According to the 2001 Residential Energy Consumption Survey (RECS) fielded by the Energy Information Administration (EIA), 23.3 million households had room air conditioners. According to 2005 Appliance magazine data, 27 percent of U.S. households had room air conditioners. In addition, in 2005, approximately 8 million room air conditioners were shipped for sale. In 2001, EIA estimated that room air conditioners use approximately 580 kWh per unit annually and 950 kWh per household annually, and room air conditioners represent 1.9 percent of total residential electricity use across the U.S. Appliance magazine estimates the average life span of a room air conditioner to be 10 years. Sales of ENERGY STAR-qualified room air conditioners went from 35 percent of total sales in 2004 to 52 percent of total sales in 2005 according to DOE data.

Level	Number of Models	Number of Brands	Number of Mfrs
Tier 1	18	5	4
Tier 2	4	1	1

4.4.2 Potential Savings

The table below shows the average annual energy savings for room air conditioners over the appropriate federal standard, averaged across capacities, at the different efficiency levels.

Level	Average kWh/yr Savings*
Tier 1	191
Tier 2	215

* Savings averaged across capacities

4.4.3 Efficiency Parameters

CEE uses Energy Efficiency Ratio (EER) to qualify models for the CEE room air conditioner specification. EER is obtained by dividing the measured cooling capacity of the unit (Btu/hr) by its total electrical input (watts). The outdoor ambient temperature during the test is maintained at 95°F.

4.4.4 Efficiency Specification

The CEE room air conditioner specification is summarized below. The federal standard and ENERGY STAR level are included as well. For full CEE specification details, see the CEE web site at www.cee1.org/resid/seha/rm-ac/rm-ac_specs.pdf.

Level	EER by Product Class (Btu per Hour)			
	< 8,000	8,000 – 13,999	14,000 – 19,999	≥ 20,000
Federal Standard	9.7	9.8	9.7	8.5
ENERGY STAR	10.7	10.8	10.7	9.4
Tier 1	11.2	11.3	11.2	9.8
Tier 2	11.6	11.8	11.6	10.2

Effective January 1, 2003

4.4.5 Qualifying Products List

CEE does not currently maintain a qualifying products list for room air conditioners. Room air conditioner data can be found on the ENERGY STAR web site at www.energystar.gov/index.cfm?c=roomac.pr_room_ac.

5 Initiative Participation

To be considered an Initiative participant, an energy or water efficiency program must:

1. Support the ENERGY STAR appliances program;

AND

2. a. Provide incentives (e.g., rebates) for appliances meeting at least Tier 1 efficiency levels described in the Appliance Market Information and Specifications section of this Initiative Description;

OR

b. Deploy a significant and focused educational/promotional program which identifies and promotes super-efficient appliances meeting at least Tier 1 efficiency levels described in the Appliance Market Information and Specifications section of this Initiative Description;

OR

c. Implement both of the above (1 and 2).

In addition, in compiling its annual Appliance Program Summary, published each fall, CEE will encourage participants to report specific program details for communication to key market players.

5.1 Participant Benefits

Participation in the Initiative provides a number of benefits to efficiency programs, including:

- **Participate with other efficiency programs in the CEE forum:** CEE provides a forum for efficiency programs to come together, discuss, and come to consensus on a number of issues, including efficiency specifications and comments to ENERGY STAR and other groups.
- **Save program resources:** An efficiency program using the CEE efficiency specification saves labor resources that otherwise would be required for product and program research and planning.
- **Encourage manufacturers to produce and market super-efficient appliances:** If large numbers of programs use CEE efficiency specifications, they provide more encouragement to manufacturers to produce and market super-efficient appliances than one program could alone. Though one program may represent a small fraction of the national market, that same program together with other participating programs represent a much larger percentage of the national market.
- **Set a clear target for design:** Program administrators offering programs with consistent efficiency specifications provide manufacturers with a uniform target, making it easier for them to respond to program and consumer needs.
- **Produce positive publicity:** CEE undertakes ongoing communication efforts on behalf of the Initiative and its participants, and regularly updates the list of participating programs. Efficiency programs receive positive publicity for voluntarily helping customers reduce energy consumption, thus cutting air pollution and greenhouse gas emissions without sacrificing appliance performance and amenities important to the consumer.

5.2 Roles of Key Initiative Players

Efficiency programs in the U.S. and Canada participating in the SEHA Initiative are responsible for carrying out the Initiative's objectives on the ground. In addition to energy and water efficiency programs, CEE as an organization (including the CEE Board), DOE and the ENERGY STAR program, and CEE's industry partners, have roles in making the SEHA Initiative successful. The primary aspects of efficiency programs', CEE's, DOE's, and CEE's industry partners' roles are outlined below.

5.2.1 Energy and Water Efficiency Programs

- Implement local strategies to deal with the heterogeneous nature of the market players (i.e., customize the national concept to fit the needs of the local efficiency program territory)
- Establish local market intelligence
- Identify local retail and distribution partners and support their ongoing cooperation
- Develop core messages to consumer segments
- Identify appropriate vehicles to convey messages
- Develop sales and other promotional collateral

5.2.2 CEE

- Secure support for the Initiative by efficiency programs, manufacturers, distributors, retailers, and other stakeholders
- Facilitate development of super-efficiency specifications
- Provide program updates to industry partners on initiative participation
- Participate in the ENERGY STAR specification development and review processes
- Provide a forum for the exchange of information between initiative participants, industry, and DOE and the ENERGY STAR program
- Coordinate with DOE and the ENERGY STAR program
- Assist in Initiative promotion
- Maintain and distribute qualifying products lists, as needed
- Coordinate a national impact evaluation
- Develop a national super-efficient training component for retailers, if desired

5.2.3 DOE and ENERGY STAR

- Secure corporate support for the ENERGY STAR program by national retailers, distributors, and manufacturers
- Establish and maintain ENERGY STAR specifications and disseminate qualifying product lists at ENERGY STAR levels
- Build and license the use of the ENERGY STAR brand, including the logo and name
- Secure efficiency program partnerships
- Support the local delivery of the ENERGY STAR name and logo, which includes supporting energy efficiency program sponsors (EEPS)
- Provide national sales data to track impact

- Implement a national public service campaign

5.2.4 Industry: Manufacturers, Distributors, Retailers, and Industry Associations

- Provide input during CEE efficiency specification revision processes
- Provide CEE with appropriate product data for CEE qualifying products lists
- Participate in the ENERGY STAR program
- Partner with efficiency programs at the local and regional levels

6 Contact Information

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