

Awareness regarding energy efficiency star labeling on household appliances amongst the consumers of Vadodara city

URVASHI MISHRA AND SARJOO PATEL*

Assistant Professor

Department of Family and Community Resource Management,
Faculty of Family and Community Sciences,
The Maharaja Sayajirao University of Baroda, Vadodara (Gujarat) India
(Email : urva_mishra@yahoo.com, sarjoo_patel@yahoo.com)

ABSTRACT

Climate change is the biggest problem in the world for the last three years. We are reminded that the ice shall disappear in the Arctic in the near future, with some cities inundated if deforestation continues and there are so many indicators that the existence of Mother Earth is in danger. From the perspective of household appliances play a major role in this picture. The star rating labels are informative labels fixed on manufactured products which describe the product's energy performance (usually in the form of energy use, efficiency or energy cost) and rate the product on a comparative scale, thereby providing consumers with necessary information to enable making informed purchase. The objectives of the present study were 1) To know the level of label recognition, understanding and influence of the energy star label among the Barodian Consumers, 2) To know the source of information regarding energy star label. The findings of the study revealed that 75per cent of the selected consumers were aware of The Energy Star Rating programme amongst which 56.14 per cent of the respondents had high understanding regarding star labeling and only 36.33 per cent of the respondents had its high influence on purchase.

Key Words : Electricity consumption, Energy conservation, Household equipment and appliance

INTRODUCTION

Current scenario of energy consumption :

Electricity is one of the most vital infrastructure inputs for economic development of a country. The demand for electricity in India is enormous and is growing steadily. This growth has been slower than country's economic growth. To balance this demand and supply of electricity, it is the time for electric utilities to go for energy electrical equipment for huge

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savings as this would be utilized for future needs. India currently ranks sixth in the world in terms of primary energy demand and over the last five years India's electricity demand has grown by over 6% annually. This increase in demand mainly stems from rapid economic growth, with India being the second fastest growing economy in the world. But economic growths, and resultant energy demand, have not been even across the energy demand sectors. Although India remains primarily an agrarian economy in terms of employment ranking, much of the economic growth has been driven by industry and services.

With the welcoming economic growth, usage of various appliances like refrigerators, computers, air conditioners, geysers, colour televisions, office equipment, etc., is on the rise in India and is resulting in substantial increase in the demand for energy. High energy consumption leads to increased energy demands, concentration of carbon dioxide in the atmosphere and a surge in global temperatures. The rate of economic development of a country is directly linked with the supply of energy. An affordable, reliable supply of energy is vital for continued economic expansion, yet the cost of new supply facilities is staggering. If energy supply capacities are expanded without promoting more efficient use of energy, the amount of capital invested will eclipse the economic growth it seeks to sustain. The simplest way-out of this development challenge is to use the energy more efficiently.

The difference between what we do and what we are capable of doing would suffice to solve most of the world's problems.—*Mahatma Gandhi*

“Energy conserved is energy produced” is the slogan used the world over to raise public awareness on the importance of efficient use of energy. Electricity conservation measures are often cheaper than building new power plants. Using more efficient lights and appliances, agricultural and industrial motors, better insulation etc., can significantly reduce the energy supply required. Across the world, people have become conscious of the demand versus supply equation and are finding new ways to use energy judiciously. The Energy Efficiency Standard and Labeling (S&L) program has been successfully implemented in many countries and has brought significant impacts in terms of availability of higher quality energy efficient products in the market places resulting in energy as well as money savings for consumers on use of energy labeled products, a healthy competition in the markets through market transformation and lesser pressure on generation of additional power. The implementation of Standard and Labeling program in US alone has displaced over fifty thousand MW of electricity. To a large extent it has also addressed the issue of climate change through the reduction of Greenhouse Gases (GHG) including carbon dioxide. Due to this transformation, Bureau of Energy Efficiency (BEE) a designated agency empowered by Ministry of Power, Govt. of India, under EC Act 2001, has implemented the energy efficiency Standard and Labeling program in India. As on date BEE has successfully registered 12 products under the scheme out of which 4 products are under the mandatory labeling regime.

Energy-efficiency labels :

Energy efficiency labels are informative labels affixed to manufactured products to indicate the product's energy performance. Usually they are in the form of relative rankings of energy performance. The energy parameters indicate quantitatively how much energy is

consumed by the product or the energy efficiency rating of that product and/or, other related requirements. Energy labels can stand alone or complement energy standards. The objectives of standard and labeling of India is to provide the consumer an informed choice about the energy is saving, and thereby the cost saving potential of the labeled household products and other electronics/electrical products. To impact in energy saving. To gear up position domestic industry for compete in international markets where norms for energy efficiency in many countries are mandatory.

The Standard and Labeling scheme was launched by the Bureau of Energy Efficiency Govt. of India in May, 2006 and is currently in place for equipment/appliances that include Frost Free Refrigerators, Tubular Fluorescent Lamps, Room Air Conditioners, Direct Cool Refrigerators, Distribution Transformers, Electric Motors, Pump Sets, Ceiling Fans, LPG Stoves, Electric Geysers, Colour TVs and Washing Machines. Energy labeling of BEE is generally linked with the performance and safety parameters as prescribed in the national standards. The products that qualities for energy labeling are first expected to meet these requirements, thus linking energy efficiency and high quality performance.

Formulation of energy efficiency standards:

Energy efficiency standard are the procedures and regulation that prescribe limits on the energy consumption (minimum levels of the energy efficiency) of manufactured products. These measurements are based on prescribed test protocols/procedures that ensure accurate and consistent estimate of the existing and achievable level of energy performance. Throughout the world, standardization has been used as an effective tool for tackling energy problems.

Significance of energy labeling:

Without a credible energy label, a consumer looking at an appliance has no idea whether a product saves energy or is an energy guzzler. The energy usage pattern of an appliance is usually hidden from the necked eye, and invariably not known to the user. However, energy consumption determines the operating cost of most appliance and is therefore of concern to the consumer and his pocket. Consumers are sometimes aware of only some basic details, such as wattage/ units and act on that information. But wattage alone is no substitute for the information that an energy label provides, like lumen/watt of a lamp or the Energy Efficiency Ratio of an Air conditioner. Like other Energy Efficiency Program, energy labeling aims to market transformation for energy-using products and appliances towards greater energy efficiency. Energy labeling programs help consumer to understand which products are most efficient and influence them to choose more efficient ones. At the same time they create healthy competition among manufacturers to produce and market the most energy-efficient models and thus promote efficiency.

Types of energy labels:

Energy-efficiency labels are informative labels affixed to manufactured products to describe the product's energy performance (usually in the form of energy use, efficiency, or energy cost); these labels give consumers the data necessary to make informed purchases. We distinguish between two types of labels *viz.*, Endorsement labels and Comparative labels.

Endorsement labels are essentially “seals of approval” given according to specified criteria. Comparative labels allow consumers to compare performance among similar products using either discrete categories of performance or a continuous scale. Energy labels can stand alone or complement energy standards. In addition to giving information that allows consumers who care to select efficient models, labels also provide a common energy-efficiency benchmark that makes it easier for utility companies and government energy-conservation agencies to offer consumers incentives to buy energy-efficient products. The effectiveness of energy labels is heavily dependent on how they present information to the consumer and on how they are supported by information campaigns, financial incentives, and other related programs.

Potential benefits of energy efficiency labels:

Energy performance improvements in consumer product are essential element of energy efficiency policies and climate changes mitigation programs. When designed and well implemented, their advantages are:

- i. They can produce large energy savings ;
- ii. They can be very cost-effective and helpful at limiting energy growth without limiting economic growth
- iii. They require change in the behavior of a manageable number of manufactures rather than the entire consuming public which is much larger and harder to reach.
- iv. The resulting energy savings are generally assured, comparatively simple to quantify, and readily verifiable.

The effect of well-designed energy efficiency labels and standards is to reduce unnecessary electricity and fuel composition by household and office equipment, (e.g. Refrigerators, Air Conditioners, Water Heaters, Electronic Equipment, etc.). Reducing electricity use reduces the fuel combustion in electric power plants.

Significant benefits of energy labeling include:

1. Enhancements in consumer welfare, as the scheme empower consumers with data on informed choices and encourage selection of the most efficient products.
2. Reduction in capital investment for energy supply infrastructure;
3. Enhancement in national economic efficiency by reducing energy bills;
4. Strengthening competitive markets;
5. Meeting climate change goals through reduction of CO₂
6. Averting urban/regional pollution.

Energy labeling program in India and role of BEE :

The Bureau of Energy Efficiency (BEE) was established in India on 1 March 2002, under the Energy Conservation Act (EC) 2001, and is responsible for spearheading the improvement of energy efficiency in the economy through various regulatory and promotional instruments. As one of its objectives for promoting energy conservation, BEE has devised an energy labeling system, where the energy efficiency label (Comparative) has 1 to 5 Star Ratings with an indicator that shows what star rating a particular product has earned (1 star

for least efficient up to 5 star for most efficient). BEE has already implemented energy labeling program for 12 products namely Refrigerators, Tubular Fluorescent Lamps, Air-Conditioners, Direct Cool Refrigerators, Distribution Transformers, Electric Motors, Ceiling Fans, Ballasts (Chokes), Agri. Pump Sets, Geysers, Gas Stoves, Color TVs and Washing Machines.

Potential Savings of Money on Energy Labeled Products :

More stars mean more energy efficiency and more savings on your monthly energy bills.

– **For Refrigerators (FF) :** There is an annual savings of about Rs. 2,130/- on the use of a 5 star labeled Refrigerator versus a no star Refrigerator of 250 litre capacity. For Air Conditioners (1.5 ton of split type), there is about a saving of around Rs. 3,500 by using of 5-Star labeled air Conditioner versus a 1 star. This means a saving for individual consumers of about 700 units (kWh) of electricity with the most efficient Refrigerator and 750 units (kWh) with the most efficient Air Conditioners. Since refrigerators and air conditioners constituent more than 50% of the domestic electricity consumption, the use of the most efficient ACs and refrigerators can significantly reduce India’s electricity consumption and energy costs. Similarly for other major products, energy saving potentials is also possible viz.

– **For 48" (1,200 mm) Ceiling Fans :** There is a large energy saving potential using a 5 star fan. This equates to 0.19 kWh (Rs. 0.85) per day; Rs. 26 month; Rs. 310 or 69 units (kWh) of electricity every year (Table 1).

Table 1 : Ceiling fans (48") regular models

Star rating	Daily consumption kWh	Yearly consumption and cost		Annual saving
		Consumption kWh	Operating cost	
No Star	0.07	256	1152	000
1 star	0.65	237	1067	85
3 star	0.61	223	1004	148
5 star	0.51	187	842	310

– **For Color 21" TVs:** Total savings on use of 5 stars labeled TV would be 0.264 kWh watts (Rs. 1.19) per day or 96 kWh / Rs. 433 per year against 0 stars (Table 2).

Table 2: Colour TV's of 21" CRT

Star rating	Daily consumption kWh	Yearly consumption and cost		Annual saving
		Consumption kWh	Operating cost	
No Star	0.675	246	1107	000
1 star	0.620	226	1017	90
3 star	0.515	187	842	265
5 star	0.411	150	675	432

– **For Electric Geysers :** you save 0.81 kWh or Rs. 3.63 per day or Rs. 1,325 / 296 kWh per year (Table 3).

– **For Refrigerators Direct Cool :** You save 1.29 kWh or Rs. 5.80 per day or Rs. 2,120/ 470 kWh per year against 0 star (Table 4).

Table 3: Electric geysers				
Star rating	Daily Consumption kWh	Yearly consumption and cost		Annual saving
		Consumption kWh	Operating cost	
No Star	1.5	547.5	2464	000
1 star	1.3	474.5	2135	329
3 star	.97	354.0	1593	871
5 star	.693	253	1139	1325

Table 4: Refrigerators (Direct Cool-220L)				
Star rating	Daily Consumption kWh	Yearly consumption and cost		Annual saving
		Consumption kWh	Operating cost	
No Star	2.06	755	3398	000
1 star	1.90	690	3105	293
3 star	1.20	441	1985	1413
5 star	0.77	282	1269	2129

(Savings have been calculated based on average energy tariff @ Rs. 4.5 per unit)

The study :

The Standardization and Labeling program being implemented by BEE in India is the certificate of Energy Efficient product quality. The star label provides consumers with informed choices on energy and money saving potential, in addition to an assurance of a better quality product. Energy Labeling is the one of the most cost effective policy tools for improving energy efficiency and lowering energy cost for the consumers. Keeping this philosophy in mind the study was conducted with the following objectives *viz.*,

1. To know the level of label recognition, understanding and influence of the energy star label among the consumers.
2. To know the source of information regarding energy star label.

METHODOLOGY

The study is mainly based on the primary data. The primary data were collected from 480 respondents comprising of 240 men and 240 women of different groups of consumers. The respondents were selected by simple random sampling technique.

RESULTS AND DISCUSSION

The Major findings were as follows:

Recognition :

Table 5, depicts the recognition regarding the Energy Star label amongst the selected consumers. It is clear from the above figure that 40 per cent of male and 52.08 per cent of females recognized the energy star label when shown the label (*i.e., aided recognition*). 35.4 per cent of male and 21.66 per cent of female households correctly assessed they had seen or heard of the Energy Star label without first being shown the label (*i.e., unaided*

Table 5 : Recognition about energy star labeling among the consumers

Recognition about energy star Labeling	Male n=240		Female n=240		Total n =480		
	f	%	f	%	F	%	
Aided recognition	96	40	125	52.08	221	46.04	358
Unaided recognition	85	35.4	52	21.66	137	28.54	74.58%
Did not recognize	59	24.5	63	26.25	122	25.41	
Total	240	100	240	100	480	100	

recognition).whereas, 24.5 per cent of male and 26.25 per cent of female were unable to recognize the Energy Star label.

Understanding:

Table 6 reveals the understanding regarding the Energy Star rating Labels. It is clear from the above table that amongst the 358 respondents who had recognitions of the Energy Star label (aided and unaided) 56.14 per cent of respondents had a high understanding regarding Energy star label , 23.18 per cent of respondents had general understanding and 20.67 per cent of respondents had no understanding.

Table 6: Understanding about Energy star labeling among the consumers

Understanding about Energy Star Labeling	Male n=181		Female n=177		Total N=358	
	f	%	f	%	f	%
High understanding	98	54.14	103	58.19	201	56.14
General understanding	51	28.17	32	18.07	83	23.18
No understanding	32	17.67	42	23.72	74	20.67
Total					358	100%

Influence:

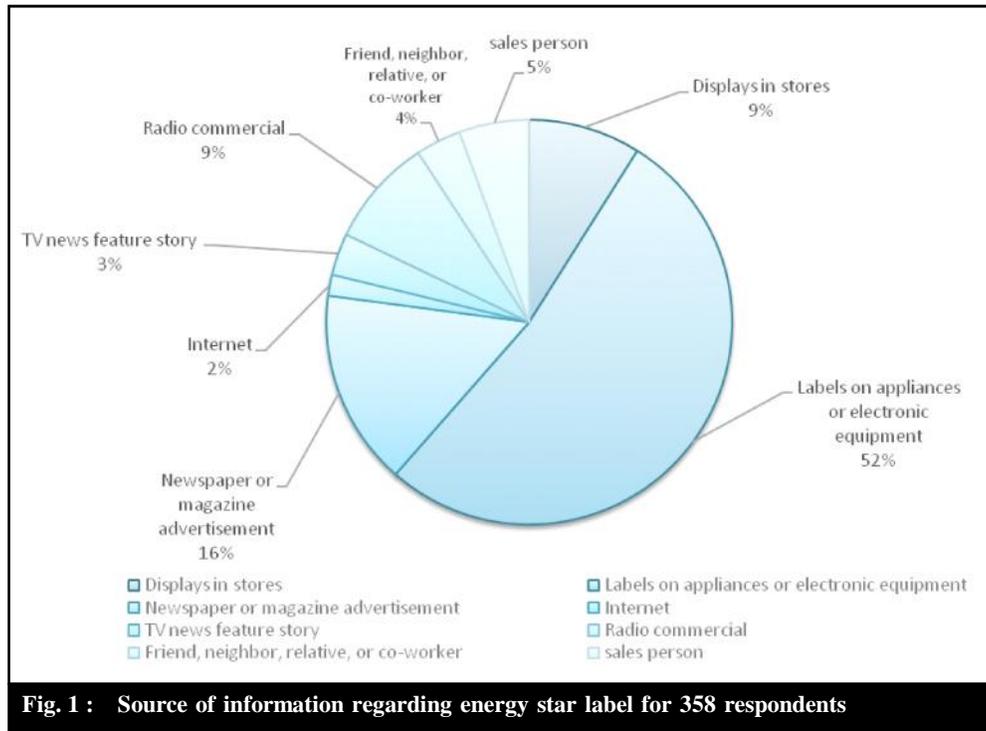
Table 7 shows the influence of label on purchasing decision of consumer. From the above table it can be concluded that amongst the 358 respondents 36.31 per cent respondents had very high influence, 24.02 per cent of them had somewhat influence, 21.78 per cent had slight influence and 17.87 per cent of the respondents had no influence on the purchase decision of electric appliances.

Table 7: Influence of the Label on purchasing decision

Influence of the label on purchasing decisions	Male n=181		Female n=177		Total n=358	
	f	%	f	%	f	%
Very much	64	35.35	66	37.28	130	36.33
Somewhat	44	24.30	42	23.72	86	24.02
Slightly	42	23.20	36	20.33	78	21.78
Not at all	31	17.12	33	18.64	64	17.87
Total	181	100	177	100	358	100

Source of information regarding energy star label :

Fig. 1 indicates the source of information regarding Energy star label for 358 respondents , it can be concluded from the figure that 52 per cent of the respondent got the information



from the labels on appliance or electric equipment ,16 per cent of them were informed by newspaper or magazines, 9 per cent of them got the information from display in stores, radio commercials and Television, respectively and 3 per cent of them got information from friends or relatives and only 2 per cent of them were aware through internet

Conclusion and Discussion:

From the present survey it can be said that with the changing trends and technological advancement consumer are aware and informed regarding new technologies. However the result of the study showed that in comparison to men, women had less recognitions and low understanding regarding the Energy Star Labeling. Since women are the backbone of household economy they need to be more awaken and be confident consumer. By carefully using household appliances or star rated appliances, one can save money on utility bill. Generally, appliances that count the most when it comes to conserving electricity are those that heat or cool, and those that are in use for long periods of time. Buying an energy efficient appliance may cost a bit more, but that expense will be made up by reduced energy use over the lifetime of the appliance.

Recommendation :

Further studies can be carried out to develop intervention programs and campaigns to bring awareness regarding energy conservation schemes amongst the consumers. Various educational package can be developed to bring awareness regarding Energy Star Rating

program among the consumers that can benefit their household budget.

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