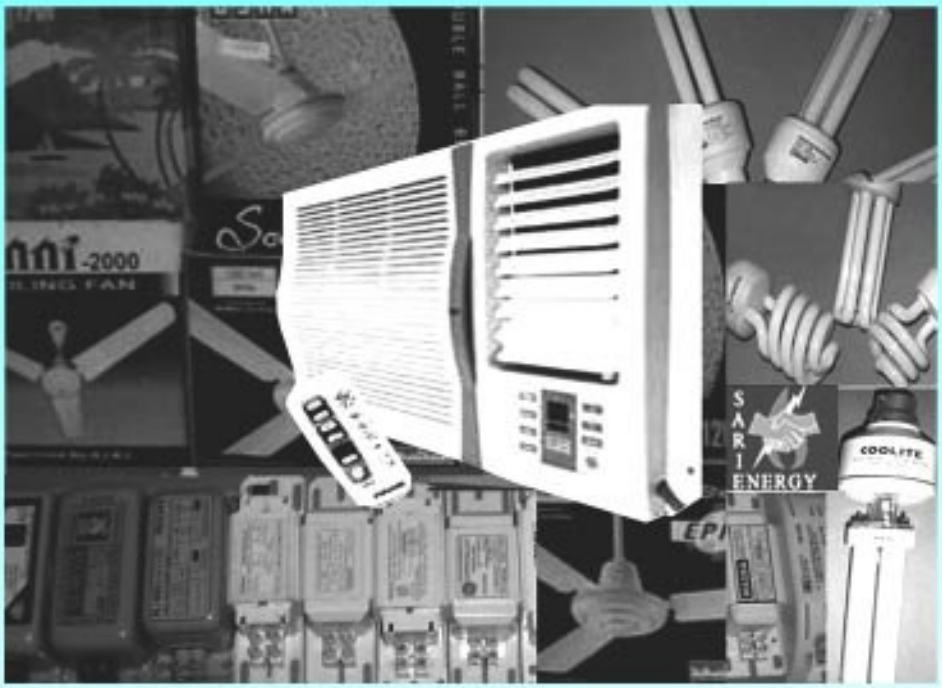
ENERGY EFFICIENCY STANDARDS IN SOUTH ASIA YET TO GAIN MOMENTUM



RESEARCH STUDY IN INDIA & SRI LANKA
TO PROMOTE ENERGY EFFICIENCY & LABELLING PROGRAM

Conducted by:

VOICE (India) & SLEMA (Sri Lanka)

Sponsored by:

Winrock International and USAID

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Contents

Preface

Electricity is one of the most important sources of energy in major energy used in industrial, commercial and domestic uses. Major end users in domestic sector are lighting, Fans, Refrigerators, Air Conditioners, Water heaters, Motors and other appliances. Barriers to adoption of energy efficiency measures in the uses are: lack of information on energy consumption of the appliances; potential benefits of using efficient appliances, / products; consumer preference for low initial cost of particular brand, colour, shape etc. To change consumer preference of low initial cost of appliances and to provide information on energy consumption and benefits of energy conservation, it would be necessary to formulate mandatory national standards and a strong consumer awareness programme on potential savings on energy. Various countries in Europe, USA, Oceania and some in Asia including Thailand have adopted energy efficiency standards and labeling programme for appliances and have been benefited immensely. Implementation of Energy Efficiency standards in above countries for variety of appliances have already displaced thousands MW of generating capacity. It is expected that by implementing Energy Efficiency Standards. In South Asia would certainly save significant amount of power which is currently being wasted in one form or other by Domestic, Agriculture and Industrial Sectors.

Keeping in view the above facts in mind and to assess the current scenario, a joint study has been carried out by two NGOs – VOICE, India and SLEMA, Sri Lanka as a pilot study to identify popular brands / models of 5 ranges of products of mass consumption which could be promoted for energy efficiency and labeling program in India & Sri Lanka. This study in its first stage has identified most selling brands & models of Ceiling fans, Ballasts, CFL, Refrigerator and Air conditioners in 4 metros and Colombo. Another area of focus was to ascertain adequate availability of label information on products in general and power consumption in particular. After carefully studying the products label, it can be stated that most of the products' label lack adequate information depriving consumers of their 'right to information', which is the most powerful tool to empower consumers on choice of products particularly products like durable & white good. Therefore attention of manufacturers, policy makers, standards bodies need to be on drawn on earliest availability of reliable, legible and adequate information about the products ratings within the laid down parameters.

1. Executive Summary

a) Background

Electricity is a critical input for economic development and progress all over the world in general and in South Asian countries in particular, is associated with massive increase in energy requirement. Due to recent economic liberalization and restructuring of economic policies, there is a massive flow of foreign funds in South Asia in terms of joint ventures in manufacturing bases. This is expected to lead to widening of gap between demand & supply of electricity. There are various other factors associated with an unreliable grid supply especially transmission and distribution losses. In light of the above, governments of many South Asian countries are taking measures to maintain a sufficient and reliable electricity supply to all potential consumers in order to sustain economic growth of their countries.

To solve the prevailing power problems, SARI/E (South Asia Regional Initiative on Energy) of USAID (United States Agency for International Development) have played a pivotal role in bringing together countries in the South Asia region to appraise them on the most efficient use of energy and to reduce pressure on further power generation derived from non-renewable resources. During the last two years, SARI/E has conducted several training programs on various issues on the objectives to sensitize the potential stake-holders of most of the countries in this region in promoting the concept of Energy Efficiency Standards & labeling (EES&L) program and harmonization of test procedures / protocols in the South Asia Region and establish network among the National Standards Bodies, Policy makers to understand the potential benefits from EES&L program and reduce trade barriers.

To further promote the benefits of EES&L, SARI/E invited joint proposal especially from NGO's to join hands to carry forward its initiatives for the ultimate benefit of south Asian countries particularly those who have common socio-economic, cultural similarities and also have free flow of trade among various countries having usage of common products.

VOICE & SLEMA: A joint study with the following aims: -

- Establish effective network on cooperative research and share market survey information on identified products between partners and other South Asian countries.
- Dissemination of Research Data (on identified products) on Energy Efficiency to stake holders viz. consumers, standards institutions, manufacturers and policy makers through media including newsletters.

b) Methodology

The methodology of study was based on collection of market data on five identified products through retail market research in Metro Cities / big cities of both countries as they represent geographical coverage of the country. Market survey covered 140 retailers per product. The market survey was carried out based on structured questionnaires which has questions on brands, models, category, types, popularity, MRP (Max Retail Price), retail price, warranty / guarantee, any claims on power consumption etc. Information on

the products were also collected from other sources such as exhibitions / trade fairs / distributors, wholesalers, websites etc.

c) Results of the study

During the Survey & field visits, it has been observed that there are a very wide variety of Ceiling Fans, Ballasts, CFLs available in the retail market. However in the case of Refrigerators and Air Conditioners, only 10-15 prominent manufacturers are in the fray. There is stiff competition in the ceiling fans market due to manufacturers from unorganized sector of India who priced their ceiling fans in the price range Rs. 500 – 1400 and in the sizes of 24" to 60" of regular category. In Sri Lanka, price range for different sizes was Rs. 2100 – Rs. 3600. However our study was focused on regular and most-selling sizes and models of the products chosen. Most of the manufacturers offer six months to two year warranty except one ceiling fan brand in India (Polar) which offer a 7 year warranty.

For Ballasts (Chokes), it has been seen that there is a strong domination by unorganized brands in the Magnetic (Copper / Aluminum) Ballast category. The market share of Magnetic Ballast in India and Sri Lanka is 65% & 80% respectively. Their price ranges from Rs. 30 to Rs. 150 in India and LKR 65 to 220 in Sri Lanka. There is also a fair presence of electronic ballasts, which cost between Rs. 70 to 350 with six months to 1 years warranty. The presence of another improved version of magnetic ballast with technical name a VPIT (Vacuum Pressure Impregnated Technology) or popularly called "Compact Ballasts" has been observed. The use of Electronic Ballasts is more cost effective for consumers as compared to Magnetic Ballasts. In Sri Lanka, some of the popular Ballasts are also available with energy labels with 'watt loss' criteria.

The survey found that in the case of CFLs, which also has a significant number of brands available in the retail market apart from 15-20 well-known brands. All the other brands are either low quality Chinese brands or locally made ballasts available at very cheap rates. Their prices were found to be much lower as compared to popular brands available at national level.

It has been also found that 11 out of 17 known brands had Energy labels in Sri Lanka on 'Performance Factor' criteria and most of them are above 3 star rating which clearly indicates significant progress in Energy labeling program in Sri Lanka. However, in India Energy Labeled CFLs are not available except for those brands, which are of foreign - origin.

One of the major discrepancies found was the non-availability of adequate Label information in general and power consumption in particular (except CFL's). During the label evaluation of 17 CFLs procured by us, it was surprising to note that two particular brands namely Lintek & Philips (Ecotone) had energy label markings of different countries. Out of 10 Ceiling fans purchased only 4 had stated power consumption (50 - 78 W) in the label. Out of 15 magnetic ballasts as bought, only 3 had indicated the Watt-Loss (9 – 12W). None of the refrigerators has mentioned any power consumption in its brochures / pamphlets. Most of the Air Conditioners (Window & Split) have mentioned the Power Consumption in the Brochures / Pamphlets. But there is a wide range of consumption within the same category and size among different models.

Given the wide variety of these products available at very competitive prices, the choice for consumers becomes very confusing especially in the case of ceiling fans, ballasts and CFL's. In the case of refrigerators, power consumption information, which is of vital importance concerning that a refrigerator is a durable product and a consumer buys for long term use, is totally absent. In most cases, consumers are deprived of high quality products (costing distinctly high) and the poor quality products are available at throwaway prices, thereby driving them to buy cheap quality products.

d) Recommendations

During the process of the project study so far, a number of issues emerged from the evaluation of various processes which warrant the National Standards Bodies, enforcement agencies, utilities, policy makers, manufacturers etc. to take immediate steps for corrective action on availability of quality products at affordable prices to consumers. Some of the recommendations for earliest implementation are:

- Immediate need to urge manufacturers to provide adequate and reliable product

information on the labels on the products & on the packaging especially on power consumption.

- None of the product as surveyed in India, (except one Ceiling Fan, two CFLs and three Ballasts) had any standard mark or Energy label on the products. But in Sri Lanka, most of the popular Ballasts and CFLs had Energy Labels. It's a lesson for Indian Standard formulation bodies, which should be urged, for speedier implementations of EE&L Standards and availability of Energy labels on Energy Efficient products to promote potential savings.
- More and more durable products need to be brought under the EES&L program by NSBs.
- Setting priority on generation of test data for bench marking of minimum energy performance standard and urge for the effective and speedier implementation of EES&L program in the country & region. NGO's can play significant role in promoting mass consumer awareness on use of Energy Efficient products particularly products of mass consumption.
- Existing National Standards need immediate up-grading and should mention the requirement on Power Consumption of all types of Refrigerator and other products of mass consumption.
- Harmonize the Standards and minimizing trade barriers to facilitate free flow of trade, of similar products among the countries of region to realize potential energy savings & benefits for improved product quality and efficiency.

CHAPTER - I

South Asia Regional Initiative/Energy (SARI/E): An Introduction

The South Asia Regional Initiative/Energy (SARI/E) Project has been designed by the U.S. Agency for International Development (USAID) as a part of the overall SARI program to assist South Asian countries (India, Bangladesh, Bhutan, Nepal, Maldives and Sri Lanka – Pakistan is not considered due to U.S. sanctions) to address the challenge of providing sufficient energy for continued economic growth. The program envisages to complement ongoing bilateral energy programs, and help bring together energy sector players from the region to share experiences and lessons learned, and discuss ways to cooperate on energy matters, thereby catalyzing and facilitating a long-term process of rationalizing energy supply and its regional distribution.

The strategic objective of SARI/E program is 'Improved policies and agreements for cross-border cooperation on sustainable energy with the ultimate goal of 'Socially and Environmentally Sound Economic Growth'. The program promises sustainable regional development through the achievement of the following:

- Increased institutional capacity to make decisions promoting sustainable energy development
- Increased private sector participation in and civil society support for sustainable energy development
- Regional forums, networks, and associations established and strengthened for cooperation and advocacy on sustainable regional energy development.

CHAPTER – II

1. Project Description

Background

Keeping in view the initiatives of SARI/E of USAID in bringing together most of the S.Asian countries on a common platform and work together on most effective use of energy and also on convergence & harmonization of product standards for mutual benefits of region. We identified common areas of interest through joint study on collection of market data to promote Energy Efficiency and labeling initiative in South Asia region. This would broadly help understand, application availability and usages of identified products in India & Sri Lanka and share the outcome with the other South Asian countries on potential benefits.

2. Aims & Objectives

(1) Primary Aims:

- Establish an effective network on cooperative research and share the market survey information on identified products between partners and other South Asian countries.
- Dissemination of Research Data on identified products on Energy Efficiency to stake holders (consumers, standards institutions, manufacturers, policy makers) through media including Newsletters.

(2) Objectives of study:

- Generation of data on availability and popularity of five identified products (brands / models).
- Label information and violation, (if any) as per their labelling provisions of the country including Energy Consumption.
- Dissemination of information through published report and newsletter.

(3) Products identified for study

i) Ceiling Fans
ii) Ballasts
iii) Compact Fluorescent Lamps (CFL)
iv) Refrigerators
v) Air conditioners

CHAPTER – III

1) Retail Market Survey - VOICE, INDIA

a) Methodology : -

The primary focus of the study was on collection of market data on 5 identified products by retail market research in 4 Metro Cities / big cities in various regions of country. The Metro cities were particularly chosen so that they represent geographical coverage of the country equitably. The total number of retailers surveyed in 4 metros was 650 as shown in table below:

Products	Regions/City				Total Shops
	North Delhi	South Bangalore	West Mumbai	East Kolkata	
CFL	50	30	30	30	140
Ballast	50	30	30	30	140
Ceiling Fans	50	30	30	30	140
Refrigerators	50	30	30	30	140
Air conditioners	30	20	20	20	90
Total	230	140	140	140	650

The market survey was carried out on finalised questionnaires which had questions on Brands, Models, Category, Types, Popularity, MRP, retail price, warranty, guarantee, any claims on energy consumption etc. This study has generated data on products category, type, brands and models, availability, labels information, claims on energy consumption, standards marks etc. Information on product's specification was also collected from other sources such as, exhibitions / trade fairs / Distributors, wholesalers, websites etc.

b) Evaluation of Label Information: -

Popular brands of 3 products undergoing survey- CFLs, Ceiling Fans, Ballasts (except refrigerators & air conditioners which are expensive), were purchased for collecting general & technically comparable data from the products' labels and their packaging. Besides this, brochures, newspaper cuttings on product details and claims were also collected, summarized and evaluated. Label information and pamphlets have also provided data on energy consumption claims. Owing to budget limitations, samples of refrigerator and air conditioners were not purchased.

2) Retail Market Survey – SLEMA, SRI LANKA

SLEMA (Sri Lanka Energy Managers Association) has also carried out activities similar to that of VOICE. Collection of Market data on 5 identified products included retail market research in the Colombo metropolitan area covering 100 retailers per product (ballasts, CFLs & ceiling fans, refrigerators) and 40 retailers in the case of Air conditioners. The survey has generated data on product category, type, brands & models, labels information / claims on energy consumption, Standards marks etc.).

CHAPTER – IV

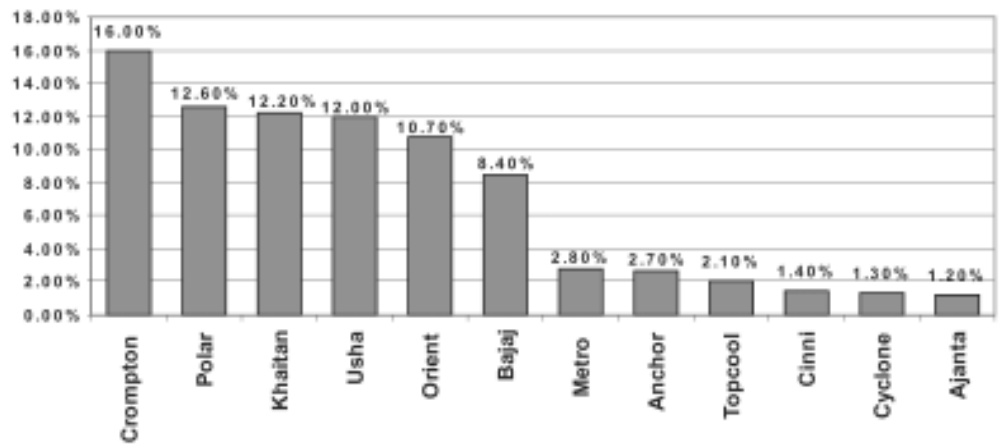
Market Survey Report on Ceiling fans

In the pre-dominantly hot Indian climate a vast majority of Indians depend on ceiling fans to beat the heat. Given the prices of fans (about Rs. 1000), they are the most common type of cooling equipment used by India consumers. Annual sales of ceiling and table fans are estimated at more than 15 millions units (which is more than 15 times the size of the market for air conditioners).

In Indian markets, manufacturers of ceiling fans are many. The survey found a total of 79 brands of fans in the four metro cities. This tally included some of the most reputed brands of the country as well as little known local brands. The chart below shows the name of 12 brands that have more than 1 % each of the overall availability in the four metro cities, covered during the survey. The table shows that a total of 1068 units were found during the survey (each brand has many models). Crompton fans were found to be the most popular available brand in shops with 16% of the total units found. This was followed by Polar fans (12.6%), Khaitan (12.2%), Usha (12%) and Orient (10.7%). Other brands such as Bajaj, Metro, Anchor, Topcool, Cinni, Cyclone and Ajanta were found with less than 10% each of their availability of the total units found.

The availability of Crompton fans as the most popular brand was not uniform in all the cities. As Crompton was found to be the most popular available brand in Delhi only. Whereas in Mumbai, Orient fan, which ranks fifth in the overall ranking, was found to be most

Availability of major brands in India



Source: Field Survey

popular available brand. In Kolkata, Polar fans were found to be the most popular and in Bangalore, Bajaj fans rank top in terms of popular available fans.

Sri Lankan Market

Except for the central hilly region or Sri Lanka, almost all other areas of the country are hot and humid. Therefore, ventilation proves to be a very successful and economical means of providing human thermal comfort. In this regard fans play a very important role in residential as well as industrial and commercial establishments. As for fans - ceiling, pedestal and table fan are the most widely used.

The Energy Conservation Fund of Sri Lanka is coordinating the development of ceiling fan testing facility and a related energy labeling program, to be implemented by the SLSI. The resulting energy label will also be in the same category of star rating as those, which have been already in place for ballasts, CFLs and refrigerators.

Popular Sizes

Indian Market

Ceiling fan sizes are determined by the diameter of the fan blades. One can find fans ranging in size from 24 inches up to 60 inches, with several sizes in between. The most common and readily available fan sizes are 36, 48 and 56 inches. A larger fan will be able to deliver more air than a smaller fan and hence would be suitable for larger rooms.

Choosing the proper size ceiling fan for a residence requires a little thought about particular application.

As far as popular size is concerned, 48 inches of fans were found to be most available sizes, with 72% of the total units found in the shops covered during the survey. Rest of the sizes were not found to be very popular as seen in the table below.

Sri Lankan Market

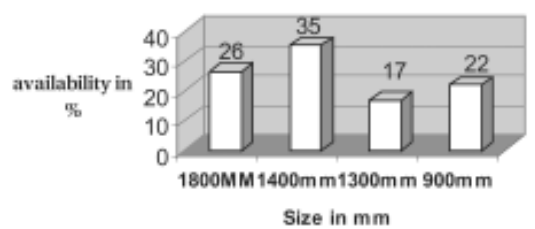
Field survey shows that the common sizes of ceiling fan diameters are 900 mm, 1300 mm, 1400 mm and 1800 mm. Percentage of fans sold in each sizes category are: 1800 mm- 26%, 1400 mm- 35%, 1300 mm- 17%, and 900 mm- 22%.

Table: Percentage distribution of popular sizes of Ceiling fan in India

SIZE in Inches	Delhi	Mumbai	Kolkatta	Bangalore	Total
48	69.9%	62.7%	62.9%	84.4%	72.3%
56	9.4%	16.4%	15.2%	1.3%	8.8%
42	7.2%	0.0%	10.2%	9.8%	8.4%
36	9.7%	9.0%	9.8%	1.3%	6.9%
24	3.8%	0.0%	2.0%	0.6%	2.0%
46	0.0%	0.0%	0.0%	1.9%	0.6%
50	0.0%	7.5%	0.0%	0.0%	0.5%
55	0.0%	4.5%	0.0%	0.0%	0.3%
45	0.0%	0.0%	0.0%	0.6%	0.2%
Total units	320	175	256	318	1069

Source: field survey

Sizes of Ceiling Fans in Sri Lanka



As per the field survey, it is observed that there are around 15 brands of ceiling fans available in the market in Sri Lanka. All of these are 3-bladed and found in different sizes in terms of blade length. Field visits reveal that as per the retailers, the most popular brands are those with lower prices in the market. The most popular size in ceiling fans is 140cm / 1400mm. The main reason for this choice may be the sizes of occupying spaces do match quite well with the flow distribution of this fan size.

Retailers' Perception on Consumer Preference

Indian Market

Survey has identified about 79 brands in the four metro cities of India. Most of these brands are either locally made or not very popular. Therefore retailer's perceptions on all the brands could not be assessed. The local brands available in a particular city may not be available in other cities. Therefore rating could not be calculated in all the cities for that particular brand. Therefore overall rankings have been calculated only for those brands, which have substantial presence at national or regional level.

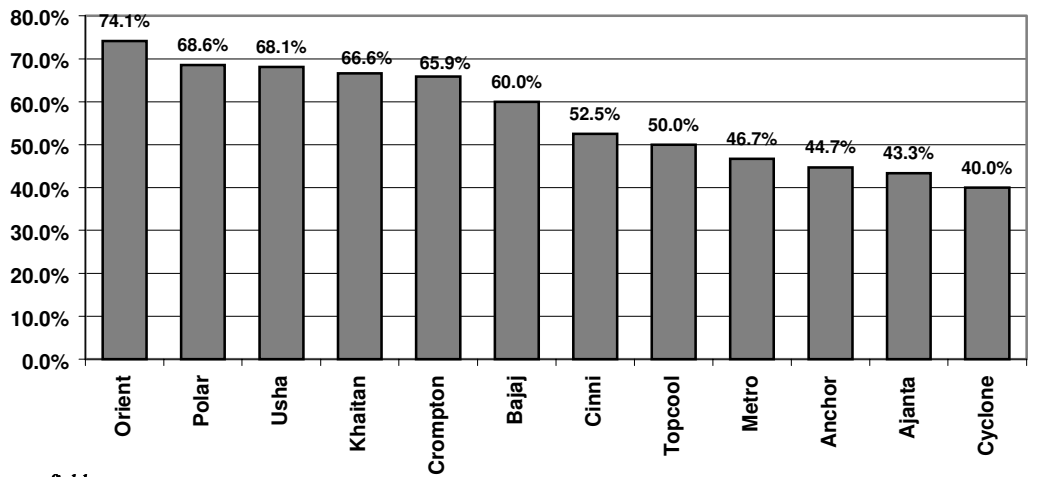
As per retailer's perception, Orient fans are the most popular based on consumer preference. As earlier discussed, Crompton fans were found to be most popular among the available brands of ceiling fans. However, consumer preference was found to be more in favour of Orient fans. Therefore, Orient fan could be considered as the most preferred brand by consumers. Polar, Usha, Khaitan, Crompton and Bajaj follow in that order. The other brands such as Cinni, Topcool, Metro, Ajanta, Anchor and Cyclone have regional presence only.

The popularity of Orient fan was not found to be uniform in all the cities covered in the survey. Above Chart given above shows Orient was found to be the most popular brand in Delhi, Kolkata and Mumbai. The consumers in Kolkata and Bangalore had better preference for Usha fans which ranks third in the overall preference. Similarly, Khaitan fans were found to be second most popular brand in Bangalore which otherwise have an overall fourth ranking.

Power Consumption

The consumption of power of a particular brand depends on its size and model. As discussed earlier, larger the size of blade, higher will be the power consumption due to larger sweep & air resistance and higher rating of motors. But larger blade size fan can deliver more air at a lower speed selection. Size should be according to the area of room to get a better service.

Retailers' perception about Top Selling Ceiling Fan Brands (India)



Source: field survey

The following table gives sizes wise power consumption of select popular brands. The sizes shown in the table are considered to be the popular ones.

the national brands. In case of regional and local brands, a consumer also has the wider leverage of bargaining. The price of ceiling fans also fluctuates depending on the season in which they are bought.

Table: Size wise Power Consumption of popular brands of Ceiling Fans (W): India

	24 inches	36 inches	42 inches	48 inches	56 inches
Khaitan		55-65	65-66	60-70	74-75
Metro		60-65		60-70	75-75
Usha	70	60-70	70-70	75-75	75-80
Orient		56-62	62-65	64-68	72-75
Crompton	55	55-60	66-70	70-74	74-75
Polar	55-56	55-62	60-62	70-70	75-75
Bajaj	60-60	62-65	62-65	68-72	75-75
Anchor			60	65-70	
Cinni			60	65-70	
Topcool	60	65	70	74-75	80
Cyclone		65-65	60-70	64-75	
Ajanta		60		65	

Source: Brouchers & websites of mfrs, retailer's perception .

Power Consumption (Sri Lanka)

Power requirement of Ceiling fans are usually inclusive of their regulators. The usual regulators have steps of three to five speed positions. Present trend is to use capacitor-type regulators in place of conventional choke-type regulators. Experiments have shown that the blade shape plays an important role on the amount of air delivery and hence the service factor which relates the air delivery to input power consumption.

The following table gives the size wise power consumption of select popular brands:

Brands	56 inches	52 inches	36 inches
Bajaj	75 w	68-72 w	
Cornel	75-80 w		
Havells		65-70 w	
Khaitan		60-70 w	
KDK	70-75 w	60-65 w	
Sunda	80 w	65-70 w	
Tellisonic	75-80 w		55 w
USHA	81 w	75 w	

Source: field survey - Sri Lanka

Price Range

The price of a ceiling fan depends on its size, design, features, colour, and warranty also on the brand image. Often regional brands are cheaper as compared to

The present survey was carried in the months of April and May. Therefore, the prices quoted would be higher as compared to the prevailing price in the winter season when the demand for fans is lower.

Table: Size wise Price range of popular brands of ceiling fans in India

	36 inches		42 inches		48 inches		56 inches	
	MRP (in Rs)	Retail Price (in Rs)	MRP (in Rs)	Retail Price Price (in Rs)	MRP (in Rs)	Retail Price Price (in Rs)	MRP (in Rs)	Retail Price(in Rs)
Khaitan	750-1110	685-1000	1050-1240	990-1110	670-1986	600-1500	680-1450	650-1350
Matro	500-800	450-470			450-850	400-575		
Usha	1100-1400	900-1250	1200-1375	1150	800-1600	700-1400	800-1650	650-1100
Orient	1050-1200	950-1050	900-1120	800-1060	750-1650	650-1400	1090-1560	985-1300
Crompton	950-1400	800-1350	1200-1550	990-1450	600-1700	550-1350	1040-1640	850-1400
Polar	1040-1300	950-1260	1000-1340	850-1280	750-1503	700-1400	525-1600	475-1440
Bajaj	n/a	n/a	1245-1450	850-1250	1275-1570	1050-1350	1380-1560	1100-1450
Cinni	n/a	n/a	1400	1150	950-1450	850-1450	n/a	n/a
Cyclone	790	790	820-1100	750-950	865-1300	860-1150	n/a	n/a
Ajanta	950-1085	700	n/a	n/a	950-1085	750-850	n/a	n/a

Sources: Field Survey

Price Range

As in the case of Indian market, the price of a ceiling fan depends upon its size, outlook & features, colour, warranty, and also on the brand image. Often regional brands are cheaper than national or international brands. It is also observed that a reasonable level of attraction is also building up for table and pedestal fans.

Warranty for Ceiling fans available in India

Most of the brands surveyed provide a 1 – 2 year warranty except Polar, which claims to give a 7-year warranty.

Brands	1800 mm	1400 mm	1300 mm	900 mm
Bajaj	2500	2650	2900	2600
Chears	3600			
Cornel		2950		
Havells	2800		2650	2600
Khaitan	2500		2850	2100
KDK	3400		3200	3600
MPL	3500			
Nulec	2800			
Pacific				3200
Philips	3200			
Vision	2800			
Sunda	2600		2100	2300
Tellisonic	2600			
USHA	2100	2800	2300	2750

**All prices shown are in Srilankan Rupees*

Sri Lanka Market

Most of the brands are limited to a maximum warranty period of six months whereas few brands offer a one-year warranty.

2) Label evaluation of ceiling fan samples

Labeling requirements Of BIS (India) & SLSI (Sri Lanka) and findings of label evaluation of samples:

	BIS (India) Requirements	Sri Lanka Standards Requirements	Findings from 10 Ceiling Fans (India)	Findings from 4 Ceiling Fans
1	**Marking (labeling) Requirements:** Each fan shall be indelibly marked with at least the following information:			
	a) Manufacturer's name, trade-name of fan (if any) and number;	YES	OK	OK
	b) Rated voltage (s) or voltage range;	YES	OK	OK
	c) Type of fan, ac or dc;	YES	Not declared by three manufacturer	OK
	d) Frequency or frequency range of power supply, if of ac;	YES	OK	OK
	e) Input in watts;	YES	Only 4 out of 10 declared	Not given by one
	f) Size of fan; and	YES	OK	OK
	g) Country of manufacture.	NO	OK	NA
	In the case of a fan provided with an earthing terminal or contact, it shall be indelibly marked with the symbol.	Not given by any one	NA	
	For additional information that the manufacturer may be requested to supply.			
2	The following additional information in respect of a ceiling fan shall be supplied by the manufacturer on request:			
	a) Power factor,	Not relevant to E-labelling, given in SLS 814	Not given by any one	NA
	b) Rated speed in rev/min,	YES	given by five out of ten only	Not given by three

c) Air delivery at test voltage,	YES. given as the rated air delivery	Only one out of 10 declared	Not given by three
d) Service value at rated voltage,	YES,	Not given by any one	Not given by three
e) Number of blades,	YES	3	Ok
f) Type of regulator and number of running position,	YES	Resistance type regulator provided by 3 manufactureres only, (7 not provided regulator with Fan)	Ok
g) Class of insulation,	YES	Not provided by three	
h) Type of bearings, and	YES	Not given by two	Not given
I) Instructions for lubrication type of bearings	YES- given as the type of bearings	Only given by 3	NA
		Not given by one	
j) Guarantee	NO	OK	NA
k) MRP	NO	Only one ISI marked	NA
l) Standard Mark, if any		Only one	

Note:

Sri lanka has Safety and Performance stds for Electric fans and Regulators SLS 814 Based on IEC std. *Since Service value is the prominent parameter of the Elabelling stds, it may be marked on the fan, after finalising the std which is still in the committee stage Up to now above markings are in the E labelling Draft stds. Country of manufacture will appear in the Elabelling certificate.

Conclusion:

Keeping in view the tropical climate in the region, it is beyond doubt that India is one of the largest markets for ceiling fans in the world. As it has been found in the market survey, apart from the 79 brands identified, there are more brands from unorganized sector, which could not be identified due to limited scope of our study. Except for northern states (during 4-5 month winter season) fans are used throughout the year in India. As per the finding, 1200 mm and 1400 mm sizes of ceiling fans are the most selling sizes in India & Sri Lanka respectively. They generally offer 6 months to 2-year warranty. An improvement of 10 to 15% of power consumption and efficiency, huge amount of energy can be saved and can cover up for some power shortage. Since the applications of fans are identical throughout the region, there should not be any barrier in the harmonization of test standards between the two countries. There are few common brands namely Bajaj, Khaitan, Usha, Havells etc. available both in India and Sri Lanka markets. Fans should also be taken up on priority basis for formulation of Energy Efficiency standards & labeling program due to their common usage, availability, standards and mass consumption.

Recommendation:

Keeping in view the very large sales, exports and wide applications, ceiling fans need to be selected on priority basis for energy labeling program.

CHAPTER - V

Market Survey Report - BALLAST

Ballasts (magnetic / electronic) are required for tubular fluorescent lamp to provide high initial voltage for start-up and to regulate current during operation.

Magnetic and Electronic Ballasts

Magnetic ballasts - basically a copper / aluminium winding around an iron core - drive the fluorescent lamp at 50Hz, the input frequency of the power supply. Power losses appear as heat dissipated in the core and windings. Recently, energy-efficient magnetic ballasts that use larger windings and improved core materials to reduce power losses have appeared. The decades old magnetic "core-coil" ballast has begun to give way to the electronic ballast as semi-conductor technology has leaped forward in recent years.

Electronic ballasts use solid-state technology and operate at higher frequencies and efficiencies than do magnetic ballasts. They offer electricity saving beyond even best magnetic ballasts. Lamps operating with electronic ballasts reduce electricity use by 10 to 15% over magnetic ballasts for the same light output. Electronic ballasts also offer reduced flicker, lower weight, less noise and longer life than magnetic ballasts. They increase the efficacy of these lamps by operating them at a higher frequency and increase the lamp lifetime.

Electronic ballasts have a higher initial cost, are lighter, smaller, and more efficient than magnetic ballasts, and they drive fluorescent lamps to operate more efficiently, because the phosphors in the lamp produce more light when bombarded at a higher frequency. Despite their potential savings, electronic ballasts have yet to gain more than a toehold in the lighting market of most of the developing countries. In India, a handful of manufacturers sell a small number of electronic ballasts.

The Indian Ballast Market

The most common fluorescent lighting system in India is a 40-watt fluorescent tube with magnetic ballast. These magnetic ballasts typically have losses of 8-12 watts per lamp. Less than 1% of the ballasts sold in India have losses below 8 watt. Some of the reasons given for the high losses are the use of aluminum wire, poor quality lamination material and poor stamping of lamination.

Sales of electronic ballasts in India are low, but growing. The following table shows the distribution of magnetic and electronic ballasts found in the shops of four metro cities, during the course of survey.

Table: City wise percentage distribution of type of ballasts

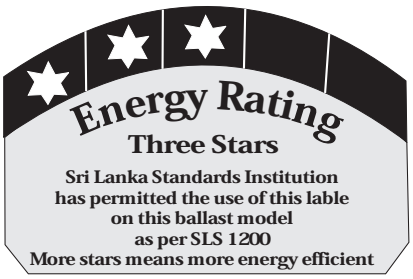
	Delhi	Mumbai	Kolkata	Bangalore	Total
Magnetic	68.9%	72.7%	94.9%	49.6%	65.3%
Electronic	31.1%	27.3%	5.1%	50.4%	34.7%
Total units	299	128	136	387	950

Source: field survey

Over 65% of ballasts found during the survey were magnetic and the rest were electronic. Therefore use of electronic ballasts is still far lower as compared to magnetic ones. However, the data also shows that the availability of electronic ballast in Bangalore is similar to that of magnetic one. This shows that consumers in Bangalore are more conscious of power saving measures. On the other hand the availability of electronic ballasts in Kolkata were surprisingly low at about 5%.

The Sri Lankan Ballast Market

The most common fluorescent lighting system in Sri Lanka is the 40-watt fluorescent tube with magnetic ballast, mainly used in domestic, commercial and industrial applications. These magnetic ballasts typically have losses of 8-12 watts per lamp. Under the Sri



Lankan Standards Institution's SLS 1200 an Energy Labelling program for ballast is implemented with a Star Rating criteria for energy efficiency. The following figure shows the Energy Label for ballasts in Sri Lanka and the table below indicates the Watt losses for the star ratings.

Energy loss	Star rating
loss £ 4W	*****
4W < loss £ 6W	****
6W < loss £ 8W	***
8W < loss £10W	**
10W < loss £12W	*
loss > 12W	no stars

The sales of electronic ballasts in Sri Lanka is negligible. Electronic ballasts are mainly used in commercial buildings and industrial establishments, and its use is growing gradually. As for Energy Labelling, electronic ballasts are given a five star rating, however, in order to receive a five star rating, an electronic ballast should fulfill the IEC requirements. The following table shows the distribution of magnetic and electronic ballasts found in the metropolitan are of Colombo, during the course of the field survey.

Table: Percentage distribution of type of ballasts found in Colombo, Sri Lanka

Magnetic	96%
Electronic	4%
Total units	159

It is apparent that the use of electronic ballasts have not yet received due acceptance by end user. The reasons behind this may be lack of awareness of saving potential of electronic ballasts.

Major Brands

Indian Market

During the course of survey in the four Indian metro cities, a total of 99 brands of ballasts were found. Out of these brands only 15 brands had share of more than 1%. Rest of the brands either had less than 1% share or they were not found in all the cities covered.

Most of these brands shown in the table above, except Reshmi and Delta, had magnetic and electronic ballasts. Philips ballasts were found to be most popular available brands with nearly about 26% of the 950 units found in the shops selling ballasts in the four Indian metro cities. Remaining brands were found with less than 10% each of the total units found. Crompton, Anchor, Wipro and Surya followed Phillips with each more than 5% of the units found.

The edge of Philips as far as its availability is concerned was found in all the cities covered during the survey.

Crompton ballast is the second most popular brand found in most of the shops of Bangalore city. In all the other cities, Cromption was not found as the second

most popular available brand. For example, in the shops of Delhi, Surya had the second position. Whereas in Mumbai and Kolkata, Anchor and Reshmi had the second positions respectively.

Sri Lankan Market

During the survey in Colombo city, only 10 brands of ballasts were found. These brands had reasonable share in the market. It is noted that among these brands, only five brands have obtained certificates under Energy Labelling program. The star ratings of these vary from 3 to 5.

Except brands ORSON and KOBE, all other brands found in the survey were either magnetic or electronic. Unlike in the case of India it is not possible to show the city wise distribution of availability of brands, as the survey was limited to Colombo metropolitan region only. But, the following table shows the market share of major brands of ballasts (in terms of availability), found during the survey.

Percentage Share For Brands Availability:

Brand	Availability (Market Share %)
Orson	40.0
Songke	28.1
Kobe	16.9
Bajaj	5.0
Hilos	3.1
Sunflower	2.5
Guangzhou	1.9
Philos	1.3
Philips	0.6
Nippon	0.6

Source: Field Survey - Sri Lanka

Table: Type wise percentage distribution of popular brands of ballasts: India

S. No	Brand	% Share Magnetic	% Share Electronic	% Share Total units
1	Philips	61.6%	38.4%	25.8%
2	Crompton	45.3%	54.7%	9.1%
3	Anchor	54.2%	45.8%	7.6%
4	Wipro	57.6%	42.4%	6.9%
5	Surya	60.0%	40.0%	6.3%
6	Bajaj	58.3%	41.7%	3.8%
7	Orient	72.0%	28.0%	2.6%
8	Reshmi	100.0%	0.0%	2.4%
9	Sunrise	78.3%	21.7%	2.4%
10	Diamond	95.5%	4.5%	2.3%
11	National	50.0%	50.0%	1.7%
12	Sandeep	92.3%	7.7%	1.4%
13	Winday	46.2%	53.8%	1.4%
14	Milton	36.4%	63.6%	1.2%
15	Delta	100.0%	0.0%	1.1%
	Total units	**620**	**330**	**950**

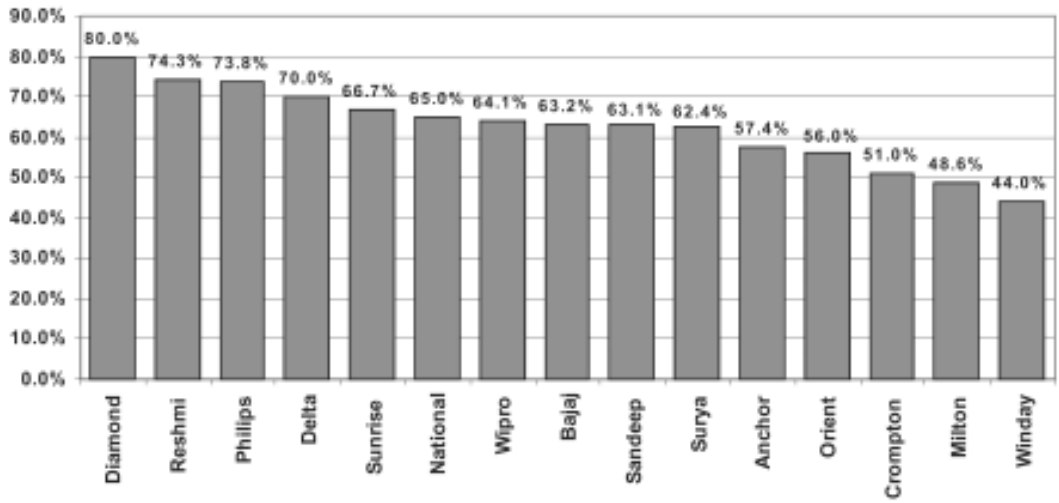
Source: Field survey

Retailers Perception on Consumers' Preference

Retailers were asked to rank on consumers preference for popular brand. Rank 1 was assigned for most popular and rank 5 for least preference. Accordingly, weights were assigned to each rank and then consumers' preference was calculated for each brand found in the shops covered in the survey. The results were surprisingly different from the popular available brands.

The ballast market is dominated by many regional and local brands. The result shows that two of the local brands – Diamond and Reshmi - present in the Kolkata market had the overall highest ratings. These two brands had the substantial presence in Kolkata market and were highly preferred by consumers. Low prices of these ballasts might be playing a role for the preference of consumers. Reputed brands like Philips and Crompton are more expensive as compared to local brands.

Consumer preference of popular brands of ballasts in percentage: India



Source: field survey

The ballast market is dominated by many regional and local brands. The result shows that two of the local brands – Diamond and Reshmi - present in the Kolkata market had the overall highest ratings. These two brands had the substantial presence in Kolkata market and were highly preferred by consumers. Low prices of these ballasts might be playing a role for the preference of consumers. Reputed brands like Philips and Crompton are more expensive as compared to local brands.

Similarly in Delhi, Anchor ballasts are preferred more than the reputed Philips and Crompton brands. Mumbai and Bangalore consumers (according to retailer's perception) have more preference towards reputed Philips brand.

Retailers Perception on Consumers' Preference in Sri Lanka

No standard statistical method was employed to evaluate the consumer's perceptions for popular brands. However consumer perception was obtained through the direct discussion with the retailers during the field survey. As per the information on data sheets the two most popular brands are ORSON and SUNFLOWER.

Price Range

Indian Market

Mainly there are 20 watts and 40 watts of ballasts available in the market. Since there are many companies in the market, therefore, a wide range in the prices was found. The prices of reputed companies, which have presence in the national market, were found to be priced higher as compared to prices the regional and local brands. The following table gives the prices of magnetic ballasts of few popular brands. The above table shows that the prices of popular brands (20 & 40W as the price difference is marginal) ballasts like Philips, Bajaj, Crompton etc. are comparatively much higher to the prices of local brands such as Milton, Reshmi, Diamond etc. There is also gap in the MRP and actual retail price of these brands.

Similar trends were found in the prices of Electronic ballasts. The next table shows the price range of electronic ballasts of some of the popular brands of electronic ballast.

In case of Electronic ballasts, some of the prominent Magnetic ballast manufacturers also manufacture

Table: Range of MRP and retail price of popular brands of magnetic ballasts: India

		40 watts		20 watts	
		MRP (in Rs)	Retail Price (in Rs)	MRP (in Rs)	Retai Price (in Rs)
Philips	Minimum	155	100	145	85
	Maximum	220	205	155	100
Sunrise	Minimum	40	35	80	65
	Maximum	190	165	100	95
Bajaj	Minimum	140	100	80	70
	Maximum	150	120	90	85
Orient	Minimum	140	80	80	75
	Maximum	150	95	95	85
Milton	Minimum	50	40	n/a	n/a
	Maximum	60	50	n/a	n/a
Crompton	Minimum	75	70	85	70
	Maximum	200	160	140	105
Wipro	Minimum	125	125	125	125
	Maximum	125	125	125	125
Delta	Minimum	80	70	70	70
	Maximum	220	199	220	120
Anchor	Minimum	68	65	80	65
	Maximum	190	185	130	105
Winday	Minimum	80	65	n/a	n/a
	Maximum	190	185	n/a	n/a
Diamond	Minimum	55	50	58	50
	Maximum	160	135	103	85
Reshmi	Minimum	56	56	45	43
	Maximum	105	90	155	110
National	Minimum	75	65	90	85
	Maximum	125	110	90	85

Source: field survey

electronic ballast whose price ranges from Rs. 150-320 depending upon the brands. Some of the regional and local manufacturers also produce these ballast with a price range of Rs. 75 to 150.

Sri Lankan Market

The 20 watts and 40 watts of ballasts are mainly available in the market. Field survey has enabled us to obtain only maximum retail price (MRP) as opposed to the retail price in the case of India. The table shows the MRPs for different brands for 20W & 40W appliances.

Warranty

In Indian Market only reputed companies give warranty on ballasts for a period of six months to one

year. The local brands and especially ballasts coming from China do not give any warranty on their products. Similar in the case in Sri Lankan market.

However in terms of number of hours of use and potential savings, electronic ballasts appear to be an acceptable option.

Table: Price (MRP) distribution of Magnetic & Electronic ballasts of available brands: Sri Lanka

Brand	Magnetic (in SLR)		Electronic (in SLR)	
	20W	40W	20W	40W
Kobe	75-95	120-140	-	160
Bajaj	75-95			
Hilos	95	120		
Songke	75-140	100-125		
Guangzhou		100		
Orson	95	125		
Philips	95			
Philos	95			
Sunflower	20	90		
Nippon	75-150	35-125		115

Source: field survey

Conclusion

It has been very difficult to identify the most popular brand of ballasts due to diversity of the availability of brand at each retailer. It has been seen that in India and Sri Lanka, the market share of magnetic & electronic ballasts is around 66% & 34% and 80% & 20% respectively. There are also few common brands namely Philips, Bajaj which are available in both the countries. It has also been noted that ballasts in Sri Lanka have energy labels on Watt-loss parameters where most of them fall in 3 star category. Moreover electronic ballasts are given 5 star rating. In India, the energy-labeling scheme is not yet available though EE standards process even though started two years back. The reason on poor availability of electronic ballast may be poor consumer awareness on potential saving.

During the survey a sizeable presence of electronic ballasts has also been noted and respondents have given encouraging response on growing sales of these ballasts. In the coming years, the wide sales gap between magnetic and electronic ballasts that exist at present, is expected to narrow down thus resulting energy savings in the application of ballasts. Standards formulation bodies need to take necessary measures immediately to act upon in formulation of Energy Efficiency Standards since these products cater a wide spectrum of product quality. Hence there exists a potential of significant amount of energy savings by use of improved watt loss on magnetic ballasts, and through the introduction of electronic ballasts. However the new product would find difficulty to take off due to relatively high initial cost of these products compared to conventional ones.

Recommendation:

Mass consumer awareness program on potential savings on the use of Electronics Ballasts through print & electronic media, displays in exhibition; posters etc. that could highlight the rationale for the use of EE electronic ballasts leading to potential energy and life cycle saving.

Comparison of Labeling requirements standards (BIS & SLSI) and Findings of label evaluation

	BIS Requirements (India)	SLSI (Sri Lanka) Requirements	Findings of 12 Ballasts (India)	Findings of 5 Ballasts (Sri Lanka)
1.1	Ballast Marking Ballast shall be marked legibly and durably giving the following information:			
	a) Mark of origin (this may take the form of a trade-mark, or the manufacturer's name or the name of the responsible vendor);	Yes, given as brand name of the manufacture or responsible vender	Yes	Ok
	b) Type;	No, It is given in the certificate whether magnetic or electronic	Yes	NA
	c) Wiring diagram indicating clearly the position of terminals, unless connections are self-evident;	No	Not given by One	NA
	d) Rated lamp voltage(s), frequency and lamp carrent(s)	Yes	Yes	Ok
	e) Rated wattage and if necessary, the designation of the type(s) of lamp for which the ballast is to be used with more than one lamp, the number and wattage of each lamp is to be indicated;	Yes	Yes	OK
	f) Power factor;	No	Not given by two	NA
	g) Ballasts with a rated maximum operating temperature of the winding shall be marked with the claimed value following the symbol tw, values increasing in 5 C steps;	No	Only 2 given	NA
	h) Ballast with tw marking may also be marked with the rated temperature-rise of the windings following the symbol t;	No	Yes	NA
	I) Country of manufacture	No	Not declared by 3	NA
1.2	The ballasts may also be marked with the ISI certification Mark	No	Only 2 ISI marked	NA
	Watt loss		Only 3 declared	Applicable under E labeling

Note:

Under E-labelling scheme (Sri Lanka) ballasts are marked

a) Brand Name b) Model Number

c) Voltage & Frequency d) Wattage

e) The stds indicates that the other parameters are to be PROVIDED on request. These markings are included in the safety and performance SLS 1150 which is direct adoption of IEC also

f) Standard (SLS) which is direct adoption of IEC

CHAPTER - VI

Market Survey Report
Compact Fluorescent Lamps (CFLs)

Introduction

All fluorescent lamps operate by discharging an electric arc through mercury plasma enclosed in a glass tube. The ultraviolet photons emitted by the de-excitation of mercury atoms are converted to visible light by a phosphors coating on the inside of the glass tube.

CFLs utilize either standard core-coil ballasts or advanced electronic ballasts. In some models the ballasts are detachable from the glass tubes. Electronic ballasts are somewhat more expensive but less bulky than core-coil ballasts, and enable the CFL to start-up instantly, producing light with no flicker.

CFLs last 5 to 10 times longer than incandescent light bulbs and provide the same high - quality light with less than one-quarter the electricity. Currently, the retail prices for these lamps range from Rs 20 to Rs 450 in India. In the case of Sri Lanka, the prices for CFLs range from around LKR 45 to LKR 925.

A 15 watt CFL replaces a 75 watt incandescent, and the consumers obtains a little more light with the CFLs than they did with the incandescent. Ignoring the value of the additional lighting, the saving at the meter from this replacement is 50W. When India's high T&D losses of 20% are taken into consideration, busbar savings increase to 62 watts. Since CFLs replace only the most heavily used incandescent bulbs, they have a peak period coincidence rate that is significantly higher than the average incandescent. Consequently, replacing a heavily used incandescent in India with a CFL conserves 42 peak-coincident watts at the power station.

In Sri Lanka SLSI, with the collaboration of CEB has implemented an energy-labelling program for CFLs under SLSI 1225. This energy labelling for CFLs is also presented in the form of a star rating, similar to other energy consuming products such as refrigerators, ballasts and ceiling fans in the near future. The following figure depicts the Energy Label for CFLs in Sri Lanka and the table below indicates the PG values (Performance Grading) for the star ratings. This program was launched in March 2003 as a voluntary program.

Fig. Energy Label for CFLs in Sri Lanka

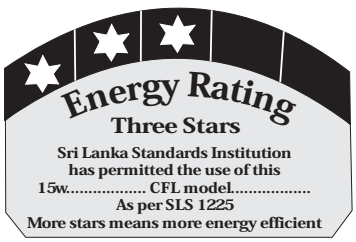


Table PG values for the star rating

PG	Star rating
PG > 70	★★★★★
65 < PG £ 70	★★★★
60 < PG £ 65	★★★
55 < PG £ 60	★★
50 < PG £ 55	★
PG £ 50	No stars

The testing of CFLs for energy labelling is carried out at the lighting-testing accredited laboratory of National Engineering Research and Development Center (NERDC).

Popular Brands

Indian Market

The survey conducted in the four metropolitan Indian cities found 58 brands of CFLs. A total of 1012 units of CFLs were found during the survey. The following table shows the percentage distribution of some of the popular brands of CFLs whose overall share was found to be 1% and above.

Philips CFLs were found to be most popular available brand with a total share of over 32%. This was followed by Orpat (16.7%) and Surya (10.5%). Crompton was found to be fourth most popular available brand with share of 7% of the total units found during the survey in the four Indian metropolitan cities.

The other brands such Wipro, Osram, Bajaj and Plano were found with shares between 2-5% whereas, Ecolight, Samron, Anchor, Sunrise, GE and Milton had shares of less than 2% each.

The popularity of these popular brands was not uniform in the cities covered. Crompton was found to be most popular available brands in Delhi and Bangalore. In Mumbai and Kolkata Orpat was the most popular which ranks second in the overall popularity. Similarly Orpat, which ranks second in the overall popularity was not very popular in Delhi. Similarly in Bangalore, Orpat was not found in the shops covered during the survey.

Table 1: Percentage wise distribution of popular brands of CFL

		Overall	Delhi	Mumbai	Kolkata	Bangalore
1	Philips	**30.2%**	**26.2%**	37.9%	32.6%	**27.7%**
2	Orpat	16.7%	0.5%	**44.7%**	**34.9%**	0.0%
3	Surya	10.5%	21.3%	1.9%	0.5%	10.3%
4	Crompton	7.0%	6.0%	0.5%	3.3%	18.3%
5	Wipro	4.1%	0.3%	6.3%	0.0%	12.1%
6	Osram	4.1%	8.4%	1.5%	2.8%	0.4%
7	Bajaj	3.1%	6.0%	1.0%	0.0%	3.1%
8	Plano	2.9%	0.0%	0.0%	0.0%	12.9%
9	Eco light	1.9%	4.1%	1.9%	0.0%	0.0%
10	Samron	1.6%	0.0%	0.0%	3.3%	4.0%
11	Anchor	1.5%	0.0%	2.4%	0.0%	4.5%
12	Sunrise	1.5%	4.1%	0.0%	0.0%	0.0%
13	GE	1.1%	0.5%	0.0%	3.7%	0.4%
14	Milton	1.0%	2.7%	0.0%	0.0%	0.0%
	Total Units	**1012**	**367**	**206**	**215**	**224**

Source: field survey

Sri Lankan Market

According to the survey results, 23 brands of CFLs are available in Sri Lankan Market. Out of these 23 brands, 11 brands have obtained energy labels under SLS 1225 for 35 models all together. Except one model, all the above models have obtained a Performance Grade (PG) more than three stars.

Philips, Osram, Deme and Clipsal CFLs were found to be most popular available brands with a total share of 17.2%, 12%, 10.5 and 10.5% respectively. The chart on the right shows the availability for the popular brands.

Because of the availability of substandard products in the market and due to the price difference between high and low quality lamps, there is a trend of using cheap CFLs as a direct substitute for incandescent lamps, forgoing the main objective of using CFL as an energy efficient lamp. To address this critical issue, relevant authorities are now planning to launch an intensified advertising campaign and an awareness program. Apart from brands listed there are also some brands in the Sri Lankan market which could not be included due to limitation of sample size and city chosen. The survey team has failed to explore even some star rated brands (Slite, Saver, Orient etc.), which are available in the market. Therefore the number of available brands is much higher than that of survey findings.

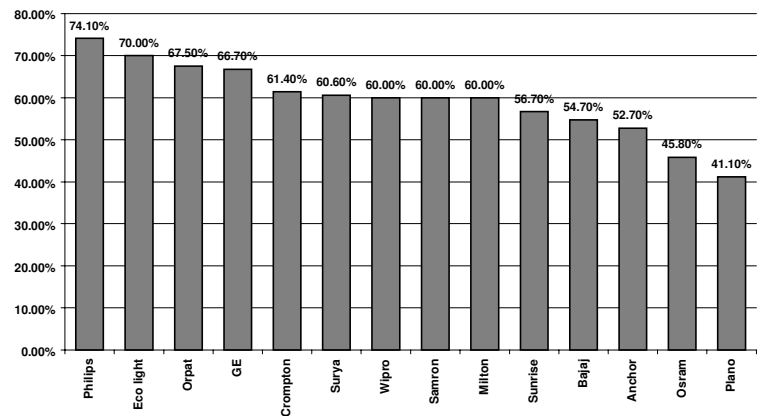
Also, we can clearly see that the consumer's preference is not well reflected by the market availability of brands.

Table 1: Percentage wise availability of popular brands of CFL

Brand	Percentage
Philips	17.2
Osram	12.0
Deme	10.5
Clipsal	10.5
Huagiang	7.5
Flash	5.4
Cata	5.2
Nippon	5.2
Meta	5.2
Energyline	4.4
Orange	3.4
Firffly	2.9
Bajaj	2.5
President	2.1
Runlux	2.1
Total Units	523

Source: field survey - Sri Lanka

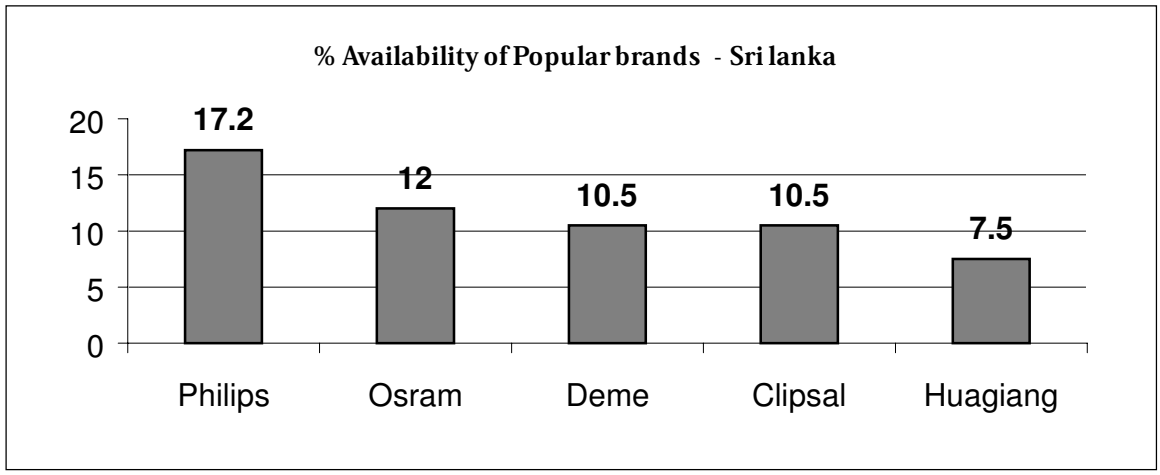
Retailer's perception on consumers' preference



Source: field survey

Indian Market

Since the availability of most of the popular brands were not found in all the cities covered, therefore, retailers perception could not be calculated for these popular brands. Many brands which are popular in one city were not present in other cities covered. This is because of many regional and local brands were found to be popular in



the different cities covered. The chart below shows the retailers perception on consumer preference for only those brands that have either substantial presence in one or all the cities covered.

Retailers' perception on Consumers' Preferences : Sri Lanka

No standard statistical method was employed to evaluate the consumer's perceptions for popular brands. However consumer perception was obtained through the direct discussion with the retailers during the field survey. As per the information on data sheets the most popular five brands and their popularity in terms of availability in the market are shown in the above chart.

CFL Ratings:

Indian Market

CFLs are available in various power ratings. They are available in as low as 2 watts to as high as 40 watts. However, survey results showed that 14 to 20 watts CFLs to be most popular. As mentioned earlier 16 watt CFLs give light equivalent to a 75 watt of incandescent. Therefore, 14/15 and 18/20 watts of CFLs are used to replace 60 watts and 100 watts of incandescent respectively, which give sufficient light and also save significant power. Survey has also indicated the availability of CFLs with higher watts such as 30, 36 and 40 watts. These CFLs are also becoming popular which are generally linear tubes.

For the convenience we have clubbed the various ratings of CFLs in different ranges such as up to 5 watts, 6-10 watts,

Table: Percentage distribution of wattage range of CFLs

	Delhi	Mumbai	Kolkata	Bangalore	Total
11-15	**39.0%**	**24.8%**	33.0%	**58.5%**	**39.1%**
16-20	41.4%	22.3%	**34.9%**	35.7%	34.9%
6-10	7.9%	21.4%	12.6%	4.5%	10.9%
up to 5	6.5%	12.6%	9.8%	0.0%	7.0%
21-25	0.0%	13.1%	7.0%	1.3%	4.4%
36-40	4.4%	2.9%	0.0%	0.0%	2.2%
26-30	0.8%	2.9%	2.3%	0.0%	1.4%
31-35	0.0%	0.0%	0.5%	0.0%	0.1%
Total units	**367**	**206**	**215**	**224**	**1012**

Source: Field Survey

11-15 watts etc. as shown in the table below. Lower ranges up till 11-25 watts are generally used for domestic uses to substitute incandescent. Higher watts CFLs are used for commercial purposes or as linear tubes.

The table on the previous page shows the availability of CFLs with watts between 11-15 were found to be most popular, with over 39% of total units found during the survey in the four metro cities. This was followed by ranges between 16-20 watts (34.9%) and 6-10 watts (10.9%). CFLs with watts up to 5 were found at fifth place. These CFLs are also becoming popular for low light for small rooms or used in multiple in the same room. High wattage CFLs with range between 21-35 are not very popular, as they constitute less than 10% of the total units found during the survey in the four metro cities. Therefore it can be concluded that watt range between 11-20 are most popular and this is found to be uniform in all the cities covered.

Sri Lankan Market

In the case of Sri Lanka CFLs are available in wide variety of wattages. They are available in as low as 4 watts to as high as 40 watts. According to the survey, 18 Watts, 15 Watts and 14Watts CFLs are found to be most popular. Therefore, in Sri Lanka, 15 and 18 watts of CFLs are used to replace 60 watts and 100 watts of incandescent in domestic sector.

Price Range

Indian Market

The prices of CFLs depend upon their wattage. Higher the wattage, higher will be the price. The survey in Indian cities found that there is wide range in the prices of CFLs depending upon their brands. Normally reputed brands available at national level carry more prices than the local and regional brands. Most of the local brands are selling CFLs with low wattages, which are normally used in place of, incandescent. The reputed national brands, however, produce and sell CFLs and linear tubes in nearly all the wattage ratings. It has been seen that the Chinese CFL of so called cheap quality cost as low as Rs. 18 upto Rs. 60 with the range of 14-26 watts ratings. However CFLs from reputed Indian and other MNCs cost anything between Rs. 90-250 in the regular and most selling sizes (15-20 watts). However some particular CFLs even cost in the price rage of Rs. 250-450 a piece.

Reputed brands like Philips, Bajaj and Cromption are more expensive as compared to the local regional brands such as Orpat, Ecolight, Samron and others. The survey also found the difference in the MRP and Actual Retail Price, depending on the popularity of particular brand. It was generally observed that in the case of regional and local brands, there is wider gap between MRP and Actual Retail price.

Reputed in Indian cities brands such as Phillips and Surya are priced higher as compared to other brands, which are not very popular.

Price Range

Sri Lankan Market

The prices of CFLs in Sri Lankan market depend upon their brand and Wattage. High quality and reputed brands represent the higher end of the price range where as substandard products represent the lower end. In between the expensive (reputed brands) and cheap (newly penetrated brands) price categories, there is a range of brands with moderate prices. According to the retailers' perception on consumers' preferences, these products with a moderate range of prices are becoming popular because of the affordable price and satisfactory performance and durability.

Warranty on CFLs:

Indian Market

Due to the penetration of regional brands in Indian Market, there was set pattern found for warranty on CFLS. The popular and expensive brands such as Philips, Crompton, Orpat etc. were of trend for giving warranty between 3-12 months. Less popular brand, on the other hand, were found to be giving warranty for 1-3 months where as there was no warranty or local brands. The Chinese CFLs, which are be to very low priced had been also been giving no warranty.

Sri Lankan Market

Most of the high quality brands offer one to two year warranty. But the warranty for CFL brands with moderate prices is limited to one year in most cases.

Price range of popular brands of CFLs wrt wattage: India

		up to 5 watts		6-10 watts		11-15 watts		16-20 watts		21-25 watts	
Brand		**MRP (in Rs.)**	**Retail Price (in Rs.)**	**MRP (in Rs.)**	**Retail Price (in Rs.)**	**MRP (in Rs.)**	**Retail Price (in Rs.)**	**MRP (in Rs.)**	**Retail Price (in Rs.)**	**MRP (in Rs.)**	**Retail Price**
Philips	Minimum	110	100	125	110	145	115	225	165	n/a	n/a
	Maximum	120	110	160	145	185	165	325	225	n/a	n/a
Orpat	Minimum	105	80	90	75	120	115	160	120	170	140
	Maximum	175	115	110	90	140	125	185	180	180	180
Surya	Minimum	60	50	100	90	140	120	150	140	175	160
	Maximum	100	65	140	120	235	200	245	230	250	250
Crompton	Minimum	n/a	n/a	160	90	130	130	150	125	400	320
	Maximum	n/a	n/a	260	120	340	255	300	280	400	320
Wipro	Minimum	100	90	120	100	125	110	180	175	225	200
	Maximum	139	125	160	150	220	215	249	240	275	260
Osram	Minimum	n/a	n/a	n/a	n/a	140	100	150	140	n/a	n/a
	Maximum	n/a	n/a	n/a	n/a	220	180	240	225	n/a	n/a
Bajaj	Minimum	120	90	140	100	140	125	190	125	n/a	n/a
	Maximum	120	90	210	175	230	195	230	185	n/a	n/a
Plano	Minimum	n/a	n/a	140	120	160	135	185	169	320	300
	Maximum	n/a	n/a	140	125	185	160	230	215	480	460
Eco light	Minimum	120	100	145	140	120	110	170	145	n/a	n/a
	Maximum	120	100	145	140	170	165	225	165	n/a	n/a
Samron	Minimum	90	60	80	65	165	145	140	140	n/a	n/a
	Maximum	130	105	80	65	195	170	265	215	n/a	n/a
Anchor	Minimum	n/a	n/a	n/a	n/a	160	150	175	160	175	170
	Maximum	n/a	n/a	n/a	n/a	175	163	210	205	250	225
Sunrise	Minimum	40	25	140	100	60	30	80	60	n/a	n/a
	Maximum	40	25	140	100	60	30	120	100	n/a	n/a
GE	Minimum	n/a	n/a	n/a	n/a	110	90	182	150	n/a	n/a
	Maximum	n/a	n/a	n/a	n/a	170	110	300	210	n/a	n/a
Milton	Minimum	150	120	120	100	n/a	n/a	120	100	n/a	n/a
	Maximum	150	120	200	180	n/a	n/a	140	120	n/a	n/a

Source: Field Survey

Labeling Requirements of BIS (India) and SLSI (Sri Lanka) and Findings on CFLs

	BIS (India)	SLSI (Sri Lanka)	Findings of 14 CFLs (India)	Findings of 8 CFL (Sri Lanka)
1	Marking			
1.1	The lamps shall be clearly and durably marked with the following mandatory markings:			
	a) Mark of origin (this may take the form of a trade-mark, the manufacturers name or the name of the responsible vendor);	Marked as Brand name of the manufacturer or responsible vendor.	OK	Not given by one
	b) Rated voltage or the voltage range (marked'V' or 'Volts');	YES	Not Given By one	Ok
	c) Rated wattage marked 'W' or 'watts');	YES	Ok	Ok
	d) Rated frequency marked in 'Hz');	YES	Not Given by One	Ok
	e) Rated Luminous flux;	YES	Not Given by 5	Not given by six
	f) Rated colour temperature; and	No	Not given by 12 (2 given on Packaging)	NA
	g) Country or Manufacture.			
1.2	In addition, the following information shall be given by the lamp should be given by the lamp manufacturer either on the lamp or packing or in installation instruction:	No	Not given by 3	NA
	a) Lamp current;	Not relevant to E labelling, it is given in the SLS 1231	only 3 given	Not given by six
	b) Burning position if restricted;	Not relevant to E labelling, it is given in the SLS 1231	Not given by anyone	NA
	c) For lamps with a weight significantly higher than that of the lamps for which they are a replacement, attention should be drawn to the fact that the increased weight may reduce the mechanical stability of certain luminaries; and	Not relevant to E labelling, it is given in the SLS 1231	Only one declared	NA
	d) Special conditions or restrictions, which shall be observed for lamp operation, for example, operation in dimming circuits.	Not relevant to E labelling, it is given in the SLS 1231	Not given by 5	Not given by six
	e) Life / Warranty	Yes, Warranty Certificate should be given by the supplier, for at least for one year	Not given by 4	Not given by four
	f) Equivalent to GLS Lamp	No	Not given by one	NA
	g) Lighting	No	Not given by 10	NA
	h) MRP	No	Not given by 3	NA
2.	BIS Certification Marking The self-ballasted lamps shall also be marked with the standard mark Energy Labeling	Not relevant to E Labeling, it is given in the SLS 1231	No Standard Mark No Standard Mark. two mark with energy labeling of other country	NA

There are no exclusive dealers or importers for most of Cheap and substandard CFLs and hence warranties have become meaningless.

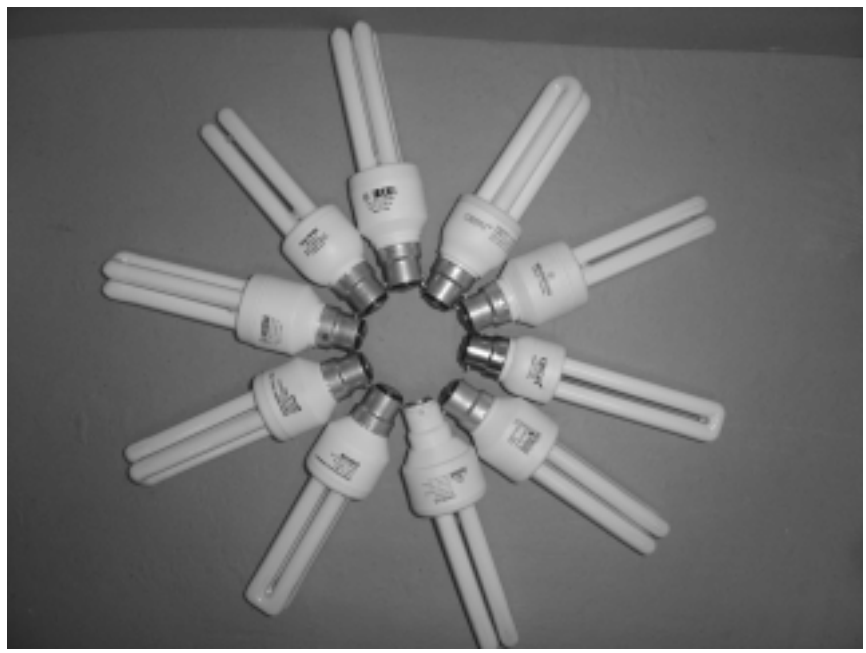
Conclusion:

During the market survey and visit to various retail outlets, there is a clear indication about consumers preferences on choices of CFL for various application. A couple of years back there were apprehension on purchase of CFL due to poor quality Chinese CFL's dumped into the retail markets which still persist. But thanks to many reputed lamp manufacturers who have also started manufacturing CFL's and considerably brought down the retail prices of CFL luring consumers to buy CFLs. Also due to DISTCOMs periodically increasing energy tariff compelling consumers to use CFLs for at least (driving away darkness) for general lighting purpose. It can be clearly seen in most of the households in urban/ rural areas, people using CFLs particularly where longer duration lighting is necessary. It is expected that the prices of well known popular brands are further going to come down thereby increasing sales further. In Sri Lanka, it is amazing to note that the out of 17 popular CFLs identified, 11 had energy labels of more than 3 star rating. Most of the selling brands were Philips, Osram and Deme. First two are also popular and available in both the countries. The most selling CFL in India & Sri Lanka in terms of ratings were 14/15 watt & 18/20 watt category.

Philips, Osram, Bajaj & Huagaing are top-selling brands and available in both countries also.

Recommendations:

- Mass awareness program through print & electronic media highlighting savings
- Need to change consumer preference against low price products specially Chinese and promote branded products
- Request NSB's for earliest label program implementation.
- Manufacturers to further bring down the prices to affordable and govt. to replace taxes and allow.



CHAPTER - VII

Market Survey Report – Refrigerators

Introduction

The refrigerator market in India is estimated at 3.70 million units during the last financial years (2003-04) and has been growing rapidly. With the entry of Multi National Companies (MNCs), the market is full of various brands with different models and sizes according to the needs of consumers. A refrigerator in India is no longer considered to be a luxury item, but a commodity required for needs.

In Sri Lankan market for refrigerator has being on the rise during the last two decades. This was mainly instilled by one of the local manufacturer offering direct cool appliances. But now at present market is dominated by imported refrigerators, mainly of indirect cool or frost-free.

In Sri Lanka, SLSI with the collaboration of CEB, has developed a standard for the refrigerator performance and energy labelling (SLS 1230). This energy labelling is in the form of star rating similar to other energy consuming products and will be initially implemented on a voluntary scale. Measures have already been taken to setup a refrigerator testing facility that is to be accredited by an accreditation body which is yet to be selected.

Most Selling Refrigerator Brands

Indian Market

In India the direct cool segment makes the most of the refrigerator market with over 62% of the units - with different models of various brands. This was found in the four metro cities. The frost-free category is still an emerging trend with over 38% of the total refrigerator units found during the survey.

Table 1: Percentage distribution of direct cool and frost free refrigerators

	Direct Cool	Frost Free
Delhi	63.0%	37.0%
Mumbai	69.3%	30.7%
Kolkata	65.1%	34.9%
Bangalore	53.5%	46.5%
Total	**61.9%**	**38.1%**

Source: field survey

The bulk availability of direct cool category in the shops selling refrigerators was seen in all the cities covered. However, availability of frost-free refrigerators was found more in Bangalore (46.5%) as compared to the availability of this segment in other cities (30.7 – 37%).

All together 12 brands of refrigerators (direct cool and frost free) were found to be available in the Indian Markets. LG has been a clear leader as the highest available brand with over 26% availability in the shops selling refrigerators in the sample of 139 shops covered. This was followed by Whirlpool with 22.1% of share found in the shops covered. These companies have taken clear advantage over the other brands by concentrating on aggressive marketing, promotional activities and vastly improved brand image.

Godrej and Samsung are also popular brands as they account for 17.3% (each) of their availability in the

shops covered. The other brands, such as Electrolux, Videocon, Kelvinator and BPL account for less than 16% of their share in the shops covered in the survey. Their individual shares range from 2.2% to 4.7%. Where as brands such as Voltas, Akai, Haier and Allwyn have minimal presence with their total share of 1.1%.

The availability of LG, which accounted for 26.4% of the total units available in the shops covered during the survey, was found to be popular in Delhi and Kolkata as they accounted for 29% and 30.3% shares respectively. In Mumbai, however, Godrej's availability (30.2%) was found to be more in the shops covered. Similarly Samsung refrigerators' share (34.1%) in Bangalore was found to be as more popular available brand.

Table. 2: City wise percentage distribution of popular brands of refrigerators.

	Delhi	Mumbai	Kolkata	Bangalore	Over All
LG	29.0%	18.7%	28.0%	30.3%	**26.4%**
Whirlpool	21.0%	26.0%	21.7%	18.9%	**22.1%**
Godrej	15.7%	30.2%	15.1%	5.9%	**17.3%**
Samsung	8.7%	13.4%	19.0%	34.1%	**17.3%**
Electrolux	5.0%	3.4%	2.7%	9.7%	**4.7%**
Videocon	8.0%	6.9%	2.1%	0.5%	**4.6%**
Kelvinator	5.7%	0.8%	7.5%	0.5%	**4.2%**
BPL	5.7%	0.0%	2.1%	0.0%	**2.2%**
Voltas	0.3%	0.0%	1.5%	0.0%	**0.6%**
Akai	0.3%	0.4%	0.3%	0.0%	**0.3%**
Haier	0.3%	0.4%	0.0%	0.0%	**0.2%**
Allwyn	0.3%	0.0%	0.0%	0.0%	**0.1%**
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Field survey

Apart from the brands listed in the above table 2, there are also some other brands i.e.Siemens, Daewoo and Ichiban, in the India, which could not be captured in the survey due to the limitation of the sample size and cities chosen.

Sri Lankan Market

In the Sri Lankan context, the frost free category of refrigerators dominates the market. There are nine brands commonly available in the market and all of them produce direct cool models whereas eight of them are producing frost free as well. The survey found that frost free comprise 64% of the total available brand where a diet was found to be 36%.

LG has been a clear leader in the market with over 50% availability in the shops selling refrigerators in the shops covered. This is followed by Singer, Sisil and Samsung.

Apart from the brands listed in the above table, there

Table: Distribution of popular brands of refrigerators

Brand	% Availability
LG	21.00%
Sisil	18.00%
Others	15.00%
Singer	11.00%
Whirlpool	10.70%
Samsung	10.70%
Godrej	10.70%
National	3.50%

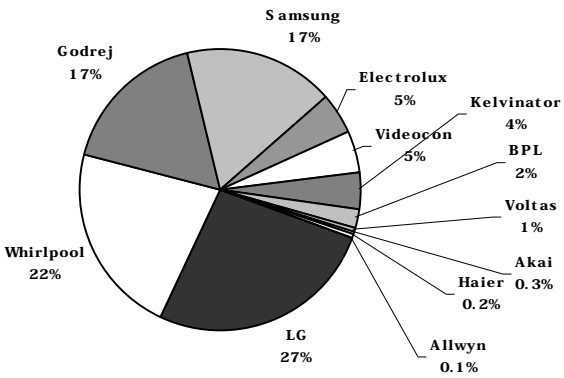
Source: Field survey

are also some other brands in the Sri Lanka which could not be captured in the survey due to the limitation in the sample size.

Retailer's Perception On Consumer Preference

Indian Market

In order to understand the popularity of various brands, retailers were also asked to rank the consumer preference of popular brand on a scale of 1 to 5, with 1 being the most preferred choice. The ratings were given a specific weight in order to find out the most popular brand as per retailers perception. The result in the table below shows that as far as popularity is concerned it more or less confirms to their availability in the market. LG, Whirlpool and Godrej are the most



preferred brands by the consumer according to the retailers' perception.

The consumers' preferences for most popular brands were, however, not uniform in all the cities covered during the survey. As the table shows, LG was found to be more popular in Delhi and Kolkata. In the two other cities, Mumbai and Bangalore, LG is not very poplar according to retailers' perception. For instance, the consumers in Mumbai and Bangalore have more preference toward Samsung, which has fourth place in overall ranking.

Sri Lankan Market

In Sri Lanka no standard statistical method was employed to evaluate the consumers perceptions for popular brands. However consumer perception was obtained through the direct discussion with the retailers during the field survey. As per the information on data sheets the three most popular brands were LG, Sisil and Singer.

Popular Sizes of Refrigerators

Indian Market

The survey also found that the capacity range between 100-200 ltrs had dominated the refrigerator market in the cities surveyed. About 48 % of the refrigerator units found in the shops had the capacities in this range. Among this range (between 100-200 ltrs), 175 ltrs was found to be dominating the market, followed by 170 and 180 ltrs. However, there has been increasing demand for 200-300 ltrs capacities. The table shows that over 44 % of the refrigerator units were found within this range. In the market the new capacities being installed (especially by the MNC's) are in the '220 ltrs & above' segment. The other categories such as less than 100 ltrs, 300-400 ltrs and over 400 ltrs constitute less than 10% of the market as found during the survey.

Table. 2: City wise percentage distribution of popular brands of refrigerators.

Capacity	Delhi	Mumbai	Kolkatta	Bangalore	All
100-200 ltrs	55.9%	36.3%	60.5%	28.6%	47.9%
200-300 ltrs	36.8%	53.1%	38.3%	54.1%	44.2%
300-400 ltrs	2.0%	5.3%	0.6%	15.1%	4.6%
<100 ltrs	5.0%	1.1%	0.0%	0.0%	1.7%
>400 ltrs	0.3%	4.2%	0.6%	2.2%	1.7%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: field survey

The availability of refrigerators with 100-200 liters capacities, as the most popular, is not uniform in all the cities surveyed in India. The table clearly shows that the refrigerators with capacities between 200-300 liters are more popular in Mumbai and Bangalore, where their availability is found to be more than 50%.

The survey also found that in frost free categories, the new capacities are being stalled up in higher capacities ie 200 liters and above. In this segment 230 liters was found to be most available units with a share of more than 33%. This was followed by 220lites and 260 liters. The trend was found to be similar in all the cities covered.

Sri Lankan Market

The majority of the capacities available in Sri Lanka are of 110-280 liters, 110 liters being direct cool type of appliances while 280 liters is mainly for two door frost free type.

Brand	Capacity
LG	110-280
Toshiba	110
National	110
Whirlpool	110-280
Samsung	110-280
Sisil	110-281
Godrij	120-280
Singer	125
Westpoint	180

Power Consumption

An electric appliance has two price tags. One tag is the purchase price on the equipment when picked out at the store. The other price is the operating cost paid out month after month, year after year, in the form of electricity bill. When a new refrigerator is bought, it will entail cost in the form of power consumption each month to run it. Twenty years from now it should still be keeping food cold. However, at the end of twenty years, money spent on operating the refrigerator would be much more then spent on buying it.

The energy efficiency of refrigerators, in most of the countries, has improved dramatically over the past two decades, partially as a result of some new standards devised. The efficiency of a refrigerator is based on the energy consumed per year. Although many energy-efficient refrigerators may be more expensive to purchase, they will cost less to operate over the lifetime of the appliance.

It is estimated that on an average, a refrigerators consume about a sixth of all electricity in a typical American home - using more electricity than any other single household appliance. Fortunately, refrigerators have gotten more efficient over the past 20 years. While there still is room for improvement, today's refrigerators use 60 percent less electricity on average than 20-year-old models.

Therefore, during purchase of a new refrigerator, it's important to consider the power consumption (operating costs) as well as the purchase price. Purchasing an energy efficient refrigerator really pays off in monthly utility bills.

Indian Market

In Indian market, refrigerator manufacturers hardly specify the power consumption on their products. During the course of survey, retailers were asked the question on power consumption. However, the responses were not up to mark. The retailers quoted a wide range of data on power consumption, as they themselves were not sure on this question. Therefore it might happen that various models of particular brand might be consuming different level of energy. Data on power consumption in most of the cases is not specified on the product. Indian standard specify labeling requirement on power consumption, but none of brands give this information.

In India, BEE is finalizing Energy Efficiency standards on energy labeling on products and chosen refrigerator on top priority for labeling. In coming year there will be products available with labels in the Indian markets.

Sri Lankan Market

With reference to power consumption, the state is similar to that found in India. The power consumption is hardly specified on the products. During the course of survey, retailers were asked the question on power consumption. However, the responses were negative. As an example, 140- 270W is the power consumption for a two door frost-free refrigerator of certain brands. However the Sri Lanka standard on refrigerator performance require that the power consumption should be quoted on the label.

Marking /Labeling Requirements

Labeling Requirements BIS (India) and SLSI (Sri Lanka)

BIS (India)	SLSI (Sri Lanka)	Voice (India) Observation
Marking (labeling) Requirements:		
Each refrigerator shall have the following information marked in a permanent and legible manner on one or several locations where it is readily visible either when the refrigerator is away from a wall or after the removal without the help of the tools, of the small door or ventilating grating.		
a) The manufacturer's name or trade-mark,	Yes	OK
b) The model (or commercial designation) of the refrigerator and serial number,	Yes	OK
c) The rated gross volume in cubic decimeters or liters,	Yes	OK
d) The name of the refrigerant used in system and its quantity,	Yes	OK
e) Voltage range,	Yes	OK
f) Supply characteristics,	Yes	OK
g) Wiring diagrams,	No, i.e. given with the information which should be provided by the supplier	OK
h) Rated energy consumption in Watts	Yes, ie. given as input any manufacturer	Not given
i) Ice-making time,	No	Not declared
j) Overall dimensions,	No	OK
k) Name of fuel used (applicable in case of absorption type refrigerator). And	No	NA
l) Rated storage volume. litres of fresh food and the frozen food compartment	Yes, ie. gien as the volume in	
Each refrigerator shall be accompanied on delivery by instructions for its use and maintenance printed on strong paper, cardboard, or similar material. These instructions shall at least contain information on:		
a) Installation requirements (in particular leveling of the refrigerator);	No	OK
b) Conditions of operation (starting, stopping);	No	OK
c) Use of various control devices (thermostat, defrosting, etc); and	No	OK
d) Maintenance and cleaning the refrigerator.	No	OK
Standard Mark		
The domestic refrigerator may also be marked with the Standard Mark		No standard marked product

Note:

Rated Energy consumption is given by KWH the Energy Label which should be affixed on the Refrigerator after assigning the star rating
The following marking are also in the SLS standard for E-labelling Refrigerator standard.
The rated gross volume
The relevant standard of E-labelling of refrigerator is SLS 1230

* Observations are based on previous study only as samples of this product were not purchased due to increase in budget

Price Range

Indian Market

The price of a particular brand of refrigerator depends on various factors such as model, size, and colour and also on the various schemes available at particular period. The actual retail price, the price on which the product is available at particular time period, is often less than the MRP mentioned in the list. Companies try to increase their turnover or sale by introducing various schemes. Therefore the questionnaire for collecting data included MRP and the actual selling price.

Secondly many brands have more than one model therefore substantial gap was recorded in this price range. For instance LG's 175-litre refrigerator are priced between Rs. 7690-9280. However in 175 litre size, LG has more than 7 models. Similarly the price of 175 litre Whirlpool refrigerator, the second popular available brand in direct cool segment found to be in ranges between Rs. 7900-8500, depending upon its various model. Similar trends were also found in frost free segment. The survey had found that in the frost free segment mostly higher capacity refrigerator are popular. LG refrigerators of 230-235 liters were found in price range of Rs. 12,000 – 14,500 depending upon its various model. Whirlpool models were priced in the range of 11,900 – 12.200 Godrej in the range of Rs. 14,250-15.500, Samsung in the range of Rs. 12,500 – 14000 and Electrolux in the range of 13,200-13500.

Sri Lankan Market

In case of Sri Lanka, only the maximum retail price has been obtained from the field survey. The price of the appliance entirely depends on the available features and popularity of the brand for a given capacity. The MRP of 110-180 liters LG refrigerator were found in the range of Rs.18,000 – 60,000. Similarly Whirlpool was found in the range of 25000 – 30488, Samsung in the range of 20,200-36000 and Sisil in the range of 19,500 – 22,000. Mostly 110 litre comprise direct cool segment and while 280 litre comprise frost free segment.

Warranty

Giving warranty on product is another marketing strategy in Indian market. Most of the companies give warranty to their customers during the time of selling. However, there are two policies regarding warranty. Full refrigerator is covered under one year warranty and the compressor, which is the main part in refrigerators, are covered under five to seven years warranty period. The survey showed that most of the brands covered, give five-year warranty. However, this is only for compressors. Other parts and defects are under one year warranty. Similar brands were found in Sri Lankan Market where five-year warranty is given for compressor and one year for full functioning of refrigerator.

Conclusion

The analysis of the data as collected during the detailed market survey of 4 metros of India and Colombo in Sri Lanka reveals that there are twelve and ten brands with various models ranging from 90 Litre to 450 liter capacity in direct cool and frost free category respectively. LG has the largest spectrum of brands and models selling in Indian retail market followed by Whirlpool and Godrej. In Sri Lanka also LG has the largest market share followed by Sisil and Singer. There are also a couple of Chinese brands now available in addition to Indian and some MNCs. Most of the refrigerators offer 1 to 5 years warranty on refrigerator and compressors respectively. None of the refrigerator has mentioned about Power Consumption in its brochures/ pamphlets as collected from reliable resources. The energy labelled refrigerators are yet to be seen in Indian and Sri Lanka Markets. There is a strange finding on category of refrigerator in Sri Lanka where the market share of Frost Free Refrigerator is 64% and direct cool of 36%, which is quite opposite to Indian market. There are 4 popular brands namely LG, Whirlpool, Godrej & Samsung which are common in both the countries clearly indicting the opportunities for adopting common products standards and methodology for testing thereby minimizing technical barriers to trade and acceptability in the region.

Recommendation

Since significant progress has taken place in the formulation of energy efficiency standards in both the countries, it can be jointly taken up for common acceptable energy efficiency & labeling standards in both the countries that will save lot of costs and duplicate work.

CHAPTER - VIII

Market Survey Report - Air Conditioners

Given the scorching heat of summers, in India and Sri Lanka air conditioners are fast-moving products. However, the market is relatively small. According to Economic Intelligence Unit (EIU), in 2003, 980,000 air conditioners were sold in India. This is less than one-third the number of fridges sold (3.6m units). The fundamental reason for the limited size of the market for room air conditioners is high price costing a minimum of about Rs15,000 (US$330) for a 1-ton unit, therefore air conditioners are out of the reach of most of Indian consumers (relatively high excise duties have contributed to high prices, though these have been falling over the years). Moreover, given their high-energy consumption, operating costs are also considerable.

Sri Lanka has a hot and humid climate except the Northern part which is less humid and the Central zone that has moderate climate. At a given location the ambient temperature and relative humidity (RH) variation is very little throughout the year (of course subjected to diurnal variation) except for a slight variation in humidity during the monsoon seasons. The Central zone of the country has a slightly different climatic characteristic showing a relatively higher variance in ambient temperature. As such, use of active means to control internal thermal comfort in commercial and residential buildings play an important role. A shift towards active air conditioning from traditional passive ventilation-based methods for thermal comfort is very well observed. In this perspective use of air conditioners in commercial and residential buildings is becoming very popular and to a certain level could be considered compulsory.

In India, Air-conditioners continue to be considered as a luxury items. However, there is tremendous potential of Air Conditioners in the Indian Market. More than 30 leading AC manufacturers are operating in the market, competing to increase their share. The market for AC is witnessing severe competition, forcing suppliers to expand and consolidate their revenue stream to operate with minimum margins.

Earlier Indian AC market was dominated by unorganized sector due to wide gap in prices of organised sector, which controlled major market share. This is increasingly coming down with the continuous slashing of excise and customs duty. The decline in the unorganized sector's share may continue, since several branded players are importing air conditioners and still managing to be price-efficient. At the same time, homegrown players like Videocon and Amtrex have also introduced technologically upgraded products via tie-ups with global players like Matsushita and Hitachi.

With reference to the rapidly growing market for AC's in India and Sri Lanka and the increase in number of brands imported from regional suppliers, there exist a huge need for an effective energy labeling program and its promotion aiming at huge potential for energy saving. In Sri Lanka, plans for the future energy labeling program for this ACs has been already envisaged at national level taking into account the above factors.

India's user often requires the support of the suppliers in the proper selection, application, and maintenance of AC.

Most Selling Air Conditioners

Indian Market

Window Air conditioners are still popular in the Indian market with nearly 70% of the total units were found during the survey. Split Air conditioners are, however, grabbing increasingly larger pie of the AC market in India at the cost of window air-conditioners. Their share was found to be over 33% in the total units of refrigerators found during the survey. A couple of years back, the split Air conditioners were considered a luxury product. The growth in this segment, according to market experts, has been triggered by falling price-tags, aesthetic appeal, rising consumer aspirations, technology, noise level, innovation, lifestyle needs, increased purchasing power, power efficiency and limitation of space for installation.

Table 1: Percentage distribution of window and split Air conditioners

	Window	Split
Delhi	74.2%	25.8%
Mumbai	64.2%	35.8%
Kolkatta	72.2%	27.8%
Bangalore	60.4%	39.6%
Total	66.9%	33.1%

**Source: Field survey*

The above table also shows bulk availability of window Air conditioners in shops of in all the cities surveyed. However, proportion of availability of these Air conditioners varies in all the cities. For example, share of split Air conditioners were found much higher in the shops of Bangalore (39.6%) as compared to other cities, where the range was between 25.8-35.8%.

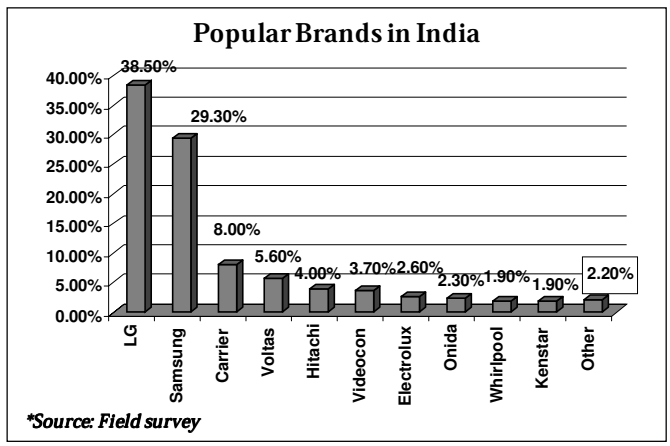
In addition to the above brands there were few more well known brands namely Amtrex, Daikin, Panasonic, ETA General, Fedder, Fedders Lloyds, Mitsubishi Electric, Ichiban, Haier etc were also available in the retail markets but could not be identified during the market survey due to limited of sample size and city covered. There is also significant presence of brands from unorganized sector (locally assembled in Window & Split category) having a marking share of about 7-8%. The above brands are available in markets however we did not find them on shops visited during survey.

Sri Lankan Market

In contradiction to the Indian market, Sri Lankan air conditioner sales are dominated by Split type AC's. And this has an increasing trend. The market share of Split type to Window type is 75% to 25%. Even in Sri Lanka, a couple of years back, the split AC's were considered a luxury. However, it is predominantly used in commercial sector and gradually penetrating into the domestic sector as well. This is directly linked to the growth observed in the commercial sector instilled by the private sector participation.

Popular Brands

All together 18 brands of Air conditioners, window and splits, were found in 94 shops covered in four metro cities of India during the survey. LG was found to be the highest available brand with 38.5% of the total 697 units found during the survey. LG entered in the Indian market in 1997 and has the strategy to expand its market share further. Samsung followed LG with 29% of share found to be available in the shops surveyed. Both these companies have been directly importing their latest products and marketing them at competitive price. Lowering of import tariffs has helped both these companies in expanding their market share. This trend was found be similar in all the Indian cities surveyed.



Sri Lankan Market

The field survey reveals that all together there are 10 brands of AC's in Sri Lanka market. As shown in the following chart. LG was found to be the highest available brand with 30% market share followed by 20% of Haier. Out of the remaining 50%, Fujicool, Samsung and National account for 30% of market share.

Retailers' Perception on Consumer Preference

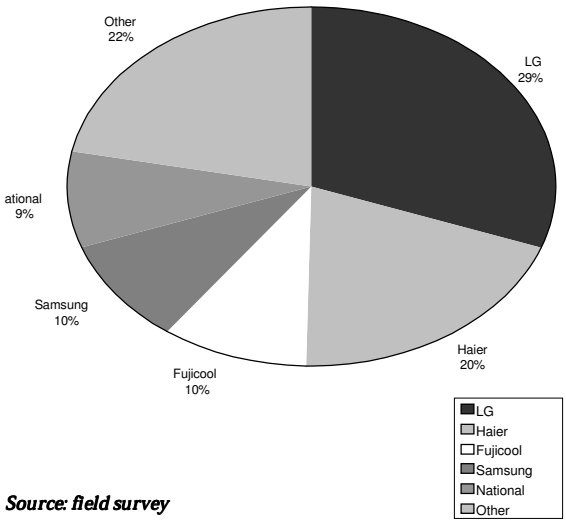
In order to understand the popularity of various brands, retailers were also asked to rank the consumer preference of popular brand on a scale of 1 to 5, with 1 being the most preferred choice. The ratings were given a specific weight in order to find out the most popular brand as per retailers perception.

The result showed that as far as popularity in consumers' preference is concerned, carrier is a popular choice than LG. Which has secured the highest ranking in terms of availability.

Carrier is followed by LG as the second popular choice of air conditioners by the consumers in retailers' perception. This also confirms to the availability of the Air conditioners in Indian market as discussed in the previous section. Consumers are shifting their preferences and moving towards more cost effective popular brands. LG has good marketing network and spends money on brand building. Voltas, a Tata group product, acquires third place in retailers' perception of consumer preference. Voltas is India's premier air-conditioning and engineering services provider. Recently it has introduced India 's first AC in the sub-Rs 10,000 price range, with capacity 0.6 tonnes for small rooms meant for prayer and study. Voltas was the first company to introduce Air conditioners with less that 0.75 tonnes in India.

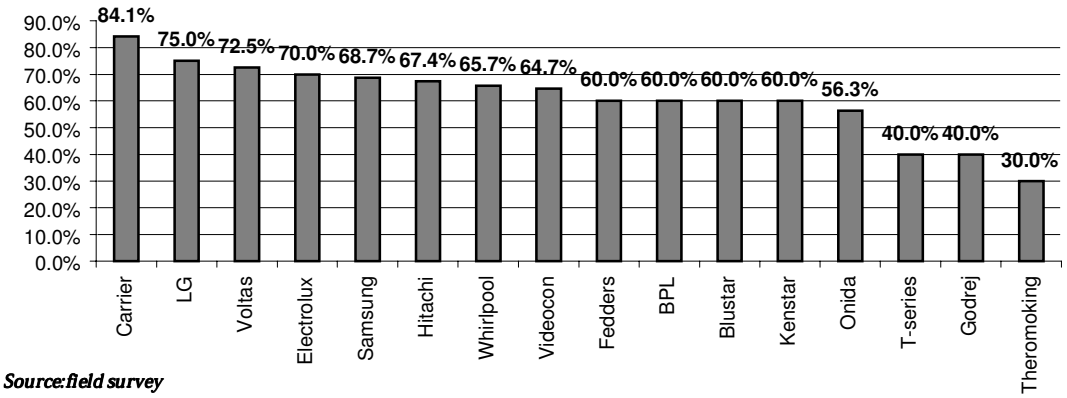
Sri Lankan Market

Availability of Popular Brands : Sri Lanka



Source: field survey

Retailers' perception on consumer's preference for popular brands of Air Conditioners



Source:field survey

No standard statistical method was employed to evaluate the consumers' perceptions for popular brands. However consumer perception was obtained through the direct discussion with brands the retailers during the field survey. As per the information on data sheets the two most popular were LG and Haier.

Capacity

Indian Market

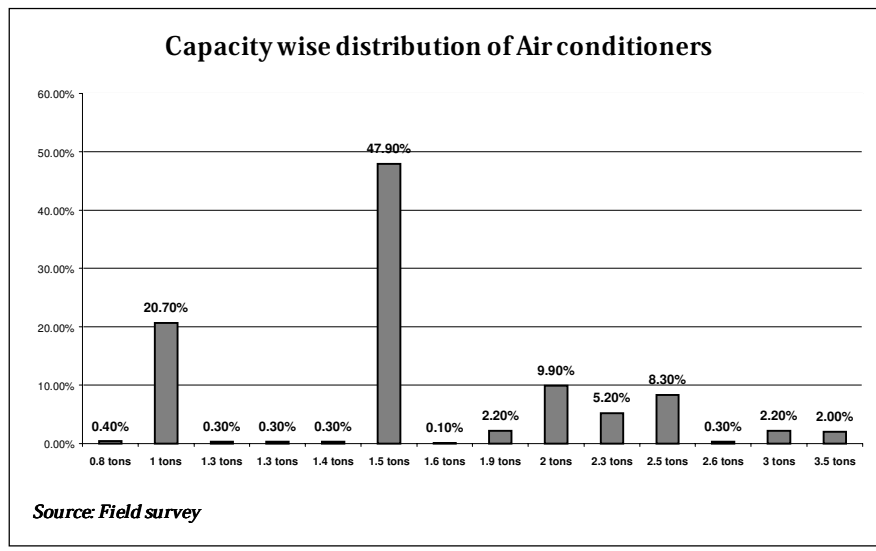
The survey also took in to account the popular available air conditioners with respect to their capacity. Air conditioners with 1,5 tons are found to be most available air conditioners in the market surveyed. Nearly about 48% units found during the survey in the four metro cities, fell in to this category. This was followed by one ton Air conditioners (20.7%). Air conditioners with other tonnage capacity were also found during the survey, however, their availabilities were found to be very low – less than 10% each. The data shown in the table below comprise Air conditioners of both the segments – windows and split. High tonnage capacity is used in split segments. Air conditioners with 2.5 tons and above generally fall in the split segments.

The trends of 1.5 tons as most popular available Air conditioners were found to be similar in all the cities covered, except in Mumbai, where Air conditioners with one tons were found be more popular. It is generally believed that the main purpose of AC is for cooling purpose but helps in reducing humidity also. The general climate in Mumbai is more humid than hot. Therefore, Air conditioners are used in Mumbai for reducing humidity rather than cooling purposes. A low capacity AC plant is supposed to be used for reducing humidity.

Sri Lankan Market

In Colombo metropolitan area, the available sizes of AC's are 9000, 12,000, 18,000, 24,000, 36,000, 40,000, 60,000, and 72,000 BTU/hr. The following table indicates the data found from the field survey in terms of the range of capacities available for each type of AC, along with the availability share in the Colombo metropolitan region.

The reason for such a distribution appears to be due to certain level of homogeneity in the size and type of office spaces and typical practice of distributing the capacities in order to obtain modular operation.



	9000	12000	18000	24000	36000	40000	60000	72000
Window	X	X	X	X	X	X	X	X
Split	X	X	X	X	X	X	X	X
Market Share	<6%	10%	30%	35%	<6%	<6%	<6%	<6%

Power Consumption

Indian Market

For consumers in India, power consumption is one the main considerations during the purchase of an AC unit. As the running cost of an AC is considered to be very high, it has not still become very popular in the household sector. AC in India is still considered to be luxury item as it accounts for increase in power tariff by almost 30 to 40%.

Power consumption in Air conditioners depends on its capacity and models containing various features. Manufacturers are obliged to mention the power consumption in KW on the product itself. During the course of survey, retailers were asked to mention the brand wise/ model wise power consumption of the units being sold in their shops. In some cases power consumption of the units were noted from the product itself. The following table shows the capacity wise power consumption range of some of the popular brands found in the four metro cities.

Table. 4: Range of power consumption of different brands and models of Window & Split Air conditioners.

			Power consumption in watts
Capacity	**1 ton**	**1.5/1.6 ton**	**2 ton**
LG	1300-1350	1300-2000	2400-2710
Carrier	1300-1400	2000	2000-2350
Samsung	1170-1300	1860-2000	2400-2600
Voltas	1300	1850-2550	2000-2600
Onida	1200	1800-1980	
Whirlpool	1300-1475	1790-1980	2450-2750
Hitachi	1300	1800	2200
Kenstar		1800-1850	
Electrolux	1180-1350	1800-1850	2500-2600
Videocon	1350	1900-1990	24400-2550

**Source: Field survey & other reliable sources*

Sri Lankan Market

Similar to the Consumers in India, Sri Lankans too are highly concerned about the energy consumption in AC units, both for Window and Split types. Price of the unit does matter, however, many of the brands are offered at very competitive prices, at nearly equal power consumption limits. The following table is a cross section of findings from the field survey.

Price Range

Indian Market

The demand for AC is increasing in the household sector on account of two factors.

- Rise in the disposable income and comfort level of middle and upper middle class
- Drop in the prices of AC on account of increased competition.

Brand	BTU/hr	Wattage
LG	12000	1300
Haier	12000	1300
Fujicool	12000	1300
Samsung	12000	1000
National	12000	1300
	12000	1300
	18000	1200-2200
Singer	24000	1950-2500

With entry of several MNCs, the competition has led to the reduction in prices. However, The penetration of household air conditioners are still very low in India at around 1% compared to 20% in Indonesia, 24% in China, 40% in Thailand, 45% in Malaysia. High power tariff, high excise duty and after debility weather conditions are some of the reasons for the low demand in Indian market.

The survey found difference in the MRP range and the actual retail price range. For example, the MRP range of 1 ton of LG Air conditioners, depending upon it model was found be between Rs 14,800 and Rs 15,200. However, the actual retail price ranges was found to be between Rs 14,350 - Rs 15,000. Therefore consumer pays less than MRP amount. The extent of lower cost that consumer pay varies from season to season, depending on the discount available at that particular period.

The maximum price range in Window type 1 ton of ACs was found to be incase of National brand ACs. The range was found to be between Rs. 23,900 – 25,000. Where as well as voltas brands were selling the same tonnage of window ACs in the range of Rs. 13,000 – 13,500. The actual price at which these ACs were available were found to be lower in the range of Rs. 500 – 700 per unit.

The prices of Split Air conditioners are much higher than the window Air conditioners. Therefore, the demand for split type Air conditioners are lower as compared to window type. However, with the narrowing down of the prices between Window and Split type Air conditioners and also the better options the demand of split Air conditioners are picking up. The LG ACs with 1 tonnage capacity in split category were found in the range of Rs. 23,990 – 31, 500 in different Indian metro cities covered during the survey. Similar price trends were found in case of other popular brand. The range were found to be higher with high tonnage capacity.

Sri Lankan Market

In the Sri Lankan air conditioner market, for a given capacity, variation of the maximum retail price (MRP) is modest for various brands. For example LG was found to be selling its split type 9000 BTU ACs at SLR 35,000 which was very competitive as compared to Sharp and National brands at SLR 45,000. Secondly Fujicool was found be selling 12000 BTU ACs at SLR 40,000, where as save capacity ACs of LG and Haier were found at SLR 45,000.

In case of Window type ACs, LG 9000 btu ACs were found at SLR 30,000. Where a same capacity ACs of National brand was found be at SLR 35,000. Similarly 1200 BTU Ac were sold in Sri Lankan market at SLR 45,000 by LG. Where as, Haier was found be selling same capacity ACs at SLR 30,000.

Warranty

Giving warranty on product is another marketing strategy in Indian market. Most of the companies give warranty to their customers during the time of selling. However, there are two policies regarding warranty. Full AC is covered under one year warranty and the compressor, which is the main part in AC, is covered under five to seven years warranty period. The survey showed that most of the brands covered give five-year warranty. However, this is only for compressors. Other parts and defects are under one year warranty. Similarly trends in warranty were found to be prevalent in Sri Lankan Market

Conclusion:

Air conditioners are considered to the power guzzlers among all the durable and white goods. Keeping in view study in the retail market and affordability due to now lower costs of some of the competitive brands, the AC market is expected to grow further in urban and rural areas. But due to its huge power consumption which upsets the energy bills. Except northern and western states of India and central hilly regions of Sri Lanka, Air conditioners are used throughout the year in India and Sri Lanka. In case of sales, window air conditioners are most sold in India where as in Sri Lanka split AC's have larger share of sales as compared to window. In capacity sales, India has longer share of 1.5 ton where as in Sri Lanka 2 ton occupy large sales of AC's. There are also some common brands in India and Sri Lanka market viz, LG, Haier, Samsung, National. LG has the higher market share and sales in both the countries.

Even without improving on reasonable energy efficient air conditioners, 15-20% power can certainly be saved by appropriate use of AC's especially by taking care of appropriate size, category, proper/ ideal installation and architecture design of home/ offices, adequate and good insulated rooms.

Labeling Requirements of BIS (India)	**Labeling Requirements of SLSI (SriLanka)**
The split air conditioner shall have the following information marked on a nameplate in a permanent and legible manner in a location where it is accessible and visible: a) Name and address of the manufacturer; b) Type or model number and serial number of the unit; c) Name and quantity of refrigerant charge; d) Rated voltage, phase and rated frequency; e) Nominal cooling capacity f) Power consumption at rated conditions; and g) Nominal current at rated conditions.	No standards available
Standard Marking, if any	
Unitary Air Conditioner	
Marking (labeling) Requirements:	
The unitary air conditioner shall have the following information marked on a name plate in a permanent and legible manner in a location where it is accessible and visible; a) Name and address of the manufacturer; b) Type of model number and serial number of the unit; c) Name and quantity of refrigerant charge; d) Rated voltage, phase and rated frequency; e) Nominal cooling capacity at rated condition; f) Power consumption at rated conditions; and frequency g) Nominal current at rated conditions.	a) Manufacturer's name or trade mark; b) Manufacturer's address; c) Type or model; d) Serial number i) Type and quantity of refrigerant charge; and ii) Electrical ratings including voltage, current, e) Net total room-cooling capacity; Power consumption f) Heating capacity (if provided); h) Test pressure of refrigerating system; g) Ventilation capacity;

Summery of Important Findings on Labeling/ Marking of products

Ceiling Fans:

1. 6 out of 10 did not mentioned their power input
2. Power input claimed by 4 brands various from 50 – 78 Watts for same type and size (however actual value may be higher than that)
3. Important information like air delivery, service value, rated speed and power factor also not mentioned by most of manufacturers.
4. Only three out of 10 supplied Resistance type regulators
5. Only one standard marked
6. Table given clearly shows differences in labeling standard requirements of both countries.

Ballast:

1. 3 Ballasts not mentioned country of manufacture
2. Only 3 given their watt losses
3. Table given clearly shows differences in labeling requirements of both countries.

CFL:

1. Luminous flux not mentioned by 50 % manufactures
2. Rated colour temperature not mentioned on 12 out of 14 Ballasts
3. Country of manufacture not declared on 3 Ballasts
4. Information like, lamp current, burning position, special condition, life/ warrantee not given on most the products
5. MRP not mentioned on 3 CFLs
6. None standard marked product
7. Two energy labeled CFLs out of 14 of other countries.

Refrigerator:

1. Rated energy consumption & ice making time not declared by any manufacturer
2. No standard marked product

Air Conditioner:

Energy consumption declared by all the manufacturers but it varies for same category and size/capacity

VOICE Profile

VOICE (Voluntary Organisation in Interest of Consumer Education) is a vibrant and proactive voluntary action group. Its objective is to protect and further the interests of the consumers. The Group aims at not only making the consumer conscious of the malpractices perpetuated in the market–place, but also creating an awareness that organised efforts can overcome the helplessness of the individual consumer. It works towards informing the consumer of his / her rights, and motivating him / her to demand value for money in a global competitive market.

VOICE is

- A full member and a Director of Consumers International (CI) based in London (U.K).
- A member of the Central Consumers Protection Council (CCPC) of the Ministry of Consumer Affairs, Govt. of India.
- An active participant in the nationwide campaign for implementation of Citizens' Charter Principles.
- An active member of various committees of Bureau of Indian Standards
- Involved in technical co-operation and exchange with Stiftung Warentest (Germany) Consumenten Bond (The Netherlands), Consumers Union (New York), Australian Consumers Association, Consumers Association U.K. and ICRT in Europe
- A member of Central Committee for Food Standards (CCFS) of the Ministry of Health, Govt. of India.
- A member of the Consumer Co-ordination Council, New Delhi, an apex body of 43 consumer organisations, and its Chairman (1997-1999).
- A regular member of National Codex Committee and various Codex committee of food standards
- A member of laboratory advisory committee of STQC (Standardisation Testing & quality certification.
- A member of Bureau of Energy Efficiency representing consumer issues.

SLEMA Profile

Sri Lanka Energy Managers Association (SLEMA) was founded in 1984 by a group of professionals, to promote efficiency and rational use of energy in Sri Lanka. In 1994, SLEMA was incorporated by an Act of Parliament. The present membership, consisting of Associate, Corporate and Institutional Members, stands around 350.

Regular Activities:

SLEMA regularly conducts extensive training courses, research, general awareness programmes and consultancy in Energy and related fields. SLEMA also participates in international and regional research projects about Energy Policy, Planning, Management, and environmental impacts of Energy Conversion.

Some of the specific activities regularly conducted are,

- Energy Audit Training Course for engineers on design, operation and maintenance of energy conversion systems in industries, buildings and energy utilities
- Training Course for Boiler Operators and Technicians on safety, maintenance and efficiency of boilers and steam distribution systems
- Dissemination of information about new techniques and technological advancements in Energy Conservation and Demand Management
- Awareness programmes in the form of public lectures, workshops and seminars on topics ranging from Energy Efficiency, Renewable Energy Sources, Energy Planning and Management, and Energy and Environment.

Every year SLEMA holds its Annual Sessions where several technical presentations are made on different topics in the Energy sector.

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