CONCLUSION & SUGGESTIONS

The researcher has collected information from the different segments of the society required for the present study and on the basis of collected data researcher has drawn some inferences, which are as follows-

7.1 FINDINGS

7.1.1 Findings for Household users -

1. Maximum household users use electricity and LPG as their major source of energy whereas kerosene, coal and biogas users are very few in percentages. As a source of energy 83.3% household users use electricity and 80% household users use LPG.

2. Among the total respondents 73.3% household users always care for saving electricity whereas 17.3% care very often for saving of electricity.

3. Electricity is a costly affair is the opinion of 92.7% household users.

4. Among total respondents 69.3% household users are happy with present electric supply whereas 14% are unhappy with the same.

5. In reasons of unhappiness 42.7% are unhappy because of interruption in supply of electricity and 24% are unhappy because of load shedding.

6. 0-2 hours load shedding is faced by 66.7% household users and 20% face it almost 2-4 hours.

7. Gas connection is very common 96% people have gas connection at their home.

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8. Customers are looking for alternative source of energy in which 89.3% household users are aware about alternative source of energy and 76.7% household users are looking for the same.

9. To overcome with energy problem 32.3% household users use solar energy as alternative source of energy, 30.9% use products which conserve energy, 21.6% use energy very carefully.

10. Solar water heater, solar cooker, solar home lighting, solar lantern are the products about which there is awareness among the household users.

11. Usefulness of solar products is appreciated by 58% household users, 48% household users feel that uses of solar products leads to savings, 43.3% household users have shown interest in buying other solar equipments also.

12. When to buy solar equipments is not yet decided by 48% of total household users.

13. Solar water heater users are 50.6%, 22.3% are using solar cooker, 11.6% are using solar lantern and only 5.6% have installed solar home lighting systems.

14. Use of solar equipments leads to save energy and cost is the response from 96% respondents.

15. Advantages of solar influenced 63.6% of total household users, 20.1% are influenced by users and 6.5% have purchased solar products because of advertisements.
16. Capacity of equipment and service are the main factors which are considered while purchasing solar equipments.

17. Among the total respondents 60.7% household users feel to a great extend that solar equipments are economical as compared to conventional equipments.

18. Solar equipments are hazard free is the opinion of 78% household users and 72% feel that they are environmental friendly.

19. Subsidy for solar water heater is taken by 39.5% household users, 13.6% have taken subsidy for solar cooker and 12.7% users don’t know about subsidy.

20. Among all household users 66.6% are satisfied with solar water heater, 32.7% household users are satisfied by using solar cooker.

21. Consumption of energy depends upon the use of consumer durables. It is observed that maximum number of customers are using many consumer durables like T.V., washing machine, fridge, mixer, iron, motor pump, A.C., fan, tube lights, geyser etc. Use of so many consumer goods needs more energy which means more demand of electricity, which is not available to fulfill the growing demand.

7.1.2 Findings for Manufacturers and Distributors

1. Manufacturers and distributors feel that awareness among people about solar water heaters is 100%, 26.7% are aware about solar cooking systems and solar dryers, 60% says that there is awareness about solar home light systems, 73.3% says that solar lantern are also known to people.
2. Among all the solar products under study solar heaters have daily inquiry.

3. Domestic users are more in number for solar heaters as compared to industrial, institutional and government users. Solar lantern is also demanded more from domestic users. Solar home light system is more popular among domestic and commercial users whereas solar streetlights are mainly used by government and industries. There is more demand for solar pumps by domestic that too rural customer.

4. To increase sale of solar energy products 86.7% of respondents are agree for doing heavy advertisements, 86.6% respondents are agree with the solution of reducing cost of the solar products, 53.3% are agree to increase subsidy amount whereas 40% are disagree with the same, 80% respondents feel that there should be compulsion from the government, 100% respondents are agree with the solution that promotion of environment consciousness among the people and loan facility at low rate of interest at convenient and simplified platform, 86.6% feel that tax incentives should be provided to the customers.

5. Challenges and problems before manufacturers and distributors are- 66.7% are agree that there is lack of awareness to customers about government subsidies, 100% respondents are agree that lack of awareness to customers about long term cost benefits, 50% says that there is lack of awareness about the different kinds of solar products, 66.6% respondents are disagree with the problem of high installation cost for customers.
7.1.3 Findings For conventional energy source users

1. Among all the respondents 80% are aware about the benefits of solar equipments.

2. Installation of solar system in future is the plan of 70% respondents.

3. Among the major reasons for not buying the solar equipments- 21.3% people say that initial price is high, 42% says that there is no space for installation, 8% says that there is no scope for alteration, 19.3% says that they have never thought about it.

4. There is awareness about various financial assistance, scheme/subsidies for solar products is among 44.7% of total respondents whereas 52% are not aware about the same.

5. If government subsidy or loan is available then 66% respondents are ready to buy solar equipments.

6. For getting government subsidy or loan it needs lot of time is the opinion of 23.3% respondents, 21.3% says that it needs lot of documentation, 43.3% have no reason or they themselves don’t know about it.

7. If tax incentives are given then 56% respondents can buy solar products. 32% people say that solar products are not easily available for buying, 36.7% people have tried to get information about such products, and 54.7% feel that solar products are costly as compared to non solar products.

8. Lack of awareness about the tax incentives given by the government for such products is among 46.7% of total respondents, 42.7%
respondents are agree about after sale service is being provided, only 40% respondents are agree with the easy availability of products.

7.1.4 Findings For commercial users:

1. All commercial users take very good care for saving electricity. It was found that 100% commercial users take care for their savings.

2. Electricity is a costly affair is the opinion of 86.7% commercial users.

3. Commercial users are satisfied with the present electric supply, but they also feel that electricity is costly affair so if the they will come to know about the benefits of use of solar products they can make investments in solar systems. Satisfaction with present electric supply is found in 73.4% respondents.

4. Awareness for alternative sources of energy is found among 86.7% respondents

5. To overcome with energy problem- 46.7% say that they use energy very carefully, 33.3% say that they use products which conserve energy, 40% of them use solar energy as alternative source of energy.

6. Awareness about solar equipments, their usefulness and savings is among 73.3% respondents, 26.7% respondents have shown interest in buying solar products.

7. Decision of purchasing solar equipments is taken by commercial users because- 60% respondents are influenced by advantages of solar products, 6.7% respondents got feedback from existing users.
8. Use of solar equipments leads to saving in energy and cost is the opinion of 73.3% respondents.

9. After sale service is considered as a major factor by 20% respondents while purchasing solar products, 33.3% respondents consider brand as a factor, 40% gives preference to capacity of equipment whereas 26.7% gave preference to area occupied by the product.

10. Solar equipments are economical as compared to conventional ones is the opinion of 60% commercial users and 73.3% respondents say that solar equipments are hazard free and environment friendly in nature.

11. Lack of awareness is found in 33.3% commercial users about availability of loan with low interest rates whereas 46.7% respondents know about government scheme,

12. Satisfaction by using solar water heater is found in 40% of total commercial users.

7.2 TESTING OF HYPOTHESES

1. People prefer solar equipments because of limited supply of other sources of energy.

Null Hypothesis: Preference of solar equipments does not depend upon the limited supply of other sources of energy.

Alternative hypothesis: Preference of solar equipments depends upon the limited supply of other sources of energy
The above hypothesis was tested for both commercial users as well as household users. To test the hypothesis, Chi-square test is applied for which the results are presented below:

Table 7.2.1: Association between preference for solar equipments and limited supply of other sources of energy

<table>
<thead>
<tr>
<th>Types of Users</th>
<th>Chi-Square value</th>
<th>Df</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial users</td>
<td>73.897</td>
<td>08</td>
<td>0.000</td>
</tr>
<tr>
<td>Household users</td>
<td>84.225</td>
<td>08</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 1 above indicates that the significance value for both commercial users as well as household users is 0.000 which is less than the statistical significant value of 0.05 which implies that the null hypothesis is rejected. Hence we can conclude that there is statistically significant association between preference of solar equipments and limited supply of other sources of energy for both commercial users as well as household users. The First hypothesis of the study is proved by this test.

2. **For household as well as industrial consumers, the use of solar product leads to saving in power cost in the long run.**

Null hypothesis: Use of solar products does not lead to any saving in power cost.

Alternative hypothesis: Use of solar products leads to saving in power cost.

The above hypothesis was tested for both commercial users as well as household users. To test the hypothesis, Chi-square test is applied for which the results are presented below:
Table 7.2.2: Association between saving in power cost and use of solar products

<table>
<thead>
<tr>
<th>Types of Users</th>
<th>Chi-Square value</th>
<th>Df</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial users</td>
<td>3.599</td>
<td>03</td>
<td>0.000</td>
</tr>
<tr>
<td>Household users</td>
<td>7.216</td>
<td>03</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 2 above indicates that the significance value for both commercial users as well as household users is 0.000 which is less than the statistical significant value of 0.05 which implies that the null hypothesis is rejected. Hence we can conclude that there is statistically significant association between saving in power cost and use of solar products for both commercial users as well as household users. The second hypothesis of the study is proved.

3. There are major challenges before solar product manufacturing industries specially higher capital investment and lack of awareness to the end users.

Null hypothesis 1: Higher capital investment does not influence the sales of solar product manufacturing industries.

Alternative hypothesis 1: Higher capital investment influences the sales of solar product manufacturing industries.

Null hypothesis 2: Lack of awareness to the end user about government subsidies does not influence the sales of solar product manufacturing industries.

Alternative hypothesis 2: Lack of awareness to the end user about government subsidies influences the sales of solar product manufacturing industries.
Null hypothesis 2: Lack of awareness to the end user about long term cost benefits does not influence the sales of solar product manufacturing industries.

Alternative hypothesis 2: Lack of awareness to the end user about long term cost benefits influences the sales of solar product manufacturing industries.

The above hypothesis was tested for solar product manufacturers. To test the hypothesis, Chi-square test is applied for which the results are presented below:

**Table 7.2.3 Challenges before solar product manufacturing industries specially higher capital investment and lack of awareness to the end users.**

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Chi-Square value</th>
<th>Df</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Null hypothesis 1</td>
<td>3.076</td>
<td>4</td>
<td>0.008</td>
</tr>
<tr>
<td>Null hypothesis 2</td>
<td>3.708</td>
<td>4</td>
<td>0.002</td>
</tr>
<tr>
<td>Null hypothesis 2</td>
<td>13.448</td>
<td>4</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 3 above indicates that the significance value for all the three null hypotheses is less than the statistical significant value of 0.05 which implies that all the three null hypothesis are rejected.

We can thus say that there are major challenges before solar product manufacturing industries specially higher capital investment and lack of awareness to the end users. The third hypothesis of the study is proved.
7.3 Justification of Objectives

1. To study the advantages/benefits of solar products as energy savers.

Table 6.2.19: Economy of solar equipments as compared to conventional equipments

<table>
<thead>
<tr>
<th>Response</th>
<th>Commercial Percent</th>
<th>Household Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very</td>
<td>46.7</td>
<td>60.7</td>
</tr>
<tr>
<td>Some extent</td>
<td>13.3</td>
<td>31.3</td>
</tr>
<tr>
<td>No</td>
<td>0.0</td>
<td>2.7</td>
</tr>
<tr>
<td>No response</td>
<td>40.0</td>
<td>5.3</td>
</tr>
</tbody>
</table>

Table 6.3.23: Usage of solar equipments leading to saving in energy

<table>
<thead>
<tr>
<th>Response</th>
<th>Commercial Percent</th>
<th>Household Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>73.3</td>
<td>96.0</td>
</tr>
<tr>
<td>No</td>
<td>13.3</td>
<td>0.0</td>
</tr>
<tr>
<td>No response</td>
<td>13.3</td>
<td>4.0</td>
</tr>
</tbody>
</table>
2. To identify the awareness of different Government schemes available for promotion of solar equipments.

Conventional energy source users

Table 6.1.7: Awareness about various financial assistance scheme / subsidies

<table>
<thead>
<tr>
<th>Awareness about financial assistance schemes</th>
<th>No.of Respondents</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>67</td>
<td>44.7</td>
</tr>
<tr>
<td>No</td>
<td>78</td>
<td>52.0</td>
</tr>
<tr>
<td>No response</td>
<td>05</td>
<td>3.3</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100</td>
</tr>
</tbody>
</table>

Commercial users

Table 6.2.24: Awareness about availability of government scheme

<table>
<thead>
<tr>
<th>Response</th>
<th>No.of Respondents</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>07</td>
<td>46.7</td>
</tr>
<tr>
<td>No</td>
<td>02</td>
<td>13.3</td>
</tr>
<tr>
<td>No response</td>
<td>06</td>
<td>40.0</td>
</tr>
</tbody>
</table>

Table 6.2.23: Awareness about availability of loan with low interest rates

<table>
<thead>
<tr>
<th>Response</th>
<th>No. of Respondents</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>02</td>
<td>13.3</td>
</tr>
<tr>
<td>No</td>
<td>05</td>
<td>33.3</td>
</tr>
<tr>
<td>No response</td>
<td>08</td>
<td>53.4</td>
</tr>
</tbody>
</table>
6.4.15: To study the challenges and problems before solar product for Distributor.

<table>
<thead>
<tr>
<th>Sr. no</th>
<th>Challenges</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree Nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>No response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lack of awareness to customers about government subsidies</td>
<td>1 (16.7%)</td>
<td>3 (50.0%)</td>
<td>1 (16.7%)</td>
<td>1 (16.7%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Lack of awareness to customers about long term cost benefits</td>
<td>3 (50.0%)</td>
<td>3 (50.0%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>High installation cost for customers</td>
<td>0 (16.7%)</td>
<td>1 (16.7%)</td>
<td>1 (16.7%)</td>
<td>2 (33.3%)</td>
<td>2 (33.3%)</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>Lack of awareness about the different kinds of solar products.</td>
<td>2 (33.3%)</td>
<td>1 (16.7%)</td>
<td>2 (33.3%)</td>
<td>1 (16.7%)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
6.5.15: To study the challenges and problems before solar product for Manufacturer.

<table>
<thead>
<tr>
<th>Sr.no</th>
<th>Challenges</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree Nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>No response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Lack of awareness to customers about government subsidies</td>
<td>4 (26.7%)</td>
<td>8     (53.3%)</td>
<td>1         (6.7%)</td>
<td>2         (13.3%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.</td>
<td>Lack of awareness to customers about long term cost benefits</td>
<td>8 (53.3%)</td>
<td>5     (33.3%)</td>
<td>0         (0%)</td>
<td>2         (13.3%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.</td>
<td>High installation cost for customers</td>
<td>4 (26.7%)</td>
<td>10    (66.7%)</td>
<td>1         (6.7%)</td>
<td>0         (0%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4.</td>
<td>Lack of awareness about the different kinds of solar products.</td>
<td>8 (53.3%)</td>
<td>7     (46.7%)</td>
<td>0         (0%)</td>
<td>0         (0%)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
7.4 SUGGESTIONS:

7.4.1 Suggestions for Government:

1. **Social Awareness:** In rural as well as urban area people are not aware about the use of solar energy products. Social awareness can be created for more and more use of solar energy products.

2. **Environmental consciousness:** Solar energy which is also known as clean energy as it is environment friendly and does not have any adverse effect on the environment can be promoted among the people as a source of energy.

3. **Advertisement:** Heavy advertisement may be done by using all possible media like- T.V., Radio, Print media, Bulk SMS, social media, personal selling etc.

4. **Easy loan:** All types of solar products need high initial cost for the end users which are one of the major challenges before solar product manufacturers and distributors. Loan procedure can be made as easy as car loan so that people will take advantage of loan facility.

5. **Compulsion:** Use solar water heaters, solar lighting in big residential as well as commercial complex can be made mandatory everywhere which will automatically reduce the use of non-renewable energy. In huge size of malls where tremendous use of electricity is done all the year around, roof top solar systems should be made mandatory as per their requirement so that their dependence on conventional sources of energy will be reduced.

6. **Subsidy:** Subsidy can be provided to commercial users also so that there will be more response for solar products from commercial sector
like industries, hotels, hostels, hospitals, petrol pumps, institutions who actually consume more non-renewable energy.

7. **Employment Generation:** Solar technician course can be started through ITI’s which will provide employment opportunities.

8. **Research and Development:** Research and development can be promoted for good/ideal designing of solar products which will save manufacturing cost of solar products and in turn will reduce the price of product for end users.

9. **Standardization:** Standardization or benchmarking can be done for the cost of various solar products which will be helpful for maintaining healthy competition in solar market.

10. **Digitization:** To avoid delay in the process of installation of solar product complete digitization of all the documents from submission to sanction can be made compulsory along with easy process at electricity Distribution Company.

11. **Tax incentives to be provided:** To promote the use of solar energy systems government should provide more tax incentives to the customers. These tax incentives should be provided to commercial users also so that they will also invest in installing the solar systems.

12. **Promotion of solar products use in remote area:** Promotion for the use of solar energy products like solar lantern, solar pump, and solar street light can help to improve the living of those people who are living in very remote areas, where electricity is not available.

13. **Use of infrastructure:** If heat generated from sun is converted in the form of solar energy and utilized properly for domestic as well as
commercial usage then it will help to reduce global warming which in turn will help to reduce the day by day raising temperature.

14. **Increase the number of training centers:** An organization can be established at state/central level which will provide proper training to the employees related to this field.

15. **Simplified testing and Installation process:** Product testing procedure can be made easy and less time consuming. Renewal period of testing certificate can be extended from existing one year to more than one year. This would bring transparency in solar business and reduce the flaws in the testing and installation process.

16. **Easy flow of subsidies:** The government should take efforts for the quick release of funds especially in case of subsidies. This would result in bringing more business.

### 7.4.2 Suggestions for Manufacturers:

1. Proper training can be given to the distributors/dealers so that there will be perfection in their work.

2. Manufacturers can appoint trained staff or can give training to existing staff, can maintain good relation with distributors in terms of after sale service, maintenance of the solar products like cleaning of panels.

3. Manufacturers can also take some more efforts to make solar products more popular-like advertising through popular media. Mouth publicity can also be encouraged as the satisfied customers are the assets for the organization.

4. Customer care can be provided to the existing customers as and when required.
5. More importance can be given for the research and development of the products. Product can be developed by innovative designing which will help to improve the efficiency. Research can also be done for finding out the substitute raw material which will improve the productivity.

7.4.3 : Model Suggested for promotion of Solar Energy
Description:
The model aims at providing a solution to the existing problems in the energy sector with reference to the use of solar products. The researcher after the careful study had proposed the model for meeting the challenges before the solar product manufactures. The model considers the role of Government, manufacturer and the ultimate end user in the application of the solar products promotion, application and production.

Suggested modus operandi is based on the fact that it is a continuous process where demand and supply ultimately results in overcoming the problems in the manufacturing and application and optimum utilization of solar energy. The model states that the government has to take active steps in formulating the policy for promoting the use of solar energy, as it is beneficial to all sectors, which involve the manufacturer, end user and the nation as well.

The policies framed must consider both the manufacturer and the consumer which involves the household and commercial users. The manufacturers association has to play a lead role in creating awareness and promotion of solar products. The association has to involve research related activities to develop better and more sophisticated models with a major aspect in reduction of cost factor. Proper consultancy, timely and easily available of maintenance and sales provision along with the implementation of government policies and their follow up must be a regular and continuous activity of manufacturing associations. Effective working of manufacturing associations would result in increased demand from the end users, resulting in a demand for more production and supply of solar related products.

This cycle would enhance the utility of solar products to the end user and increase the production and manufacturing solar products. Ultimately the revenue side increases leading to the development of a nation as a whole.
Outcome of the model:

1. The challenges before the manufactures of solar products can be overcome by increasing the supply of solar products, hence raising revenue to the producers and manufacturer in turn increasing revenue to the government.

2. More and more number of people will get the benefit of use of solar products in relation to the conventional source of energy at a lower cost with better standard and quality.

3. The increased demand results in employment generation in the sector of consultancy, installation and maintenance etc.

4. The reduction in the use of conventional sources will result in saving energy and fight the crisis of scarce energy.

5. The abundant, freely available solar energy can be put to best use by increasing the application of solar products in day to day use.

6. Clean Source of energy will be promoted to the future generation to lead a healthy and safe life.
   Thus the need of conserving energy can be promoted and brought into reality with the help of suggested model.

7.5 Opportunities and Challenges before Solar Product Manufacturing Industries in North Maharashtra

From the data collected the researcher found that, people are also becoming aware about the shortfall of conventional energy. Urban and rural populations both are facing the problem of energy shortage by way of load shedding, interruption in electricity supply, increasing rates of fossil fuel. Use of only conventional energy will not be sufficient in the period to come in near future. There is a need to use alternate source of energy which is available in abundance like solar energy, wind energy, tidal energy…etc. thus after the collection of data the researcher found that there are plenty of opportunities for the manufacturers and distributors of solar energy products. The country has wide household as well as commercial market which are mostly dependent on conventional sources of energy but are ready or willing to use non-conventional source of energy i.e. solar energy.
Solar Business Opportunities:
The figure 1 describes the opportunities available if one wants to enter in the new solar business or those which are already in the business of solar energy products or services.

Figure 7.5.1 – Opportunities Available In Solar Business

(Source: Field Survey)

Upcoming young and dynamic entrepreneurs can start their own business in the field of solar energy in various categories like:

1. **Power Plant Developer:** The work of power plant developer starts from site survey for the upcoming projects till the Annual Maintenance Contract (AMC). It includes the work of fabrication, electrification, plumbing, civil work as per the requirement of the project. Technical help can be provided for those who want to install solar roof top systems, home light system, solar fencing, solar water heating systems, solar cookers for commercial use.

2. **Manufacturing of core products:** Product can be designed in such a way which will help to improve the efficiency. Manufacturing of such a designed products can be started like solar PV modules, Solar Sheets, solar lantern, solar cooker, solar street light, solar home lighting, solar
charger, and solar cap or any other newly invented product in this line with required changes which will help in solving the problems like high cost, more space required etc. The conventional use of kerosene lamp may get replaced by solar lanterns in rural areas so there is a wide scope for production of these products.

3. **Manufacturing of sub-components**: Solar products require many other allied products which are essential for the installation of solar systems. For e.g. Solar water heater system requires water tank, different types of pipes, fabrication work for installation, along with solar panels. Installation of solar water heater system for new constructions is mandatory in many cities in India.

4. **Manufacturing of machinery**: The machinery which is required to produce the core solar products and allied products can also be developed and manufacturing of all types of machineries can be started.

5. **Implementation support**: Installation of solar systems needs skillful work to get best results. After installation also, it needs implementation support by the skillful technicians, which can be provided by the experts.

6. **Support services IT and Training**: There is a controlling system named as SCADA which gives information about the amount of electricity generated per day, and other information as per requirement from the installed system. For the implementation of such type of software, IT people are also required in this field. Training can be given to the staff for the requirement of software as well as hardware people as it is helpful in remote areas also. For retaining the present customers and to solve their queries, if any customer care services can also be provided in support services.

7. **R & D and Innovative ideas**: Research and Development is a continuous process which is required in all the fields. There are varieties of solar products which are coming in the market for different
uses but improvements and innovations are essential. For the purpose of reduction in cost of solar products it requires that efficiency of products should be improved. And for this improvement changes in the existing design of products, substitute raw material, if required can be invented. If young entrepreneurs can come up with some new and innovative ideas, will be beneficial for all sectors like commercial, household users, for agricultural use.

9. **Use of Solar energy in agriculture**: Our agriculture is mainly dependent on monsoon. Proper irrigation system is essential for better productivity and as electricity is not easily available everywhere so use of solar energy for pumping of water can be of great help in this sector.

### 7.6 Challenges before solar product manufacturers and distributors

A coin has two sides; similar is the case for solar business. Although there are bright prospects for the solar business today and in coming years, there are few challenges in the same business.

1. Lack of awareness to customers about government subsidies. Government is also taking efforts to promote the use of solar energy by way of providing subsidies to customers, loan with low interest, tax benefits to commercial as well as household users. But somehow people either don’t know about the schemes available or they are reluctant to know about the same.

2. Lack of awareness to customers about long term cost benefits. People think that initial investments are more for installation of solar systems but they don’t consider that after few years there expenses for energy uses will become as good as nil.

3. High installation cost for customers. Along with solar panels other products are also required like storage batteries for the conversion of power into electricity, fabrication work, electrification and sometimes civil work as per the requirement which increases the cost of installing systems.

4. Lack of awareness about the different kinds of solar products among the end-users is the main hurdle for manufacturers and distributors.
5. Solar energy is not available during night time.

6. Use of solar energy is dependent on weather conditions. Sunny area is required for better results.

7. The installation of solar panels requires large size of space/land. As the life of these products is considerably long the space/land occupied by solar system cannot be utilized for other purposes. India is already a highly populous and land starved country.

8. Dust is the problem which requires cleaning of panels on regular intervals which increases the operational costs.

9. The solar power plant which is installed in remote areas may face problem of water for cleaning purposes. As the hard water is not suitable for cleaning the panels, and lack of continuous water supply is the problem.

10. In urban areas also the customers those who have installed solar water system opines that in the early morning when person needs hot water for bathing first 2/3 buckets are of cold water. So they feel that if cold water is not required then initial cold water is wasted for getting the hot water.

7.7 Scope for future study
A number of research topics appeared in the mind of researcher while doing current research work. But because of limitations of selected objectives and hypotheses researcher cannot do it at the same time. The upcoming researcher can choose any of the following topics for the further study of their research work-

1) To study the opportunities and problems faced by solar product users.

2) A study of Need of consultancy in the business of solar products.

3) A study of role of government in promotion of renewable sources of energy.

4) A comparative study about the use of solar energy and its products in rural and urban area of specific city/region.
7.8 CONCLUSION:

India is a fast developing country and lifestyle of people has also improved significantly. All the sectors like industrial, commercial, agricultural and residential need the power for fulfilling their daily needs at every walk of their life. For becoming a developed nation India need a plentiful amount of energy which is also required for industrial development. Prices of crude oil are continuously increasing and other sources of energy are also limited, countries all over the world are increasingly penetrating for environment friendly, safe and reliable long term sources of energy. In this scenario solar energy proves to be an abundant energy source which can be put to use.

Growing population is not just a matter of the number of people but it also related to fulfill the needs of growing population. For fulfilling our daily needs, we require food, potable water, shelter, energy for electricity and fuel. For the production of all these things we make use of natural as well as manmade resources on the large amount. Due to this conventional resources are becoming scare and also the increasing use of these resources creates pollution and harms the environment.

To overcome with the problem of energy crises use of renewable energy especially solar energy which is environment friendly, available in abundance and long lasting can be a solution. Only the thing is that awareness about the use of solar products and their benefit should be created among the people. Government is taking tremendous efforts to promote the use of solar energy in urban and rural area for household as well as commercial purpose.

Government is providing new and innovative schemes to encourage the use of clean energy for household as well as commercial purpose. Schemes like Jawaharlal Nehru National Solar Mission, Make in India, Maharashtra Renewable Energy Policy 2015, and Scheme for development of Solar Parks, Roof top solar power generation, Street Lighting & water pumping, Scheme for Municipal Corporation will be of great help to rural as well as urban
population to make maximum use of available natural resource like solar power. The challenges which solar PV market is facing may overcome up to some extent through such innovative schemes by government. Proper awareness should be created among overall population about the government policies and schemes through which maximum utilization of available resources is possible which in turn will help to reduce pollution and save the environment.

It can be concluded that use of solar products leads to save energy and cost for household as well as commercial users. Use of solar products is hazard free and do not have any adverse effect on the environment. Various government schemes are available for promoting the use of solar energy products, but people are not aware about those schemes in rural as well as urban area. To create awareness about various schemes promotion in respective area can be done so that manufacturers and customers both will be benefited. Initial higher cost for some solar products like solar water heater, solar roof top systems is the major challenge before solar product manufacturers and distributors. Cost of non-renewable energy is continuously increasing and for saving in their utility bills people are turning towards use of alternative energy sources like solar energy. And non renewable energy is having limited supply. For reduction in cost of solar energy products researchers are working continuously. Innovations in design of products, changes in material used for the production may improve the efficiency of the products which will help the further reduction in the prices of solar equipments. The acceptance of solar equipments depends upon the awareness of solar equipments which is the need of an hour!