Benefits of Extensive Solar Electricity Generation in Reference to Current Climate Change Scenario

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Abstract. Solar power is the cleanest and most flawless; most dependable form of energy. As noteworthy sources of electrical power generation are draining step by step and furthermore its utilization raises genuine natural concerns. These reasons have constrained the advancement of new energy resources which are sustainable and naturally protected. Solar Energy conversion has recovered the spotlight of Worldwide Energy Activities. A solar power system is durable, Environment-accommodating and furthermore lessens our carbon impression. Power is to be transported from enormous power plants to end-customers through a broad system. Rooftop Solar power is useful in expanding power productivity, thinking about the short distance. Solar Energy ends up being domestic and thus, we are in control for our very own bill and energy use. Moreover, solar power systems are sturdy; this probability of power disruption is reduced. The sun provides us with more energy than we could ever utilize, the benefits of solar power are best noticeable in the long haul. We may connect solar energy with electricity through PV (Photovoltaic) panels by expanding our utilization of solar panels. It is at par any reasonable doubt that Rooftop will be a Game Changer. The sun is exceptionally encouraging and promising source of energy. As much as solar was costly before, amid the most recent 30 years, alone researchers have thought of a decent and solid method for tapping the energy from the sun. Solar Energy is obtained through solar panels and converted over to solar electricity utilizing Photovoltaic (PV) technology. PV solar panels are long enduring and productively convert energy from the sun to electricity. Solar Energy must move from Class to Mass.

KEYWORDS: electricity, energy, ecologically, generation, solar.

1. Introduction
Solar Energy is Rocking and Marching ahead globally. Gujarat has done remarkably well in the area of Solar Rooftop. The energy the earth receives from the sun, this energy to generate electricity for human use. When sunlight hit the photovoltaic cells, it knocks the electrons loose from their atoms. As the electrons flow through the cell, they generate electricity that is called solar electricity. Solar-powered photovoltaic panels convert this sun rays into electricity by exciting electrons in silicon cells using the photons of the light from the sun.
This energy can then be used to supply renewable energy to our home or other businesses. Most of the energy generated globally utilizes fossil fuels involving the emission of environmentally hazardous carbon dioxide and depletion of fossil fuel resources. The continuous variation in fuel prices has added a major concern on its sustainable use for future energy requirements. In order to minimize the environmental degradation during energy production process due to emissions of hazardous gases, the utilization of renewable energy resources can make the energy use clean as well as sustainable. Due to an ever-increasing demand of clean energy, a sharp rise in the utilization of naturally available solar energy has been observed.

2. Research Objectives
   * To find out how to explore the impact of extensive solar electricity generation.
   * To create public awareness and involve users to increase more generation of electricity by use of solar energy.
   * To study the challenges of implementation of solar electricity on a larger scale.

3. Methodology
   As per our objectives we have to find out usages of solar electricity & conventional electricity also to explore the impact extensive solar electricity generation. We have planned to get perfect feasible data by installing rooftop solar panel grid on 3 residential sites out of which one is owned by me another is owned by my brother Dr. Pranav Joshi and third is owned by Dr. Nirav Thakkar – Principle of A.G Teachers Secondary High School.
Table 1 (Data Analysis)

| SOLAR CALCULATION – RETURN OF INVESTMENT IN REFERENCE TO GLOBAL CLIMATE CHANGE SCENARIO |
|-------------------------------------------------|------------------|-----------------|-----------------|-----------------|------------------|
| SERVICE NO. – 246195                            | Purposed KW      | 3               | 4               | 5               | 7               |
| Per Day Conservative Unit                       | 12              | 16              | 20              | 28              |
| Generation Days                                 | 60              | 60              | 60              | 60              |
| Generation Unit in Two Month                    | 720             | 960             | 1200            | 1680            |
| Solar Power Sell Rate Rs.                       | 3.22            | 3.22            | 3.22            | 3.22            |
| Power Consumption Torrent Power Rate            | 7               | 7               | 7               | 7               |
| Investment Rate Per KW                          | 48300           | 144900          | 193200          | 241500          | 338100          |
| 30% MNRE subsidy (YEAR OF 2018)                 | 43470           | 57960           | 72450           | 101430          |
| State subsidy, max up to Rs. 20,000 (YEAR OF 2018) | 20000           | 20000           | 20000           | 20000           |
| Total Subsidy (MNRE and State Govt.)            | 63470           | 77960           | 92450           | 121430          |
| Investment Rate Rs.                             | 81430           | 115240          | 149050          | 216670          |
| Solar Roof-Top System Life Year                 | 25              | 25              | 25              | 25              |
| Per Year End Life Value                         | 3257.20         | 4609.60         | 5962.00         | 8666.80         |

| TORRENT POWER BILL DETAILS                      | SOLAR INSTALLATION |
|------------------------------------------------|--------------------|
| Year                                           | 3KW                | 4KW                | 5KW                | 7KW                |
| Mon th                                         | 3KW                | 4KW                | 5KW                | 7KW                |
| Consum ed Unit                                 | 3KW                | 4KW                | 5KW                | 7KW                |
| Torrent Power Unit Rate                        | 3KW                | 4KW                | 5KW                | 7KW                |
| Bill Amount                                    | 3KW                | 4KW                | 5KW                | 7KW                |
| Saving Units Consumed From Torrent             | 3KW                | 4KW                | 5KW                | 7KW                |
| 2018 Oct                                       | 1673.00            | 481               | 721               | 961               | 1441             |
| 2018 Dec                                       | 1323.00            | 531               | 771               | 1011              | 1491             |
| 2018 Feb                                       | 1092.00            | 564               | 804               | 1044              | 1524             |
| 2018 Apr                                       | 1379.00            | 523               | 763               | 1003              | 1483             |
| 2018 Jan                                       | 1456.00            | 512               | 752               | 992               | 1472             |
| 2018 Mar                                       | 1370.40            | 480               | 720               | 960               | 1440             |
| 1229                                           | 8293.40            | 3091              | 4531              | 5971              | 8851             |

| SOLAR UNIT                                      | 3KW                | 4KW                | 5KW                | 7KW                |
| Sell To Torrent INR                            | 3.22               | 1548.82            | 2321.62            | 3094.42            | 4640.02          |
| Sell to Torrent INR                            | 3.22               | 1709.82            | 2482.62            | 3255.42            | 4801.02          |
| Sell to Torrent INR                            | 3.22               | 1816.08            | 2588.88            | 3361.68            | 4907.28          |
| Sell to Torrent INR                            | 3.22               | 1684.06            | 2456.86            | 3229.66            | 4775.26          |
| Sell to Torrent INR                            | 3.22               | 1648.64            | 2421.44            | 3194.24            | 4739.84          |
| Sell to Torrent INR                            | 3.22               | 1545.60            | 2318.40            | 3091.20            | 4636.80          |
| 9953.02                                        | 14589.82           | 19226.62           | 28500.22           |                   |

| PER YEAR SAVING (PAID BILL AMOUNT + SELL AMOUNT) | 18246.42 | 22883.22 | 27520.02 | 36793.62 |
| PER YEAR SAVING IN PERCENTAGE                   | 22.40%   | 19.85%   | 18.46%   | 16.98%   |
| SAVING AFTER END OF LIFE OF SOLAR SYSTEM        | 14989.22 | 18273.62 | 21558.02 | 28126.82 |
| RETURN ON INVESTMENT IN PERCENTAGE              | 18.40%   | 14.99%   | 14.46%   | 12.98%   |
4. Limitations

- In industrial sector, huge industrial shades are mostly comprised of cement and cement sheets and if they covert it in to metal shade, the charges are high.
- Due to the conventional paranoid nature of humans and the fear of unknown does not allow them to change their methods of approach.
- Lack of Awareness.
- DISCOM Cooperation, Education and Training.
- Availability of Net Meters.
- Complex approval procedures.
- Availability of Finance at affordable rates.
- Subsidy Disbursement Delays.
- Prompt and Efficient After sales service by MNRE and GEDA Channel Partners.

5. Conclusion

To fulfil the global increasing energy demand, Solar Electricity can generate and supply electricity without any power cut problem. The surplus energy can be provided to the national grid; so that demands of other power-deprived states can be satisfied. This will definitely help in reducing electricity bills in long term. Solar power is pollution free and causes no greenhouse gases to be emitted after installation. It also reduces dependency on fossil fuels & other conventional sources. Solar Panels manufacturing units and other ancillary units will create jobs, this will reduce unemployment ratio and will be a great boost to the economy as well. Excess power can be sold back to the power company if grids are inter-connected. Solar Energy is a full time energy resource. Burning coal or other fossil fuel may produce useful by-products, but it can also emit harmful wastes, such as Carbon Dioxide and Sulphur Dioxide. Solar energy does not emit air or water pollution or other greenhouse gases. Solar produced energy can have a positive, indirect effect on the environment when it replaces or reduces the use of other energy sources that have larger effects on the environment. Any customer who uses this solar rooftop panel with any household appliances can get Return on Investment as follows; 3KW – 18.40%, 4KW – 14.99%, 5KW – 14.46%, 7KW – 12.98% so by using this technology any consumer can benefit himself and the nature.

6. Contribution of Research Paper

- To prepare a guideline of feasibility survey of solar power implementation considering parameters like return on investment in reference to current global climate change scenario and cost benefit analysis.
- To prepare a comprehensive document that can be referred by any household, corporate business, personal, Govt. & semi Govt. department in the future.

7. References

[1] Veena D R (1988), studied the rural energy consumption in Gujarat.
[2] Chintan Solanki (2017), Govt. of India is targeting 175 GW of solar power generation by 2022.
[3] During 2018-2017 another 61 associations have affiliated themselves with ISA and other 26 countries will sign the accords formed in this summit.
[4] In 2017, Chinnaswami Stadium of Bangalore became the world’s first stadium, which fully operates on Solar Electricity.
[5] Nipa Bhatt (2011), Study of solar activity and its impact on terrestrial environment.
[6] Girish Kulkarni (2017), Techno economical feasibility of using solar energy for environmentally sustainable buildings.
[7] Anjali Arun (2017), study of demand side management in electrical power systems – effect on cost of electricity.
[8] Divya Bhaskar (25.06.2018), use of 1400 LED to light up Somnath Temple.
[9] Divya Bhaskar (22.01.2018), Diu becomes self-dependent when it comes to electricity needs by installing solar power plant generating 9 MW of solar electricity.
[10] Divvy Bhaskar (23.05.2018), installation of solar panels on roads in France consisted of 1 Km. and 2880 PV panels were utilized.
[11] Divya Bhaskar (19.05.2018), Guest houses in Somnath all set to have solar panels and will generate approx. of 300 KW electricity which will reduce traditional coal usage.