

TABLE 5.1—TEST LOAD SIZES—Continued

| Container volume | | Minimum load | | Maximum load | | Average load | |
|------------------|-------------|--------------|------|--------------|-------|--------------|------|
| cu. ft. | liter | lb | kg | lb | kg | lb | kg |
| ≥ < | ≥ < | | | | | | |
| 4.80–4.90 | 135.9–138.8 | 3.00 | 1.36 | 19.90 | 9.02 | 11.45 | 5.19 |
| 4.90–5.00 | 138.8–141.6 | 3.00 | 1.36 | 20.30 | 9.20 | 11.65 | 5.28 |
| 5.00–5.10 | 141.6–144.4 | 3.00 | 1.36 | 20.70 | 9.39 | 11.85 | 5.38 |
| 5.10–5.20 | 144.4–147.2 | 3.00 | 1.36 | 21.10 | 9.58 | 12.05 | 5.47 |
| 5.20–5.30 | 147.2–150.1 | 3.00 | 1.36 | 21.50 | 9.76 | 12.25 | 5.56 |
| 5.30–5.40 | 150.1–152.9 | 3.00 | 1.36 | 21.90 | 9.95 | 12.45 | 5.65 |
| 5.40–5.50 | 152.9–155.7 | 3.00 | 1.36 | 22.30 | 10.13 | 12.65 | 5.75 |
| 5.50–5.60 | 155.7–158.6 | 3.00 | 1.36 | 22.80 | 10.32 | 12.90 | 5.84 |
| 5.60–5.70 | 158.6–161.4 | 3.00 | 1.36 | 23.20 | 10.51 | 13.10 | 5.93 |
| 5.70–5.80 | 161.4–164.2 | 3.00 | 1.36 | 23.60 | 10.69 | 13.30 | 6.03 |
| 5.80–5.90 | 164.2–167.1 | 3.00 | 1.36 | 24.00 | 10.88 | 13.50 | 6.12 |
| 5.90–6.00 | 167.1–169.9 | 3.00 | 1.36 | 24.40 | 11.06 | 13.70 | 6.21 |

Notes: (1) All test load weights are bone dry weights.
 (2) Allowable tolerance on the test load weights are ±0.10 lbs (0.05 kg).

IV. Summary and Request for Comments

Through today’s notice, DOE announces receipt of Samsung’s petition for waiver from certain parts of the test procedure that apply to clothes washers and grants an interim waiver to Samsung. DOE is publishing Samsung’s petition for waiver in its entirety pursuant to 10 CFR 430.27(b)(1)(iv). The petition contains no confidential information. The petition includes a suggested alternate test procedure to measure the energy consumption of clothes washers with capacities larger than the 3.8 cubic feet specified in the current DOE test procedure. DOE is interested in receiving comments from interested parties on all aspects of the petition, including the suggested alternate test procedure and any other alternate test procedure.

Pursuant to 10 CFR 430.27(b)(1)(iv), any person submitting written comments to DOE must also send a copy to the petitioner, whose contact information is included in the ADDRESSES section above.

Issued in Washington, DC, on August 2, 2011.

Kathleen Hogan,
 Deputy Assistant Secretary for Energy Efficiency, Office of Technology Development, Energy Efficiency and Renewable Energy.

June 20, 2011

Dr. Henry Kelly, Energy Efficiency and Renewable Energy Department of Energy, 1000 Independence Avenue, SW., Washington, DC 20585.

Re: Petition for Waiver and Application for Interim Waiver, Clothes Washers Capacity Greater than 3.8 Cubic Feet

Dear Assistant Secretary Kelly: Samsung Electronics America, Inc., a subsidiary of Samsung Electronics Co., Ltd. (Samsung), respectfully submits this Petition for Waiver

and Application for Interim Waiver to the Department of Energy (DOE) for the testing of clothes washers with capacity greater than 3.8 cubic feet.

The 10 CFR Part 430.27(a)(1) allows a person to submit a petition to waive for a particular basic model any requirements of § 430.23 upon the grounds that the basic model contains one or more design characteristics which either prevent testing of the basic model according to the prescribed test procedures, or the prescribed test procedures may evaluate the basic model in a manner so unrepresentative of its true energy consumption characteristics as to provide materially inaccurate comparative data. Additionally, 10 CFR Part 430.27(b)(2) allows an applicant to request an Interim Waiver if economic hardship and/or competitive disadvantage is likely to result absent a favorable determination on the Application for Interim Waiver.

Reasoning

In order to meet current market demands, Samsung designed and will be marketing clothes washers with capacities greater than 3.8 cubic feet. Samsung expects that the majority of Samsung clothes washers will be greater than 3.8 cubic feet in capacity. The current test procedure, Appendix J1 to Subpart B of Part 430, Table 5.1, does not contain load sizes for capacities greater than 3.8 cubic feet, preventing Samsung from appropriately testing clothes washer models with capacity greater than 3.8 cubic feet. The Department recognized this test method deficiency in the Interim Waivers granted to Electrolux (76 FR 11440), LG (76 FR 11233), Whirlpool (75 FR 69653), General Electric (75 FR 76968), and Samsung (76 FR 21881).

The nature of this Application for Interim Waiver and Petition for Waiver does not differ from Samsung’s original Application for Interim Waiver and Petition for Waiver as published in 75 FR 57937.

Conclusion

Samsung requests that DOE expeditiously grants the requested waiver for our Samsung clothes washer, model WF501***. This request is based upon the grounds that:

1. Current test methods for clothes washers do not allow testing of clothes washers with greater than 3.8 cubic feet capacity.

2. DOE has already granted Samsung an Interim Waiver in 75 FR 57937, per Table 5.1, for similar models.

Affected Persons

Primarily affected persons in the clothes washers category include Alliance Laundry Systems, LLC., BSH Home Appliances Corp., Electrolux Home Products, Fisher & Paykel Appliances, Inc., GE Appliances, Haier America Trading, L.L.C., LG Electronics Inc., Miele Appliances, Inc., and Whirlpool Corporation. Samsung will notify all these entities as required by the Department’s rules and provide them with a version of this Petition. A copy was also provided to the Association of Home Appliance Manufacturers (AHAM).

Sincerely,
 Michael Moss,
 Director of Corporate Environmental Affairs.
 [FR Doc. 2011–20015 Filed 8–5–11; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF ENERGY

Office of Energy Efficiency and Renewable Energy

[Docket Number EERE–2011–BT–NOA–0049]

Commercial Building Asset Rating Program

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Notice of request for information (RFI).

SUMMARY: The U.S. Department of Energy (DOE or the Department) seeks to develop a voluntary National Asset Rating Program for Commercial Buildings (AR Program). The AR Program would establish an Asset

Rating system for commercial buildings based on a national standard and would evaluate the physical characteristics and as-built energy efficiency of these buildings. It would also identify potential energy efficiency improvements. The goal is to facilitate cost-effective investment in energy efficiency and reduce energy use in the commercial building sector. DOE seeks comments and information related to the development of the AR Program.

DATES: Written comments and information are requested on or before September 22, 2011.

ADDRESSES: Interested persons may submit comments, identified by docket number EERE-2011-BT-NOA-0049, by any of the following methods. Your response should be limited to 3 pages.

- *E-mail:* to *AssetRatingRFI-2011-NOA-0049@ee.doe.gov*. Include EERE-2011-BT-NOA-0049 in the subject line of the message.

- *Mail:* Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, Mailstop EE-2J, Revisions to Energy Efficiency Enforcement Regulations, EERE-2011-BT-NOA-0049, 1000 Independence Avenue, SW., Washington, DC 20585-0121. Phone: (202) 586-2945. Please submit one signed paper original.

- *Hand Delivery/Courier:* Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, 6th Floor, 950 L'Enfant Plaza, SW., Washington, DC 20024. Phone: (202) 586-2945. Please submit one signed paper original.

Instructions: All submissions received must include the agency name and docket number.

FOR FURTHER INFORMATION CONTACT: Direct requests for additional information may be sent to Mr. Cody Taylor, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program, EE-2J, 1000 Independence Avenue, SW., Washington, DC 20585-0121. Telephone: 202-287-5842. E-mail: *Cody.Taylor@ee.doe.gov*.

SUPPLEMENTARY INFORMATION:

Background

The Department seeks to develop a voluntary AR Program. The AR Program would establish an Asset Rating system for commercial buildings based on a national standard and would evaluate the physical characteristics and as-built energy efficiency of these buildings. It would also identify potential energy efficiency improvements. The goal is to facilitate cost-effective investment in energy efficiency and reduce energy use

in the commercial building sector. The Asset Rating is intended to complement other building rating and benchmarking tools in the market. DOE's Better Building Challenge (in which partners will commit to an energy savings pledge, assess the improvement opportunities across their portfolio, undertake a showcase building retrofit, and share their progress), and DOE's partnership with the Appraisal Foundation (which would enable investors, building owners and operators, and others to accurately assess the value of energy efficiency as part of the overall building appraisal).

The AR Program will inform building owners about the energy efficiency of their buildings, enabling comparison of the energy performance between buildings while controlling for differences in building operations and occupant behavior. The AR Program will also identify opportunities for cost-effective improvements in the building systems to increase energy efficiency.

Voluntary green building rating systems and ENERGY STAR Portfolio Manager have been used to varying degrees in the building industry to demonstrate building sustainability and energy performance. For existing buildings, measured energy performance based on utility bill history has been the dominant way to rate building energy performance. However, when a complete and continuous utility history is missing (for example, a vacant or partly empty building or a multi-tenanted building), it becomes difficult to evaluate building energy performance. Moreover, building stakeholders don't have a consistent basis for determining whether the energy use differences between two similar buildings are associated primarily with installed building systems or with operational choices. This information is important for building owners and investors when making decisions about efficiency improvement; it also informs prospective buyers and tenants who may want to compare among existing, new, and renovated buildings. Therefore, a national program would enable building stakeholders to directly compare as-built energy performance of building systems among similar buildings, regardless of occupant behavior and building operation.

Recent regional Asset Rating initiatives, such as California's AB 758 and the Massachusetts Commercial Asset Labeling Program, indicate a growing interest in a national Asset Rating system. The AR Program would facilitate the evaluation of energy-related building characteristics, which

include building envelope, HVAC systems, lighting systems, and other major building service related equipment. The program would identify opportunities for energy efficiency improvements and estimate their likely savings. If communicated to potential buyers, lessees, and lenders, the Asset Rating would provide information necessary for the real estate market to value building energy efficiency measures.

The Department has aggressive goals for facilitating cost-effective energy savings in commercial buildings, most recently stated in the Better Building Initiative as a goal of 20% savings by 2020. Through the AR Program, the Department intends to establish a building Asset Rating system that can be broadly applied to both new and existing commercial buildings, and provide affordable and reliable information to building stakeholders. The Department intends the Asset Rating system to work with and complement the Portfolio Manager Operational Rating system, once the Asset Rating system is sufficiently demonstrated. Both of these systems could be expected to evolve over time, providing opportunities for increasing integration. An integrated Asset and Operational Rating together would provide a feedback loop and accountability for building owners and operators to ensure that their building is performing as intended and meeting its potential. An integrated system would also help building operators track the results of upgrades and identify potential operation and maintenance problems. The Asset Rating and Operational Rating would together comprise a national building rating system that effectively combines the as-built building efficiency with a gauge of operational success.

This Request for Information (RFI) calls on stakeholders to review the considered approaches and provide information to assist the Department in the development and implementation of this program. DOE intends to adopt or develop standardized approaches to evaluate the potential energy efficiency of commercial buildings, provide strategies to help building owners improve building energy efficiency, and establish a framework to convey the information to audiences at various levels. This RFI presents the following aspects of the AR Program:

- Market needs and opportunities.
- Guiding principles for the program.
- Options and approaches for key elements of the program.
- Pros and cons of various approaches.

- Initial proposed approach.
 - Additional work that the Department is considering.
- The RFI is structured as follows:
- (1) Program Overview.
 - (2) Market Needs and Guiding Principles.
 - (3) Target Audience and Building Types.
 - (4) Basic Metrics.
 - (5) Rating Methods.
 - (6) Rating Scales.
 - (7) Recommendations for Improvements.
 - (8) National Commercial Building Energy Database.
 - (9) Quality Assurance.
 - (10) Potential for Additional Supported Options.
 - (11) Glossary of Key Terms.
 - (12) References.

The Department will consider all input it receives and plans to have an initial program design available by the end of September 2011. Based on that program design, the Department expects to pilot the program in partnership with interested parties and ongoing commercial energy efficiency programs, beginning in January 2012. The Department welcomes input on issues or logistical concerns that could extend this timeframe.

Program Overview

Limited information on the expected efficiency of a building based on as-built building systems and opportunities for cost-effective energy efficiency improvements are identified barriers to energy efficiency investments. The Department seeks to address these barriers by establishing a standardized approach for assessing the energy performance of commercial building assets and developing an easy-to-use tool to help building owners and stakeholders identify opportunities for improvement. Accordingly, the AR Program, as considered, has three components:

- A rating system to compute building energy efficiency and convey energy performance information, taking into account the building envelope, mechanical and electrical systems, and other major energy-using equipment. The Department intends to seek ways for the Asset Rating to be used in coordination with the Portfolio Manager Operational Rating to help building owners understand the opportunities for both capital and operational improvements in their buildings.
- A Web application, included as part of a free Asset Rating online software tool (AR Tool), to maintain building data entered by building owners or operators and to analyze building

energy use, accounting for envelope, mechanical and electrical systems, and other major energy-using equipment. This tool would provide an energy rating and enable owners and operators to benchmark their building efficiency. It would be used to provide an Asset Rating Report.

- A second facet of the AR Tool, designed to help building owners and operators identify and implement strategies to improve efficiency of their buildings. In addition to receiving an Asset Rating, building owners and investors would be able to use the tool to analyze the potential for capital improvements to increase energy efficiency. The potential to improve and the potential energy savings would be included in the Asset Rating Report. DOE intends to support continuous improvement of energy efficiency by allowing buildings to be re-rated following a retrofit.

Market Needs and Guiding Principles

The AR Program is intended to enable building stakeholders to directly compare expected as-built energy performance among similar buildings and to analyze the potential for capital improvements to increase energy efficiency cost-effectively. It would give building stakeholders insight into a property's long-term energy cost, thus informing their valuation of that building. The AR Tool would provide an as-built rating, identify potential energy efficiency improvements, and provide the anticipated rating resulting from those improvements, illustrating for stakeholders the impact of potential capital improvements. Research (McCabe, 2011; McKinsey, 2009) shows a need to communicate energy and cost savings to owners, investors, financiers, and others to overcome market barriers and motivate capital investment in building energy efficiency.

The AR Program is intended to complement and coordinate with the existing Operational Rating system, ENERGY STAR Portfolio Manager. The Department is aware of other rating systems and standards that exist or are under development. These include but are not limited to ASHRAE Building EQ, LEED, Green Globes, ASTM Building Energy Performance Assessment, COMNET Commercial Buildings Energy Modeling Guidelines and Procedures. The Department will consider developments in these rating systems and standards as it creates a national Asset Rating system.

The primary goal of the AR Program is to spur commercial building energy improvements in construction and/or retrofits, so the principles that guide the

program are based on market needs. These guiding principles, which drive the key program elements, are as follows.

- Information must be credible, reliable, and replicable.
- Information must be transparent and easy to understand.
- Collecting information and generating a rating must be affordable.
- Opportunities identified must be relevant and practical.
- Program must include effective quality assurance.
- Rating must recognize building energy performance across the full range of building efficiency.

The Department welcomes stakeholder comments on these guiding principles as the framework for the development of the program.

Target Audience and Building Types

The AR Program is aimed at a variety of building stakeholders—owners, operators, investors, tenants, appraisers, and designers. It may also inform lenders, local government, utilities, and green building rating systems. Considering the variety of audiences, the AR Program would provide an easy-to-understand rating that can convey building energy efficiency information to those in the general public who have no knowledge of building efficiency. The AR Tool would also provide technical information and identify opportunities for improvements to building professionals who would be implementing the recommendations. The Department seeks to develop an affordable system that provides a useful rating with minimal data collection. The Department is considering a two-tiered program. The first tier would yield a preliminary rating and identified opportunities for building improvements, as well as an estimate of the savings from the improvements. The preliminary rating of building efficiency would be based on minimum building information. The second tier would provide a certified rating after a qualified professional has validated the building information (see Quality Assurance section). The preliminary rating would give users rapid feedback on building efficiency and improvement opportunities; the second tier rating would be appropriate for the communicating the performance of the building to others.

The AR Tool is not intended to replace any engineering analysis needed for building retrofits, but to provide building owners and operators with a quick, easy, affordable tool based on a national standard. The AR Tool would be designed for users who have basic

knowledge of building systems, such as building engineers, facility managers, or contractors. Assistance from credentialed or third party AR certifiers would only be needed to receive a certified rating. The Department intends to work with interested parties, including state and local governments, utilities, and energy service companies, to develop ways to use the AR Program to promote market transformation.

Because of the different levels of complexity due to building type and size, the AR Tool development will first focus on building types that generally have simpler building systems and have adequate information sources to establish a reliable rating system. These building types include office, school, retail, warehouse, and assembly. In time, other building types will be added, including data center, laboratory, refrigerated warehouse, health care, lodging, food sale, food service, and mixed use buildings.

Basic Metrics

A building's expected energy performance can be described in a variety of ways, including (1) Energy use; (2) energy cost; or (3) greenhouse gas emissions associated with the building's energy use. The Department is considering several options for representing building energy performance, as described below.

Energy Metric—Source or Site Energy Use

An energy metric is the most straightforward way to represent building energy performance. Three building energy metrics to be considered are site energy use, net onsite energy use, and source energy use. Site energy use can be directly calculated using the sum of electricity natural gas and any other fuels used. If renewable energy is generated onsite, the expected energy generation and net energy use can also be calculated. Using a source energy metric requires the use of a conversion factor to convert site electricity use to a source equivalent, which would allow consumers to more equitably consider all fuel types and the environmental consequences of electricity generation. Although site energy is most closely related to the values that customers see on their energy bills for each fuel type, using source energy as a metric more closely reflect the cost tradeoffs among different fuels and the long-term cost implications of different energy choices. Regional source-to-site conversion factors vary and the offsite generation mix is generally not controlled by the consumer. Although regional source

conversion factors more accurately represent actual energy use, a national conversion factor allows comparison across the nation and ensures that a building does not receive a relatively low rating just because of its location.

The Department plans to use source energy with a national source-to-site conversion factor as the basic metric because source energy can most accurately represent total energy use of a building and the related environmental impacts. Also, using source energy makes the Asset Rating system compatible with ENERGY STAR Portfolio Manager, which adopted source energy as its basic metric. Source energy use is familiar to building owners and operators who have been using Portfolio Manager or other building rating systems relying on Portfolio Manager. The Department welcomes stakeholder comments on the energy metric for Asset Rating.

Cost Metric

Consumers are generally more familiar with cost metrics. However, energy costs for commercial buildings vary considerably in different parts of the country and change over time, including over the course of the day. Without much more specific information about a building's operations and its time-dependent per-unit energy prices, energy cost does not provide a durable, comparable metric upon which to base a rating. A cost metric alone cannot directly be used to judge building energy performance or guide building owners' investment decisions.

For the above reasons, the Department does not intend to choose cost information as the primary metric for the program. However, the Department is exploring how to use cost information to assess opportunities to improve building energy efficiency and describe the likely cost savings associated with these improvements. Though the actual Asset Rating would not be affected by energy or equipment costs, both of these costs may be used to perform a life cycle cost analysis, the results of which could be used to propose opportunities for cost-effective energy savings.

Greenhouse Gas Metric

Energy use significantly contributes to greenhouse gas emissions, and the AR Program would provide an opportunity to educate consumers and help them reduce their emissions. Using a greenhouse gas metric as the primary program metric would most closely link the Asset Rating to associated environmental impact. However, the primary focus of the AR program is cost-

effective energy efficiency improvements, which is not perfectly aligned with a greenhouse gas metric. As noted by the Northeast Energy Efficiency Partnerships using a greenhouse gas metric can "confuse the existence of non-carbon power sources—including large hydropower and nuclear power—with actual energy savings." (Dunsky, *et al*, 2009).

Therefore, the Department does not intend to choose greenhouse gas information as the primary metric for the program. However, the Department is exploring ways to support greenhouse gas information as an optional element of the program based on a partner's interest.

Initial Approach: The Department intends to use source energy use intensity as the primary performance metric. Onsite renewable energy generation may be recognized, but separately from the rating calculation. The Department welcomes stakeholder comments on the above metrics.

Rating Methods

Various rating methods are possible. All methods share some characteristics, such as:

- A data collection phase in which the user defines key building characteristics.
- An energy use prediction phase.
- A comparison/rating phase.

For the data collection phase, the user would enter the characteristics of the building being examined; these values would then be used in conjunction with a set of default building characteristics to develop the required inputs for the energy use prediction phase. The user inputs would fall into six broad categories:

- General characteristics (use type, location, age, available fuels, etc.).
- Design characteristics (geometry, orientation, window to wall ratio, structure type, etc.).
- Envelope elements (window types, wall constructions, roof constructions, etc.).
- HVAC system characteristics (technology used, fuel type, efficiency, etc.).
- Lighting system characteristics (lamp type, numbers of lights, sensors and controls, etc.).
- Service hot water (fuel type, efficiency, storage capacity, etc.).

In addition to the above user inputs, a set of internal values would be used in the analysis. The internal values are based purely on a building's use type and would be held constant across all models of buildings with similar functions. This set of inputs primarily

consists of the occupancy and operation parameters, such as:

- Occupancy schedule.
- HVAC system operation.
- Hot water use.

Both the user-entered and the internally defined, fixed building characteristics would be combined to develop the inputs for a building energy use prediction tool.

Several potential methods for predicting a building's energy use are being considered, including:

- Pre-simulating large numbers of buildings and using interpolation to customize the results to an individual case.

- Detailed energy simulation.
- Simplified energy simulation.

Each of the above methods has unique strengths and potential issues. Selecting the correct method will require tradeoffs between flexibility, accuracy, and the end-user's time investment in data collection.

In the case of a pre-simulation methodology, the benefits are relative ease of use and a level of complexity that can be highly tailored to the needs of the asset rating methodology. Once deployed, this approach is less flexible than approaches that use real time modeling because each possible combination of building attributes must be predicted and modeled beforehand. For each additional building input characteristic that the end-user can control, the number of required models is greatly increased. Depending on the level of effort required per model, it could be challenging to implement this approach with enough granularity to provide useful results.

There is a wide range of building energy modeling tools, each with different strengths and weaknesses, including differing levels of input and output detail, required development time, and expected user expertise. Most one-off energy models are highly detailed to allow the inclusion of all of a building's unique characteristics. Using a detailed modeling approach to formulate an asset rating would most likely provide the greatest flexibility and accuracy. Such a tool would, however, require a substantial amount of development time and would still likely require a professional building energy modeler to use properly—though with greater development time some of the expertise requirements could be overcome.

Simplified analysis models use many simplifications and assumptions that allow an inexperienced user to quickly develop robust energy models. In general, these modeling tools allow fewer input combinations than a

detailed model and will reduce opportunities for error. The primary drawback of a purpose-built simplified simulation model would be user concern about the accuracy of the results.

Whichever rating calculation method is selected, the required outputs would be the same. The Department intends to select one or more metrics (see Basic Metrics section) to be the primary output of modeling. The metric(s) would allow for both the placement of the subject building onto a rating scale (as defined in Rating Scales section) and the comparison of the building with similar buildings.

The Department welcomes stakeholder comments on the rating calculation methods.

Rating Scales

There are several ways to deliver building energy performance information to consumers. Various types of scales have been used in the existing building rating systems. The following is a discussion of the different methods and their applicability to the Asset Rating system.

Numeric Scale Reflecting Physical Units

This scale method represents a certain type of physical unit. For example, the EnergyGuide label found on household appliances uses a physical scale (supplemented with cost information), such as kilowatt hours per year in the case of refrigerators supplemented with the expected annual cost of the particular refrigerator. The miles-per-gallon (MPG) rating displayed on new vehicles is another example of using non-converted physical units to convey information. The physical units can transparently deliver the technical information to the consumers; however, consumers may be unable to judge if they are unfamiliar with the units. Unlike cost or MPG rating for vehicles, energy units such as kBtu/ft² do not convey enough information to most audiences without engineering or energy knowledge. The Asset Rating aims to promote market transformation and educate consumers, and an absolute energy scale could be challenging for the general public to interpret. In addition, an unprocessed numeric scale does not offer a comparison between a building and its peers, which is a desirable comparison because consumers are often motivated by how they compare to others.

Numeric Scale Converting Physical Units into Score System

This rating method converts a metric from physical units into a score or

index, which may be more easily understood by consumers. ENERGY STAR Portfolio Manager, for example, converts energy use in commercial buildings into a score on a 100-point scale. The Home Energy Rating System (HERS) scale, used primarily for new homes, also converts energy units into an index, where 100 represents a home built to 2006 International Energy Conservation Code standards.

The scores can be calculated using either a percentile rank method or an interval method. ENERGY STAR Portfolio Manager uses a 100 point percentile rank scale based on supporting databases, which provide statistical representation of a given building type. This approach is not appropriate for the Asset Rating because there is no reliable database recording the efficiency of existing buildings. In addition, the AR Program is intended to provide information on expected energy use (and energy costs) and effective energy efficiency strategies across all buildings. A percentile rank scale does not accomplish this objective throughout the entire range of the scale. In particular, the high efficiency—on an absolute basis—of the most efficient buildings is not fully reflected.

An alternative is a 100-point interval scale. Use of a 100 point scale would have some consistency with ENERGY STAR Portfolio Manager. An advantage of a 100-point *interval* scale is that the rating system can recognize building efficiency and building efficiency improvements in a similar manner at all efficiency levels. DOE is also considering a simpler numeric scale, similar to the 10-point scale used by the Home Energy Score (<http://www1.eere.energy.gov/buildings/homeenergyscore/>). A 10-point scale does not imply the same degree of precision as a 100-point scale. In this sense, a 10-point system, although a numeric score, functions as a bin system, which is discussed in the next section.

Categorical Scale Assigning Physical Units Into Bins

The physical units can also be converted into a category system, which could be presented in letters, numbers, stars, or other symbols. It has been shown that categorical scales, compared with continuous numeric scales, lead to better comprehension because “categorical ratings are easy to use and quick to decipher” (Thorne and Egan, 2002a). Viewers can more easily gauge a building's performance relative to other buildings or a reference point. Categorical ratings using letter grades have been used in multiple building

rating systems such as ASHRAE Building Energy Quotient and the UK Display Energy Certificate. A rating system based on letter grading is also a common format for several countries in the European Union, although the meaning of each grade could be very different across regions. A series of studies on the EnergyGuide label has demonstrated that consumers favor a stars-based format because it is familiar and intuitive, while check marks or letter grades are more confusing (Thorne and Egan, 2002b).

While stars and grades simplify things for consumers, a binned system also has drawbacks. Using a binned system can appear qualitative. Including a reference value can help alleviate this weakness. The number of bins is also important. Too many bins may complicate the system, while too few bins can make it hard for a building to improve from one bin to the next, and not be appropriately reflective of the investments made and the savings being achieved.

With a well-defined bin range, a categorical system would allow easy distinction between the categories and allow quick comparison between buildings as well as changes within a building category as improvements are made. Star ratings are visually appealing, motivating, and quickly draw attention. Thorne and Egan's (2002b) research also suggested "consumers found the stars rating system complementary with the ENERGY STAR label and certification." The shortcoming of a stars-based format is that the number of stars needs to be limited. More than six stars may make it difficult for viewers to recognize the value quickly. In this case, a numeric format (10-point scale) becomes advantageous.

Initial Approach: For the Asset Rating system, the Department is considering using a scale using physical units, possibly accompanied by a numeric interval scale. A 100-point interval scale would complement Portfolio Manager's 100-point range. The Department welcomes stakeholder comments on rating scales.

The Department is considering including the following basic building information on the Asset Rating Report to ensure that similar buildings are used for comparison:

- Building name.
- Year built.
- Climate zone.
- Building type.
- Year rating is issued.
- Report serial number (for tracking purposes).

Analysis results would be clearly displayed and formatted for easy

reading and understanding, and would include:

- Calculated energy use.
- Building Asset Rating based on calculated energy use.
- Asset Rating that can be achieved with energy efficiency upgrades.
- Energy and cost savings associated with the higher achieved rating.

Additional information may also be provided in the future, such as:

- A reference point to help users understand how their building score compares to a chosen energy code.
- Indication of whether the building has systems to provide a certain amount of energy from onsite renewables.
- Greenhouse gas emissions.

The Department is also considering working with interested partners to include local benchmark information on the Asset Rating Report for comparison. For example, a state might wish to include information pertaining to average asset ratings for a particular building type within the state. The Department welcomes stakeholder comments on the information included on the Asset Rating Report.

Identified Opportunities for Energy Efficiency Improvements

Based on the building information, the AR Tool would identify potential opportunities for energy efficiency upgrades that could cost-effectively improve a building's asset rating.

The AR Tool would identify improvement opportunities in areas such as heating, cooling, and ventilation equipment; envelope; glazing; service hot water; lighting; and electric motors.

The AR Tool is not intended to replace energy audits or any engineering analysis required for building retrofits. It is intended to provide an affordable way for building owners and operators to determine which building systems are good candidates for an efficiency upgrade. The tool may be a gateway for building owners who have limited internal resources to engage with service providers who can provide building rating with the AR tool and offer products and services that can improve energy performance.

Initial Approach: The Department is considering computing cost savings estimates for energy efficiency measures based on regional energy costs, acknowledging that local conditions will vary. The AR Tool will not display return on investment given that equipment and labor costs are likely to vary considerably. The Department welcomes public comments on the best way to assess opportunities for energy efficiency improvement.

National Building Asset Rating Database

The Department intends to establish a national building Asset Rating database to track Asset Ratings and ensure the legitimacy of ratings. The Department is aware of potential privacy issues related to maintaining this information and the desire for some jurisdictions to require disclosure of energy Asset Ratings. Public comments are welcome regarding structure and use of the Asset Rating database.

Quality Assurance

The ability to generate accurate and consistent information is important to maintain user confidence. The Department intends to include quality assurance requirements for the following:

Asset Rating Tool

The user would receive a warning when automated checks suggest that data entered may be incorrect or incomplete.

Professional Requirements for Asset Rating Application

Building owners would be able to use the free Web application to enter the required energy and building information, generate a preliminary building Asset Rating, and receive recommendations. The Department is considering requiring a professional with specific approved qualifications to validate building information inputs for a building to be eligible for a certified Asset Rating. The Department intends to develop a guideline to specify the credentials that a professional must hold in order to generate a certified rating.

Third-Party Verification

Third-party verification can be an effective way to ensure program quality. Some jurisdictions may want to require third-party verification of the accuracy of data used to acquire a certified rating. The third party may require building owners to submit supplemental building information and/or perform an onsite audit. The Department is evaluating options for implementing this type of requirement, including establishing verification standards and approving qualified third-party organizations. Verification data and reports may be integrated into the Asset Rating database, software tool, and reports.

Technical Support

Full documentation of the rating methodology would be available online for public review. A user manual, guidelines and eligibility requirements

for the qualified professionals, data checklists, and FAQs would be available to owners and operators to applying for certified Asset Ratings. In addition, help for users would be available before, during, and after the application process. A user feedback survey may be implemented to help gauge program satisfaction and to gather suggestions for improvement.

Initial Approach: The Department is considering ensuring the quality of the Asset Rating by providing a free Web-based application to guide standard data collection, calculate energy use, and generate ratings; requiring professionals to review final submissions; enabling third-party verification; and providing necessary technical support. Public comments on the quality assurance methods are welcome.

Potential for Additional Supported Options

While a national performance metric and rating system would help ensure consistency across the country, the Department recognizes that state and local governments and other program implementers may be interested in providing information that goes beyond the national metric and rating.

To that end, the Department intends to partner with state and local governments to support the sharing of additional information as part of this effort. For example, while greenhouse gas information is unlikely to be a standard metric for the AR Program, the Department could provide conversion factors to states and other partners that are interested in providing such information.

This document describes the major design questions that the Department is considering in developing a voluntary AR Program. DOE is seeking comments on the issues discussed above. However, stakeholders are welcome to raise other relevant issues that the Department may have overlooked in this design process.

Glossary of Key Terms

Asset Rating—An assessment of building energy performance that is based solely on a building's physical assets, excluding the impacts of building operation characteristics.

Asset Rating Report—A short form document showing only key outcomes for a building that has undergone the Asset Rating process.

Baseline—The amount of energy that is consumed annually before implementation of energy efficiency measures based on historical metered data, engineering calculations, submetering of buildings or energy-consuming systems, building load

simulation models, statistical regression analysis, or some combination of these methods.

Benchmark—The building profile used as a reference point for comparing energy use and other performance characteristics.

ENERGY STAR Portfolio Manager—A Web-based, portfolio-wide energy and water tracking system that tracks many metrics of energy use— including total site energy, source energy, weather normalized energy use index, greenhouse gas emissions, indoor and outdoor water usage, and (for some building types) the ENERGY STAR score.

ENERGY STAR energy performance scale—A 1–100 percentile rank score that indicates how a building performs relative to similar buildings nationwide. The scores are adjusted using standardized methods to account for differences in building attributes, operating characteristics, and weather variables. Buildings performing better than 75% of similar buildings can be certified to ENERGY STAR.

Energy Efficiency Measure—A design, operation, or technology change for the purpose of reducing energy consumption.¹

Net Onsite Energy Use—The sum of all energies that are consumed in a building minus any energy that is generated on site.

Operational Rating—An assessment of building performance that is developed to reflect the energy performance of a building, accounting for its physical assets and its specific operational characteristics.

Site Energy Use—The amount of energy consumed at a building location or other end-use site, as reflected in the utility bills. Includes electricity generated by onsite renewable energy systems.

Source Energy Use—The total energy used at a site, including upstream losses in distribution, storage, and dispensing of primary fuels, or power generation, transmission, and distribution of electricity.

Percentile Rank Scale—A percentile scale that is defined solely in relation to a sample population; the scale itself contains no information in absence of information regarding the specific sample population. The primary purpose of a percentile rank scale is comparison between peer buildings.

Interval Scale—A scale for which each location along its span relates directly to some metric or measurement.

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Disclaimer and Important Notes

This is an RFI issued solely for information and program planning purposes; this RFI does not constitute a formal solicitation for proposals or abstracts. Your response to this notice will be treated as information only. DOE will not provide reimbursement for costs incurred in responding to this RFI. Respondents are advised that DOE is under no obligation to acknowledge receipt of the information received or provide feedback to respondents with respect to any information submitted under this RFI. Responses to this RFI do not bind DOE to any further actions related to this topic.

Issued in Washington, DC, on August 2, 2011.

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[FR Doc. 2011–20014 Filed 8–5–11; 8:45 am]

BILLING CODE 6450-01-P

¹ Source: ConstructionDictionary.com, <http://www.construction-dictionary.com/definition/energy-efficiency-measure-EEM.html>.