

Energy Star-Qualified Products:

The Principles Behind the Label

In 1992 the US Environmental Protection Agency (EPA) introduced ENERGY STAR™ to identify and promote energy-efficient products to reduce greenhouse gas emissions. Computers and monitors were the first labeled products. Through 1995, EPA expanded the label to additional office equipment products and residential heating and cooling equipment. In 1996, EPA partnered with the US Department of Energy (DOE) for particular products. Today, the ENERGY STAR label can be found on over 40 product categories (and thousands of models), including major appliances, office equipment, lighting, and home electronics.

Procurement officials and product manufacturers often ask us how we determine the feasibility for any new ENERGY STAR product category and the corresponding performance-based specifications. Both the EPA and DOE follow six key principles to ensure that the ENERGY STAR label remains an effective consumer tool. While these principles are not applied as a strict checklist, they are used as guidance during an iterative process to determine the next product category for labeling.

ENERGY STAR Principles

1. Significant energy savings can be realized on a national basis.

EPA and DOE seek to identify product categories that can contribute significant energy savings nationwide. An ENERGY STAR specification can achieve sizable energy savings from a product category where there are significant savings on a unit basis and relatively small annual unit sales or, where there are relatively small energy savings on a unit basis, but very large annual unit sales. To determine energy savings potential, EPA and DOE collect and analyze a variety of factors, including:

- Number of products sold nationwide and widespread availability
- Market growth rates



- Amount of energy used by product in various power modes as appropriate (e.g., active, sleep, and standby/off power modes)
- The product's typical usage pattern (i.e., amount of time spent in each of the various modes of operation)
- Amount of energy that may be saved through the application of different technologies, operating procedures, or design practices
- Product lifetimes
- Applicable standards and legislation that may affect a product's energy consumption and availability
- Extent to which potential energy savings may be impacted by installation practices or system interactions

It is EPA and DOE's goal to create ENERGY STAR specifications for only those product categories where it is clear that the energy savings potential of a product will translate into tangible energy savings when the product is used. That is, installation or system integration issues must have little or no impact on a consumer's ability to realize the product's energy efficiency. This is essential to building and maintaining consumer confidence in the ENERGY STAR label. As a result, the Agencies are very cautious about labeling products that are components of larger building or industrial systems.

For example, due to interest from various stakeholders, EPA evaluated the feasibility of an ENERGY STAR specification for integral electric motors. After extensive research and discussion, EPA concluded that systems integration issues made it not possible at this time to guarantee that the installation of an energy-efficient motor would also yield an energy-efficient system.

2. Product performance can be maintained or enhanced with increased energy efficiency.

EPA and DOE seek to maintain the ENERGY STAR label as a beneficial purchasing tool for a broad array of consumers. This is accomplished by ensuring that the

label is not only a credible symbol for energy efficiency, but that it is also found on products with the features and performance that consumers demand. The Agencies would expect few consumers to choose more efficient products if it required sacrificing performance, non-energy-related features, or functionality. The Agencies will continue to examine the following factors when determining the feasibility of new ENERGY STAR product categories and performance-based specifications, to ensure that product quality, features, and functionality are not compromised.

- Safety
- Performance
- Warranty
- Size/capacity/fuel source
- Speeds (e.g., print speed)
- Product sub-categories (e.g., component TV unit)
- Other features that consumers consider in making purchasing decisions

3. Purchasers will recover their investment in increased energy efficiency within a reasonable period of time.

Some energy-efficient products may have a price premium while others do not. In either case, all products that use energy have two price tags: 1) the initial cost of the product at the time of purchase, and 2) the cost of energy to operate that product over its lifetime. In evaluating the cost effectiveness of a specification for ENERGY STAR qualified products, the following factors are examined:

- Product lifetimes
- Additional cost of energy saving technologies for the manufacturer
- Incremental cost of increased efficiency of products (versus the incremental cost of other product enhancements) as passed onto the purchaser
- Price of energy
- Additional testing that may be needed to qualify as ENERGY STAR
- The geographic distribution of sales (e.g., North vs. South)
- Prevalence of rebates or other incentives for the purchase of energy-efficient products

ENERGY STAR specifications are set so that if there is a cost differential at the time of purchase, this cost is recovered through utility bill savings over a reasonable period of time for the typical consumer.

4. Energy-efficiency can be achieved with several technology options, at least one of which is non-proprietary.

ENERGY STAR is an effective marketing tool that may convey a business advantage to manufacturers that use it. As such, EPA and DOE are careful not to favor one manufacturer over all others by designating a proprietary technology or unique design approach when developing the performance attributes of an ENERGY STAR product specification. To ensure that specifications are set so that more than one manufacturer can meet them with at least one of their product models, the following factors are considered and evaluated:

- Number of companies that manufacture a product type
- Availability, variety, and cost-competitiveness of energy-saving technologies
- Proprietary or exclusive nature of any technologies in use
- Product energy consumption and performance can be measured and verified with testing.

5. Product energy consumption and performance can be measured and verified with testing.

Product testing has two roles: 1) to yield accurate energy consumption values for products whose manufacturers are hoping to earn the label, and 2) to verify that labeled products are performing at the appropriate levels and delivering on ENERGY STAR's promise to consumers. When assessing the viability of a product category to be covered by ENERGY STAR, and when developing specific performance-based specifications, EPA and DOE make every effort to choose energy performance metrics (e.g., CFM/W, cubic feet per meter per watt; AFUE) for which an industry accepted test procedure exists. It is critical that the Agencies, in concert with product manufacturers and other stakeholders, work closely to fine-tune the selected test procedure to ensure it accurately and repeatedly measures the energy consumption of a product, regardless of who is conducting the testing.

At other times, existing industry test procedures may not be entirely appropriate for use by ENERGY STAR, or may not exist at all. In this case, the Agencies must take the lead, while working closely with manufacturers and other stakeholders, to develop an appropriate test procedure that yields accurate and precise (repeatable) energy consumption values for the units under test.

6. Labeling would effectively differentiate products and be visible for purchasers.

As previously described, a goal of ENERGY STAR is to provide value to purchasers by enabling them to easily identify energy-efficient products that have earned the ENERGY STAR label. To achieve this goal, EPA and DOE have set specifications that may be met by only the most efficient products. This level typically represents approximately the top quartile of products currently available in the market at the time the specification is initially set. By recognizing the top quartile, EPA and DOE distinguish these products from the others, thereby adding to their intrinsic value.

Observing variations in the energy performance of models in a product category is important for ENERGY STAR to design a specification and to serve in this differentiation role. Moreover, the more extreme the spectrum of energy performance among models, the larger the potential magnitude for energy savings that may result from a product specification. If all product models used approximately equal amounts of energy, then an ENERGY STAR specification would not be pragmatic.

In some cases, very few models may meet the ENERGY STAR specification when it is initially set. Through research and analysis prior to setting the specification, EPA and DOE may conclude that manufacturers could implement relatively simple design changes to modify product models to enhance their energy-efficiency. With these design changes, sufficient numbers of models will qualify and ENERGY STAR will identify the more efficient products on the market.

Revision Cycle

Once an ENERGY STAR specification is in place for some amount of time, market conditions and the available model mix may change, resulting in a majority of models meeting the specification. Thus, the label would no longer serve as a differentiator. This scenario dictates that EPA and DOE reassess the specification and potentially revise it, so that the label again serves to identify the most efficient models. In effect, the specification development cycle begins again driven by the application of ENERGY STAR's guiding principles. 

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