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MARKET POTENTIAL FOR SOLAR BASED POWER SOLUTIONS - A STUDY WITH PARTICULAR REFERENCE TO NUMERIC POWER SYSTEMS LIMITED, CHENNAI

A PROJECT REPORT
submitted by

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In partial fulfilment of the requirements
for the award of the degree

of

MASTER OF BUSINESS ADMINISTRATION

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KCT Business School
Department of Management Studies
Kumaraguru College of Technology
(An autonomous institution affiliated to Anna University, Coimbatore)

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Certificate

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BONAFIDE CERTIFICATE

Certified that this project report titled **"Market Potential for Solar based Power solutions – A study with particular reference to Numeric Power Systems, Chennai"** is the bonafide work of **Mr. R. Rajesh (0720400029)** who carried out the research under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

Project Guide

Director

Viva – Voce Examination held on 5/5/09

NUMERIC POWER SYSTEMS LIMITED

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This is to certify that Mr. Rajesh. R, Roll No 07MBA29 a student of KCT Business School, Kumaraguru College of Technology, Coimbatore has successfully completed his project entitled "Identification of Buyer behaviour of the Customer and to estimate the Market Potential for the Solar Based Power solutions in Chennai for Numeric Power Systems Limited" from 18th Jan 2009 to 18th April 2009 in partial fulfilment of the requirement for the award of the MBA.

During his stay, he was exposed to the various functioning of Marketing Department. His character and conduct was found to be good.

We wish him all the best in his future endeavours.

Anil Kulkarni

Marketing Manager – Solar Wing

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I express my profound gratitude to my **Family Members & Friends** for their help and encouragement. I also take this opportunity to thank all those creative minds and helpful hearts for their assistance in making this project work.

RAJESH. R

Declaration

DECLARATION

I, hereby declare that this project report entitled as "**Market Potential for Solar based Power Solutions – A study with particular reference to Numeric Power Systems Limited, Chennai**", has been undertaken for academic purpose submitted to Anna University, Coimbatore in partial fulfilment of requirements for the award of the degree of Master of Business Administration. The project report is the record of the original work done by me under the guidance of ***Mr. K.R .Ayyaswamy***, Professor, KCT Business School, Department of Management Studies during the academic year 2008-2009.

I, also declare hereby, that the information given in this report is correct to the best of my knowledge and belief.

Date:

Place: Coimbatore **RAJESH. R**

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Abstract

ABSTRACT

On the rise of the power crisis across the globe, the implementation of the Kyoto protocol has become the need of the hour. The whole world is looking into the generation of clean power. The efforts taken by the government to cease emission have not reached the population effectively. The need to access the potential in the current market is much needed. In order to investigate the potential it is indeed important initially to understand the overall buying behaviour of the customers. The measurement scales in the study includes the awareness level of the customers, willingness to shift, general buying behaviour and the driving and restraining forces. The organisation could concentrate upon creating awareness campaigns upon the customers on carbon trading and clean production techniques. The organisation could create environmental awareness through which the company can build image on the customer minds. Thus the study concludes that apart from marketing a product it also attracts the potential customers to become a socially responsible individual.

Introduction

CHAPTER 1

INTRODUCTION

1.1 Introduction to the study:

With the fluctuating high cost of petroleum, minimizing dependence on importing conventional energy resources, stewardship to protect the Planet and providing affordable energy to all, countries including India have stepped up their energy path for harnessing indigenous renewable resources. To tap the infinite energy and transform as well as transmit it to each household, the Indian government has accelerated promotion of the use of universally available Solar Energy.

Thus the study includes the possibilities of identifying a potential market for the products of Solar based power solutions which enables the manufacturers of the product more scope and detailed understanding the opportunity which possess in the current market scenario and also to better enable themselves to make much more innovations in the Solar based products by identifying the general attitude of the market players and the needs of the target population.

The importance of Identifying the potential market for the Solar Power generation can be given in order to initially identify the product designed will make out the money in the market or not. This study also enables to asses the possibilities of infringing into the current and also in establishing new market trends. The study also enables the manufacturers of the power generation segment to deploy resources effectively by ranking markets in priority order.

The study forecasts total opportunity in terms of number of customers and revenue potential. The geographic profiling of the customers is also necessary for any business in order to capture the desired market with the target customer population. As per the saying "Birds of same feather flock together", similarly people with similar buying behaviours and demographic profiles tend to live close together. This helps you identify neighbourhoods or markets where the potential is highest.

The study is mainly based upon the research work done by Taztel who conducted this work during the year 2002. The study has a taxonomy of the customers into four broad categories. Taztel in his study has distinguished between the buyers based upon several factors and the classification is as "Value seeker", "Big Spender", "Non spender" and "Experiencer". Based upon the buying pattern of the customer the Potential of the Solar based Power Solution and its products can be narrowly assessed. The classification and the criteria with which the study has been undertaken is portrayed in the below table.

1.1 Table Showing the Taxonomy according Taztel's study

	Tight with Money Price in its negative role; Worry about money	**Loose with Money** Price in its Negative Role; Enjoy spending
High Materialism Public meaning of things 'Thingify' experiences; Self Monitoring; Dissatisfied, want more	**Value Seeker** Bargain Hunter; Collector, hold possessions; Enjoy price comparison shopping; "Save to spend"	**Big Spender** Exhibitionist; Replace Possessions; Price Quality Scheme; Debt prone
Low Materialism Private Meaning of things Non-material values	**Non Spender** Saver; Ascetic Lifestyle; Price Averse; Quality less important	**Experiencer** Spend for recreation; Self Development, and Services; Generous

1.2 Introduction to the Company:

Company Profile:

History Of The Organisation:

Numeric Power Systems Limited is powered by an all new-technology which represents years of advancement, towards the goal of positioning the company as the market leader and being the single largest source for a wide range of power solutions. NPSL is a mnc in the power management solutions arena with a sales and service network in over

has always been the excellence in quality of products and dedication in service and this has facilitated Numeric to carve a niche for itself in the Indian UPS market and has made the brand a legend in the country.

Numeric has been the "No.1 Online UPS Manufacturer in India" for the sixteen consecutive years. In addition the company's stocks have been listed in the Stock Exchanges - BSE, MSE and NSE. They offer end-to-End Power protection solutions from 500 VA to 4800 kVA. They operate six ISO 9001: 2000 state-of-the-art manufacturing plants to their credit.

After a decade of professional relationship, the world's largest Consumer Electronics Company Panasonic Industrial Asia Pvt Ltd., (a member of Panasonic Japan) has appointed NUMERIC Power Systems Ltd., as the national distributor for their SLA batteries in 2005. This alliance between NUMERIC and Panasonic will offer the complete range of Panasonic High Performance SLA batteries to the Indian market directly and through their channel partners. Numeric has two tier distribution models wherein the NUMERIC range of power conditioning products is available through the National Distributors.

Mission:

The mission of the organisation is to continue and excel towards providing high Quality Power Management solutions and be the Industry Leader through

- Latest technology UPS products
- Powerful solutions for all special applications
- A wide spread network to stay close to all customers
- Dedicated and trained team of resources for efficient support
- Higher level of commitment to achieve high performance and maximum uptime
- Power Quality Audits and Energy Management solutions

Management:

The company is run by the Managing Director Mr.R.Chellappan with whom all powers are vested. The Board of Directors have a say in the operations of the company as well. The company is divided into various departments to enable efficient administration and control. Each department has a vice-president under whom is the Area General Manager who reports the daily advancements of the firm.

The management and the members of Numeric manufacturing and service team are fully conversant with the latest developments and trends in power electronics. Two of the directors are from Sundstrand Aerospace Illinois, USA and two others on the board have over 27 years of profound experience in electrical projects with Federal Government USA. The promoter Directors have over 25 years of experience in India with organizations like Ashok Leyland and Best & Crompton in the manufacture of Power Electronic Products. In the team of 10 Directors, 6 are Electrical & Electronics Engineering Graduates.

Client Profile:

The company has got a wide range of clientele base both within and outside the country. The Indian client profile includes Nationalised Banks, Multinational Banks, Private & Co-operative Banks, SBI & its associates, Citibank, ICICI, HDFC, Central & State Govt. Research Body, Private Institutions, Top Tech & Management Institutions, BARC, C-DAC, IIT, IIM, ISRO, ISI, NIT, IT/ITES Corporates, BPO's & Services, CTS, Wipro, Infosys, Honeywell, Motorola, Multinational Corporates, Indian Corporate & Manufacturing Houses, Reliance, Times, Murugappa Group, TVS Group, ABB, L&T, MRF, Hero, State & Central Govt. Bodies, Defence & PSU's, AAI, ECIL, ITI, IOCL, APTS, NIC, DGSND, BSNL, Indian Railways.

The International Clientele base of NPSL are given as NCR, British Petroleum, Diebold, v Infosys, Wipro, IBM, Intel, Motorola, HP, Microsoft, Sun Microsystems, Honeywell, Reliance, AMD, Siemens, Philips, Citi Bank, Standard Chartered, HSBC and BNP Paribas.

Products profile:

1. UPS: - Line interactive, double conversion line, High energy products

2. Home Power Products: - Digital HPH Series, Digital HPX sine wave inverters

3. Special power systems:-Volt safe, ISO safe

4. Solar Power solutions

Competitive strength of the company:

Some of the aspects which make Numeric Power Systems Limited, Chennai are as follows :

a) single largest source for a wide range of power solutions
b) acclaimed as the "No.1 UPS Manufacturer in India" for the 16th consecutive year (Soft Disk Award 2008).
c) NUMERIC's stocks have been listed in the Stock Exchanges - BSE, MSE and NSE.
d) Continuous technological innovations and proximity to the customer
e) ISO 9000:2000 certified institution

1.3 Introduction to the Industry:

Micro and Macro Analysis

India due to its geo-physical location receives solar energy equivalent to nearly **5,000 trillion kWh/year**, which is far more than the total energy consumption of the country today. But India produces a very negligible amount of solar energy - a mere 0.2 percent compared to other energy resources. Power generation from solar thermal energy is still in the experimental stages in India. Up till now, India's energy base has been more on conventional energy like coal and oil. However, India has now attained 7th place worldwide in Solar Photovoltaic (PV) Cell production and 9th place in Solar Thermal Systems. Grid-interactive renewable power installed capacity as on 2006 aggregated 9,013 MW corresponding to around 7 percent of the total power installed capacity which equates to over 2 percent of total electricity.

Worldwide photovoltaic installations increased by 1,460 MW in 2005, up from 1,086 MW installed during the previous year. That was a 67 percent increase over the 750 MW produced in 2003. In 2002 the world solar market increased 40 percent. Solar Energy demand has grown at about 25 percent per annum over the past 15 years. In 1985, worldwide annual solar installation demand was only 21 MW. According to the **IEA's** fact sheet, "Renewables in Global Energy Supply," the solar energy sector has grown by 32 per annum since 1971. Worldwide, grid-connected solar PV continued to be the fastest growing power generation technology, with a 55 percent increase in cumulative installed capacity to

Similarly, India witnessed an acceleration of solar hot water installations in 2005. Global production of solar PV increased from 1,150 MW in 2004 to over 1,700 MW in 2005. Japan was the leader in cell production (830 MW), followed by Europe (470 MW), China (200 MW), and the US (150 MW).

India: Status of Solar Energy

The solar PV program was begun in the mid 70's in India. While the world has progressed substantially in production of basic silicon mono-crystalline photovoltaic cells, India has fallen short to achieve the worldwide momentum. In early 2000, nine Indian companies were manufacturing solar cells. During 1997-98 it was estimated that about 8.2 MW capacity solar cells were produced in the country. The total installed manufacturing capacity was estimated to be 19 MW per year. The major players in Solar PV are Bharat Heavy Electricals Ltd. (BHEL); Central Electrtonics Ltd., and Rajasthan Electricals & Instruments Ltd., as well as by several companies in the private sector. The latest, 100 million dollars investment from Tata BP Solar in India is the pointer towards the booming solar market in India. Of late, the market is growing for SPV applications based products with the active encouragement of the government.

The Ministry of New and Renewable Energy, earlier known as the Ministry of Non-conventional Energy Sources - have initiated innovative schemes to accelerate utilisation and exploitation of the solar energy. Number of incentives like subsidy, soft loan, 80 percent accelerated depreciation, confessional duty on import of raw materials and certain products, excise duty exemption on certain devices/systems etc. are being provided for the production and use of solar energy systems.

The Indian Renewable Energy Development Agency (IREDA) - a Public Limited Company established in 1987- provides revolving fund to financing and leasing companies offering affordable credit for the purchase of PV systems. As a result, the Renewable Energy Sector is increasingly assuming a greater role in providing grid power to the Nation as its total capacities reached about 9,013 MW. This apart, the Electricity Act 2003, National Electricity Policy 2005 and National Tariff Policy 2006 provide a common framework for the regulation of renewable power in all States/UTs through quotas, preferential tariffs, and guidelines for pricing 'non-firm' power. However, in the Draft New and Renewable Energy Policy Statement 2005, which is yet be approved, the government is very cautious about the status of renewable energy in the future. It says, "despite the fact that the biomass solar

technical community of the country unduly complacent into believing that necessary steps for expected changes can wait."

While the world has progressed substantially in production of basic silicon mono-crystalline photovoltaic cells, India has fallen short to achieve the worldwide momentum. India is now in 7th place worldwide in Solar Photovoltaic (PV) Cell production and 9th place in Solar Thermal Systems with nations like Japan, Europe, China, and the US currently ranked far ahead. Globally, solar is the fastest growing source of energy (though from a very small base) with an annual average growth of 35%, as seen during the past few years.

Present Scenario of Solar Power:

The MNES has been implementing installation of solar PV water pumping systems for irrigation and drinking water applications through subsidy since 1993-94. Typically, a 1,800 Wp PV array capacity solar PV water pumping system, which cost about Rs. 3.65 lakh, is being used for irrigation purposes. The Ministry is providing a subsidy of Rs.30 per watt of PV array capacity used, subject to a maximum of Rs. 50,000 per system. The majority of the pumps fitted with a 200 watt to 3,000 watt motor are powered with 1,800 Wp PV array which can deliver about 140,000 liters of water/day from a total head of 10 meters. By 30th September, 2006, a total of 7,068 solar PV water pumping systems have been installed.

Solar energy is facing three fundamental challenges of cost, its manufacturing procedure as well as its waste products that have any impact on the environment and the land acquisition for erecting solar PVs.

The hunt for better, cheaper solar cells is due in India. Solar PV now cost one tenth of what they did in early 1980s. Despite the fact that the price of solar photovoltaic technology has been coming down over the years it still remains economically unviable for power generation purposes.

During 1999, the cost of solar cells being manufactured in the country was estimated to be in the range of Rs. 1.35 to 1.50 lakhs per kW. The average cost of solar PV modules was around Rs. 2 lakhs per kW. At present the initial cost of both types of solar energy systems is higher compared to the cost of conventional energy systems and also the other non-conventional energy systems. However, the estimated unit cost of generation of

kWh and Rs. 10 - 15 per kWh respectively in India. With present level of technology, solar electricity produced through the photovoltaic conversion route is 4-5 times costlier than the electricity obtained from conventional fossil fuels.

There is growing concern over the possibility of global climate change resulting from increased anthropogenic greenhouse gas build up in the atmosphere. Although there seems to be growing evidence of a global warming trend, the causal relationship to atmospheric greenhouse gases has not been substantiated at present. Current trends show the potential for a doubling of atmospheric greenhouse gases in the next 30 years [EIA, 1999]. This is largely due to economic growth in developing countries.

Theme of the Project

CHAPTER 2

THEME OF THE PROJECT

The study mainly concentrates upon identifying the potential market for the Solar based Power solutions and its related products. The study also identifies the problem in adopting the Clean Development Mechanism all around the globe in order to minimise the emissions which is huge because of the conventional power generation methods. The study focuses on identifying the buying behaviour of the target customers based on which the possibility of the customer in shifting to a newer and environment friendly technology is identified as the main theme of the project.

2.1 Objectives of the Project:

Primary Objective

- To identify the buying behaviour of the customer and thus to measure the market potential for Solar based power solutions.

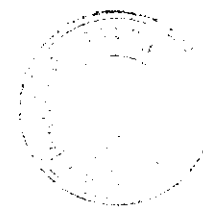
Secondary Objective

- To assess the awareness level of the customers towards Solar Power Generation accessories.
- To measure the willingness of the existing and potential customers in shifting from conventional methods of power generation to Solar based Power Solutions.
- To formulate the promotional measures in order to create much more awareness and confidence amongst the customers.

2. 2 Scope of the Project:

The scope of the study is limited only to the customers residing/operating inside the Chennai city regime. The Project concentrates only upon the Solar Panels and it does not

Power Systems Limited. For any business to grow and develop it has to initially identify the viability of the product amongst its target population. This enables the organisation to make several developments and also bridge the gap between the existing source and the new product in the market.



2. 3 Limitations of the Project:

- The study has been restricted only within the city of Chennai and the results have been generalised for all geography.
- The study sample is restricted to 120 due to time constrains.
- The factor considered for identifying the market potential is bound to change on technological advancements.

2. 4 Research Methodology:

2.4.1 Type of Study

The study is exploratory in nature. The study is considered to be exploratory since there is minimal information left in the hands or there has not been much similar work of this type had been done earlier. The study explores the buying pattern of the customers and also identifies the unknown potential inside the market.

2.4.2 Sampling Design

The sample size selected for the study is 120. The respondents were selected from all around the city of Chennai. The sampling procedure was done as a Stratified Random Sampling in which the whole territory was disintegrated as strata and the samples were selected randomly from the population.

2.4.3 Data Collection

The data collected was from both the primary and the secondary sources. The primary data are collected through a specially designed questionnaire. The secondary data are collected from magazines, journals, etc.

4.4 Tools for analysis

The study uses Chi-Square test, Z-test and rank scores. SPSS was used for analysing the data collected.

Chi-Square test is used to find out the relationship between the Nature of the Company and the Level of Electricity consumption. The test is also used to identify the dependency between the Organizational Relationship and the Confidence upon the organisation leading to switch for Solar based power solution

Z-test is used to identify the relationship significance between the proportions of the variables such as the Relationship of the company with that of the Willingness of the customer to go for Solar and Non-Solar based alternative Power solution.

Rank-score is used to identify the high rank factors such as the restraining factors and driving factors for adapting to a solar based power solution. This is also used to analyse the top ranked motivating factor.

Percentage analysis is used to identify and classify the response of the customers as well as to understand the basic profile of the sample population.

2. 5 Review of Literature:

This section deals with the review of literature collected from various sources.

David A. Hensher (1997)[1] has undergone a study on 'a practical approach to identifying the market potential for high speed rail: A case study in the Sydney-Canberra corridor'. According to the study the demand for a high speed rail system serving the Sydney-Canberra corridor currently dominated by air travel for business trips and car travel for non-business trips has been analysed. The study also outlines the steps involved in the problem specification, data needs, development of base year trip tables, model specification and estimation to establish switching behaviour in the presence of a new mode and calculation of induced demand for current travellers. The study uses a stated choice heteroskedastic extreme value switching model to evaluate the choice of fare type for

[1] David A. Hensher, A practical approach to identifying the market potential for high speed rail: A case study in the Sydney-Canberra corridor, Transportation Research Part A: Policy and Practice, Volume 31, Issue 6, , Pages

business and non-business travel given the current mode used in the corridor for each sampled traveller conventional train, charter coach, scheduled coach, plane or car. The study concludes by starting with the current travel profile, patronage can be predicted under alternative fare regimes, taking into account diverted traffic, induced traffic and growth. Treating fare class as endogenous enhances the real choice context facing potential patrons.

Wier M .et. al (2002)[2]., has conducted a study on 'Market potential for organic foods in Europe'. The study examines the potential of organic foods in European markets, focusing on consumer demand for organic foods and the possibilities for market expansion. The study also aims to assess potential sales, to identify the factors determining buying propensity, and to identify the main market barriers. The study identifies the types of consumers who purchase organic foods, classifying them according to socio-economic and demographic characteristics. The study concludes that the motives for purchasing and the willingness to pay and also identifies the main market barriers and bottlenecks, and examines the potential for future expansion.

Abhigyan Sarkar (2008)[3]., has conducted a study on 'Latest trends in Consumer buying behavior in lifestyle centers worldwide'. The study analyses that the lifestyle centers are being replaced by conventional shopping malls because of many reasons. The study highlights the reasons as nature of consumption in these lifestyle centers is largely hedonic in nature, rather than being only utilitarian. The study also describes what hedonic consumption is and how it is important demographic and psychographic variables which influences the buying behavior of consumers in lifestyle centers.

A Coskun Samli (1977)[4]., has conducted a study on 'An Approach for Estimating Market Potential in East Europe'. The study states that there are numerous techniques which are used in determining market potentials, when the data are scarce one of these

[2] Wier M. and Calverley C., 'Market potential for organic foods in Europe', British Food Journal, Volume 104, pp. 45-62(18), Number 1, 2002

[3] Abhigyan Sarkar., 'Latest trends in Consumer buying behavior in lifestyle centers worldwide', The ICFAI Journal of Management Research, Vol. VII, No. 6, pp 70-82, 2008.

[4] A Coskun Samli., 'An Approach for Estimating Market Potential in East Europe', Journal of International

becomes more readily useful than others. This technique is called the multiple factor analysis. In this study an attempt is made to determine the market potential of East Europe by using this particular technique. This approach in this study converts the unknown East European market conditions into the known U.S. market conditions by using a series of criteria as common denominators.

Susan Chirayath (2007)[5]., has conducted a study on 'Customer Attitude and Market Potential'. The study says that the revolution is still on for Indian telecom as India is expected to have 100 million GSM subscribers by 2007-08, as compared to 26 million subscribers as on March 2004, according to the Global Mobile Suppliers Association (GSA). The study also identifies that this pace, the target of 100 million subscribers by 2007-08 is definitely achievable. The present study attempts to determine the consumer buying behavior with regard to GSM mobile of LG in Ranchi, the capital of Jharkhand, an infant state facing many challenges, yet with opportunities for expansion, development and modernization. The study becomes more relevant and significant because LG is very new to GSM phone sector, only a year old in Ranchi. The findings of this research will be useful to enhance customer value, satisfaction, retention and also to help the strategic and marketing planners who are concerned with the philosophy and practice of new product development and product modification to introduce better, innovative and customized products to the consumers.

Sanjib Bhuyan et. al. (1997)[6]., has conducted a study on 'Availability and Market Potential on Non-Agricultural Businesses in North Dakota'. The study states that many North Dakota communities find it financially difficult to provide or maintain such necessary services as public safety, water and sewer services, garbage disposal, grocery and retail stores, local credit, medical care and similar other services due to gradual decline in both population and businesses. The identifies that cooperative approach may provide an option for rural communities in North Dakota for influencing economic development efforts in their localities. In an attempt to identify specific businesses for cooperative development efforts in North Dakota, this study explores the availability and market potential of various non-agricultural businesses in retail, service, wholesale, and finance, insurance, and real estate sectors in

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[5] Susan Chirayath, 'Customer Attitude and Market Potential', *The Icfai Journal of Consumer Behavior, Vol. 2, No. 3, pp. 22-38, September 2007*

[6] Bhuyan, Sanjib, Cobia, David W. and Leistritz, F. Larry Larry,Availability and Market Potential on Non-Agricultural Businesses in North Dakota. Available at SSRN: http://ssrn.com/abstract=1849 or DOI:

the state. The results of this study show that there are a considerable number of businesses in the state that have significant market potential for further growth, e.g., computer rent/lease and maintenance services in the service sector and computer and software stores in the retail sector. In addition, there is scope for cooperation among existing businesses which want to reduce their operating cost and public entities and non-profit organizations that would like to provide their services at a reduced cost. There is ample evidence of on-going cooperation among various North Dakota communities and public entities to solve the problem of the high cost of providing public or government services. The study concludes such cooperation is encouraging because it may eventually lead to formation of cooperatives to provide goods and services in the state.

Severin Borenstein et. al. (2000)[7]., has conducted a study on 'An Empirical Analysis of the Potential for Market Power in California's Electricity Industry'. The study uses demand and plant-level cost data to simulate competition in a restructured California electricity market. This approach recognizes that firms might have an incentive to restrict output in order to raise price and enables us to explicitly analyze each firm's ability to do so. The study states that, under the current structure of generation ownership, there is potential for significant market power in high demand hours. During some months, congestion over Path 15, the primary in-state north-south transmission line, exacerbates the market power potential in northern California. While these results make deregulation of generation less attractive than if there were no market power, they do not suggest that deregulation would be a mistake. Nearly all markets exhibit some degree of market power. The study found that the levels of hydroelectric production and the elasticity of demand are two of the most important factors in determining the severity of market power, having greater impact on equilibrium prices than the proposed divestitures of California's largest producers. These results indicate that policies promoting the responsiveness of both consumers and producers to price fluctuations can have a significant effect on reducing the market power problem.

Thierry Mayer (2008)[8]., has conducted a study on 'Market Potential and Development'. This paper provides evidence on the long-term impact of market potential on economic development. It derives from the New Economic Geography literature a structural

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[7] Borenstein, Severin and Bushnell, James,An Empirical Analysis of the Potential for Market Power in California's Electricity Industry(March 1998). NBER Working Paper No. W6463. Available at SSRN: http://ssrn.com/abstract=226208

[8] Mayer, Thierry Market Potential and Development(April 2008). , Vol. , pp. -, 2008. Available at SSRN:

estimation where the level of factors' income of a country is related to its export capacity, labelled Market Access (MA) by Redding and Venables (2004), or Real Market Potential (RMP) by Head and Mayer (2004). The empirical part evaluates this market potential for all countries in the world with available trade data over the 1960-2003 period and relates it to income per capita. Overall results show that market potential is a powerful driver of increases in income per capita.

Zhong Xiang Zhang (1999)[9]., has conducted a study on 'Estimating the Size of the Potential Market for the Kyoto Flexibility Mechanisms'. The study signifies that the Kyoto Protocol incorporates emissions trading, joint implementation and the clean development mechanism to help countries to meet their Kyoto targets at a lower overall cost. This paper aims to estimate the size of the potential market for all three flexibility mechanisms under the Kyoto Protocol over the first commitment period 2008-2012, both on the demand side and on the supply side. Based on the national communications from 35 countries, the paper first estimates the potential demand in the greenhouse gas offset market. Then, the paper provides a quantitative assessment of the implications of the EU proposal for concrete ceilings on the use of flexibility mechanisms for the division of abatement actions at home and abroad. Finally, using the 12-region's marginal abatement cost-based model, the paper estimates the contributions of three flexibility mechanisms to meet the total emissions reductions required of countries under the four trading scenarios respectively. The results clearly demonstrate that the fewer the restrictions on trading the gains from trading are greater. This is the first comprehensive study to estimate the size of the potential market for Kyoto mechanisms and quantify the implications of the EU proposal on the basis of the individual national communications to the UNFCCC.

[9] Zhang, ZhongXiang,Estimating the Size of the Potential Market for the Kyoto Flexibility Mechanisms(December 1999). FEEM Working Paper No. 8.2000. Available at SSRN: http://ssrn.com/abstract=200073 or DOI:

Analysis and Interpretation

CHAPTER-3

DATA ANALYSIS AND INTERPRETATION

This Chapter includes the analysis and the corresponding interpretation for the data collected from the customers of all categories residing over Chennai. The Chapter includes the general profile categorization of the customers and analysis is done through several statistical tools viz., Chi-square test, Percentage Analysis, Binomial Test and Weighted ranking.

3.1 Nature of the Respondents:

The table below indicates the nature of the respondents

3.1 Table Showing the Frequency and Percentage of the Nature of the Respondents

Nature	Frequency	Percent
Domestic	21	17.5
Manufacturing	10	8.3
Service	34	28.3
SME	49	40.8
PSU	6	5.0
Total	120	100.0

From the above table it is clearly seen that maximum i.e. 40.8% of the respondents belong to the Small and Medium Enterprises comprises of small and medium ranged shops, restaurants, offices, recreation centres, shopping complex and other entertainment centres. The second highest about 28.3% of the respondents belongs to the services sector. The Government and the Public sector has got minimal position in the list of respondents.

3.2 Years of Operation/residence:

The table below gives the number of the operating/residing years of the respondents in a locality.

3.2 Table Showing the Frequency and Percentage of the Operating Years in a particular Area

Operating Years	Frequency	Percent
0-3 years	31	25.8
3-5 years	51	42.5
5-7 years	31	25.8
More than 7 years	7	5.8
Total	120	100.0

This helps to understand better with the ownership and other details of the respondents. The respondents of about 51% are operating at a particular locality for a period between 3 and 5 years. The other categories have been equally distributed for a range of about 31%. Only a few respondents have been operating at the current locality for more than seven years.

3.3 Relationship of respondents with NPSL:

The table below indicates the relationship status of the respondents with the products of Numeric Power Systems Limited.

3.3 Table Showing the Frequency and Percentage of the Nature of the Respondents

Relationship Status	Frequency	Percent
No Relationship	67	55.8
Less than Year	24	20.0
1-3 Years	26	21.7
3-5 Years	3	2.5

The table above that much of the respondents of about 55.8% is not related with the NPSL. The respondents of about 21.7% are related for a range of 1-3 years with the company's products.

3.4 The duration of Power failure at the respondent's locality:

The table below indicates the average duration of power failure that occurs on a day to day basis.

3.4 Table Showing the Frequency and Percentage of the Average duration of Power Failure

Duration	Frequency	Percent
0-2 hrs/day	20	16.7
2-4 hrs/day	59	49.2
4-6 hrs/day	37	30.8
above 6 hrs/day	4	3.3
Total	120	100.0

The above table clearly portrays that 49.2% of the respondents have an average daily power failure from their existing source for 2-4 hours a day. There are also respondents of 30.8% at the second highest power interruption for 4-6 hours per day.

3.5 Respondents Expectation of the life expectation on NPSL's product:

The table below indicates the life expectation of the NPSL's product categories.

3.5 Table Showing the Frequency and Percentage of the Life Expectation on Numeric Products

Life Expectation	Frequency	Percent
0-2 yrs	49	40.8
2-4 yrs	52	43.3
4-6 yrs	17	14.2
More than 6 yrs	2	1.7
Total	120	100.0

From the above table it is clearly eminent that very high profile of about 43.3% of the respondents expect the NPSL's product to perform above 2 years to less than 4 years. About 40.8% of the customers belong to the expectation category of the product's performance for less than two years.

3.6 Respondents awareness on the alternative power source:

The table below shows the respondents awareness level on the effective alternative power source.

3.6 Table Showing the Frequency and Percentage of the Alternate Source of Power

Alternative source	Frequency	Percent
Wind	20	16.7
Solar	74	61.7
Geo thermal	10	8.3
Hydro power	5	4.2
Bio gas	11	9.2
Total	120	100.0

The table shows that a major portion of the customers have identified that the solar based power solution is a best alternative for the current power suppliers. To the maximum 61.7% of the respondents have claimed that the Solar power as the effective alternative power source. The next stand is taken by Wind Power with 16.7% than the other existing power solutions.

3.7 Respondents Attraction towards NPSL based upon its years of existence and achievements:

The table below shows the respondents tendency to shift to a NPSL's product based upon its achievements and the level of experience it has acquired.

3.7 Table Showing the Frequency and Percentage of the Customer Affinity upon NPSL

Organisational Attraction	Frequency	Percent
Yes	61	50.8
No	59	49.2
Total	120	100.0

From the above table it is evident that most of the customers i.e ***50.8%*** get attracted and gain confidence of the company and will to shift to a Solar based power solution. The rest of about ***49.2%*** feel that they r not much moved with the performance of the company

3.8 Dependency of Nature of the respondents and the Electricity Consumption

Table shows the contingency values of the classification of the Nature of the respondents and with that of their corresponding electricity consumption.

3.8 Table Showing the Cross Tabulation between Nature of the Company and Electricity Bill

Nature of Company	Electricity Bill				Total
	below 10000	10001-30000	30001-50000	above 50000	
Domestic	11	9	0	1	21
Manufacturing	0	0	5	5	10
Service	2	16	13	3	34
SME	2	28	14	5	49
PSU	0	0	3	3	6
Total	15	53	35	17	120

Hypothesis H_0: The Power consumption is independent on the Nature of the respondent

Table showing the Chi square test results for the Nature of the respondent and the corresponding significant values

3.9 Table Showing the Chi Square between Nature of the Company and Electricity Bill

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	68.209	12	0.000
Likelihood Ratio	66.904	12	0.000
Linear-by-Linear Association	11.584	1	0.001

The Chi Square Test result shows the asymptotic significance value rejects the null Hypothesis H_0 since the value is very close to the '0' thus the alternate hypothesis has been accepted. The Electricity consumption is highly dependent upon the Nature of the respondent.

3.9 Dependency of Organisational Relationship with the Intension of switching to Solar based Power solutions based on Organisational Performance.

Table shows the contingency values of the classification of the respondents' relationship with the organization and with that of the respondents confidence in organization to switch to Solar based power solutions.

3.10 Table Showing the Cross Tabulation between Period of Relationship and Confidence on the Organization

Period of Relationship	Confidence on Organisation		Total
	Yes	No	
No Relationship	37	30	67
Less than Year	11	13	24
1-3 Years	11	15	26
3-5 Years	2	1	3
Total	61	59	120

Hypothesis H_0: The respondents relationship with the company is independent of the Tendency of the respondent to shift towards Solar based Power solutions.

Table showing the Chi square test results for Relationship with the company and Confidence of the Respondent.

3.11 Table Showing the Chi Square between Period of Relationship and Confidence on the Organization

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.814	3	0.612
Likelihood Ratio	1.824	3	0.610
Linear-by-Linear Association	0.741	1	0.389

The Chi Square Test result shows the asymptotic significance value accepts the null Hypothesis H_0 since the value is very higher to the order greater than '0.5' thus the alternate hypothesis has been accepted. Thus the Relationship with the company and the confidence of the respondent are highly independent to each other.

3.10 Binomial Test showing the Significant difference between the Knowledge of the Company and Opting for solar and Non solar products:

The Binomial test is done using the Z-test statistic and the significant difference between the proportion of the two variables considered are identified.

Contingency table showing the frequency of the respondents opting for the Solar & Non-solar based power sources with the Knowledge of the Company.

3.12 Table Showing the Frequency between Relationship Status with the Company and selection of Alternate Power Source

Relationship Status with the Company	Alternate Power source		Total
	Solar	Non Solar	
Yes	38	15	53
No	36	31	67
Total	74	46	120

Hypothesis H_0: The proportion of Knowledge about the company has no significant difference between the Choice of alternative power source.

Test Statistic,

$$z = \frac{p1 - p2}{\sqrt{PQ(\frac{1}{n1} + \frac{1}{n2})}}$$

p1 = 38 / 53 ; p2 = 36 / 67 ; P = (38+36) / (53+67) ; Q = 1 – P

Obtained Value, z = 2.0102

Tabulated Value, z = 1.96

Since the obtained value is greater than the tabulated value the Null hypothesis H_0 is rejected. Hence the Choice of Alternative power source significantly differs from that of the Respondents' relationship with the Company.

3.11 Highly Influencing Restraining Factor

The table shows the ranks of the restraining factors. Each rank is given a weight in the range of highest Rank as 6 to the lowest rank as 1. The weighted scored for each factor is calculated and thus the most influential factor could be identified.

3.13 Table Showing the Ranks of the Restraining factors affecting the Customers

Restraining Factors	Ranks						Total
	1	2	3	4	5	6	
Installation Cost	41	15	42	9	8	5	120
Maintenance issues	8	44	31	20	16	1	120
Refusal From Top Management	20	11	10	19	23	37	120
Lack of Awareness	19	13	9	11	31	37	120
Technological Constrains	10	23	25	33	17	12	120
Physical Space Occupied	22	14	4	27	25	28	120

3.14 Table Showing the Weighted Ranks of the Restraining factors affecting the Customers

Restraining Factors	Weighed Rank Scores						Total
	1	2	3	4	5	6	
Installation Cost	246	75	168	27	16	5	537
Maintenance issues	48	220	124	60	32	1	485
Refusal From Top Management	120	55	40	57	46	37	355
Lack of Awareness	114	65	36	33	62	37	347
Technological Constrains	60	115	100	99	34	12	420
Physical Space Occupied	132	70	16	81	50	28	377

The above table shows the weighted scores for the Restraining factors. The factor with the highest score is considered to be the most influencing. Thus from the above table the factor ***Installation cost*** with score '537' is considered to be the most influential factor following which factor ***Maintenance Cost*** with score '485' stands second to the installation cost as per the response by the population.

3.12 Reasons for Shifting to a Solar based Power Solutions

The table shows the ranks of the factors which enables the respondent to shift to a solar based Power solution. Each rank is given a weight in the range of highest Rank as 6 to the lowest rank as 1. The weighted scored for each factor is calculated and thus the most influential factor for the choice of adopting can be identified.

3.15 Table Showing the Ranks of the Driving factors influencing the Customers

Driving Factors	Ranks						Total
	1	2	3	4	5	6	
Environment Friendly	21	30	7	20	14	28	120
Back Up Time	29	35	19	9	22	6	120
High Load Capacity	4	32	38	15	19	12	120
Cost Effectiveness	25	14	25	37	11	8	120
Corporate Social Responsibility	20	4	7	8	42	39	120
Supplier Independency	21	5	22	32	14	26	120

3.16 Table Showing the Weighted Ranks of the Driving factors influencing the Customers

Driving Factors	Weighed Rank Scores						Total
	1	2	3	4	5	6	
Environment Friendly	126	150	28	60	28	28	420
Back Up Time	174	175	76	27	44	6	502
High Load Capacity	24	160	152	45	38	12	431
Cost Effectiveness	150	70	100	111	22	8	461
Corporate Social Responsibility	120	20	28	24	84	39	315
Supplier Independency	126	25	88	96	28	26	389

The above table shows the weighted scores for the Driving factors. The factor with the highest score is considered to be the most influencing. Thus from the above table the factor ***Backup time*** with score '502' is considered to be the most influential factor following which factor ***Cost Effectiveness*** with a score of '461' is the second most driving factor.

3.13 External Influencing Factors

The table shows the ranks of the factors which enables motivates the respondents. Each rank is given a weight in the range of highest Rank as 6 to the lowest rank as 1. The weighted scored for each factor is calculated and thus the most influential motivating factor whose approach will influence the respondent

3.17 Table Showing the Ranks of the External factors influencing the Customers

Influencing Factors	Ranks					Total
	1	2	3	4	5	
Self Intuition	30	16	21	32	21	120
Peers Recommendation	12	59	37	7	5	120
Competitor Adoption	30	7	33	27	23	120
Self Help Groups	17	10	10	23	60	120
Dealers	31	28	19	31	11	120

3.18 Table Showing the Weighted Ranks of the External factors influencing the Customers

Influencing Factors	Weighed Rank Scores					Total
	1	2	3	4	5	
Self Intuition	180	80	84	96	42	482
Peers Recommendation	72	295	148	21	10	546
Competitor Adoption	180	35	132	81	46	474
Self Help Groups	102	50	40	69	120	381
Dealers	186	140	76	93	22	517

The above table shows the weighted scores for the Driving factors. The factor with the highest score is considered to be the most influencing. Thus from the above table the factor ***Recommendation from Peers*** with score '546' is considered to be the most influential factor for the respondents to adopt to a Solar based Power solution following which factor ***Dealers approach*** with a score of '517' is the second most motivating cause.

3.14 Identifying the buyer behaviour of the customer

The table shows the characteristic responses in order to identify the buyer behaviour. The responses of the customers are classified into four categories in accordance with the ***Taztel's Taxonomy.***

3.19 Table Showing the Frequency Values of Buyer Behaviour Classification

Taztel Classification	Response	Strongly Agree	Slightly Agree	Slightly Disagree	Strongly Disagree
Value Seeker	Performance is vital	21	64	30	5
	Deal at low cost	27	48	38	7
Big Spender	Service Reliability	19	68	28	5
	Ultimate Satisfaction	24	60	28	8
Non Spender	Credit Purchase	56	48	11	5
	Work within Backup time	14	71	30	5
Experiencer	Brand Image	16	71	27	6
	Past Experience	37	61	11	11

By Computing the weighted scored for the above table the individual scores for each category can be identified by allocating weight to each response. Strongly Agree – 4, Slightly Agree – 3, Slightly Disagree – 2, Strongly Disagree – 1.

3.20 Table Showing the Weighted Values of Buyer Behaviour Classification

Taztel Classification	Response	Strongly Agree	Slightly Agree	Slightly Disagree	Strongly Disagree	Total Score
Value Seeker	Performance is vital	84	192	60	5	676
	Deal at low cost	108	144	76	7	
Big Spender	Service Reliability	76	204	56	5	681
	Ultimate Satisfaction	96	180	56	8	
Non Spender	Credit Purchase	224	144	22	5	729
	Work within Backup time	56	213	60	5	
Experiencer	Brand Image	64	213	54	6	701
	Past Experience	148	183	22	11	

From the above the scores of each individual category clearly shows that most of the respondents are of the category of Non – Spenders. The Non-Spenders category stands high with the highest score amongst other categories of buyers with a score of '729'. The second highest score of '701' was obtained by the Experiencer category which determines that the customers are mostly making decisions only on their past experience and not on any other factors. So it is eminent that there are few value seekers also present inside the group of population. Since the score with minimal deviation the buyers can be easily classified.

The Buying pattern was primarily identified in order to analyse the general buying behaviour of the respondents for whom all promotional measures can be taken in order to understand the target population in an elaborate manner.

Findings, Suggestions and Conclusion

CHAPTER-4

FINDINGS, RECOMMENDATIONS AND CONCLUSION

The study provides a detailed picture about the market potential for the Solar power solutions form the analysis made. The behavior of the buyer is also analyzed from the primary data collected.

4.1 FINDINGS AND INFERENCE:

The project includes several findings with regards to the base of the customers. From the statistical analysis made these following were found with regards to the sampled population.

- In case of the nature of respondents the maximum i.e. ***40.8%*** of the respondents belong to the ***Small and Medium Enterprises*** which comprises of small and medium ranged shops, restaurants, offices, Recreation centres, Shopping complex and other entertainment centres. The second highest about ***28.3%*** of the respondents belongs to the ***Services sector***. The Government and the Public sector has got a minimal position in the list of respondents.

- The period of the respondents operating residence at a particular locality of about ***51%*** are residing/operating at a particular locality for a period between ***3 and 5 years***. The other categories have been equally distributed for a range of about ***31%***. Only a few respondents have been residing/operating at the current locality for more than seven years.

- There are much of the respondents of about ***55.8%*** is ***not related*** with the NPSL. The respondents of about ***21.7%*** are related for a range of ***1-3 years*** with the company's products.

- From the analysis it portrays that ***49.2%*** of the respondents have an average daily power failure from their existing source for ***2-4 hours a day***. There are also respondents of ***30.8%*** at the second highest power interruption for ***4-6 hours per day***.

- The respondents of about ***43.3%*** expect the NPSL's product to perform ***above 2 years to less than 4 years***. About ***40.8%*** of the customers belong to the expectation category of the product's performance for less than two years.

- Major portion of the customers have identified that the solar based power solution is a best alternative for the current power suppliers. To the maximum ***61.7%*** of the respondents have claimed that the ***Solar power*** as the effective alternative power source. The next stand is taken by ***Wind Power*** with ***16.7%*** than the other existing power solutions.

- Most of the customers i.e ***50.8%*** get attracted and gain confidence of the company and will to shift to a Solar based power solution. The rest of about ***49.2%*** feel that they r not much moved with the performance of the company.

- From the Chi square analysis the relationship between the Nature of the Company and the Electricity consumption was identified. It is found that both the factors are highly dependent on each other with a Chi Square value of ***68.209***.

- The Chi square analysis also was used to find the relationship between the Organisational Relationship and that of the Confidence level of the respondents for shifting to a Solar based power solution. The test result shows that there was ***no relationship*** between the two identified variables with a Chi Square value of ***1.814***. Hence the relationship is not the only factor to get the Confidence upon the Company.

- The binomial test shows that the proportion of the two variables i.e. Choice of Alternate Power source and the Knowledge about the organisation is not significant with each other. The Selection of the Power Source and the Knowledge about the company varies significantly.

- The factor with the highest score identified as the most influencing factor. Thus from the analysis the factor ***Installation cost*** with score '537' is considered to be the most influential factor following which factor ***Maintenance Cost*** with score '485' stands second to the installation cost as per the response by the population.

- The factor with the highest score is considered to be the most influencing and hence

following which factor ***Cost Effectiveness*** with a score of '461' is the second most driving factor.

- The factor with the highest score is considered to be the most influencing and hence the factor ***Recommendation from Peers*** with score '***546***' is considered to be the most influential factor for the respondents to adopt to a Solar based Power solution following which factor ***Dealers approach*** with a score of '***517***' is the second most motivating cause

- The buyer behaviour was found based on the Classification accordance to the Taztel's Taxonomy of buyer behaviour. The analysis done through the mean score portrays that the classification ***Non-Spenders*** category stands high with the highest score amongst other categories of buyers with a score of '***729***'. The second highest score of '***701***' was obtained by the ***Experiencer*** category which determines that the customers are mostly making decisions only on their past experience and not on any other factors.

4.2 RECOMMENDATIONS AND SUGGESTIONS:

Based on the above findings from the study the following recommendation was provided for consideration to Numeric Power Systems Limited. As a researcher the following suggestions that could be possibly adopted by the organization were also gioven under through the judgment of the researcher.

- Most of the respondents here in this study are from the Small and Medium Enterprise. Hence all the study results signifies and orients towards the requirement and behavior of these kind of clients. The Organization has to concentrate initially on all categorical needs as per the study.

- The Buyer Behavior study indicates that the Most of buyers are of Non Spender Category and hence the company has to modify their promotional and sales strategy accordingly.

- It is better to approach the customers who are residing for longer period at a particular place because the respondents located at a particular location for a longer period are likely to shift to the power solutions.

- Most of the respondents are initially not aware of the Organization, hence it is important for the NPSL to create an image about the company in the minds of the non customers. Attracting existing customers in shifting towards Solar based power solution has to be done with consideration that the company does not loose the customer upon insisting for a change.

- The present situation where the power failure seems to occur as per the data collected shows that this is a better market for the organization to get some long term contracts unlike getting short term benefits through small scale business.

- The Power failure seems to vary from locality to locality and the company has to take care that it launches appropriate promotional measures as per the locality of the customer base inside Chennai.

- A large base of customer group has displayed their view on the NPSL expected performance of their product. Thus the company can utilize this phenomenon while launching promotional and awareness creation campaign.

- There are over and about 60% of customers who are aware that Solar power generation is the safe and cost effective alternative source which is a major advantage for the company to target those population and it is easier for the organization to tap this market.

- On the other hand 40% customers remain unaware of the utilities of Solar Power Generation. Hence it is so vulnerable for the Organization to host some awareness campaigns through which the Company can tag its name in order to create an image in the minds of the customers. The NPSL can also insist upon the Government measures and the Clean Development Mechanism (CDM) followed by the Western countries to control emission.

- The target customers are highly concerned about the Installation cost and the Maintenance cost which is predominant over other costs. In order to capture the market NPSL has to create paths for the customers to eliminate the restraining forces

- The customers are highly attracted with the Back up time and the cost effectiveness. Hence the organization could concentrate upon these factors to the core function in order to attract the customers. It must also concentrate on other factors but promotional measures taken include these highlights it would lead to better sales.

- The population has addressed that it gets attracted over the influence from the general peers and secondarily from the peers. Hence the company must go for a word of mouth communication based advertising strategy. Then the company must also take efforts in effectively training the Dealers and sales agents in order to satisfy the customers since they would have a lot of technical queries upon the new product.

Recommendations of the Researcher

- As per the observation of the researcher has found that the Organization has to make several awareness programs as to attract the customers and these campaigns must insist the need of Clean Development Mechanism.

- The Organization must identify the gap between the existing product and customer requirement in order to create much more attraction and brand loyalty on the customer mind.

- The organization has to promote the product particularly to the SME and Manufacturing companies which has got the higher potential of switching since they have huge electricity consumption.

- The company can use the promotional tools such as the Demonstrational product selling as we saw there were huge percentage of Non Spenders amongst population

4.3 Conclusion

The world in its recent trends has been searching for better ways of reducing the effects of Global warming and other hazards emerging out of the emission based power generation. The International Energy Agency, International Emissions Trading Association, Carbon Finance Business(an effort form World Bank) has been funding several countries to adopt to the Clean Development Mechanism in order to have a sustained living. At this juncture of crucial hours the study analyses the scope for the Solar based power solution among the customers within Chennai is a great effort to capture such market before much of the competition arises. The scenario has gone down to such a great extent that there is wide opportunity which still remains untapped. With this study the gaps that has to be provided in order to attract the customers is identified which enables the customers to further get aware about the product as well as the technology. Thus it is evident that Solar based power generation is the only safe alternative power source in the future and there is definitely a plenty of open market yet to be trapped.

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Annexure

ANNEXURE

MARKET POTENTIAL FOR SOLAR BASED POWER SOLUTIONS – A STUDY WITH PARTICULAR REFERENCE TO NUMERIC POWER SYSTEMS LIMITED, CHENNAI.

QUESTIONNAIRE:

1. Name & locality of the company /client: _____
   _____
   _____

2. The Company/client has been operating/residing in the current locality for a period of

   ☐ 0-3 years ☐ 3-5 years ☐ 5-7 years ☐ more than 7 years

3. Nature of the company/client _____.

   (for eg: Manufacturing, Service, PSU, Domestic, Commercial.....)

4. Are you in anyway related with Numeric Power Systems Limited? a) Yes b) No
   If yes kindly specify how long you have been related_____

   ☐ Less than a year ☐ 1-3 years ☐ 3-5 years ☐ greater than 5 years

5. From the experience of past one month how long did a power failure prolong?

   ☐ 0-2 hours/day ☐ 2-4 hours/day ☐ 4-6 hours/day ☐ above 6 hours/day

6. Your life expectation on installed NPSL's product falls between

   ☐ 0-2 years ☐ 2-4 years ☐ 4-6 years ☐ more than 6 years

7. Which among these alternate power sources you think is highly efficient and cost effective?

   ☐ Wind Power ☐ Solar Power ☐ Geo thermal ☐ Hydro power ☐ Bio gas

8. Kindly rank the restraining factors, which restricts you from switching to a solar-based power solution. (Rank: 1 – Highest, 6 – lowest)

PARAMETERS	RANK
Installation Cost	
Maintenance issues	
Refusal from top management	
Lack of awareness	
Technological constraints	
Physical space occupied	

9. Which of these will make you think of switching to a Solar based power solution Kindly rank (Rank: 1 – Highest, 6 – lowest)

FEATURES	RANK
Environment friendly	
High backup time	
Large load capacity	
Cost effective	
CSR activity	
Independency from power supplier	

10. If you like to shift from existing system to a solar-based power solution whose influence will be more, rank accordingly (Rank: 1 – Highest, 5 – Lowest)

PARAMETERS	RANK
Self intuition	
Peers	
Competitors adoption	
Self Help Group Promotions	
Direct proposals from dealers	

11. Would you like to switch to solar-based power products/solution if NPSL will provide the following?

BENEFITS	YES	NO
Installed Payments		
0 %interest		
Buy Back Guarantee		
Discounted Sales		
Free after Sale service		
Free trial period		
Discounted Initial Installation		

12. Your monthly electricity bill falls between the range of

☐ Below Rs.10, 000 ☐ Rs.10, 001 – 30,000 ☐ Rs. 30,001 – 50,000 ☐ above 50,000

13. Please indicate your response to the most appropriate option that indicates your nature with a (✓).

CHARACTER	Strongly agree	Slightly agree	Slightly disagree	Strongly disagree
I intend to purchase items on credit				
Pricing of the Product is not a matter of concern if the service offered is highly reliable				
I intend to purchase the product only from my past experience				
I make purchase products pertaining to the familiarity and brand image				
I get quotations from companies and finally strike a deal that is cheaper and convenient to me				
I would like to buy products that gives me ultimate satisfaction irrespective of its price/performance				
Performance of the product is a vital criteria for selection				
I manage to perform my work within the backup time				

14. Numeric Power System Limited has proved its excellence in the Power electronics industry for the past 25 years, with a continuous award (SD) winning performance for 16 years. Does this instill confidence to switch to a solar-based power solution?

☐ Yes ☐ No

Thank you for sparing your time in filling the questionnaire ☺