

# A STUDY ON GREEN MARKETING PRACTICES OF SELECTED HOME APPLIANCES COMPANIES IN INDIA

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## **Abstract**

Green products are playing a key role for minimizing environmental effect in present times. The stakeholders also in various sectors viz., industrial sector, service sector, power sector etc are rendering their efforts for doing some differences in environmental change. To achieve greater results with regard to this issue, the government has already existed with rules and regulations that are mandatorily imposed on marketers. Thus, the study necessitates to verify green product practices, also known by terms 'Eco design', 'green design' or 'design for environment' in home appliances sector. For this purpose the study has selected refrigerator product category under home appliances. Data analysis is done through simple percentage method and one way ANOVA is utilized for testing the significant differences between the companies' brands towards the green product practices. Results reveals that there is significant difference with regard to green product practices followed in direct cool refrigerators but there is no significant differences in frost free refrigerators.

**Keywords: - Marketers, Government regulations, Eco design practices, Refrigerator Product category, Environmental Change**

## **INTRODUCTION**

Today, the World has become very conscious about the environment due to burning issues of climate change, ozone depletion, loss of biodiversity etc resulting to environmental effect. Rapid developments and industrialization for growth of countries has lead to these serious problems. It is found that industrialized countries contribute 560 kg of solid waste per capita each year which is three times more than in 1984 .So, to overcome this hazardous problem huge efforts are adopted by Government agencies, marketers, consumers and NGO's to go in a Greener way. Even at early stage, number of declarations and regulations for environmental protection were framed at International level which included restriction on Chlorofluorocarbon recommended by the Montreal protocol of 1987, the restriction on CO<sub>2</sub> recommended by the Kyoto protocol of 1997, the European community directions on restriction of use of certain hazardous substances (ROHS) and on waste Electronics and Electrical equipment (WEEE) effective since 2006 but in India though the government has framed mandatory regulations for protection of environment and society in whole , still it stands at infant stage. The Indian government has made it compulsion especially for marketers of consumer durable and home appliances for adhering to regulations of Star labelling Programme by BEE (Bureau of Energy efficiency) the nodal body under the power ministry for energy rating of consumer electronics, ROHS and WEEE regulations under the Ministry of Environment and Forests (MOEF). Due to this regulatory compulsion or considering it as an opportunity to build a stronger brand with the consumers or to gain larger market share , marketers are adopting eco design practices to make the product greener. Even through the BCG (Boston Consulting Group) survey of consumers in both developed and developing countries majority of respondents indicated their preference for green products especially in food and consumer durable sector.

**LITERATURE REVIEW:-**

**Ravindra Saxena<sup>1</sup> and Pradeep.K.Khandelwal<sup>2</sup> (2010)** attempts to study the perception and attitude on three types of Indian industries viz., durable, non-durable and services towards green philosophy and green products for its sustainable development. The study utilizes structured questionnaires and a five point advanced likert scale for measuring industries activities towards green marketing and green brands. The findings of research study shows that all the three types of industries have positive attitude for green philosophy and green practices. It reveals that by practicing green philosophy and by selling green products, companies can gain distinctive competitive advantage and can sustain for a longer period of time in the market. It further perceives and suggests that consumers in India will prefer more and more green products in future and by presenting themselves with green image will lead them to gain distinctive advantage.

**Apporva Raval<sup>1</sup> and Mamta Brahmhatt<sup>2</sup> (2014)** identifies the effectiveness of green marketing practices on consumer awareness about global warming, factors responsible for global warming, purchasing intention and barriers to purchase green consumer durables (Electronics, Household Appliances, Automobiles) as the parameters for study in Gujarat region of India. The study tries to find out whether there is difference in purchasing criteria for consumer durable among different industries by adopting ANOVA test. The researcher gets to know that majority of consumers are aware about global warming and its harmful effects of environmental changes on human being. It is perceived that human activities like creating smoke as one of the biggest reason for environmental harm followed by throwing chemicals and gases, throwing solid wastes and wasting natural resources.

The consumers show positive intention to buy and pay more for green consumer durable and contribute to create awareness by word of mouth, but some factors like difficulty to buy, poor performance, high price pose as barrier to their purchase. The study concludes and proves that there was significant difference for purchasing criteria of eco-friendliness, colour and stand mark for green products, whereas purchasing criteria for appearance, price, quality, Brand, Package and labelling, variety, service and need fulfillment for green consumer durables showed no significant difference among different industries.

**Danish Mehraj<sup>1</sup> and Dr.Ishtaiq Hussain Qureshi<sup>2</sup> (2016)** tries to understand the perception of industries in India towards green marketing practices, green philosophy and to investigate initiatives taken by those industries for becoming green. To create a sustainable environment, the study aimed to explore and indentify the components of environmental attitude that can drive the specific ecological behaviour of Indian organizations. Most of the industries had the perception that adopting green marketing practices would ensure them competitive advantage, ensuring sustainability. The findings of the study revealed that industries now a days are having high concern about environmental protection and are willing to produce those products which are environmental friendly i.e., green in nature.

**Devakumar.G<sup>1</sup>, Sunil Kumar B.K<sup>1</sup>, Sunil Pawar<sup>1</sup>, Supeel H.S<sup>1</sup>, Kiran V.E<sup>1</sup>, Bharath Kumar B.V<sup>1</sup>, Askhay Vinayak Bhat<sup>1</sup>, Pooja Aruli Bhat<sup>1</sup> (2017)** carried out an empirical study on green marketing strategies with respect to organic products for market sustainability in the establishment called 'The Green path organic state' located in Malleshwaram. It aimed to identify the existing green marketing practices adopted by "The Green path organic state" and to analyze the relationship between various marketing mix strategies and their impact for marketing sustainability. A pilot study was conducted with the identified key personals to prepare a structured questionnaire and thereafter primary data has been collected from a sample size of 259 respondents. The data were analyzed using SPSS and Cronbach's Alpha test has been carried out to check reliability and KMO has been conducted to check the validity of the data. The research results showed that there should be added online and social media promotion to increased awareness and creation of pull in the market place; also it is the need of the hour for creaking mass awareness on the usage of green products.

**STATEMENT OF THE PROBLEM:-**

Now-a-days the words like climate change, loss of biodiversity; ozone depletion etc has gained much recognition across the world as all the stakeholders are aware of this issues resulting to environmental change. The marketers are showing their concern towards these environmental changes by adopting various practices into their organizational activities in a greener way. Through literature review, limited studies have been found in Home appliances sector. So, researcher has selected Refrigerator products among the top three Home appliances companies existing in India. Researcher appraises the number of practices carried out by these Home appliances companies and verifies significance difference between them.

**RESEARCH OBJECTIVES:-**

1. To understand the Green product and Eco design concept.
2. To find out and analyze green product practices in Refrigerator product category of home appliances companies selected for study.
3. To assess significant differences of Green product practices (eco design) between the companies' brands

**Hypothesis for the study:-**

$H_{1A}$ : There is no significant difference in Green product practices between the company brands under Refrigerator product category.

$H_{1A}$  There is significant difference in Green product practices between the company brands under Refrigerator product category.

**RESEARCH METHODOLOGY:-****Collection of data:-**

The present research study is descriptive and analytical in nature. To appraise the eco design practices in corporate entities, three top ranking home appliances companies in India were selected. To study the parameters in these selected companies secondary sources is utilized. Secondary data is collected through company's product manuals, product brochures and catalogues, company's yearly sustainability reports, company's annual reports, company's and governmental official websites and newsletters.

**Sample Description:-**

To appraise the eco design practices in corporate entities, three top ranking home appliances companies in India were selected viz., Videocon industries limited, LG Electronics India private ltd, Samsung India electronics private ltd.,. Further there are various product models produced by these brands in refrigerator product category, so for study three product models of respective brands were selected on basis of their popularity in India. Further, the study has considered two segments of refrigerators viz., direct cool refrigerator and frost free refrigerators.

**Tools and Techniques:-**

Collected data has been analyzed by using statistical techniques like percentage method and one way ANOVA is used for knowing the significance difference between Eco design (green product) practices of home appliances companies' brands.

**SCOPE OF STUDY:-**

The range of home appliances products is very wide. So, the present study is restricted only on selected home appliances which are widely used by consumers in their daily lives. The Study has considered refrigerator products for appraising the eco design practices.

**CONCEPT OF GREEN PRODUCT:-**

Green products are considered as products that minimizes environmental impacts at every phase of product life-cycle. Designing products and packaging for minimal impact can be tricky, it might be represented as ecological benefit by in reality it may be little or might not have added environmental value. It is argued that there is no such thing as a truly "green" product, because every product, no matter how thoughtfully designed, uses resources and creates waste. Therefore, "green" is a relative term with some products being greener for certain reasons or in certain circumstances.

For sustainable product design marketers are adhering to strategies for growing their businesses and also to minimize their environmental and health-related risks by addressing the specific environmental and social issues most relevant to their consumers and other stakeholders which are examined below.

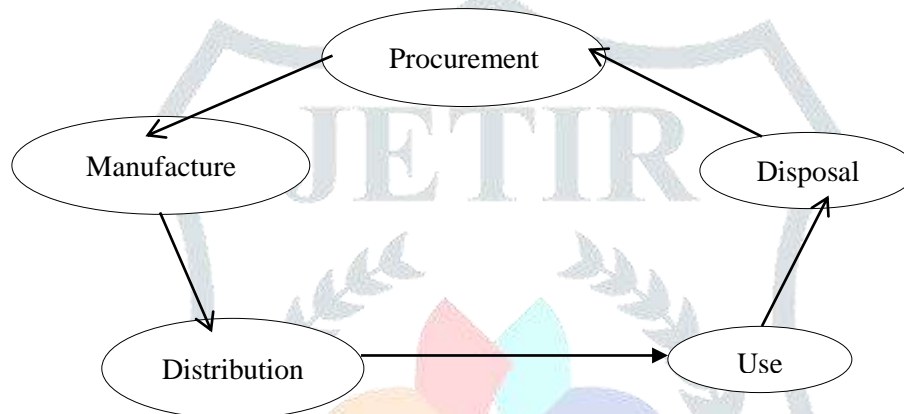
1. Recycled content
2. Source reduction
3. Organically grown
4. Reduced toxicity
5. Use of responsible manufacturing practices
6. Energy and fuel-efficient
7. Water efficient
8. Extended product life
9. Reusable and refillable
10. Recyclable

11. Compostable
12. Safe for disposal

### ECO DESIGN CONCEPT:-

For any of consumer goods, the manufacturer requires raw materials, water and energy. To utilize this three resources effectively, a systematic process has to be followed so that any of this resources doesn't leads to wastage. For this purpose, Eco design concept plays a key role in savage of these resources thereby causing minimal or no environment effect. The eco design practices have been adequately adopted by manufacturers either due to their own interest or to build greener brand image among the consumers or due to stringent regulations imposed by government.

Eco design is a means of minimizing the environmental impacts throughout the product life cycle. Product life cycle passes through different stages in eco design process viz., Procurement, Manufacture, Distribution, Use and disposal which can be also presented in diagrammatic form as shown below:-



**Figure 1: Stages in Eco design process**

Source: Terms adapted from

[www.genesifp7.eu/education-centre](http://www.genesifp7.eu/education-centre)

### Introduction to refrigerators:-

Refrigerators are one of the most commonly used appliances by middle class income group people. This refrigerator segment makes up 18.0 percent of the consumer appliances market. The Indian refrigerator market is worth Rs 74.2 billion in the year 2013 and is expected to grow at Rs.98.4 by 2016. There are two basic segments namely direct cool and frost free.

#### i. Direct cool refrigerators

These are the refrigerators with or without crisper, ice making or frozen food storage compartments and are not cooled by internal forced air circulation. Cooling is primarily obtained by natural convection only. However, some products may have fan to avoid internal condensation but not to claim as frost free.

**Table 1: Eco design requirements for direct cool refrigerator category**

Sl. No	Parameters	Requirements
<b>General Requirements</b>		
1.	Gross Volume	Measured gross volume shall not be less than rated gross volume by more than 3% of the latter
2.	Storage volume	Measured storage volume shall not be less than rated storage volume by 3% of the latter
3.	Storage shelf area	Rated storage shelf area shall not be greater than measured storage shelf area by 3% of the latter
<b>On performance</b>		
4.	Storage temperature	Fresh food storage compartment +18 to + 430 C
		Crisper compartment +80 C to + 140C

5.	Energy consumption	Shall not be at least 5% less than values specified below:-
		Up to 651 = 0.85 kwh/24hr
		66 to 1651 = 1.1 kwh/2hr
		166 to 1401 =1.4 kwh/2hr
		241 to 3101 = 1.6 lwh/2hr
311 to 4501 = 1.9 kwh/2hr		
6.	Pull down temperature	Measured value should be above the value stated value by the manufacturer more than 5% of the latter

Source: BEE notification for REF on 26<sup>th</sup> May 2016

### Companies and product models under Refrigerator product category:-

The research study has focused on three home appliances companies for appraising eco design practices adopted by these companies. For this purpose two refrigerator segments viz., Direct cool and Frost free segments with three products models in each company have been selected. Specific codes have been assigned for the product models under each company brand for analyzing the data conveniently.

Table 2: Selected companies and their product models under direct cool refrigerators category

Codes assigned for product models	Videocon Industries Limited	Codes assigned for product models	LG Electronics India Private Ltd	Codes assigned for product models	Samsung India Electronics Private Ltd
Code V1	VM183EBR-FDW	Code L1	GL-B241APDX	Code S1	RR19K182ZRZ
Code V2	VA203EBR-HAD	Code L2	GL-D201ASDX	Code S2	RR20K172ZS8
Code V3	VF233LT	Code L3	GL-B201AHAW	Code S3	RR19K172ZVJ

Source: Official websites of respective companies

The above table 2 reveals the products of three different companies in direct cool refrigerator category selected for study. Three products of each company viz., Videocon industries limited, LG electronics India Private limited, Samsung India electronics private limited are considered for study. On basis of these products, the researcher tries to know eco design and non eco design practices considered in each of its product models.

### Parameters for refrigerator category:-

#### Direct cool:-

The data has been analyzed on basis of parameters identified for study under direct cool product category specified in table 3. Further the parameters have been identified as eco design and non eco design practices carried out in company brands

Table 3: Parameters for direct cool refrigerator product category

Sl. No	Parameters	Eco design/Non Eco design
1	Energy efficient	Eco design
2	Deodorizer	Eco design
3	Direct cooling technology	Eco design
4	Anti-bacterial gasket	Eco design
5	Stabilizer free operation	Eco design
6	Reduction of heavy substances	Eco design
7	Compliance with IS	Eco design
8	Transparent interior	Non Eco design
9	External condenser	Non Eco design
10	Door lock	Non Eco design

11	Power coated door finish	Eco design
12	Insitu door foam	Non Eco design
13	OPAQUE (HIPS) interior	Non Eco design
14	Shelf bottle with moulded door support	Non Eco design
15	Tray fresh room	Non Eco design
16	Smart inverter compressor	Eco design
17	10 year warranty on compressor	Non Eco design
18	Moist balance crisper	Eco design
19	Humidity controller	Eco design
20	Toughened glass shelves	Non Eco design
21	Faster ice making	Non Eco design
22	Ariona handle type	Non Eco design
23	Solar smart refrigerator	Eco design
24	Base stand with drawer	Non Eco design
25	LED light	Eco design
26	Multi air flow	Eco design
27	Bar chrome handle	Non Eco design
28	Fire retardant wire	Eco design
29	Safety panedl cover for entrie back of refrigerator	Eco design

Source: Product manuals and websites

**Table 4: Eco design and Non Eco design practices of selected Direct cool refrigerators of selected companies**

Videocon				LG				Samsung			
DCR	Eco design	Non Eco design	Total	DCR	Eco design	Non Eco design	Total	DCR	Eco design	Non Eco design	Total
Code V1	7 (78%)	2 (22%)	9 (100%)	Code L1	10 (59%)	7 (41%)	17 (100%)	Code V1	12 (63%)	7 (37%)	19 (100%)
Code V2	6 (43%)	8 (57%)	14 (100%)	Code V2	9 (56%)	7 (44%)	16 (100%)	Code V2	16 (67%)	8 (33%)	24 (100%)
Code V3	7 (54%)	6 (46%)	13 (100%)	Code V3	9 (60%)	6 (40%)	15 (100%)	Code V3	9 (69%)	4 (31%)	13 (100%)
Total	20 (56%)	16 (44%)	36 (100%)	Total	28 (58%)	20 (42%)	48 (100%)	Total	37 (66%)	19 (34%)	56 (100%)

Source: Data calculated based on available product manuals and websites

The above table 4 shows the eco design and non eco design practices of selected direct cool refrigerator category of three different companies in consumer electronics and home appliances. In Videocon, out of 9 parameters the first model i.e., vm183ebr-fdw fulfills 78% of eco design practices and 22% of non eco design practices. In the second product model i.e., va203ebr-had, 43% of eco design practices are fulfilled out of 14 parameters and 57% are of non eco design. In the third product model i.e., vf233lt fulfills 54% of eco design practices and 46% of non eco design practices out of 13

parameters. The study finds out of these three product models, the first model (vm183ebr-fdw) fulfills maximum number of eco design practices compared to its other models.

In LG, the first model (gl-b241apdx) out of 17 parameters, fulfills 59% of eco design and 41% of non eco design practices. Considering the second product model (gl-d201asdx), of total 16 parameters, fulfills 56% of eco design and 44% of non eco design practices. Lastly with regard to third product model (gl-b201ahaw), of total 15 parameters, 60% of eco design practices and 40% of non eco design practices are fulfilled. To say overall in LG, maximum number of eco design practices are followed by its third product model (gl-b201ahaw) with 60%.

In Samsung, of its three product models, the first product model (rr19k182zrz) covers 63% of eco design practices and 37% of non eco design practices. Considering the second product model (rr20k172zs8), of total 24 parameters, 67% are eco design and 33% are non eco design practices. Lastly with its third product model (rr19k172zvj), of total 13 practices only 69% are eco design and 31% are non eco design practices. It means that out of three modes of Samsung the third (rr19k172zvj) model covers 69% of maximum eco design practices

### TEST RESULTS FOR DIRECT COOL REFRIGERATORS:-

To test the significant differences between the companies' brands towards green product practices it was necessary to compare the individual mean score by using one way ANOVAs test. Table 5 reveals the descriptive results of green product practices and the tests conducted on them

**Table 5: Descriptive result for company brands and green product practices**

Descriptive								
Eco design practices								
Company brands	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Videocon	3	6.6667	0.57735	0.33333	5.2324	8.1009	6.00	7.00
LG	3	9.3333	0.57735	0.33333	7.8991	10.7676	9.00	10.00
Samsung	3	12.3333	3.51188	2.02759	3.6093	21.0573	9.00	16.00
Total	9	9.4444	3.04594	1.01531	7.1031	11.7858	6.00	16.00

**Table 6: Results of Analysis of variance for green product practices among the company brands**

ANOVA					
Eco design practices					
Sources	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	48.222	2	24.111	5.564	0.043
Within Groups	26.000	6	4.333		
Total	74.222	8			

It can be seen that, sum of squares between the three companies brands is 48.222 and within the product models of respective companies is 26.000 with respective  $df_b$  value 2 and  $df_w$  value 6. Further to know the F value, mean of squares between and within the groups have been considered. Through which table revealed F value calculated using mean square between and within the group are 5.564. The p-value for the computed F value is 0.043 (<0.05) which is less than 0.05 significance level. Hence, the researcher rejects the  $H_0$  and conclude that, there is significant difference in Green marketing practices within the product models of the company and between the company brands in direct cool refrigerator product category.

### Frost free refrigerators:-

This is a household refrigerator in which all frozen food storage space is cooled by a frost-free system. Unfrozen food storage space may or may not be cooled by a frost-free system but all storage spaces in the appliance whether frozen or unfrozen are automatically defrosted with automatic disposal of water.

In these systems, cooling is provided by forced air circulation and can be automatically operated to prevent permanent formation of frost on all refrigerated surfaces. It doesn't accumulate ice or frost forms on stored food.

**Table 7: Eco design requirements for frost free refrigerator category**

Sl. No	Parameters	Requirements					
<b>General Requirements</b>							
1.	Gross volume	Measured gross volume should be less than rated gross volume by more than 3% of the latter or 4 liter, whichever is greater value					
2.	Storage volume	Measured storage volume shall not be less than the rated storage volume by more than 3% of the latter, whichever is greater value					
3.	Cellar compartment storage volume	rated storage volume of any cellar compartments shall not be greater than rated storage volume of fresh food storage compartment					
4.	Storage shelf area	Measured value not be less than rated value by more than 3 % of the latter					
<b>Performance requirements</b>							
5.	Pull-down temperature	shall not be more than the value stated by manufactures by more than 10 % of the latter					
6.	Minimum energy performance	Shall be atleast 5% less than the following;-					
			MEPS Period	Min	Max		
				Kwh/Ltr/Yr	Kwh/Yr	Kwh/Ltr/yr	Kwh/h/
			7 Jan 2010 to 31 Dec 2011	0.8716	759	0.6973	607
			1 Jan 2012 to 31 Dec 2013	0.6973	607	0.5578	486
		1 Jan 2014 to 31 Dec 2015	0.4463	389	0.357	311	
7.	Storage temperature	Fresh food storage compartment	$\leq +10$ to $\leq +5$				
		Food freezer compartment	$\leq -18$				
		Cellar compartment	$\leq +8$ to $\leq +14$				
		Chill compartment	$\leq +3$				

Source: BEE notification dated on 8<sup>th</sup> May 2013

#### **Companies and product models under frost free Refrigerator product category:-**

The research study has focused on three home appliances companies for appraising eco design practices adopted by these companies. For this purpose two refrigerator segments viz., Direct cool and Frost free segments with three products models in each company have been selected. Specific codes have been assigned for the product models under each company brand for analyzing the data conveniently.



**Table 8: Selected companies and their product models under frost free refrigerator category**

Codes assigned for product models	Videocon Industries Limited	Codes assigned for product models	LG Electronics India Private Ltd	Codes assigned for product models	Samsung India Electronics Private Ltd
Code V1	VZ263PECUB	Code L1	GL-F282RSOY	Code S1	RT26H3000RX
Code V2	VP242PRP-HFB	Code L2	GL-T302RPOU	Code S2	RT28K3343U2
Code V3	VP202LGC-HFB	Code L3	GL-Q292SDSR	Code S3	RT30M3954U7

Source: Official websites of respective companies

The above table 8 reveals the products of three different companies in frost free refrigerator category selected for study. Three products of each company viz., Videocon industries limited, LG electronics India Private limited, Samsung India electronics private limited are considered for study. On basis of these products, the researcher tries to know eco design and non eco design practices considered in each of its product models.

#### **Parameters used for frost free refrigerator category:-**

The data has been analyzed on basis of parameters identified for study under frost free refrigerator product category specified in table 9. Further the parameters have been identified as eco design and non eco design practices carried out in company brands.

**Table 9: Parameters for frost free refrigerator product category**

SL. No	Parameters	Eco design/Non Eco design
1	Energy efficient	Eco design
2	Eco friendly refrigerant	Eco design
3	Child lock	Non Eco design
4	Deodorizer	Eco design
5	Auto air flow	Eco design
6	Deep freezer technology	Eco design
7	Humidity controller	Eco design
8	10 years warranty on compressor	Non Eco design
9	Door alarm	Eco design
10	Dairy bin	Non Eco design
11	LED interior lamps	Eco design
12	Super cool function	Eco design
13	Toughened glass shelves	Non Eco design
14	Led freezer lamp	Eco design
15	Active air flow	Eco design
16	Turbo mode	Eco design
17	Unique led control panel	Eco design
18	Active odour filter	Eco design
19	Photosis fresh	Eco design
20	Corner cooling	Non Eco design
21	Anti bacterial gasket	Eco design
22	Insitu door foam	Non Eco design
23	Transparent interior	Non Eco design
24	VCM door finish	Eco design
25	Emboss PCM cabinet finish	Eco design
26	Concealed condenser	Non Eco design
27	I-Micorn temperature control	Eco design

28	Reduction of heavy substances	Eco design
29	Compliance with IS	Eco design

Source: Product manuals and websites

**Table 10: Eco design and Non Eco design practices of selected Frost free refrigerators of different companies**

Videocon				LG				Samsung			
FFR	Eco design	Non Eco design	Total	FFR	Eco design	Non Eco design	Total	FFR	Eco design	Non Eco design	Total
Code V1	21 (72%)	8 (28%)	29 (100%)	Code L1	18 (78%)	5 (22%)	23 (100%)	Code S1	10 (67%)	5 (33%)	15 (100%)
Code V2	7 (58%)	5 (42%)	12 (100%)	Code L2	19 (76%)	6 (24%)	25 (100%)	Code S2	13 (59%)	9 (41%)	22 (100%)
Code V3	7 (54%)	6 (46%)	13 (100%)	Code L3	13 (87%)	2 (13%)	15 (100%)	Code S3	17 (77%)	5 (23%)	22 (100%)
Total	35 (65%)	19 (35%)	54 (100%)	Total	50 (79%)	13 (21%)	63 (100%)	Total	40 (68%)	19 (32%)	59 (100%)

Source: Data calculated based on available product manuals and websites

The above table 10 shows the eco design and non eco design practices of selected frost free refrigerator category of three different companies in consumer electronics and home appliances. In Videocon, out of 29 parameters the first model i.e., vz263pecub fulfills 72% of eco design practices and 28% of non eco design practices. In the second product model i.e., vp242prp-hfb, 58% of eco design practices are fulfilled out of 12 parameters and 42% are of non eco design. In the third product model i.e., vp202lgc-hfb fulfills 54% of eco design practices and 46% of non eco design practices out of 13 parameters. The study finds out of these three product models, the first model (vz263pecub) fulfills maximum number of eco design practices compared to its other models.

In LG, the first model (gl-f282rsoy) out of 23 parameters, fulfills 78% of eco design and 22% of non eco design practices. Considering the second product model (gl-t302rpou), of total 25 parameters, fulfills 76% of eco design and 24% of non eco design practices. Lastly with regard to third product model (gl-q292sdsr), of total 15 parameters, 87% of eco design practices and 13% of non eco design practices are fulfilled. To say overall in LG, maximum number of eco design practices are followed by its third product model (gl-q292sdsr) with 87%.

In Samsung, of its three product models, the first product model (rt26h3000rx) covers 67% of eco design practices and 33% of non eco design practices. Considering the second product model (rt28k3343u2), of total 22 parameters, 59% are eco design and 41% are non eco design practices. Lastly with its third product model (rt30m3954u7), of total 22 practices only 77% are eco design and 23% are non eco design practices. It means that out of three models of Samsung the third (rt30m3954u7) model covers 77% of maximum eco design practices.

### **TEST RESULTS FOR FROST FREE REFRIGERATORS:-**

To test the significant differences between the companies' brands towards green product practices it was necessary to compare the individual mean score by using one way ANOVAs test. Table 11 reveals the descriptive results of green product practices and the tests conducted on them

Table 11: Descriptive result for company brands and green product practices

Descriptive								
Eco design practices								
Company brands	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Videocon	3	11.6667	8.08290	4.66667	-8.4124	31.7457	7.00	21.00
LG	3	16.6667	3.21455	1.85592	8.6813	24.6521	13.00	19.00
Samsung	3	13.3333	3.51188	2.02759	4.6093	22.0573	10.00	17.00
Total	9	13.8889	5.18277	1.72759	9.9051	17.8727	7.00	21.00

Table 12: Results of Analysis of variance for green product practices among the company brands

ANOVA						
Eco design practices						
Sources	Sum of Squares	df	Mean Square	F	Sig.	
Between Groups	38.889	2	19.444	0.663	0.549	
Within Groups	176.000	6	29.333			
Total	214.889	8				

It can be seen that, sum of squares between the three companies brands is 38.889 and within the product models of respective companies is 176.000 with respective  $df_b$  value 2 and  $df_w$  value 6. Further to know the F value, mean of squares between and within the groups have been considered. Through which table revealed F value calculated using mean square between and within the group are 0.663. The p-value for the computed F value is 0.549 ( $<0.05$ ) which is more than 0.05 significance level. Hence, the null hypothesis ( $H_0$ ) gets accepted and statement is concluded as there is no significant difference in Green marketing practices within the product models of the company and between the company brands in television product category.

#### FINDINGS:-

1. In Refrigerator category, under direct cool refrigerators, Samsung with 66% fulfills maximum number of eco design practices compared to Videocon with 56% and LG with 58%.
2. Under frost free category, LG fulfills maximum of 79% of eco design practices compared to Videocon with 65% and Samsung with 68%.
3. Among these two segments of refrigerator product categories selected for study, the highest eco design practices are carried out by Frost free refrigerators with 73% compared to direct cool refrigerators with 61%.
4. The study reveals significant difference in Green product practices between the company brands under direct cool Refrigerator product category
5. It finds no significant differences in green product practices between the company brands under frost free refrigerator product category.

#### Conclusion:-

Eco design plays a key role for leading to sustainable environment. Even the marketers have realized, by adopting green practices into their business activities can bring environmental change to some extent where issues relating to it can be maintained at minimum level. It is found, either due to mandatory regulations by government or for creating a green brand image to gain larger market share or due to consumers demand, marketers have induced themselves for adoption of green practices.

The study notes that. Eco design practices are largely applied for refrigerator because of strict and mandatory regulations imposed by government for these products as they are found to be of significant nature for sharing of greenhouse gas emissions. Thus the study suggests for systematic and detailed regulations to be framed by Government for stakeholders' clear understanding.

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