Energy Labeling: A Comparison of Existing Programs

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1. SYNOPSIS

Product rating, labeling, and certification programs can provide information on energy use that can influence consumer purchases. This paper examines some existing programs and explores relevant policy issues.

2. ABSTRACT

A broad range of market development strategies are being used to promote existing and new energy efficient products. One such strategy involves product rating, labeling, and certification. These programs offer a means to identify energy efficient products and encourage innovative new technology. Programs can be instituted by government agencies, by manufacturers and industry associations, or by some 'third-party', such as environmental groups, consumer advocates or utility consortia. This paper examines the key issues involved with labeling using examples of programs in the United States, Canada, and Europe.

For the most part, consumers seem unaware of the long-term cost savings and environmental benefits associated with energy efficient products. Labeling efforts aim to raise awareness among consumers and shift purchasing practices towards the more energy efficient and/or environmentally preferable products, thereby expanding the marketplace for these types of products. Different approaches are utilized. For example, some rating and labeling programs offer a means for buyers to compare similar products and make more informed choices about energy efficiency and other criteria; while others identify and endorse a limited number of products which meet a specified performance level.

3. INTRODUCTION

A variety of market development strategies are used to promote existing and new energy efficient products. Rating, labeling, and product certification programs offer a means to identify energy efficient products and encourage innovative new technology. Different types of programs have been instituted by national and provincial governments, as well as by utilities and advocacy groups. These programs may be categorized in the following ways:

° Endorsement vs. Comparison: Some labeling programs identify and endorse a limited amount of products which meet a specified performance level; while others offer a means for buyers to compare similar products and make more informed choices about energy efficiency and other criteria.

° Governmental vs. Manufacturing Associations vs. Third-party: Programs can be instituted by government agencies, manufacturers, industry associations, or by 'third-party' environmental groups, consumer advocates, utilities, or utility consortia.

° Fee-based vs. Program-funded: Many programs require that manufacturers pay to have their product certified and labeled; while others rate and label all products of a particular type on the market.

° Energy only vs. Environmental criteria: Some programs address only the energy consumption of a product; while others are more broadly based and incorporate energy into the overall assessment of environmental preferability.

Product rating, certification and labeling programs try to improve the information available about the energy and/or environmental attributes of different products. In many countries, including the U.S., there is a widespread belief that this type of information is lacking, misleading or confusing. As a result, consumers are often unaware of the long-term cost savings and environmental benefits associated with buying energy efficient products. This low level of public awareness may hamper the introduction and/or adoption of new energy-saving technology.

Advocates of rating and labeling programs hope that by providing credible, clear information about products, sales will shift in favor of the more efficient and environmentally preferable products. This will expand the marketplace for environmentally preferable and efficient products, and speed the commercialization of new technologies.

4. 'ENDORSEMENT' LABELING PROGRAMS

'Endorsement' labeling programs help consumers distinguish among similar products by doing the investigation and comparison work, and providing the buyer with a single "seal of approval" for those products which meet or exceed the established criteria. Some of these programs attempt to target the upper percentage of products on the market in terms of energy efficiency (and/or other criteria). Other programs try to encourage the purchase of a particular class of products (such as thermal insulation), rather than distinguishing between more efficient and less efficient products in a given category.

Below are brief descriptions of some of the 'endorsement' labeling programs, beginning with four that deal with energy use only, then three with a broader environmental focus.

4.1 Energy Star

The Energy Star program is a governmental program established by the U.S. Environmental Protection Agency (EPA) in 1992. Although run by a government agency, Energy Star is a voluntary labeling program for energy efficient office equipment. Plans are underway to expand the Energy Star program to home appliances and other types of energy-using commercial equipment.

Initially, the program focused on personal computers (PCs), monitors, and printers that incorporate an automatic feature to switch into a low-power "sleep" mode when not in active use. The basic requirement for PCs and monitors is a sleep mode at or below 30 watts (W). Sleep mode levels for printers vary with the machine's output rate, but are typically 30 or 45 W.

The Energy Star program was expanded in Fall 1994 to cover facsimile (fax) machines, with a two-tiered labeling program for efficient office copiers to be announced in 1995. The energy efficiency criteria for copiers include a low-power mode, auto-off feature, and automatic duplex copying (as a "default" setting). The program's first tier is designed to be readily achieved in the near term by most manufacturers, the second is targeted at the upper 20-25% of today's market, as a possible criterion for government purchasing and utility demand-side management (DSM) programs, and as a "best-practice" target for most or all models to reach within a few years.

Each manufacturer participating in the program signs a memorandum of understanding with EPA. Product testing and self-certification is left to the individual manufacturer, with provisions for EPA to follow up on any complaints from competing manufacturers or users about an improperly certified product. Products complying with the EPA requirements were eligible to use the Energy Star label beginning in June 1993. EPA is in the process of negotiating agreements with government agencies and industry groups in Europe and Japan on a common, internationally recognized set of Energy Star criteria.

The initial focus of the program was on maximizing voluntary participation by manufacturers. A recent survey by an industry association indicated a relatively low level of buyer awareness of the Energy Star program, so EPA has launched advertising campaigns to increase program awareness by large, government and institutional purchasers, as well as small businesses, individual consumers, and retailers. There are plans for future promotions through retail outlets and a voluntary corporate procurement program.

Government purchasers represent a large portion of the copier, computer, and office equipment market. In April 1993, President Clinton signed an Executive Order (#12845) requiring Federal agencies to purchase Energy Star products. This mandatory requirement has been a major factor contributing to manufacturer participation in the program.

The most striking early success of the Energy Star program has been its high rate of voluntary participation by manufacturers, especially for PCs and printers. As of late 1994, personal computers that meet the Energy Star requirements accounted for at least 50% of the business market, and a somewhat lower fraction of sales to the home PC market. Well over 80% of computer printers now on the market already comply with Energy Star requirements, and complying monitors are available in all common screen sizes, from 14 inch (35.5 cm) to 21 inch (53.3 cm). EPA maintains a data base of complying products which is available to corporate and individual consumers in electronic or hard-copy format.

Another significant but little-recognized result of the Energy Star program has been the reduced power requirements of PCs in their "active" mode, from 75-80 W a few years ago, to 35-45 W today. This occurred in part as a by-product of designs aimed at achieving sleep mode power under 30 W.

While a vast range of Energy Star compliant products are now being produced and sold, the units may not be shipped to the consumer with this feature "enabled." Therefore, if the user does not understand how and why to enable this power-saving feature, it may remain disabled.

EPA has recently revised the Energy Star requirements for PCs, monitors, and printers to require that the equipment be shipped with the "sleep" feature enabled. Recently established criteria for fax machines and for copiers (forthcoming) require that the "sleep" feature be shipped enabled, and that other user-programmable controls, such as duplex copying, be set as the "default" mode.

4.2 E-2000

The Swiss government has established a Target Value Program for energy consumption of office equipment which is supported by the E-2000 labeling program. Switzerland's Target Value Program establishes quantitative goals for the average efficiency of products sold, for several years in succession. The program came about following a 1991 resolution and a 1992 decree on reducing energy use. It is designed for voluntary compliance; however, if the target values are not met by certain dates, the federal government may set mandatory standards. (Aebischer 1994)

The target values for office equipment were defined in "close collaboration" with manufacturers. The targets include maximum energy use in stand-by mode for photocopiers, printers, fax machines, PCs and monitors. (Aebischer 1994) A total of 80 to 95% of the products must comply with these values by the deadline dates, set for 1997 and 1998.

The E-2000 labeling program will annually award labels to products which are in the top 30% for energy efficiency. These efficiency values are made more stringent every year until they reach the target values. (Aebischer 1994)

4.3 Power Smart

The Power Smart program was established in 1989 as a demand-side management (DSM) effort by a public utility in Canada. Now owned by seven Canadian utilities, Power Smart, Inc. (PSI) is an international membership organization comprised of gas and electric utilities and government agencies. PSI has 33 utility members including: all major Canadian utilities, two American utilities--Portland General Electric and American Municipal Power in Ohio--as well as utilities in Mexico, the Caribbean, and Eastern Europe.

Power Smart's programs are geared towards increasing the efficient use of energy through a cooperative approach involving utilities, manufacturers and retailers. Their labeling effort, called the Product Endorsement Program, certifies and labels products which meet PSI's criteria for energy efficiency. The program helps consumers identify energy efficient products and attempts to "push the envelope" by moving the market towards greater efficiency. (Lee, personal communication, 1994)

Power Smart's labeling criteria are set to capture roughly the top 20% most energy efficient products (in terms of sales). However, the 20% threshold is not absolute. Depending on the type of product and its market, some labeling criteria are set at the top 3% and others at 40%. PSI's general philosophy is to move the market on the whole towards energy efficiency, rather than strictly adhering to a set of efficiency standards. (Abraham, personal communication, 1994) In addition to energy-using products, those which enhance energy efficiency, such as thermal insulation, can qualify for the Power Smart label.

Interested manufacturers can submit an application for the product label and, if accepted, pay a $500 fee to Power Smart for each product line. As of the middle of 1994, over 1,850 products had been certified by Power Smart in more than 30 product categories. (Carozza, personal communication, 1994) Over 80 North American manufacturers, including large corporations such as Dow, DuPont, Honeywell, Panasonic, Motorola Lighting and General Electric, have products endorsed by Power Smart.

PSI has not obtained independent market data of the labeling program's impact, but there is some anecdotal evidence. For example, BC Hydro has reported 95% awareness of Power Smart programs in British Columbia and sales of energy efficient refrigerators and motors have risen dramatically. They claim that sales of efficient refrigerators in British Columbia have risen from 15% to 90% of the market in two years and high efficiency motor sales have increased from 5-10% to over 70% in less than three years. However, it is important to note that because Power

Smart uses a variety of marketing tools and DSM programs simultaneously (including rebates), it is difficult to determine how much impact the labels themselves have had, independent of the other programs.

PSI says they differ from government and other 'third-party' labeling efforts because their criteria are not absolute and they are not concerned that all products meet a fixed threshold. Instead, PSI is simply trying to "push consumers and pull manufacturers" in a general direction towards greater energy efficiency by making it easier for consumers to identify the more efficient products on the market. (Lee, personal communication, 1994)

4.4 BPA's Blue Ribbon Award Campaign ("Blue Clue")

In 1986, the Bonneville Power Administration (BPA), a U.S. federal power marketing agency, launched its Blue Ribbon Award Campaign or "Blue Clue" program to promote the purchase of energy efficient refrigerators and freezers as part of their demand-side management (DSM) effort. The overall objectives of the Blue Clue program were to increase the market share of energy efficient appliances, and to determine how much impact education and promotion could have on the market.

BPA identified those refrigerator and freezer models which were in the top 15% for energy efficiency. These were designated with a Blue Ribbon "Energy Efficiency Award" and were listed in a brochure. The brochure was accompanied by a labeling program to help consumers easily identify the energy efficient models. To encourage retailers to take part in the program, BPA provided them free Blue Ribbon award stickers to place on qualifying models, brochures, posters and other promotional material, along with free listings in newspaper advertisements. BPA had a three month region-wide television and newspaper advertising campaign, and provided consumers with a toll-free number for questions and brochure requests.

One of BPA's goals was to determine to what extent education and promotion could affect the market share of new, energy efficient refrigerators and freezers. According to an independent consultant survey, participating retailers estimated that about 22% of customers had been "influenced" in their purchase by the Blue Ribbon campaign. Roughly one-quarter of the retailers said that the Blue Ribbon was a "very useful" sales tool. As far as the market share increase, about one quarter of participating retailers reported that the program had influenced "either their orders to their suppliers or the number of qualifying models on display." However, the consultant cautioned that the report and accompanying surveys may have been undertaken too early in the program to get an accurate assessment of the program's impact. This program ended in 1991.

The following are summaries of some 'endorsement' labeling programs which have a more comprehensive focus: energy consumption as a part of the overall environmental preferability of products.

4.5 Green Seal

Established in 1990, Green Seal is a non-profit, non-governmental product labeling and consumer education organization in the United States. Its goal is to offer unbiased 'expert' advice to consumers on products that are "less harmful to the environment." Green Seal is not supported or managed by government agencies or by product manufacturers; it believes that this independent status offers a credible approach to identifying environmentally preferable products.

Green Seal's labeling program identifies and endorses energy-saving and environmentally preferable products which meet their standards. To date, 52 standards have been established for products ranging from household cleaning products and paints, to windows and household appliances. Green Seals takes a 'cradle to grave' look at the entire life-cycle of a product (from manufacture, to use, to disposal), and focuses on those aspects of the life-cycle which cause the most harm to the environment. (Weissman, personal communication, 1994)

Energy use is a major component of the standards for compact fluorescent lighting, windows, dishwashers, clothes washers and dryers, refrigerators and freezers, and cooktops, ovens and ranges. The Green Seal label identifies those models with energy efficiency levels that are roughly in the top 15 to 20% of models on the market. (Hauck, personal communication, 1994)

Manufacturers interested in applying for the Green Seal Certification Mark pay a product evaluation fee to have their product tested by a Green Seal accredited laboratory. Because this is a 'fee-based' program, use of the label is reserved for those products which have been submitted by the manufacturer and certified by Green Seal. Consequently, there are products on the market which may meet the standards but do not have the Seal. Since Green

Seal began certifying products in March 1993, over 112 products have received the label. (Weissman, personal communication, 1994)

To promote recognition of the label, Green Seal has begun several public awareness campaigns. Beginning in 1994, large purchasers such as governments, universities, and corporations, could become Green Seal Environmental Partners by committing to a 'green' procurement policy. Green Seal advertising dollars are limited, so they have targeted 'free' advertising media, such as public service announcements and magazine articles.

Because Green Seal's program is relatively new and only a few products carry a Certification Mark, no market impact data are available on consumer recognition or reaction to the labels, whether purchasing decisions have been affected, or manufacturer reaction. However, Green Seal conducted an attitude survey in which 4 out of 5 consumers indicated they would be more likely to purchase a product certified by Green Seal when choosing among products of equal quality and price.

4.6 Environmental Choice

Canada's Environmental Choice Program (ECP) is a governmental, market-based initiative which certifies and labels products and services that "ease the burden on the environment." It was the second program of its kind in the world -- West Germany's 'Blue Angel' program was the first.

The ECP labeling program aids consumers in identifying products and services that are less harmful to the environment. The federal department, Environment Canada, established the program in 1988 to promote more environmentally conscious purchasing and support efforts to improve and/or maintain environmental quality.

ECP oversees the development of environmental criteria for product and service guidelines and reviews research on the product's environmental impact during its life-cycle (production, transportation, use and disposal), examining opportunities for significant reductions in the burden the product or service places on the environment. Products and services which meet the program's guidelines for environmental impact can qualify to bear the 'EcoLogo' label. As a voluntary program, ECP invites manufacturers, importers, retailers and service providers to apply for the EcoLogo when they believe their products or services would "qualify for, and benefit from, an independent, impartial environmental certification."

As of the middle of 1994, ECP had published 29 guidelines addressing over 65 product and service categories, such as recycled paper, major household appliances, and water-conserving devices. The guideline-setting process is continuing and the Program aims to triple the number of product guidelines over the next two years. (Leah, personal communication, 1994)

Although established and run by the federal government, ECP is not a mandatory program. Once guidelines are established for a particular product or service, interested manufacturers, service providers and others can voluntarily apply for the EcoLogo. They must agree to have their product or process tested and pay an initial verification fee, as well as an annual license fee, which is based on the sales of the certified product or service. ECP believes the independent verification and testing process makes the EcoLogo more credible to consumers. So far, over 700 products and services have been certified and authorized to use the EcoLogo.

ECP does not examine all of the products available to Canadians. Only those products which are voluntarily submitted and accepted will be certified. Companies with certified products or services can display the EcoLogo label and use it in their marketing efforts.

ECP is operating on a cost-recovery system and public funding is scheduled to gradually decrease over the next three to four years. The idea is that ECP will be self-funded by the fees paid by companies (licensees) which have products and services that have been certified to display the EcoLogo. (Leah, personal communication, 1994)

Until recently, the marketing of the label to both consumers and potential licensees has not been very effective and there seems to be a relatively low level of consumer recognition of the label (some have seen it, but few know what it means), as well as low public demand for labeled products. In response, Environmental Choice has recently taken steps to revamp the program, using an aggressive three-pronged marketing approach of increasing public awareness, working with retailers, and focusing on youth education. (Leah, personal communication, 1994)

At present, ECP has little information on whether the EcoLogo has affected product market shares. A consumer's decision to purchase products which are less harmful to the environment may be influenced by the presence of the EcoLogo, but can also be based on other factors, such as price and marketing.

4.7 European Community Ecolabeling

In 1992, the Member States of the European Community (EC) established an ecolabeling program designed to encourage manufacturers "to make products that least harm the environment" and to better inform consumers on the environmental impacts of products. (UK Ecolabelling Board 1993)

The EC labeling 'scheme' is based on a 'cradle-to-grave' assessment of product categories. Products which meet the criteria agreed upon by the Member States can carry the Ecolabel. Interested manufacturers must submit independent test data in support of their Ecolabel application. An application fee, as well as an annual licensing fee, will be required. (U.S. EPA 1993)

The member countries have been assigned specific product categories and are responsible for performing a life-cycle analysis and drafting criteria for those product types. The United Kingdom led the development of the criteria for clothes washers and dishwashers, and both have been adopted by the EC Commission. (UK Ecolabelling Board 1993) A consulting group gathered background information and made an assessment of the cradle-to-grave impacts of the two appliances. The study addressed the pollution and resource use involved in the production, distribution (including the manufacturing of the packaging), the use, and disposal of the appliances. They found that for both product types, by far, the largest contribution to the overall environmental impact is made by the use stage. Energy and water consumption, as well as the air and water emissions which accompany them, have the greatest influence. (UK Ecolabelling Board 1993)

Therefore, the criteria established dealt largely with the use stage of the appliances. The Ecolabel criteria include requirements for energy and water consumption, "best practice" user information, and performance characteristics. (UK Ecolabelling Board 1993) The "best practice" user information is required to provide consumers with clear instructions on how to obtain optimal performance from the appliance, as well as how to recycle the plastic components.

5. 'COMPARISON' LABELING PROGRAMS

In contrast with 'endorsement' labeling, a 'comparison' labeling program tries to provide consumers with information on all or most of the models within a given product category, leaving it to each buyer to evaluate energy efficiency (or other environmental attributes) along with price, convenience, reliability, and other features of interest. 'Comparison' labels typically use a set of standardized information to report on the labeled model's energy performance characteristics (such as annual energy use, energy operating cost, or an efficiency index) and often includes the model's performance as compared to similar models. The assumption is that if consumers have easy access to comparable energy performance information, they will make better informed decisions and -- on the whole -- select products that are more energy efficient.

The following are brief descriptions of five 'comparison' labeling programs; four of them focus on providing energy information, while the fifth program provides more comprehensive information on overall environmental impacts of the products.

5.1 Energy Guide

The U.S. government established a mandatory compliance program in the 1970s requiring that certain types of new appliances be labeled to help consumers compare the energy efficiency among similar products. The Federal Trade Commission's (FTC) Appliance Labeling Rule became effective in 1980 for refrigerators, freezers, refrigerator-freezers, water heaters, clothes washers, dishwashers, room air conditioners, and furnaces. The Rule has been amended several times and now requires labeling on heat pumps and central air conditioners, fluorescent lamp ballasts, showerheads, faucets, water closets, urinals, general service fluorescent lamps, medium base compact fluorescent lamps, general service incandescent lamps (including reflector lamps), and pool heaters. (CFR 1994)

The labeling requirements set forth under the Appliance Labeling Rule vary for different types of products, but cover all models for sale within the United States. For example, some appliances require the yellow and black Energy Guide label be affixed to them, while others, such as plumbing and lighting products, are required to provide certain

information on the product or its packaging. (CFR 1994) The basic purpose of the labeling program is the "effective communication of energy usage of labeled products," according to the FTC. (FTC 1994)

For household appliances (refrigerators, refrigerator-freezers, freezers, water heaters, dishwashers, and clothes washers), the Energy Guide labels show the estimated yearly energy cost to operate the product, along with a scale for comparison among similar products. The annual operating cost is based on the national average electric rate in cost per kilowatt-hour. (CFR 1994)

For climate control equipment (room air conditioners, central air conditioners and heat pumps), the Energy Guide labels have a numerical rating of energy use, with a scale for product comparison. The numerical rating is the Energy Efficiency Rating (EER) which is the amount of heating or cooling the product provides for the amount of electricity that it consumes. High efficiency models have a high EER while low efficiency models have a low EER. Pool heaters are now covered under the rule and the label will show the thermal efficiency. Recent changes to the rule require that the energy efficiency ratings be defined using the industry terms, such as Annual Fuel Utilization Efficiency (AFUE) and Seasonal Energy Efficiency Ratio (SEER). (CFR 1994)

For the two types of labels, the comparison scales include either the yearly operating cost or the EERs of the most and least efficient models within that category (models with similar size and/or capacity). The labeled model is represented by an arrow pointing to its relative position on that scale. This allows consumers to compare the labeled model with other models.

However, some major changes to the Energy Guide labeling program took effect in December 1994 (Note: mandatory compliance has been delayed for some disclosure requirements). Amendments to the Appliance Labeling Rule require that the labels for the six home appliances display the energy usage in kilowatt-hours of electricity consumed per year, rather than the estimated annual operating cost. (FTC 1994a) Cost information will still be displayed on the label; however, the cost matrix based on regional energy costs will be replaced by a single figure -- the annual cost of operation (based on a standard set of assumptions).

These and other changes will make the labels "easier to read and more useful to consumers in comparing the energy efficiencies of the appliances," according to the FTC (FTC 1994). Some observers believe the changes will make compliance simpler for manufacturers. (E Source 1994)

The value of the Energy Guide labels remains poorly understood; however, there is widespread concern that they are not effective in helping consumers identify which models are truly energy efficient. For example, a Bonneville Power Administration report concluded that the Energy Guide labels are "not a convenient way for consumers to identify energy efficient models" and therefore "are not particularly effective in specific purchase decisions." (BPA 1988) However, one study concluded that over one-third of clothes washers buyers and about one-half of refrigerator buyers who were aware of the Energy Guide labels claimed that this information affected their purchasing decision. (Dyer 1986)

To help consumers better understand the new format of the Energy Guide labels, the FTC is planning "a consumer and industry education effort" for 1995, which will likely target the retail sector. (Mills, personal communication, 1995) This appears to be the first outreach program planned since the inception of the label in the early 1980s.

5.2 EnerGuide

In 1978, the Canadian government established the EnerGuide labeling program to help consumers choose efficient home appliances. EnerGuide's two stated goals are to protect the environment through reducing electricity demand, and to help consumers spend less money on electricity. (Energy, Mines and Resources Canada 1993) In addition, the program is part of the federal Green Plan dealing with the threat of global warming and other environmental impacts associated with energy use.

By law, the EnerGuide label must be affixed to every range, refrigerator, freezer, dishwasher, clothes washer and clothes dryer sold in Canada. The label was revised in 1992 to include a scale of energy performance which enables consumers to compare the model with others within the same class for type and capacity. (Energy, Mines and Resources Canada 1993) The new rectangular label includes yearly energy consumption (in kilowatt-hours per year), rather than the monthly figure shown on the previous round labels.

The EnerGuide labeling program is quite similar to the U.S.'s Energy Guide program. However the EnerGuide labels emphasize actual energy usage, rather than the annual energy cost, which has played a larger part in the U.S. program until recently.

Unlike the U.S. program, an EnerGuide Directory is published annually and lists by product category and class, all of the new models for sale in Canada, ranked in order from the most efficient to the least efficient. (Energy, Mines and Resources Canada 1993) Each entry includes the manufacturer/brand name, model number, and the monthly and yearly energy consumption values. Additional information is provided for some products; for example, the fresh food, freezer, and total volumes are provided for each refrigerator model. The Directory's Introduction section provides a formula to determine the energy cost of the appliance over its lifetime and encourages consumers to consider choosing an efficient model to get the savings in electricity costs over the life of the appliance. This Directory is a valuable tool in comparing efficiencies among similar products.

5.3 European Community Energy Labeling

The European Community (EC) has agreed that household appliances offered for sale will be labeled to show the energy consumption of that model, along with a comparison of energy use with similar models.

The EC Council Directive 92/75/EEC of September 1992 calls for the labeling and standardized product information for the energy consumption of household appliances. This legislation is intended to provide consumers with greater information about the energy use of products and "is expected to influence consumers' purchase choices in favour of energy efficient appliances." (Ministry of Trade and Industry 1993) According to a Danish leaflet, the program will provide consumers with "better opportunities" for selecting energy efficient appliances by making it "easy for consumers to compare the energy consumption of different appliances." (DTI Energy 1993) The labeling scheme is also aimed at encouraging manufacturers to produce more efficient appliances.

In January 1994, a follow-up directive implemented labeling of electric refrigerators, refrigerator-freezers and freezers -- the first products to get the EC energy label. (Official Journal of the European Communities 1994) Starting in January 1995, labels will be placed on the front or top of the outside of these appliances.

These labels will contain the manufacturer, make, and model of the refrigerator or freezer; a graphical representation of energy efficiency ranging from the letter A with a green arrow (more efficient) to G with a red arrow (less efficient) beside the arrow which indicates the position of that particular model on the efficiency scale; the energy consumption in kilowatt-hours per year; the fresh food and freezer volumes; and 'star labeling' which indicates the temperature which the freezer can maintain. If the appliance has received the EC Ecolabel, this symbol will be placed on the energy label as well.

In a six-month pilot project in early 1994, Denmark introduced the EC energy labeling of refrigerators and freezers to the retail sector using one chain of white goods stores (Snehvide). (DTI Energy 1994) The chain was given energy labels which correspond with the official EC label and the salespeople were given technical materials and training. The store featured the energy labels as a part of their ordinary advertisements and marketing activities.

Promotional literature and sales aids given to the stores' salespeople included a leaflet on EC energy labeling for refrigerators and freezers. This easy-to-understand brochure explains each part of the energy label and includes an overview of the EC program. It emphasizes that the new labeling scheme will help consumers identify the 'green' appliances because more efficient appliances benefit the environment by reducing electricity consumption.

Results from an evaluation of the Danish pilot program showed that the energy labels had a large influence on the choice of refrigerators and freezers made by consumers. (DTI Energy 1994) The customer reaction was generally positive, most (about 85%) customers noticed the energy label, and most (about 70%) found it easy to understand. In addition, the energy labels seemed to increase consumer interest in the energy consumption of the products. Almost all of the sales staff interviewed believed that the labels had "got the customers to change their stand point towards less energy-consuming appliances." (DTI Energy 1994)

As far as sales, there was an increasing turnover of energy efficient products. In addition, it was noted that there was a shift in what the store offered for sale; the assortment of products shifted more towards the efficient models. "This change is due to greater awareness regarding purchase of low-energy products, and can certainly be attributed to the energy labelling." (DTI Energy 1994)

5.4 National Fenestration Rating Council

The National Fenestration Rating Council (NFRC) is a public/private collaboration in the U.S. which was established to develop a voluntary, national energy rating and labeling program for windows, doors, skylights and other fenestration products.

Established in December 1989, NFRC is a coalition of representatives from the fenestration and building industries, government, utilities and consumer groups. The Council is developing a performance rating system for various energy characteristics, with a corresponding certification and labeling program for fenestration products. The idea is similar to the national energy rating and labeling system for automobiles (stickers showing estimated miles per gallon) and household appliances (Energy Guide labels). The goal is to have a uniform system which will enable builders and consumers to make direct comparisons among similar fenestration products, and therefore make more informed choices about energy efficiency.

NFRC has established rating procedures for various aspects of fenestration products, including the amount of heat transfer that results from temperature differences across the window (U-value) and the measure of a window's ability to admit solar energy impinging on its surface (solar heat gain factor). These characteristics, along with others, are rated numerically and appear on the label. Manufacturers pay a fee to have their products evaluated and tested by laboratories accredited by NFRC. The first window was labeled in 1993; eighteen months later, NFRC had certified and labeled over 12,000 products made by over 160 manufacturers. (Mathis, personal communication, 1994)

NFRC is promoting the use of a uniform methodology for rating energy performance of fenestration products. NFRC's system does not endorse any products over others, nor does it set minimum standards for the rating. Rather, it is a means to measure products with different characteristics -- a way to compare products using the same yardstick. It publishes a directory which lists the certified products and their characteristics. Plans are underway to make the directory available on-line via the Internet within the next year. (Mathis, personal communication, 1994)

Several states, including California, Washington and Oregon, have specified that fenestration manufacturers must use the NFRC rating procedure to determine if their products comply with state energy codes. The rating system has also been adopted by utilities, such as Bonneville Power Administration, for DSM programs.

NFRC's work is being recognized nationally and internationally. Their procedure for determining the emittance of glazing materials has been accepted by the American Society for Testing Materials (ASTM). In addition, the International Standards Organization (ISO) is working with NFRC to ensure that their related standards will be compatible with NFRC procedures.

To date, NFRC has no direct market data on the sales or recognition of certified products; however, they believe that as a result of building energy codes, utility programs and consumer demand for NFRC-certified energy ratings, there is an increasing number of energy efficient fenestration products available on the market. NFRC's Administrative Director described the industry's response as follows: "As with any newly standardized performance rating methodology, coupled with consumer-targeted educational materials such as product certification and labeling, NFRC's rating, certification and labeling program is helping to transform the industry. Manufacturers are introducing an increasing number of energy efficient fenestration products as reflected in the distribution of product performance." (Mathis, personal communication, 1994)

To illustrate, the mean U-value for the products listed in NFRC's first published directory (November 1993) was 0.55 Btus/hr ft2 oF; the average for the products in the most recent directory (August 1994) is 0.40. The number of products covered in the most recent directory increased dramatically; but the 27% decrease in the mean U-value reflects, at least in part, an effort by manufacturers to get their efficient products certified. Another NFRC staffmember said that manufacturers now feel it is important to change and improve the energy performance of their products in order to avoid being listed as poor performers in the directory.

5.5 Scientific Certification Systems

For this 'comparison'-type program, the focus is broader than the others we have addressed; a product's energy consumption is addressed as part of the overall environmental impact.

Founded in 1984, Scientific Certification Systems (SCS) is a multidisciplinary independent scientific organization in the U.S. working to promote environmentally sustainable policy planning, product design, management and

production. The goal is to educate the general public about the environmental ramifications of product and lifestyle choices. Recently, SCS established a labeling approach (formerly known as "Green Cross") to provide consumers with detailed information about the environmental profile of products. With the label, SCS expects that consumers "will be better able to make informed choices when comparing products." (Chaffee, personal communication, 1994)

SCS uses an "Environmental Report Card" to provide consumers with detailed information about a product's environmental impact based on a life-cycle study of the product and its packaging. The Report Card is likened to a nutritional label found on food in that it identifies and quantitatively measures 18 characteristics or "environmental burdens" of the products. Examples of environmental burdens include the use of energy, the depletion of natural resources, the release of pollutants into the air and water, and the generation of solid waste. The Report Card displays numerical values and a bar graph with an exponential scale used to show the relative environmental burden posed by each (longer bars signify a higher burden).

SCS uses a life-cycle assessment of the product and packaging, examining production, distribution, use and disposal, to measure specific environmental burdens. For example, to assess air pollution, measurements are made of chemical releases (such as carbon dioxide) to the atmosphere. In evaluating the environmental burdens of a product, SCS reviews laboratory data, visits manufacturing plants, and arranges for testing when necessary.

All SCS services are provided on a direct fee-for-service basis; however, payment of evaluation fees is no guarantee that SCS will grant certification. There are no licensing fees associated with the use of the SCS certification mark. As of the end of 1994, 18 products had a SCS report card affixed to them.

SCS' Environmental Report Card offers information for consumers to use when choosing among products without offering a 'seal of approval' for certain products. SCS' believes that this approach helps consumers and retailers better understand the full range of environmental considerations and ramifications associated with products. The view at SCS is that an endorsement label is not the best approach because in a rapidly changing market, the certified product may not be the best alternative available. In addition, standards for a 'seal of approval' may mask significant environmental trade-offs. For example, there may be products which would not meet the criteria set up by the endorsement labeling organization, but would have fewer environmental burdens overall from a total life-cycle assessment standpoint.

SCS' Environmental Report Card has been criticized as being too complex for the average consumer to use, but SCS believes the critics have no foundation for this. There is "no data or studies to prove or even show that consumers cannot understand and use this information successfully." (Chaffee, personal communication, 1995)

Another issue is the fact that a product bears the Report Card may lead the customer to assume that it is environmentally preferable to the other non-labeled products on the shelf. Because the SCS Report Card may not appear on every brand of a similar product, it may be difficult for consumers to make a legitimate comparison.

6. DISCUSSION: PROGRAM AND POLICY ISSUES

Attitude surveys have shown that consumers want to "vote with their wallet" and make environmentally conscious purchases. Labeling programs can assist consumers in this pursuit. But many questions remain: to what lengths will consumers go to purchase a 'greener', more efficient product, what are they willing to give up (if anything), are they willing to pay more for it, and what information sources will they view as credible? These and many other questions must be answered in order to assess the impacts of product labeling programs.

6.1 Evaluation of Labeling Program Impacts

To date, few evaluations of labeling programs have been undertaken, but some of the observations made in the BPA report are worth noting. The report concluded that the labeling of energy efficient appliances was a contributing factor in the success of the utility's promotional campaign. However, it cautioned that "consumers require more education . . . before energy efficiency will become a more important or determining factor in the purchase decision." (BPA 1988)

Since many of the product rating, labeling and certification programs were established relatively recently, it is difficult to get a clear idea of what effect they have on the consumers and the market. Reliable data is clearly needed to evaluate the effects of labeling on consumer behavior, market shares of labeled products, and manufacturer response. In addition, testing should be done to determine what type of label format and information consumers best

respond to: energy units, monetary units, efficiency index, or scales for comparison? or do consumers better understand and respond to graphical representations, such as an 'endorsement' label logo?

6.2 Impacts of Labeling on Manufacturers and Retailers

With regard to manufacturers response to these labeling initiatives, a few programs reported that some are eager to participate, while others seem to view it as market intrusion. The impact on manufacturers and retailers deserves more careful study.

° The NFRC experience clearly demonstrates a manufacturer response to a labeling and rating program, in that so many manufacturers submitted their products for rating, and several reportedly introduced new, more efficient products.

° It is interesting to note that Green Seal has found that some of the smaller manufacturers, especially those with small advertising budgets, are eager to take part and get their products certified and labeled. They view the Seal as something that can give them an edge in the market, especially since consumers seem to have a desire to shop 'green'. However, some manufacturers fear that as more products become certified, the competitive edge they can get with the Green Seal will disappear.

° In the Blue Clue program, some retailers were hesitant to participate out of a concern for losing sales. They feared that customers would request brochure-listed models which their store did not carry.

6.3 'Comparison' vs. 'Endorsement'

There are many issues which need to be addressed when looking at 'comparison' vs. 'endorsement' labeling. 'Comparison' labels appear on many or all of the product models available, with the expectation that consumers will draw their own line in determining which products are energy efficient. As far as 'comparison' labels: can a nationwide rating system have an effect on what consumers choose? To what degree will the energy ratings affect purchase decisions? When consumers notice that some of the products are labeled, will they wrongly assume that these are the ones which are energy efficient? With energy information prominent on labels, will this push manufacturers to increase production of more efficient products? Will this speed the development of new, more efficient technologies for these types of products?

With 'endorsement' labels, there are several issues which must be examined further:
° Consumers seem to be wary (with good reason in some cases) of manufacturer claims and labels regarding environmental attributes and energy efficiency. Will consumers be able to distinguish between manufacturer labels and those used by 'third-party' organizations, such as utilities and environmental groups? Will third-party labels have any credibility in the eyes of consumers?

° What about the proliferation of third-party labelers? Will the increase in product labels act to confuse or desensitize the consumer? Who will monitor these labelers for misleading or false claims? The International Standards Organization (ISO) is investigating many of these questions.

° What will happen when it is time for third-party labelers to update their standards? For example, Green Seal plans to update product standards every three years, but several issues associated with this are not fully resolved. Some manufacturers with certified products are concerned that they will not meet the new, more stringent standards. To allay this concern, products meeting the outdated standard will be 'grandfathered' for a time.

6.4 'Fee-based' vs. 'Program-funded'

With 'fee-based' programs, there will be a number of products on the market which will not be rated, certified or labeled. Some of these products may be 'green' but their manufacturers are unaware of, unwilling, or unable to take part in the program. It is possible then, that the most efficient and environmentally preferable items available on the market will not be labeled.

The organizers of a 'program-funded' program (such as Blue Clue and some governmental programs) typically depend on environmental and/or energy efficiency data supplied by the manufacturers themselves, instead of an independent unbiased source. It could be argued that this data may not be the most accurate representation of a product's attributes.

6.5 Government vs. Non-government Labeling

There are differing opinions about whether or not consumers view governments as a credible source for 'green' information. While governmental labeling could have funding and support that a non-profit third-party labeler may be lacking, governments are subject to political pressure which could affect their standard-setting and approval processes.

6.6 Importance of Information and Promotion

Both the BPA program evaluation and the Danish pilot program for EC energy labels suggest that carefully planned, sustained programs to inform both sales people and their customers about the label are an essential component of a successful program. Unfortunately, for most labeling programs, such training and awareness efforts have been of secondary importance or absent altogether. This may be due in part to the difficulty of evaluating net benefits of such activities, in part to the limited success achieved by "general energy awareness" campaigns by utility companies and others (i.e., not linked to a specific piece of information such as an energy label), and in part due to cost constraints.

7. CONCLUSION

This paper has described just a few of the existing programs for 'endorsement' and 'comparison' labels of energy-related equipment, including some which cover environmental as well as energy attributes. After briefly examining some issues associated with program design and implementation, we conclude that there has been far too little attention paid to empirical evaluations of the effects of product labeling on decisions by both buyers and sellers, or on the most effective means for presenting relevant product data to different groups of buyers.

8. ACKNOWLEDGMENTS AND ENDNOTE

The information and research sources for this paper include: each program's literature, brochures, reports, and personal interviews with the following individuals, whose help and advice the authors gratefully acknowledge:

Arthur Weissman and David Hauck of Green Seal; Tim Leah, Janet Stavinga, Valerie Douglass, John Forman, and Cynthia van Ginkel of the Environmental Choice Program; Areef Abraham, Brenda Lee, Moira Ann Handford, Eric Cardey, and Jack Danforth of Power Smart, Inc.; Francesca Carozza of Portland General Electric; James Mills of the Federal Trade Commission; Chris Mathis of the National Fenestration Ratings Council; Bruce Cody and Sheila Riewer of Bonneville Power Administration; Chet Chaffee of Scientific Certification Systems; and Erja Pylvanainen, National Consumer Research Centre, Helsinki, Finland.

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