



ENERGY STAR® Program Requirements for Light Commercial HVAC

Partner Commitments Version 2.0 – DRAFT 2

Commitment

The following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacturing of ENERGY STAR qualified light commercial HVAC equipment. The ENERGY STAR Partner must adhere to the following program requirements:

- comply with current ENERGY STAR Eligibility Criteria, defining the performance criteria that must be met for use of the ENERGY STAR certification mark on light commercial HVAC equipment and specifying the testing criteria for light commercial HVAC equipment. EPA may, at its discretion, conduct tests on products that are referred to as ENERGY STAR qualified. These products may be obtained on the open market, or voluntarily supplied by Partner at EPA's request;
- comply with current ENERGY STAR Logo Use Guidelines, describing how the ENERGY STAR labels and name may be used. Partner is responsible for adhering to these guidelines and for ensuring that its authorized representatives, such as advertising agencies, dealers, and distributors, are also in compliance;
- qualify at least one ENERGY STAR labeled light commercial HVAC model within one year of activating the light commercial HVAC portion of the agreement. When Partner qualifies the product, it must meet the specification (e.g., Tier 1 or 2) in effect at that time;
- provide clear and consistent labeling of ENERGY STAR qualified light commercial HVAC models. The ENERGY STAR label must be clearly displayed in product literature (i.e., user manuals, consumer brochures, spec sheets, etc.) and on the manufacturer's Internet site where information about ENERGY STAR qualified models is displayed. It is also recommended that the label appear on the top/front of the product;
- offer and encourage training to distributors and/or contractors on the following issues: air distribution issues and their effect on equipment performance, refrigerant charging, proper installation of registers, duct work, and plenum to ensure low leakage and to meet insulation requirements, and proper use of the Manual N calculation, or other equivalent commercial load calculation, in order to encourage proper sizing of equipment;
- provide to EPA, on an annual basis, an updated list of ENERGY STAR qualifying light commercial HVAC models. Once the Partner submits its first list of ENERGY STAR labeled light commercial and central air conditioner models, the Partner will be listed as an ENERGY STAR Partner. Partner must provide annual updates in order to remain on the list of participating product manufacturers;
- provide to EPA, on an annual basis, unit shipment data or other market indicators to assist in determining the market penetration of ENERGY STAR. Specifically, Partner must submit the total number of ENERGY STAR qualified light commercial HVAC models shipped (in units by model) or an equivalent measurement as agreed to in advance by EPA and Partner. Partner is also encouraged to provide ENERGY STAR qualified unit shipment data segmented by meaningful product characteristics (e.g., capacity, size, speed, or other as relevant), total unit shipments for each model in its product line, and percent of total unit shipments that qualify as ENERGY STAR.

The data for each calendar year should be submitted to EPA, preferably in electronic format, no later than the following March and may be provided directly from the Partner or through a third party. The data will be used by EPA only for program evaluation purposes and will be closely controlled. If requested under the Freedom of Information Act (FOIA), EPA will argue that the data is exempt. Any information used will be masked by EPA so as to protect the confidentiality of the Partner;

- notify EPA of a change in the designated responsible party or contacts for light commercial HVAC equipment within 30 days.

Performance for Special Distinction

- In order to receive additional recognition and/or support from EPA for its efforts within the Partnership, the ENERGY STAR Partner may consider the following voluntary measures and should keep EPA informed on the progress of these efforts:
- consider energy efficiency improvements in company facilities and pursue the ENERGY STAR label for buildings;
- purchase ENERGY STAR labeled products. Revise the company purchasing or procurement specifications to include ENERGY STAR. Provide procurement officials' contact information to EPA for periodic updates and coordination. Circulate general ENERGY STAR labeled product information to employees for use when purchasing products for their homes;
- ensure the power management feature is enabled on all ENERGY STAR qualified monitors in use in company facilities, particularly upon installation and after service is performed;
- provide general information about the ENERGY STAR program to employees whose jobs are relevant to the development, marketing, sales, and service of current ENERGY STAR labeled product models;
- feature the ENERGY STAR label(s) on Partner Web site and in other promotional materials. If information concerning ENERGY STAR is provided on the Partner Web site as specified by the ENERGY STAR Web Linking Policy (this document can be found in the Partner Resources section on the ENERGY STAR Web site at www.energystar.gov), EPA may provide links where appropriate to the Partner Web site;
- provide a simple plan to EPA outlining specific measures Partner plans to undertake beyond the program requirements listed above. By doing so, EPA may be able to coordinate, communicate, and/or promote Partner's activities, provide an EPA representative, or include news about the event in the ENERGY STAR newsletter, on the ENERGY STAR Web pages, etc. The plan may be as simple as providing a list of planned activities or planned milestones that Partner would like EPA to be aware of. For example, activities may include: (1) increase the availability of ENERGY STAR labeled products by converting the entire product line within two years to meet ENERGY STAR guidelines; (2) provide information to users (via the Web site and user's manual) about energy-saving features and operating characteristics of ENERGY STAR qualified products; and (3) build awareness of the ENERGY STAR Partnership and brand identity by collaborating with EPA on one print advertorial and one live press event;
- provide quarterly, written updates to EPA as to the efforts undertaken by Partner to increase availability of ENERGY STAR qualified products, and to promote awareness of ENERGY STAR and its message.
- join EPA's SmartWay Transport Partnership to improve the environmental performance of the company's shipping operations. SmartWay Transport works with freight carriers, shippers, and

other stakeholders in the goods movement industry to reduce fuel consumption, greenhouse gases, and air pollution. For more information on SmartWay, visit www.epa.gov/smartway;

- join EPA's Climate Leaders Partnership to inventory and reduce greenhouse gas emissions. Through participation, companies create a credible record of their accomplishments and receive EPA recognition as corporate environmental leaders. For more information on Climate Leaders, visit www.epa.gov/climateleaders;
- join EPA's Green Power partnership. EPA's Green Power Partnership encourages organizations to buy green power as a way to reduce the environmental impacts associated with traditional fossil fuel-based electricity use. The partnership includes a diverse set of organizations including Fortune 500 companies, small and medium businesses, government institutions as well as a growing number of colleges and universities, visit <http://www.epa.gov/grnpower>.



ENERGY STAR® Program Requirements for Light Commercial HVAC

Eligibility Criteria Version 2.0 – DRAFT 2

Below is the **DRAFT 2** Version 2.0 product specification for ENERGY STAR qualified light commercial HVAC equipment. A product must meet all of the identified criteria if it is to earn the ENERGY STAR.

1) Definitions: Provided below are definitions of the relevant terms in this document.

- A. Central Air Conditioner: A central air-conditioner model consists of one or more factory-made assemblies that normally include an evaporator or cooling coil(s), compressor(s), and condenser(s). Central air conditioners provide the function of air-cooling, and may include the functions of air circulation, air cleaning, dehumidifying, or humidifying. For the purposes of this specification, both split system (i.e., a system with components located both inside and outside of a building) and single package units (i.e., a system that has all components completely contained in one unit) rated at 65,000 Btu/h to <240,000 Btu/h are eligible for ENERGY STAR qualification. In addition, three-phase equipment rated below 65,000 Btu/h may qualify under this Version 2.0 specification if it meets the energy efficiency criteria outlined in Section 3, below.
- B. Heat Pump: A heat pump model consists of one or more factory-made assemblies that normally include an indoor conditioning coil(s), compressor(s), and outdoor coil(s), including means to provide a heating function. Heat pumps shall provide the function of air heating with controlled temperature, and may include the functions of air-cooling, air circulation, air cleaning, dehumidifying, or humidifying. For the purposes of this specification, both split system and single package units rated at 65,000 Btu/h to <240,000 Btu/h are eligible for ENERGY STAR. In addition, three-phase equipment rated below 65,000 Btu/h may qualify under this Version 2.0 specification if it meets the energy efficiency criteria outlined in Section 3, below.
- C. Gas/Electric Package Unit: A single package unit with gas heating and electric air conditioning that is often installed on a slab or a roof. For the purposes of this specification, units rated at 65,000 Btu/h to <240,000 Btu/h are eligible for the ENERGY STAR label assuming they meet the cooling portion of the specification in Section 3, below. In addition, three-phase equipment rated below 65,000 Btu/h may qualify under this Version 2.0 specification if it meets the energy efficiency criteria outlined in Section 3, below.

Note: Currently, light commercial HVAC equipment with capacity between 65,000 Btu/h and 250,000 Btu/h (including three-phase equipment below 65,000 Btu/h) are eligible for ENERGY STAR qualification. EPA proposes to revise the $\geq 135,000$ Btu/h to 250,000 Btu/h size category to $\geq 135,000$ Btu/h to <240,000 Btu/h. This change would align ENERGY STAR with the categorization provided in the Energy Policy Act of 2005 and ASHRAE 90.1 Standard.

$\geq 240,000$ Btu/h Equipment: The Air-Conditioning, Heating, and Refrigeration Institute (AHRI) plans to launch a certification program for products rated at 240,000 Btu/h and up to 760,000 Btu/h in 2010. EPA will reconsider the inclusion of larger size equipment for future revisions of the specification.

- D. Variable Refrigerant Flow (VRF) Multi-Split Systems: Variable refrigerant flow multi-split systems provide simultaneous heating, cooling, and heat recovery in different zones. VRF systems consist of multiple variable speed or variable capacity compressors, evaporators, and refrigerant management and control systems.

Note: EPA received a request to include VRF multi-split equipment in the revised specification. According to AHRI, the test standard for VRF multi-split equipment - AHRI 1230 - is near completion. Once the test standard is approved, EPA will conduct a review and consider the inclusion of this equipment in this Version 2.0 specification. Stakeholders are encouraged to provide comments on this proposal.

EPA aims to develop a concise and detailed definition of VRF multi-split systems for this version of the specification. The definition provided above represents a general description of these systems. Stakeholders are encouraged to suggest industry accepted resources (e.g., test procedure) that might be used to develop a definition for VRF multi-split equipment or provide edits to the text provided above to ensure it is technically sound.

- E. Cooling Capacity: The cooling capacity is the quantity of heat in BTU (British Thermal Units) that an air conditioner or heat pump is able to remove from an enclosed space during a one-hour period.
- F. Energy Efficiency Ratio (EER): EER is a measure of efficiency in the cooling mode that represents the ratio of total cooling capacity (Btu/hour) to electrical energy input (Watts).
- G. Coefficient of Performance (COP): COP is a measure of efficiency in the heating mode that represents the ratio of total heating capacity (Btu) to electrical input (also in Btu).
- H. Integrated Energy Efficiency Ratio (IEER): IEER is a measure that expresses cooling part-load EER efficiency for commercial unitary air-conditioning and heat pump equipment on the basis of weighted operation at various load capacities¹.
- I. Seasonal Energy Efficiency Ratio (SEER): SEER is a measure of equipment energy efficiency over the cooling season. It represents the total cooling of a central air-conditioner or heat pump (in Btu) during the normal cooling season as compared to the total electric energy input (in watt-hours) consumed during the same period.
- J. Heating Seasonal Performance Factor (HSPF): HSPF is a measure of a heat pump's energy efficiency over one heating season. It represents the total heating output of a heat pump (including supplementary electric heat) during the normal heating season (in Btu) as compared to the total electricity consumed (in watt-hours) during the same period.
- 2) Qualifying Products: For the purposes of ENERGY STAR, light commercial HVAC equipment includes the following: air-source air conditioners, air-source heat pumps, and gas/electric package units. As mentioned above, both split system and single package units rated at 65,000 Btu/h and below 240,000 Btu/h are eligible for the ENERGY STAR label. As it is used primarily in commercial settings, three-phase equipment rated below 65,000 Btu/h may also qualify for ENERGY STAR.

¹ Public Review Draft of the Proposed Addendum s to ASHRAE Standard 90.1- 2007, *Energy Standard for Buildings Except Low-Rise Residential Buildings*, October 2007.

- 3) Energy-Efficiency Specification for Qualifying Products: Light commercial HVAC equipment must meet the requirements provided in Tables 1 or 2, below, to qualify as ENERGY STAR. Please note, where applicable, products must meet both the EER and IEER specification in order to qualify for ENERGY STAR.

Table 1: Criteria for ENERGY STAR Qualified Light Commercial Air Conditioners

Equipment Type	Size Category	Minimum Energy Efficiency Criteria	Test Procedure*
Air-Source Air Conditioner (3 phase – Single Package)	<65,000 Btu/h	Tier 1 (Jan 1, 2010): 14 SEER; 11 EER Tier 2 (Jan 1, 2012): TBD	AHRI 210/240
Air-Source Air Conditioner (3 phase – Split System)	<65,000 Btu/h	Tier 1 (Jan 1, 2010): 14 SEER; 12 EER Tier 2 (Jan 1, 2012): 14.5 SEER; 12 EER	AHRI 210/240
Air-Source Air Conditioner	≥65,000 Btu/h – <135,000 Btu/h	Tier 1 (Jan 1, 2010): 11.5 EER; 11.6 IEER Tier 2 (Jan 1, 2012): TBD	AHRI 340/360
Air-Source Air Conditioner	≥135,000 Btu/h – <240,000 Btu/h	Tier 1 (Jan 1, 2010): 11.7 EER; 11.8 IEER Tier 2 (Jan 1, 2012): TBD	AHRI 340/360

Gas/Electric Package Unit Note: To qualify for ENERGY STAR, a gas/electric package unit must meet the appropriate air conditioner specification based on its size category.

Table 2: Criteria for ENERGY STAR Qualified Light Commercial Heat Pumps

Equipment Type	Size Category	Minimum Energy Efficiency Criteria	Test Procedure*
Air-Source Heat Pump (3 phase – Single Package)	<65,000 Btu/h	Tier 1 (Jan 1, 2010): 14 SEER; 11 EER; 8.0 HSPF Tier 2 (Jan 1, 2012): TBD	AHRI 210/240
Air-Source Heat Pump (3 phase – Split System)	<65,000 Btu/h	Tier 1 (Jan 1, 2010): 14 SEER; 11 EER; 8.2 HSPF Tier 2 (Jan 1, 2012): 14.5 SEER; 12 EER; 8.2 HSPF	AHRI 210/240
Air-Source Heat Pump	≥65,000 Btu/h – <135,000 Btu/h	Tier 1 (Jan 1, 2010): 11.5 EER; 11.6 IEER; 3.35 COP Tier 2 (Jan 1, 2012): TBD	AHRI 340/360 COP rated at 47° F
Air-Source Heat Pump	≥135,000 Btu/h – <240,000 Btu/h	Tier 1 (Jan 1, 2010): 10.9 EER; 11 IEER; 3.25 COP Tier 2 (Jan 1, 2012): TBD	AHRI 340/360 COP rated at 47° F

***Note:** Beginning January 1, 2010, test procedures ARI 210/240 and ARI 340/360 will be referenced as AHRI 210/240 and AHRI 340/360, respectively.

Note: Based on overlap between residential and commercial products as well as evidence of similar energy performance, EPA is proposing to harmonize the Tier 1 energy efficiency criteria for three-phase, <65,000 Btu/h **single package** CAC/ASHP equipment with current ENERGY STAR Tier 2 levels for single-phase residential, **single package** CAC/ASHP equipment. According to the AHRI Directory of Certified Products, approximately 23% of models available meet these proposed levels. EPA intends to re-examine the compliance rate for this product category in 2010. If the compliance rate has increased, EPA will consider proposing more stringent requirements for this product type under Tier 2. EPA plans to establish Tier 2 requirements by January 2011 with a scheduled effective date of January 1, 2012.

For three-phase, <65,000 Btu/h **split system** equipment, EPA is proposing a two-tier approach toward harmonizing with ENERGY STAR Tier 2 Residential CAC/ASHP levels. Tier 1 would become effective on January 1, 2010 and Tier 2 on January 1, 2012. While the ENERGY STAR Tier 2 compliances rates for three-phase split system equipment are currently 12% for CAC and 9% for ASHP, EPA's expectation is that additional qualified models will enter the market prior to January 1, 2012. The proposed Tier 1 compliance rates for three-phase, <65,000 Btu/h CAC and ASHP models are approximately 30% and 24%, respectively. EPA's goal is that approximately 25% of models meet ENERGY STAR performance levels when the specification goes into effect. EPA will revisit the AHRI Directory in early 2010 to determine whether the levels and/or timeline are reasonable.

Heating Section Type: In response to Draft 1, AHRI proposed separating products into heating section type categories (i.e., equipment with "electric resistance" and "all other" types) and establishing different sets of EER and IEER values for each heating section type. AHRI recommended setting EER and IEER values 0.2 lower than each proposed value of EER and IEER for electric resistance type equipment for "all other" heating type equipment in size categories 65,000 Btu/h and above.

In considering this suggestion, EPA reviewed available model data in the AHRI Directory to determine the compliance rates for "all other" heating type equipment that meet AHRI's proposed EER levels. Upon review, EPA found compliance rates of 29% and 63% for CAC equipment rated between 65,000 Btu/h and <135,000 Btu/h and between 135,000 Btu/h and <240,000 Btu/h, respectively. At EER levels proposed for electric resistance type equipment, compliance rates for "all other" heating type equipment were much closer to the target goal of 25%. EPA has decided that a sufficient number of "all other" heating type equipment models can meet performance levels of electric resistance equipment, and establishing different sets of EER and IEER values for each heating section type is not necessary. Based on these findings, EPA is proposing to establish one set of EER and IEER levels for all heating section types of equipment.

≥65,000 Btu/h Levels: In response to industry's decision to replace IPLV with IEER as the accepted metric for part load efficiency beginning January 1, 2010, EPA will set levels for IEER instead of IPLV in this revised specification. The earliest that certified ratings for IEER will be publicly available in the AHRI Directory is January 1, 2010. To ensure that ENERGY STAR continues to represent the top energy performers, new ENERGY STAR levels will need to take effect at the same time the federal minimum requirements take effect (i.e., January 1, 2010). While EPA would prefer to use IEER performance results provided by the AHRI Certified Directory to analyze potential new levels, the timing of its availability does not coincide with the timeline for finalizing this new specification. Given these circumstances, EPA is proposing a two-tier approach to setting performance levels for equipment rated at and above 65,000 Btu/h.

EPA is proposing to incorporate AHRI's suggested EER, IEER, and COP values specified for electric resistance equipment for all heating section types used in CAC equipment rated between 65,000 Btu/h and <135,000 Btu/h and ASHP rated between 135,000 Btu/h and <240,000 Btu/h for Tier 1.

Note continued:

For CAC equipment between 135,000 Btu/h and <240,000 Btu/h and ASHP equipment between 65,000 Btu/h and <135,000 Btu/h, the compliance rates are unacceptably high at the AHRI-suggested level of 11.3 EER. As an alternative, EPA is proposing 11.7 EER for CAC equipment, all heating types rated at 135,000 Btu/h and under 240,000 Btu/h, and 11.5 EER and 3.35 COP for ASHP equipment rated at 65,000 Btu/h and under 135,000 Btu/h. Consistent with the other categories where the IEER level is set 0.1 above corresponding EER values, EPA proposes an IEER value of 11.8 for CAC equipment rated between 135,000 Btu/h and <240,000 Btu/h and an IEER value of 11.6 for ASHP equipment rated between 65,000 Btu/h and <135,000 Btu/h. EPA encourages stakeholders to provide input on these proposed levels.

EPA expects to begin the Tier 2 review process immediately following the Tier 1 effective date of January 1, 2010. EPA's goal is to finalize Tier 2 levels no later than January 2011 in order to provide manufacturers significant time to transition product literature and other ENERGY STAR materials prior to the effective date of January 1, 2012.

- 4) **Test Procedure:** The manufacturer shall perform energy-efficiency tests, or have tests performed by third party testing labs, as necessary, to determine which products comply. Based on the results of these tests, the manufacturer shall self-certify those products that meet the specification outlined above. Light commercial air conditioners and heat pumps shall qualify under rating conditions in accordance with AHRI 210/240 (formerly ARI 210/240) or AHRI 340/360 (formerly ARI 340/360), as appropriate. The test procedure for each equipment type and size category is provided in Tables 1 and 2 of Section 3, above.
- 5) **Effective Date:** The date that manufacturers may begin to qualify products as ENERGY STAR is defined as the *effective date* of the agreement. Any previously executed agreement on the subject of ENERGY STAR qualified light commercial HVAC shall be terminated effective **December 31, 2009**.
 - A. **Qualifying Products under Tier 1 of the Version 2.0 Specification:** Tier 1 of the Version 2.0 ENERGY STAR Light Commercial HVAC specification shall become effective on **January 1, 2010**. All products, including models originally qualified under the previous Version 1.0 light commercial HVAC specification, with a date of manufacture on or after January 1, 2010, must meet the new Version 2.0 requirements in order to qualify for ENERGY STAR. The date of manufacture is specific to each unit and is the date (e.g., month and year) on which a unit is considered to be completely assembled.
 - B. **Qualifying Products under Tier 2 of the Version 2.0 Specification:** The second phase of this specification, Tier 2, shall become effective on January 1, 2012. All models, including those originally qualified under Tier 1, with a date of manufacture on or after January 1, 2012, must meet the Tier 2 requirements in order to qualify for ENERGY STAR.
 - C. **Elimination of Grandfathering:** EPA will not allow grandfathering under this Version 2.0 ENERGY STAR specification. **ENERGY STAR qualification under previous Versions is not automatically granted for the life of the product model.** Therefore, any product sold, marketed, or identified by the manufacturing partner as ENERGY STAR must meet the current specification in effect at the time of manufacture of the product.

Note:

Once the new Version 2.0 specification takes effect, all ENERGY STAR qualified light commercial HVAC models will be required to meet the new Version 2.0 Tier 1 levels to remain qualified. On January 1, 2010, EPA will sunset version 1.0 and replace it with the new version 2.0 criteria and performance levels. All existing ENERGY STAR qualified models that met version 1.0 requirements but do not meet Tier 1 requirements will be removed from the ENERGY STAR qualified product list by EPA and may no longer bear the ENERGY STAR mark or designation for any purpose.

EPA's goal is to finalize the new specification no later than mid-August 2009 and maintain the proposed specification effective date for Tier of January 1, 2010. EPA recognizes that this timeline does not provide the typical time period for manufacturers to transition product literature and other ENERGY STAR materials prior to the effective date. However, it is important that the ENERGY STAR specification aligns with federal minimum standards to ensure continued relevance in the marketplace come January 1, 2010.

- 6) **Future Specification Revisions:** EPA reserves the right to change the specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. In keeping with current policy, revisions to the specification are arrived at through industry discussions. In the event of a specification revision, please note that ENERGY STAR qualification is not automatically granted for the life of a product model. To carry the ENERGY STAR mark, a product model must meet the ENERGY STAR specification in effect on the model's date of manufacture.

Variable Refrigerant Flow (VRF) Multi-Split Equipment: EPA plans to conduct a review and determine whether it is appropriate to expand the specification to include VRF multi-split equipment specification once the test standard, AHRI 1230, is finalized and robust performance data is available.

Energy Efficiency Criteria for Single Package Equipment <65,000 Btu/h: In 2010, EPA intends to revisit Tier 1 performance levels in this Version 2.0 specification for single-package CAC/ASHP equipment rated below 65,000 Btu/h to determine if new levels are warranted for Tier 2. EPA plans to use the performance data provided in the AHRI Certified Directory to establish Tier 2 requirements with the goal of representing approximately the top 25% of available models. Tier 2 is scheduled to go into effect on January 1, 2012.

Energy Efficiency Criteria for Equipment \geq 65,000 Btu/h: EPA intends to revisit the performance levels presented in this Version 2.0 specification for equipment rated at and above 65,000 Btu/h once more IEER data becomes available. This IEER data will help EPA to characterize the market with regard to model availability, evaluate cost-effectiveness, and determine whether the levels in Tables 1 and 2 of this Version 2.0 specification represent the top energy efficiency performers. EPA expects to begin the Tier 2 review process immediately following the Tier 1 effective date (i.e., January 1, 2010). Tier 2 is scheduled to become effective on January 1, 2012.

Similar to this Version 2.0 development process, any revisions to the specification requirements will be shared with industry stakeholders for review and comment.

Note: Text has been added above to indicate that EPA will conduct a review of VRF multi-split equipment in the specification once a test standard and performance data are available. EPA will also revisit the performance levels presented for single package CAC/ASHP equipment rated below 65,000 Btu/h and all equipment rated at and above 65,000 Btu/h beginning in 2010. When IEER data is made available in early 2010, EPA intends to use the AHRI Certified Directory to determine whether levels proposed for IEER continue to represent the top 25% in energy efficiency. EPA will share the results of this additional analysis with industry stakeholders and discuss a new proposal, if necessary.