

Minimum Efficiency Performance
Standards, Labels, and Test Procedures for
Refrigerators, Freezers, and Room Air
Conditioners in Canada, México, the United
States, China, and Other Developing and
Transition Nations

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Terminology

In the United States, the term “standard” is used to denote a minimum efficiency performance standard, and the term “test procedure” refers to test methods for determining energy performance.

In Canada, “standards” contain the test procedure, recommended minimum levels, and often marking or labelling instructions. The test procedure and minimum levels contained within the standard are not mandatory for a particular product type until that product is regulated through an amendment to the Energy Efficiency Act. Similarly, in Mexico, the NOM generally includes the test procedure, recommended minimum levels, and labelling instructions. The term “norma” is used to refer to minimum efficiency performance standards.

To minimize confusion regarding terminology, whenever appropriate this document uses the following terms as defined below:

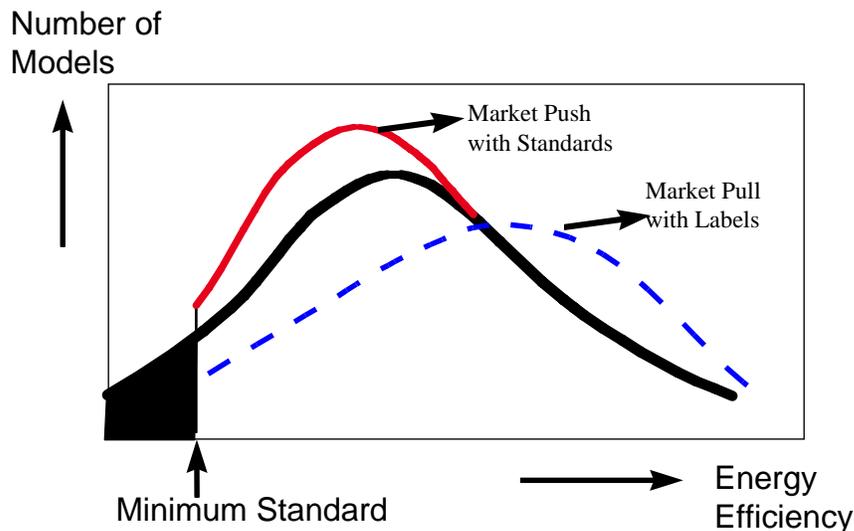
- **MEPS:** federal, mandatory minimum efficiency performance standard (the US “standard”, the Mexican “norma”).
- **Test Procedure:** A test method for determining the energy performance of a product.

I. INTRODUCTION

In the United States, Canada, and Mexico, minimum energy performance standards (MEPS), test procedures, comparative labeling, and endorsement labeling are key elements of each country's energy policies. These programs, implemented in varying ways and within different institutional contexts, have been highly effective in saving energy. One recent article estimated that U.S. appliance efficiency standards saved 120 billion kWh of electricity and 1.70 EJ of total energy per year as of 2002, with the savings growing each year as the appliance stock turns over.¹

Standards and labels are particularly effective policy tools for increasing the efficiency of energy-using appliances, equipment, and lighting by accelerating the penetration of energy-efficient technology into the marketplace.

Figure 1. Standards and Labels Work Together to Transform Markets



As Figure 1 shows, the effects of standards and labels in the marketplace are complementary. For each energy-using product, one can identify a metric that measures energy efficiency (e.g., kilowatt hours per year for refrigerators or EER for room air conditioners). The black line in Figure 1 represents the market for energy-using products in the absence of standards and labels. As the red line shows, standards “push” the market by causing manufacturers to eliminate production of the least-efficient models previously sold. As the hatched blue line shows, labels “pull” the market by providing information to consumers that allows them to make better-informed decisions and purchase the most-efficient available models, thus stimulating manufacturers to design higher-efficiency products. Together, standards and labels increase the efficiency of products offered in the market.

¹H. Geller, P. Harrington, A.H. Rosenfeld, S. Tanishima, and F. Unander. *Policies for Increasing Energy Efficiency: Thirty Years of Experience in OECD Countries*. *Energy Policy* 34 (2006): 556-573.

Energy-efficiency programs, including standards and labeling, aim to foster a sustainable “market transformation” process – permanently transforming specific markets toward increased sales of energy-efficient products. This is done by:

- developing a metric to measure the energy efficiency of a country’s (or region’s) major energy uses;
- designing clear procedures to test and verify energy use for each of these uses; and
- establishing consistent criteria for mandated and/or recommended efficiency levels throughout a country or region’s different energy-efficiency policies and programs.

Among the range of available programs and tools, standards and labeling programs have several advantages:

- (a) they have potential for generating very large energy savings,
- (b) they are a cost-effective way to reduce energy waste and contribute to increased economic efficiency,
- (c) they require changes in the behavior of a manageable number of manufacturers rather than the total consuming public,
- (d) they treat all manufacturers, distributors, and retailers equally, and
- (e) the resulting energy savings are generally assured, are comparatively simple to quantify, and can be readily verified.

By providing assurances that the superiority of new models will be communicated to prospective buyers, standards and labeling programs stimulate the research and development (R&D) that introduces advanced technologies.

These programs benefit from continuous review and adjustment of the criteria to ensure that they accurately describe progress toward energy performance goals. An open and transparent review process helps to ensure that manufacturers can minimize the costs of adjusting to future standards and labeling requirements.

Process for Setting MEPS in the U.S.

The U.S. Department of Energy (DOE) is required by legislation to set MEPS for a wide range of specified products. Additionally, those products which are not covered by MEPS but which consume more than a minimum amount of energy are to be considered for MEPS. However, MEPS can only be set after a prescribed process of research and consultation, and the MEPS levels must be demonstrated to be technically feasible and cost-effective. MEPS levels are periodically reviewed by DOE, and higher levels are set if the analysis justifies a revision.

A number of analyses are performed in the setting of each MEPS. An engineering analysis identifies and quantifies the cost of energy-saving technologies. Economic analysis analyzes historical and projected costs and benefits to consumers, manufacturers,

utility companies, and the country. Environmental impacts, including reducing emissions of carbon dioxide and nitrogen oxides, and utilization of chlorofluorocarbons, also are analyzed.

New process rules for setting MEPS in the United States were published in July 1996. The new rules were designed to: 1) provide for early input from stakeholders and support efforts to build consensus on MEPS, 2) increase the predictability of the rulemaking timetable, 3) reduce the time and cost of developing MEPS, 4) ensure increased use of outside expertise, 5) eliminate design options early in the process, 6) ensure thorough analyses of impacts and the use of transparent and robust analytical methods, 7) ensure consideration of non-regulatory approaches, and 8) articulate policies to guide the selection of MEPS. Central to the new process is the consultation with stakeholders at all stages. DOE created an advisory committee to guarantee stakeholders access to the process and the continuing process evaluation and improvement.

II. MANDATORY EFFICIENCY PERFORMANCE STANDARDS (MEPS) AND TEST PROCEDURES

A. Refrigerators and freezers

i) USA

MEPS levels

The MEPS regulations cover household refrigerators or refrigerator-freezers with a capacity of not more than 1100 L (39 cu ft), and freezers with a capacity of not more than 850 L (30 cu ft). Table 1 shows the MEPS levels that took effect on January 1, 1993 as well as the revised standards that took effect on July 1, 2001.

For the new round of MEPS which took effect on July 1, 2001, new classes of “compact” refrigerators and freezers have been defined. Compact refrigerators are those that are both less than 220 litres (7.75 cu ft) and less than 0.91 metres (36 inches) high.

MEPS levels for each product class are defined in terms of adjusted volume, where AV (Adjusted volume, cu ft) = Volume of fresh food compartment (cu ft) + ($K \times$ volume of freezer compartment (cu ft)). The values of K are:

- 1.0 for a refrigerator without a freezing compartment;
- 1.44 for a single-door refrigerator with an internal freezing compartment;
- 1.63 for a combination refrigerator-freezers; and
- 1.73 for a freezer.

Justification for MEPS

The U.S. Department of Energy published the 2001 refrigerator and freezer MEPS on April 28, 1997. The regulations included a summary of the analyses performed by contractors to the U.S. DOE. The DOE estimated that the new refrigerator and freezer MEPS would save 7.03 exajoules (EJ) of energy over a 30-year time period. The regulations also would cut CO₂ emissions by 465 million metric tons and NO_x emissions by 1.362 million metric tons, according to the DOE.

The benefit-cost analysis performed by the DOE indicated that the energy savings would pay back the extra first cost for achieving the standards in three to four years, for typical U.S. households and most of the product categories. The DOE also analysed the economic impact on manufacturers and determined that the proposed standards would not adversely affect appliance manufacturers. The DOE considered but rejected tougher standards levels because the payback period is estimated to be much longer, and also because the standards would reduce manufacturers' profit margins. In performing these calculations, the DOE uses a real (after inflation) consumer discount rate of 6 percent. In addition, the DOE found that the standards would result in no significant lessening of product utility or performance.

However, the DOE provided an additional 14 months before the standards took effect (the minimum time from publication to date of effectiveness is three years, according to U.S. law). This was done to give manufacturers more time to develop hydrochlorofluorocarbon (HCFC) substitutes in conjunction with redesigning products to meet the new energy efficiency standards. HCFC production was banned in the U.S. and other countries as of January 1, 2003.

Table 1: Refrigerator and Freezer MEPS, USA and Canada

Product Class	Description	Maximum annual energy consumption (kWh/yr)	
		Effective 1/1/93	Effective 7/1/01
1	Refrigerators and refrigerator-freezers with manual defrost	13.5 AV + 299	8.82 AV + 248.4
2	Refrigerator-freezers with partial automatic defrost	10.4 AV + 398	8.82 AV + 248.4
3	Refrigerator-freezers with automatic defrost with top-mounted freezer, no through-the-door ice service; and all refrigerators with automatic defrost	16.0 AV + 355	9.8 AV + 276
4	Refrigerator-freezers with automatic defrost with side-mounted freezer, no through-the-door ice service	11.8 AV + 501	4.91 AV + 507.5
5	Refrigerator-freezers with automatic defrost with bottom-mounted freezer, no through-the-door ice service	16.5 AV + 367	4.6 AV + 459
6	Refrigerator-freezers with automatic defrost with top-mounted freezer, and with through-the-door ice service	17.6 AV + 391	10.2 AV + 356
7	Refrigerator-freezers with automatic defrost with side-mounted freezer, with through-the-door ice service	16.3 AV + 527	10.1 AV + 406
8 (a)	Upright freezers with manual defrost	10.3 AV + 264	7.55 AV + 258.3
9 (a)	Upright freezers with automatic defrost	14.9 AV + 391	12.43 AV + 326.1
10 (a)	Chest freezers and all other (non-compact) freezers	11.0 AV + 160	9.88 AV + 143.7
11 (b)	Compact Refrigerators and Refrigerator-Freezers with Manual Defrost	13.5 AV + 299	10.70 AV + 299.0
12 (b)	Compact Refrigerator-Freezer—partial automatic defrost	10.4 AV + 398	7.00 AV + 398.0
13 (b)	Compact Refrigerator-Freezers automatic defrost with top-mounted freezer and compact all-refrigerators - automatic defrost	16.0 AV + 355	12.70 AV + 355.0
14 (b)	Compact Refrigerator-Freezers - automatic defrost with side-mounted freezer	11.8 AV + 501	7.60 AV + 501.0
15 (b)	Compact Refrigerator-Freezers - automatic defrost with bottom-mounted freezer	16.5 AV + 367	13.10 AV + 367.0
16 (b)	Compact upright freezers with manual defrost	10.3 AV + 264	9.78 AV + 250.8
17 (b)	Compact upright freezers with automatic defrost	14.9 AV + 391	11.4 AV + 391
18 (b)	Compact chest freezers	11.0 AV + 160	10.45 AV + 152

Source: CFR430, Subpart C, Clause 430.32. AV = Adjusted volume in cubic feet. (a) Not given a product class in Canadian regulations, but covered under “Freezers” (b) Compact products not separately defined under current Canadian regulations.

Test procedures

The test procedure is specified in CFR Part 430, Subpart B, Appendix A1. The test is carried out at an ambient temperature of 90°F (32.3°C) with the doors closed and with the following internal temperatures:

- 38°F (3.3°C) in the fresh food compartment of a refrigerator or a refrigerator-freezer;
- 15°F (-9.4°C) in the freezer compartment for a refrigerator (Product Class 1);
- 5°F (-15.0°C) in the freezer compartment for a refrigerator-freezer (Class 2 to 7);
- 0°F (-17.8°C) for a separate freezer.

ii) Canada

MEPS levels

Canada's regulations cover household refrigerators or refrigerator-freezers with a capacity of not more than 1100 L (39 cu ft), and freezers with a capacity of not more than 850 L (30 cu ft). The product categories, shown in Table 1, are aligned with the US program.

The Minimum Efficiency Performance Standard (MEPS) criteria, adopted in February 1995, were identical with those that became effective in the US in January 1993. Canada then modified its regulations to conform with to the new levels adopted in the United States. The new standard levels took effect in both Canada and the US in July 2001 (see Table 1). MEPS levels for each product class are defined in terms of adjusted volume.

Test Procedures

The test procedure is in CAN/CSA-C300-00. It is essentially harmonized with US 10 Code of Federal Regulations (CFR) Part 430. The test is carried out at an ambient temperature is 32.3°C (90°F) with the doors closed and with the following target internal temperatures:

- 3.3°C (38°F) in the fresh food compartment of a refrigerator;
- ≤ 7.22°C (45°F) in the fresh food compartment of a refrigerator-freezer;
- -9.4°C (15°F) in the freezer compartment for a refrigerator (Product Class 1);
- -15.0°C (5°F) in the freezer compartment for a refrigerator-freezer (Class 2 to 7);
- -17.8°C (0°F) for a separate freezer.

iii) México

MEPS levels

MEPS for Mexican residential refrigerators are currently specified by NOM-015-ENER-2002 which was published January 15, 2003 (which took effect 120 natural days after their publication). These standards substituted for the previous standards which were enacted in 1997. The current standards are very similar to USDOE 2001 MEPS for residential refrigerator/freezers. Tests are even conducted at 115 Volts (instead of the 127 volts as previously stipulated). The NOM-015-ENER-2002 establishes MEPS limits for maximum yearly energy consumption as shown in Table 2. In addition, Mexican energy efficiency standards now cover compact refrigerators and freezers as well, following actions taken in the U.S. and Canada.

Table 2. MEPS levels for refrigerators and freezers, México

	Type of Refrigerator or Freezer	Maximum energy Consumption (kWh/yr)
1	All Refrigerators & Refrigerator-freezers by manual/semiauto defrost	0.31 VA + 248.4
2	Refrigerator – Freezers - partial automatic defrost	0.31 VA + 248.4
3	Refrigerator – Freezers - automatic defrost with top-mounted freezer without through-the-door ice service and all-refrigerators-automatic defrost.	0.35 VA + 276
4	Refrigerator – Freezers – automatic defrost with side-mounted freezer without through-the-door ice service.	0.17 VA + 507.5
5	Refrigerator – Freezers – automatic defrost with bottom-mounted freezer without through-the-door ice service.	0.16 VA + 459
6	Refrigerator – Freezers – automatic defrost with top-mounted freezer with through-the-door ice service.	0.36 VA + 356
7	Refrigerator – Freezers – automatic defrost with side-mounted freezer with through-the-door ice service.	0.36 VA + 406
8	Upright Freezers with manual defrost.	0.27 VA + 258.3
9	Upright Freezers with automatic defrost.	0.44 VA + 326.1
10	Chest Freezers with manual defrost.	0.35 VA + 143.7

Maximum energy consumption in kWh/year; VA = Adjusted volume in litres, Source: NOM-015-ENER-2002.

Test procedures

The test method for refrigerators and freezers in México is the same as CAN/CSA C300-M89 and US DOE CFR430 Subpart B Appendix A and B.

iv) China

MEPS levels

China adopted efficiency standards for refrigerators and freezers in 1989 using the same approach as the U.S., Canada, and Mexico. Namely, the maximum electricity use of a given type of model is a function of the adjusted volume plus a constant. New standards went into effect in 2000 and covered nine different product categories (five types of refrigerators, four types of freezers). The standards were revised again with the more stringent standards taking effect in two phases, the first tier in 2003 and then a second tier taking effect in 2007. The 2003 standards resulted in approximately a 10% reduction in maximum electricity consumption relative to the 2000 standards, and the 2007 revision will result in a further 10% reduction roughly speaking.

v) Other Developing and Transition Countries

According to the CLASP web site (www.clasponline.org), the following countries had adopted mandatory efficiency standards on refrigerators and freezers as of September, 2004, in addition to the ones mentioned above: Russia and other former Soviet Union countries, Korea, Taipei, Czech Republic, Poland, Hungary, Costa Rica, Colombia, Iran, Venezuela, Jamaica, Egypt, and Tunisia (refrigerators only). In addition, the European Union adopted MEPS on refrigerators and freezers in 1992.

Among larger countries without mandatory efficiency standards, India is well on its way to adopting MEPS for refrigerators and freezers. However, the standards under development in India were not publicly available as of April, 2006.

B. Room air conditioners

i) USA

MEPS levels

The MEPS regulations cover single-phase air conditioners that are not “packaged terminal air conditioners”. Products with and without louvred sides are defined as distinct categories, as indicated in Table 3. The initial MEPS levels went into effect on January 1, 1990. More stringent levels were published in October 1997 and took effect on October 1, 2000. New product categories for units designed to be installed in casement windows (narrow vertical windows) also were added.

The MEPS requirements for each air conditioner category are summarized in Table 3. The MEPS requirements apply to cooling performance only, although different

cooling MEPS may apply if the product heats as well as cools.

Table 3: MEPS Levels for Room Air Conditioners, USA

	Product Class: Reverse Cycle?	Cooling capacity range	1990 Min EER (BTU/Wh)	1990 Min EER (W/W) (a)	2000 Min EER (BTU/Wh)	2000 Min EER (W/W) (a)
Units with louvred sides	1. No	Less than 6,001 BTU/hr (<1.76 kW)	8.0	2.34	9.7	2.84
	2. No	6,001 – 7,999 BTU/hr (1.76 -2.34 kW)	8.5	2.49	9.7	2.84
	3. No	8,000 – 13,999 BTU/hr (2.34 -4.10 kW)	9.0	2.64	9.8	2.87
	4. No	14,000 – 19,999 BTU/hr (4.10-5.86 kW)	8.8	2.58	9.7	2.84
	5. No	≥ 20,000 BTU/hr (≥5.86 kW)	8.2	2.40	8.5	2.49
	11. Yes	< 20,000 BTU/hr (<5.86 kW)	8.5	2.49	9.0	2.64
	13. Yes	≥ 20,000 BTU/hr (≥5.86 kW)	8.5	2.49	8.5	2.49
Units without louvred sides	6. No	Less than 6,000 BTU/hr (<1.76 kW)	8.0	2.34	9.0	2.64
	7. No	6,000 – 7,999 BTU/hr (1.76 – 2.34 kW)	8.5	2.49	9.0	2.64
	8. No	8,000 – 13,999 BTU/hr (2.34 - 4.10 kW)	8.5	2.49	8.5	2.49
	9. No	14,000 – 19,999 BTU/hr (4.10 -5.86 kW)	8.5	2.49	8.5	2.49
	10. No	≥ 20,000 BTU/hr (≥5.86 kW)	8.2	2.40	8.5	2.49
	12. Yes	< 14,000 BTU/hr (<5.86 kW)	8.0	2.34	8.5	2.49
	14. Yes	≥ 14,000 BTU/hr (≥5.86 kW)	8.0	2.34	8.0	2.34
	15. Casement-only		(b)		8.7	2.55
	16. Casement-slider		(b)		9.5	2.78

Source: 10CFR430 Subpart C Part 430.32 (a) MEPS levels are specified in terms of Btu/W-hr metric in the U.S. The W/W metric is given for information only. (b) New classification introduced for 2001 MEPS.

Test procedures

The test procedure is in Part CFR 430 Subpart B, Appendix F, referencing ANSI/AHAM RAC-1-82, ASHRAE 16-83-RA88 and ASHRAE 90-1-1989.

Justification for MEPS

The U.S. DOE estimated that the new room air conditioner standards that took effect in the U.S. in 2000 would save 0.67 exajoules (EJ) of energy over a 30-year time period. Although this level of energy savings is modest (about 10% as great as the energy savings from the 2001 refrigerator and freezer standards), it is still considered significant.

The benefit-cost analysis performed by the DOE indicated that the energy savings would pay back the extra first cost for achieving the new air conditioner standards in five years or less for typical U.S. households, for all of the product categories. For seven of the twelve categories, the typical payback period is three years or less. The DOE estimated that the standards could result in a small decrease in manufacturers' profit margin in the short run, but little or no negative effect on long run profitability. The DOE considered but rejected tougher standards levels because the payback periods are estimated to be much longer, and also because the standards would significantly reduce manufacturers' profit margins. In addition, the DOE found that the standards would result in no significant lessening of product utility or performance, in part because four new classes of products were created in setting the standards.

ii) Canada

MEPS levels

The Regulations cover single-phase air conditioners that are not "packaged terminal air conditioners" with a cooling capacity up to 10.55 kW (36,000 BTU/hr). Products with and without louvred sides are defined as distinct categories. In 1995 Canada adopted the U.S. window air conditioner standards that took effect in the U.S. in 1990. Canada subsequently adopted the 2000 U.S. window air conditioner standards, effective in Canada on January 1, 2003. The U.S. and Canadian standards are identical.

Test procedures

The test procedure is in CAN/CSA-C368.1-M90. It is based on ASHRAE standard 90-1-1989, which is also used in the U.S.

iii) México

MEPS levels

The law in force is NOM-021-ENER/SCFI/ECOL-2000 on energy efficiency and safety requirements for the use and elimination of chlorofluorocarbons (CFC's) in room air conditioners. This law, which includes limits, test procedures, and labeling, was published on April 24, 2001 and entered into effect on June 23, 2001. This law replaces the previous room air conditioner law, NOM-073-SCFI-1994.

Room air conditioners with or without heating devices, are classified by their cooling capacity, as well as their specific design characteristics, as shown in the Table 4.

Table 4: Classifications for Room Air Conditioners, México

Type	Class	Cooling Capacity (W)
Without inverse cycle and with lateral grooves	1	Less than or equal to 1,758
	2	between 1,759 and 2,343
	3	between 2,344 and 4,101
	4	between 4,102 and 5,859
	5	between 5,860 and 10,600
Without inverse cycle and without lateral grooves	6	Less than or equal to 1,758
	7	between 1,759 and 2,343
	8	between 2,344 and 4,101
	9	between 4,102 and 5,859
	10	between 5,860 and 10,600
With inverse cycle and with lateral grooves	11	Less than or equal to 5,859
	13	Between 5,860 and 10,600
With inverse cycle and without lateral grooves	12	Less than or equal to 4,101
	14	Between 4,102 and 10,600

The energy efficiency of the air conditioners referred to in this law is specified using the “Relación de Eficiencia Energética” (REE). The equipment subject to this law must have an REE value greater than or equal to the values specified in Table 5. The manufacturer must include on the label the value of the REE in W/W.

Table 5. Minimum REE Values for Room ACs in Mexico (W/W)

Class	REE
1	2.84
2	2.84
3	2.87
4	2.84
5	2.49
6	2.64
7	2.64
8	2.49
9	2.49
10	2.49
11	2.64
12	2.49
13	2.49
14	2.34

Test procedures

The test procedure used for determining equipment efficiency follows ANSI/ASHRAE-16-1988 and is also the same as US DOE CFR430.

iv) China

MEPS levels

China first adopted MEPS on room air conditioners in 1989, along with standards on refrigerators and other products including clothes washers, fans, TVs, lamps, ballasts, and motors. In 2004, China adopted new standards on room ACs that take effect in two phases. The first phase took effect in 2005 while the second phase will take effect in 2009. The standards apply to both conventional “single package” and split system room air conditioners (also known as “mini-splits”). The MEPS are expressed as the EER and are a function of capacity and product type, as shown in Table 6.

The 2009 standards are relatively stringent and are considered a “reach standard” for Chinese manufactures. They are roughly equivalent in stringency to standards now in effect in the United States and Canada. Given that over 30 million room ACs are now sold in China every year and this market is rapidly growing, the projected energy savings and peak demand reduction from the room AC standards are quite significant—13 GW of peak demand reduction by 2015 and 20 GW by 2020.² This is more than the capacity of the Three Gorges dam hydropower plant!

Table 6. Minimum EER Values for Room ACs in China (W/W)

Cooling capacity (W)	2005	2009
Single package	2.30	2.90
Split, $\leq 4,500$	2.60	3.20
Split, 4,500 – 7,100	2.50	3.10
Split, 7,100 – 14,000	2.40	3.00

v) Other Developing and Transition Countries

According to the CLASP web site (www.clasponline.org), the following countries have adopted mandatory efficiency standards on room air conditioners as of September, 2004, in addition to the ones mentioned above: Russia and other former Soviet Union countries, Korea, Thailand, The Philippines, Taipei, Costa Rica, Columbia, Jamaica, Iran, Egypt, and Ghana.

² J. Lin and D. Fridley. *China's Room AC Reach Standard Impact*. Berkeley, CA: Lawrence Berkeley National Laboratory. Dec. 2004.

III. COMPARISON LABELS

A. U.S. Energy Guide program

In 1975 the Energy Policy and Conservation Act required the US Federal Trade Commission (FTC) to establish an appliance energy efficiency labeling program. The program, Energy Guide, became effective from about 1980 when manufacturers were obliged to place energy labels indicating energy consumption on their appliances. Appliances labeled include central and room air conditioners, clothes washers, dishwashers, freezers, furnaces, refrigerators, refrigerator-freezers, water heaters, heat pumps, boilers, ballasts, and lamps.

The label originally showed only the annual cost of operation; however, problems arose when national average electricity price changed from year to year. In 1994, the FTC revised the Energy Guide label to make annual energy use (in kWh) rather than average annual operating cost the main comparative indicator. The rating system shows energy (kWh/year), operating cost, and the lowest and highest energy used for similar products. Energy efficiency ratios (i.e., EER or SEER) are used for climate-control appliances such as window air conditioners, for which energy consumption varies by region and seasons. The annual cost appears on the label in the case of room air conditioners, and on fact sheets and in industry-produced product directories for the other climate-control appliances.

B. Canada's EnerGuide program

Natural Resources Canada administers the national comparative labeling program, EnerGuide, which has both mandatory and voluntary labeling elements. The mandatory component applies to room air conditioners, freezers, refrigerators, refrigerator-freezers, clothes dryers, clothes washers, clothes washer/dryers, dishwashers, and ranges/ovens. The mandatory EnerGuide labels display the energy (kWh/year) used by the appliance and how this compares with the lowest and highest energy consumption for similar products. Air conditioner ratings are based on the Energy Efficiency Ratio (EER) of the unit. Voluntary labeling applies to a wide range of other products.

C. México's comparative labeling program

México's mandatory comparative labeling program is implemented for the most part by the Comisión Nacional de Ahorro de Energía (CONAE). Products covered include room and central air conditioners, refrigerators and/or refrigerator-freezers, clothes washers, centrifugal residential pumps, gas water heaters, commercial refrigeration, and non-residential building envelopes.

Products that require efficiency labels are rated as part of the MEPS process. The label for refrigerators shows how efficient the appliance is in comparison to one

operating at the MEPS level. The Air Conditioner label displays the EER and allows calculation of running costs. It ranks the product relative to the MEPS level (which is shown on the label) from A to E, with E being the best.

D. China’s labeling program

China has a mandatory efficiency labeling system for refrigerators, freezers, and room air conditioners. For refrigerators and freezers, each product gets a grade of 1 through 5 (1 being most efficient, 5 least efficient; see Table 7). EUmax is the maximum energy use of a product of the type and volume under the MEPS.

Table 7. China’s Labeling System for Refrigerators

Cooling capacity (W)	Energy Efficiency Grade
< 55% of EUmax	1
55 – 70% of EUmax	2
70 – 80% of EUmax	3
80 – 90% of EUmax	4
90 – 100% of EUmax	5

Room ACs also are labeled in China on a five grades/tiers basis.

IV. ENDORSEMENT LABELS

A. U.S. ENERGY STAR program

A voluntary energy efficient product labeling program known as ENERGY STAR®) was initiated by the U.S. Environmental Protection Agency (EPA) in 1992. Starting in 1996, the U.S. Department of Energy began collaborating with EPA on the program. Appliances labeled under the ENERGY STAR program include computers, monitors, printers, fax machines, central and room air conditioners, ventilating fans, ceiling fans, copiers, furnaces, boilers, heat pumps, transformers, dishwashers, refrigerators, clothes washers, residential lighting products, scanners, TVs, VCRs, set top boxes, audio products, DVDs, CFLs, programmable thermostats, water coolers, dehumidifiers, windows, roof products, exit signs, and traffic lights (see www.energystar.gov for details).

For office equipment such as personal computers and photocopiers, and household electronic equipment such as video cassette recorders, the ENERGY STAR label indicates that the model has certain power management capabilities, and that the manufacturer has undertaken to supply the product with those capabilities turned on, or “enabled.” For other types of equipment, the ENERGY STAR label indicates that the product is among the most efficient of its type, either because it is in the top roughly 20% in terms of energy efficiency, or because it exceeds the MEPS level by a specified

margin. The amount by which an appliance must exceed the MEPS differs for each product and is dependent on available technology in each product category. For photocopiers, the product must have certain paper handling as well as power management capabilities.

B. Description of Canada's Energy Star - High Efficiency Label

In 2001, The Government of Canada through Natural Resources Canada (NRCan) became a partner of International ENERGY STAR. The International ENERGY STAR Program began in October 1995 with an agreement between the governments of Japan and the United States regarding labeling of office equipment. NRCan and other partner countries recognize and promote the criteria and logo established under the USA ENERGY STAR scheme. The logo administered in Canada includes the bilingual *High Efficiency/Haute Efficacité* tagline which identifies it as Canadian.

The following products are part of the initial agreement involving Canada: refrigerators, dishwashers, clothes washers, bottled-water coolers, room air conditioners, dehumidifiers, condensing gas furnaces, central air conditioners and heat pumps, programmable thermostats, office equipment and home electronics (TVs, VCRs, and DVDs). Products in the agreement that currently have an EnerGuide label will have the Energy Star logo on the same label. Products approved in one country are licensed to display the label in any of the other participating countries. Product information is then shared among the participants. The U.S. EPA and U.S. DOE are responsible for developing the endorsement criteria, but NRCan is consulted when developing new specifications.

C. Description of México's Sello FIDE program

In 1995, México introduced the Sello FIDE, a voluntary energy efficiency endorsement seal given by the Fideicomiso para el Ahorro de Energía Eléctrica (FIDE). FIDE is a non-profit association that draws membership from a collaborative of Mexican utilities, labor organizations and businesses including CONAE and Comisión Federal de Electricidad (CFE, or Federal Electricity Commission).

Appliances labeled under this program are room air conditioners, fluorescent lamps and CFLs, refrigerators, refrigerator-freezers, and televisions. Manufacturers have to submit certified test results on their products to confirm that they cover the Sello FIDE requirements. A certified laboratory tests the product to verify manufacturer claims. If approved, manufacturers pay for certification and sign an agreement stipulating length of validity of the Sello FIDE endorsement, how it can be displayed, cancellation of certification, etc. Manufacturers can then display the Sello FIDE on their products. FIDE advertises the Sello FIDE in order to entice consumers to look for it when purchasing electrical equipment.

D. Voluntary Labeling in China

China has a voluntary energy efficiency labeling program similar to ENERGY STAR. It now covers over 20 products including clothes washers, TVs, motors, computers, printers, fax machines, CFLs, lighting ballasts, microwave ovens and rice cookers! The China Energy Certification Center administers this program (<http://www.cecp.org.cn/englishhtml/index.asp>).

Appendix A: Relevant Web Sites

Canada

<http://energiguide.nrcan.gc.ca/> - EnerGuide

<http://oee.nrcan.gc.ca/english/> - Office of Energy Efficiency

<http://oee.nrcan.gc.ca/regulations> - Natural Resources Canada Regulations

www.scc.ca - Standards Council of Canada

<http://www.csa.ca/standards/> - Canadian Standards Association

<http://www.oee.nrcan.gc.ca/energystar> - Canadian Energy Star site

México

www.conae.gob.mx - Comisión Nacional para el Ahorro de Energía (CONAE - National Energy Savings Commission)

www.fide.org.mx/ - Fideicomiso para el Ahorro de Energía Eléctrica (FIDE Trust for saving Electrical Energy)

www.secofi.gob.mx/normas - Dirección General de Normas (Mexican Standards Association)

www.energia.gob.mx - Secretaria de Energia (Ministry of Energy)

www.cre.gob.mx - Comisión Reguladora de Energía (CRE Energy Regulatory Commission)

www.cfe.gob.mx - Comisión Federal de Electricidad (CFE Federal Electricity Commission)

USA

http://www.eere.energy.gov/buildings/appliance_standards/ - DOE appliance and equipment standards

www.energystar.gov - ENERGY STAR® web site

http://www.eere.energy.gov/consumer/your_home/appliances/index.cfm - energy use of home appliances

General

<http://www.clasponline.org/main.php> - Collaborative Labeling and Appliance Standards Program (CLASP)