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Research article

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A study on installation of solar power energy at CHC, Shadnagar, AH Nagarkurnool and District Hospital, Mahabubnagar with reference to break even analysis - comparative study

Dr.V.Rambabunaik, Dr. B.S.Rajiv

MD.HA, Project Officer, District Hospital, Mahabubnagar

MD.HA, Assistant Professor, ACSR GMC Nellore.

*Corresponding author: **Dr.V.Rambabunaik**

ABSTRACT

Solar energy is a source of energy from sun, conversion of this energy is very beneficial to human. It can be converted into electrical or some other ways. Solar panels are a specially designed panel which absorbs solar energy that converts into electrical energy and that can be used in various ways. Study on installation of solar power energy at the hospitals will be useful and by differentiating the normal source of electricity usage with that of the solar energy and some other electricity sources it can be judged by considering the various parameters like, power conception bills of various hospitals that are under consideration, A break even analysis is a kind of technical study and giving a rough idea on the relationship cost volume and profit which is a best way for planning and financial reporting hence this analysis gives an cost of comparison and some of the limitations. By such kind of studies it will be better for patient care, reduce cost of expenditure in maintenance of hospitals.

Keywords: APVVP, Break even analysis, Comparative study, Comparative study.

INTRODUCTION

Andhra Pradesh Vaidya Vidhana Parishad is a separate autonomous body which is under control of Government of Andhra Pradesh. APVVP hospitals are non-teaching hospitals in Medical and Health department.

The APVVP hospitals are having deferent bed strength based on population and area. Most of the hospitals are located in urban area only. Based on population the Government of AP divided the institutions into CHCs, Area Hospitals and District

Hospitals which are having 30 beds, 100 beds and 250 beds respectively. The main objective of the APVVP hospitals are

- patient care
- Teaching
- Training
- Community participation

A comparative statement of performance indicators of CHC, Shadnagar, AH, Nagarkurnool, District Hospital, Mahabubnagar is as follows.

Performance indicators	CHC Shadnagar	Area Hospital, Nagarkurnool	District Hospital, Mahabubnagar
Bed strength	30	100	250
Average OP/Month	8221	18738	23900
Average IP/ Month	769	771	6800
No of deliveries/ Month	142	80	360
No of Major surgeries / Month	05	17	800
SNCU / NPCB occupancy rate	>100%	>100%	>100%
BOR	80%	65%	120%

General observations about power supply in APVVP hospitals.

1. Interrupted power supply
2. Summer season power cut around 6 to 8 hours
3. Interrupted power supply effect on key result areas (KRAS)

Like

Labour room
OT
Trauma centre
SNCU
Dialysis
AMC

4. Unable to deliver the quality of patient care within right time
5. All supportive services are paralyzed like Mechanized Laundry, Mortuary department, TSD and Administrative services.

In the above Circumstances and after careful examination for better quality of patient care we search about alternate un-interrupted power supply i.e.

- a. wind power energy system
- b. Solar power energy system

Wind power energy system

Not possible to install in towns and Cities

Solar power energy system

Possible to install in town and cities. All recourses are available for installation of solar power energy system. Hence we choose the installation of Solar power energy system in APVVP hospitals.

AIM & OBJECTIVE

The basic aim of study is to find ways and means of feasibility of setting up of solar power energy system in APVVP hospitals for better patient care.

Objectives

1. The necessity of solar power energy system in APVVP hospitals, keeping in view of patient care at key result areas like OT,AMC,TRAUMACARE CENTRE,SNCU,NRC, and DIALYSIS centres
2. To assess the pattern of work load of SOLAR POWER ENERGY SYSTEM INSTALLATION
3. To study the details of input required for the establishment of SOLAR POWER ENERGY SYSTEM.
4. To study the details that how much output and input is generated and calculated through **BREAK EVEN ANALYSIS**

Data analysis**Data analysis based on available information and records.**

Item name	CHC Shandangar	Area Hospital, Nagarkurnool	District Hospital, Mahabubnagar
No of Ceiling fans	132	300	950
No of Tube lights	222	350	1200
No of Refrigerators	4	6	20
No of street lights	10	20	46
No of Air conditions	10	34	67
No of pumping motors	3	6	9
Average Electrical bill-Month Years	90000X12 Rs.10.8 lakhs	190000X12 Rs.22,80,000	Rs.5 lakhs Rs. 60 lakhs

Comparative study

Sl.No	Description	CHC Shadnagar			Area Hospital, Nagarkurnool			District Hospital, Mahabubnagar		
		Lighting system	Air conditioning system	Pumping system	Lighting system	Air conditioning system	Pumping system	Lighting system	Air conditioning system	Pumping system
1	Load based on details given by customer	71 KWH	84 KWH	52 KWH	136 KWH	284 KWH	104 KWH	440 KWH	568 KWH	157 KWH
2	Power backup	6 hours	6 hours	6 hours	6 hours	6 hours	6 hours	6 hours	6 hours	6 hours
3	Solar power plant Apex size for the	17 KWP	20 KWP	12 KWP	33 KWP	69 KWP	25.2 KWP	107 KWP	138 KWP	38 KWP
4	Solar panels – multi crystalline	200-250	200-250	200-250	200-250	200-250	200-250	200-250	200-250	200-250
5	Mounting	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
6	Space required	1775 SN/fee	2070 SN/feet	1333 SN/feet	3250 SN/fee	7000 SN/feet	2666 SN/feet	11000 SN/fee	14000 SN/feet	4000 SN/feet
7	System cost with battery	28.2 lakhs	32.5 lakhs	20.3 lakhs	52.8 lakhs	110 lakhs	40.6 lakhs	171 lakhs	222 lakhs	61 lakhs
8	Subsidy from MNRE	8.2 lakhs	9.7 lakhs	6.1 lakhs	15.4 lakhs	33.5 lakhs	12.2 lakhs	51.6 lakhs	66.24 lakhs	18.3 lakhs
9	Net cost after subsidy	20 lakhs	22.8 lakhs	14.2 lakhs	37.4 lakhs	77.5 lakhs	28.4 lakhs	119 lakhs	153.76 lakhs	42.70 lakhs
10	Depreciation tax benefit	3.9 lakhs	4.5 lakhs	2.5 lakhs	7.34 lakhs	15.5 lakhs	5.6 lakhs	23.80 lakhs	30.76 lakhs	8.54 lakhs

11	Net cost after depreciation	16.1 lakhs	18.3 lakhs	11.4 lakhs	30.1 lakhs	62 lakhs	22.8 lakhs	95 lakhs	123.01 lakhs	34.16 lakhs
	Total cost for installation of solar power plant	45.8 lakhs		104.9 lakhs			257.37 lakhs			

BREAK EVEN POINT ANALYSIS

A break even analysis is a specific technique of studying and presenting the interrelationship between costs. Volumes and profits. It is an efficient and effective method of financial reporting and planning.

At the start of any financial activity for profit say introduction of a new facility in a hospital: it becomes logical and essential to analyze with facts and figures whether the venture would be profitable in near future. However, before the actual profit, one

would come to a point of lever of operation where there is no profit or loss i.e. the costs and revenues of the activity have become even and further efforts would take the organization on the profit side. This is a point of equilibrium and is commonly known break even point. Thus that break even point is that point of sale volume for a given project of activity at which there is **no profit and on loss i.e. total revenue is equal to total cost.**

BREAK EVEN ANALYSIS – A comparative study

Costing for warranty period of 25 years	CHC Shadnagar	AH, Nagarkurnool	District Hospital, Mahabubnagar
Total fixed cost for installation of solar power system	45.8 lakhs	104.9 lakhs	257.37 lakhs
Maintenance cost per year for running of solar system for warranty period of 25 years	Rs.25000X25= 6.25 lakhs	50000X25= 12.5 lakhs	120000X25 = 30.00 lakhs
Regular electrical bill if solar power not available due to system failure and Rainy seasons for warranty period of 25 years	Rs.15000X12=1.8 lakhs 1.8X12= 45 lakhs	30000X12 = 360000 360000X25= 90 lakhs	120000X12=1440000 1440000X25 = 360 lakhs
Fuel charges for Generator for a warranty period of 25 years	4000X12= 48000 48000X25= 12 lakhs	8000X12=48000 48000X25= 24 lakhs	12000X12 = 144000 144000X25= 36 lakhs
Total expenses for warranty period of 25 years	109 lakhs	231.40 lakhs	657.37lakhs

BREAK-EVEN POINT

Hospitals	Expenses (Solar plantant installation + maintenance + Electrical bills + Fuelchaes for a period of 25 years)	Profit (Existing mechanical electrical bill)	Expenses (Profit)	Break even points – in years	Free power for year after pay back in years.
CHC Shadnagar	Rs.109 lakhs	Rs.90000X12 = 10.9X10 = 109 lakhs	109-109=0	10 years	15
AH Nakarkurnool	Rs.231.40 lakhs	190000X12= 22.8X11 years= 231 lakhs	23100- 23100=0	11	14

District Hospital, Mahabubnagar	Rs.657.37 lakhs	5 X12=60 60X11 = 660 lakhs	657.37- 660=0	11	14
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Limitations

We have to install compulsory alternate Power Supply

1. Regular Electrical Supply
2. Generator Supply
3. In Rainy Season Solar Energy Power System may not work up to the mark for solar energy power supply.
4. Battery back up is only for 6 hours. Hence, we have to think about alternate power supply.

CONCLUSION

1. The aim of the installation of solar power energy system in APVVP hospitals is to provide uninterrupted power supply to APVVP hospitals for better patient care focusing on K.R.A like A.M.C, TRAUMA CARE CENTRE, OT, SNCU, NRC, and DIALYSIS CENTRE.
2. Providing good quality of patient care to right patient, with in right time through right method
3. It is more useful to APVVP institutions because we are getting solar power free of cost on average in each hospital in 14 years.

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