Roof Top Solar Power Plant Project

Century Saras Apartment Owners Association, Yelahanka, Bangalore -64

"Let the sunshine be put to the best use"

We at Century Saras have started working on it since the new Managing Committee of dynamic, young, technocrats resident owners of Century Saras took over in October 2018.

First hurdle was to convince flat owners to invest in a project with a budget of aprox 35 lakhs out of our sinking fund for a Roof Top solar project.

A Team of technical and finance experts amongst resident owners was formed under " solar project group with embedded managing Committee members to meet every Sunday for brainstorming meeting and Extensive data collection with technological . the group have submitted a time bound report for the roof top solar project

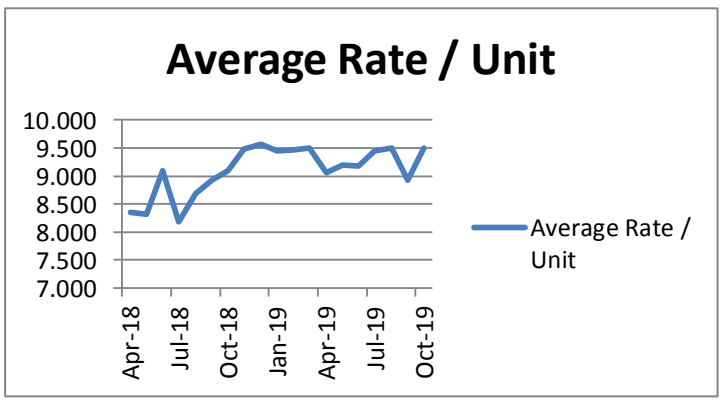
Key Points to go for Roof top solar plant and implement an environment friendly initiative at Century Saras :-

- Average monthly energy consumption for the common area for past one year including all amenities was 8122 Units, and the average BESCOM bill/month was **Rs. 76,847.00**
- **Energy requirement for the common areas including** amenities is for a 60 kWp plant. However, it is proposed to have a 50 kWp plant due to presently used LT meter New HT line for more than 50 KW plant is not feasible at this stage.
- A 50KW Roof Top Solar Project After implementation, annual savings is estimated at Rs.7.6 lacs (Rs.63,432.00/month)
- The 50KW Roof top Solar Project would come at an estimated budget cost of Rs.32.00 lacs (approx.) with a payback period of less than 5 Yrs.
- The common amenities constitutes 20-25% of the total Maintenance charges, it is advisable to implement the Project at the earliest when the BESCOM schemes is feasible for the apartments with net metering and sign power purchase agreement for 25 years (PPA) with BESCOM
- The savings on common electricity charges will recover our investment in less than 5 yrs and thereafter, this savings in electrical charges will directly result in reduction of Maintenance charges for the apartment

Presently Yearly Units	**98990**
Yearly Electricity Expenses	Rs.9,25,558

5 year Electricity expenses	1st year	2nd year	3rd year	4th year	5th year	Total
	9,71,836	10,20,428	10,71,449	11,25,022	11,81,273	53,70,007
Assumption 1 # 5% increase in BESCOM tariff						
Assumption 2 # Power consumption remain same for next 5 year						

past



Total of 98,990 units of BESCOM power for 12 months

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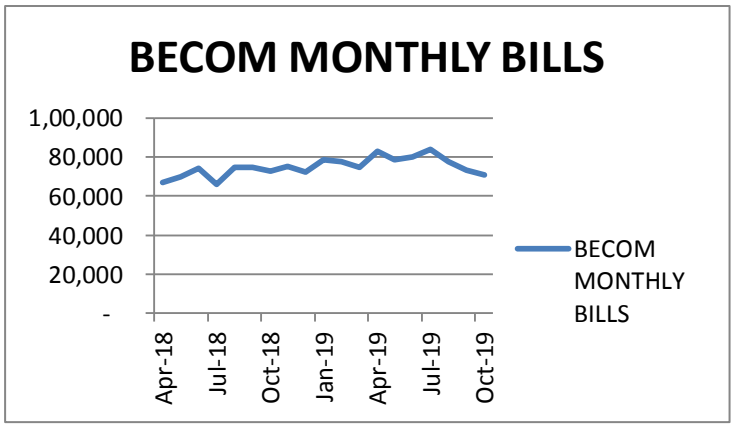


Total of last 12 months BESCOM is Rs.9,25,558.00

Why Solar Roof Top ?

- Using a renewable source of energy which is free and infinite
- We are contributing to the environment with reducing carbon footprints 73 tons per year carbon emission.
- Initial investment is high but after a payback period of less than 5 years the power generated is almost free.
- Reduction is maintenance cost of apartment by min 20 % due to reduced expense in electricity expenses.
- The Roof Top solar power plant major component Solar PV modules are with warranty 25 years with only limited maintenance.

Solar Technology selection – SOLAR PANEL

Multi-crystalline Solar Panels

- ✓ Solar panels of multi-crystalline technology is IEC & BIS approved and highest in range of multi-crystalline technology with twin peak technology.
- ✓ They use multi-crystalline solar cells technology, with 144 half-cut cells, which has superior performance against shading (with higher bypass diodes thereby making modules overall 2 halves of 125 each for shading effect).
- ✓ The main advantage of these panels are vertically integrated manufacturing the solar panels through all stages of ingot, wafer, cell and solar panel, having superior control on quality
- ✓ Due to vertically integrated quality, their losses or deration over years is lower at 0.5% year over year, compared to 0.7% for other panels and technologies

Solar Technology selection – INVERTERS

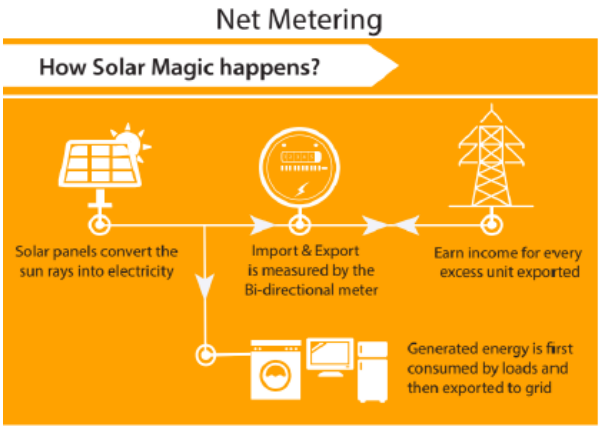
- A micro-inverter system, are digital having futuristic provisions like programming for Time-Of-Day or storing in AC Lithium batteries for deferred use and better performance under shading or individual module
- Failure or module mismatch situation. Direct current is constant and moves in one direction and it convert the direct current from your solar modules to grid- compliant AC before that energy ever leaves .There is No high voltage DC running across your roof and max DC voltage with micro inverter is module max voltage of 44Volts.

BESCOM policy

- ✓ Any roof top on a permanent structure can install solar plant upto 100% of the electricity sanctioned load of the building.
- ✓ The solar plant can be connected to the grid through gross metering/net metering for residential/Apartment
- ✓ A Power Purchase Agreement (PPA) can be signed now between the consumer and the BESCOM for 25 years will affect any future policy changes
- ✓ PPA period is for 25 years as per KERC policy 2019-20
- ✓ BESCOM gives 180 days to complete the project including installation and commissioning from the date of PPA is signed
- ✓ BESCOM will transfer any consumer payments online to Bank directly.

Net Metering:

1. One NEW Bi-Directional meter replacing the existing customer unidirectional retail meter under LT is done.
2. Additionally, either, a new solar generation meter uni-directional type is calibrated and fixed by BESCOM and sealed or existing retail unidirectional meter re-used, to measure solar generation. This is decided during inspection by BESCOM.
3. The NEW bi-directional main meter records both retail consumption as well as solar export. Solar generation as available can be used for daytime loads in this. So surplus only gets exported.
4. At end of month, NET-OFF reading (as meter rotates both directions on consumption over 24 hours vs solar export if any) is billed at retail tariff for customer to pay. In case solar units are more, these are generally settled by BESCOM within 45-60 days at prevailing KERC tariff, The bill dues for surplus if there are generally settled within 45-60 days by BESCOM.



Working of Net Metering

- Generated energy will be first consumed within the building
- Excess solar is exported to the grid
- Net of total export and total import is considered for billing
- If Export > Import, BESCOM pays for the net export
- If Export < Import, net import should be paid by the customer

Solar PV Capacity	Proposed tariff in Rs/Unit
1 kWp to 10 kW (without Subsidy)	Rs. 3.99
1 kWp to 10 kWp (with Subsidy)	Rs. 2.97
10 kWp to 2 MWp(without Subsidy)	Rs.3.07
10 kWp to 2 MWp (without Subsidy)	Rs.2.32
Above	not applicable

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Roof Top Solar - SAVINGS

We have used a total of 98,990 units of BESCOM power for past 12 months

Presently Yearly Units	**98990**
Yearly Electricity Expenses	Rs.9,25,558

Projecting 17% expenses for 5 year by Solar Power plant 50 kWp usage

5 year Solar generated Electricity expenses	1st year	2nd year	3rd year	4th year	5th year	Total
	1,65,212.10	1,73,472.71	1,82,146.34	1,91,253.66	2,00,816.34	9,12,901.15
Assumption 1 # PPA is for 25 year						
Assumption 2 # approved for net metering						

Power expense 80-83% can be saved from 50 kWp Solar plant .

With figures and facts and references of already implemented project Special General body Meating called to was convinced that investment will be recovered in 4.5 years and further up to 25 years production is savings for society.

Floating of tenders, for our specifications and after technological and financial evaluation and preparing ranking list of best EPC vendors was a transparent process.

Once finalized and awarded to the EPC vendor next was to meet the timeline solar project commissioning as 30th MARCH 2020 .Work was progressed everything was moving as per planned timeline, However due to CORONA & lockdown the project was severely hampered. However keeping our best spirit & attitude we waited patiently for Unlock 1.0 and slowly and sturdily commissioned the dream project by 5th June 2020. Total project execution, commissioning, production , upload to grid was successful. The electricity produced is been uploaded to BESCOM grid for last one month and we have mobile monitoring app to monitor the daily solar power production.

Satisfaction of SARAS TEAM was that with their hard and dedicated work they made "THE SUN TO PAY THE ELECTRICITY BILLS " for all common area utilities.

A huge accomplishment and satisfaction in deed

Coinciding with World Environment day we have Commissioned the 49.7 kWp roof top solar project at Century Saras on 5th June 2020

Helping environment by saving 54 Tons of CO2 per year and equivalent to planting 894 Trees per year a huge contribution to Environment by Century Saras