

## Rooftop Solar for Apartment Associations: A Layman's Guide to Whatever You Wanted to Know and Didn't Know Whom to Ask



*Photo of rooftop solar plant at Brigade Petunia, Banashankari (BAF Member)*

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Presented by

**BANGALORE APARTMENTS' FEDERATION (BAF)**

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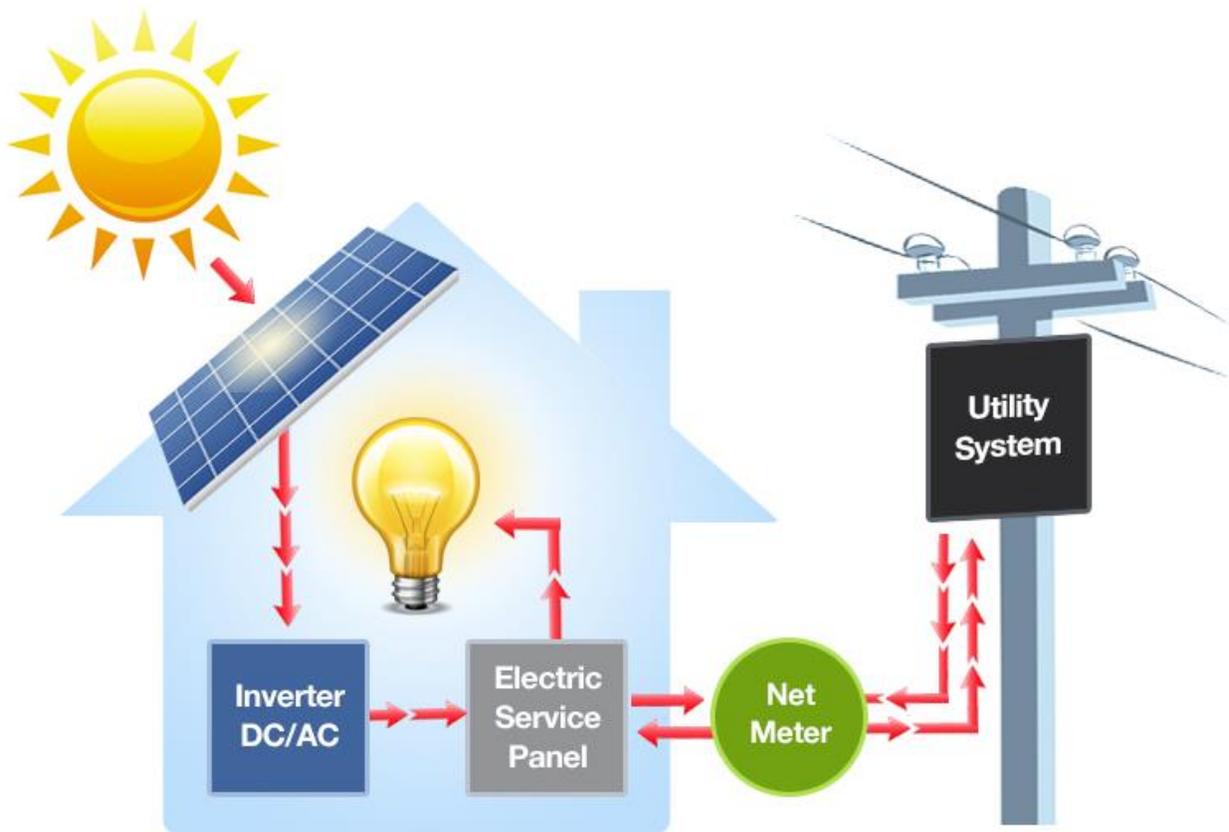
***Disclaimer:*** Bangalore Apartments' Federation (BAF) has compiled this note based on inputs from different experts as well as secondary information available. BAF advises its members and readers of this note to consult their own advisors and use their own commercial judgement while evaluating proposals from vendors. BAF will not assume any liability for any implications of decisions taken by anybody, based on this document.



## 1. WHAT IS ROOFTOP SOLAR?

In a rooftop solar system, solar panels are mounted on the roof of an apartment complex. These solar panels generate electricity in the form of DC power when the panels receive sunlight. The DC power generated by the solar panels can either

- be stored in a battery and used later when the sun is not shining; or
- converted immediately to AC power by an inverter and connected to the BESCO grid.



*Picture Courtesy: Internet*

With a BESCO-grid connected rooftop solar plant, electricity generated can be used to reduce common area electricity consumption in an apartment complex.



## 2. WHY SHOULD MY APARTMENT CONSIDER GOING SOLAR?

There are many good reasons for all of us to consider going solar at the earliest:

- Firstly there are huge cost savings possible which would reduce our electricity bills significantly; and
- Secondly, by using a renewable source of energy which is free and infinite, we are contributing to the environment
  - Solar energy reduces air pollution by reducing the amount of coal burnt in a thermal power plant
  - Solar energy reduces water pollution given that conventional thermal power plants pollute large volumes of water

Hence rooftop solar is a win-win - it saves money and helps the environment at the same time.

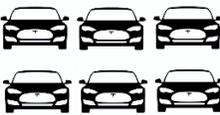
Rooftop solar has the additional benefits of long life of over 25 years, simple and easy to maintain, makes better use of under-utilised real estate, and with no safety issues of either smoke or noise pollution, or any need for fuel procurement.

**DID YOU KNOW A 100 KWp SOLAR PLANT:**

**Avoids: 80.6 Tons of CO<sub>2</sub> emissions per year**



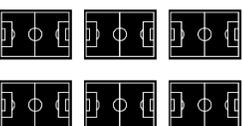
Which powers 33 Indian homes for a year!



Equivalent to driving 37 Tesla cars!



Having 2 new Lalbaghs in the city!



Deforestation of 25 football fields!



Avoiding mining of 124 tons of Coal!



### **3. SOLAR HAS BEEN AROUND FOR A LONG TIME. WHAT MAKES IT COMPELLING NOW?**

Solar panels are a bit like mobile phones – they have been getting better and cheaper every year. Even a few years ago, the cost of solar energy was much higher than other sources of energy. With continuous fall in price of solar panels, solar energy has achieved what is called “grid parity”. Simply put, this means that cost of generating solar power today is at par or lower than cost of generating other forms of electricity.

The Government has also made life easier by easing regulations for rooftop solar. In particular, the introduction of a concept called “net metering” has made solar rooftop viable for apartment complexes here in Bangalore.

#### **What is Net Metering?**

Net Metering means the solar plant can be connected to the grid so that the common area loads of the apartment complex can be met when the sun is shining. If there is excess electricity generated, it can be exported to the grid. And if there is less generation by solar, grid power can be consumed as always. BESCO changes the RWA’s electricity meter to a bi-directional meter which measures both power drawn as well as power exported and the apartment complex only pays for the net amount consumed, i.e., units consumed minus units exported.

Net metering allows apartment complexes to avoid having to invest in batteries which were expensive and had relatively short lives. Avoiding purchase of batteries vastly improves cost saving in rooftop solar.

### **4. YOU MENTIONED THAT SOLAR EQUIPMENT HAS A LONG LIFE. WHAT SORT OF LIFE CAN BE EXPECTED?**

Solar panels are expected to have a life of over twenty five years. Many of them come with performance warranties of upto twenty years. The solar panels are the most expensive item in a rooftop solar plant. They require minimum maintenance except for regular washing for removal of dust and bird droppings.

Inverters (which convert DC power generated by the panels to AC power) are the second most expensive part of the rooftop solar plant. Life of inverters generally tends to vary between 7 years to 25 years based on the inverter brand. BAF recommends that RWAs should go in for inverters offering warranty for a period of more than 10 years in order to keep maintenance and replacement costs on the lower side.



## 5. HOW MUCH MONEY CAN ROOFTOP SOLAR SAVE?

The amount of money saved will vary from apartment complex to apartment complex. The first step is to get a technical feasibility conducted by your solar vendor. They will see how many panels can be fitted on your rooftop in such a way that shadows do not fall on the panels during the peak hours of sunshine. Based on this feasibility study, the vendor will recommend the plant capacity and the technical specifications of the equipment most suitable for your rooftop and shadowing conditions.

In this note, we are consciously trying to avoid use of too much jargon or technical language. Just in case you want a flavor of the technicalities, the vendor could recommend any of mono-crystalline panels (higher performance but more expensive), poly-crystalline panels (less expensive), or PERC (passivated emitter rear cell technology) which works better in low light conditions. Choice of inverter could be from string inverters to micro inverters and sometimes supplemented by power optimizers. All these have different cost benefit trade-offs.

*A simple rule of thumb is that 10 square meters or 100 square feet of terrace space can be used to set up 1 KWp of solar capacity.*

**An Example:** If an apartment complex has 7,500 square feet of free roof space with minimal shadows, a plant capacity of 75 KWp can be installed.

- **Total cost of plant: Approximately Rs 50 lakhs**
- **Generation of 1.05 lakh units in year 1 (which reduces by 1% every year because of panel degradation)**
- **Net savings in electricity bill of approximately Rs 8.75 lakh per annum**
- **Payback period of about 6 years**
- **Project returns in high teens of 16-20% IRR. And this is without subsidy of any sort**

*Note: broad estimates based on current prices. Actuals will depend on many other factors such as shadowing, length of cables required, etc.*

**The above IRR of 16 – 20% is at the prevailing BESCO tariff today. If one takes into account hike in electricity tariffs which usually varies in a range of 4 - 11%, the payback period is even shorter and the IRR can be higher than even 20%.**



## 6. HOW DO YOU SAY A 15 – 20% IRR IS COMPELLING?

The IRR of 15 – 20% generated from a rooftop solar investment is virtually risk-free. Corpus amounts invested in bank fixed deposits earn less than 5% per annum, post tax. Even stock markets with all the risks associated, do not deliver more than 15% per annum.

**An investment which provides a virtually risk-free return of 15-20% per annum is extremely compelling!**

## 7. BUT WHAT IF MY RWA DOESN'T HAVE THE CAPITAL TO INVEST IN ROOFTOP SOLAR?

BAF strongly recommends that if it is possible to invest a part of your corpus in rooftop solar, you should go ahead and do it. Even if you do not have the requisite corpus amount, you should talk to all your residents to collect a fresh corpus for a rooftop solar investment. **It makes great financial & investment sense for associations as well as individuals to invest in rooftop solar, for reasons explained above.**

Despite the above, if you are still not able to build a corpus, no worries! There are specialized vendors who are called RESCO's who would be happy to invest in the solar plant on your rooftop and sell you the power produced under a Power Purchase Agreement (PPA). **Under the PPA model, the RWA does not have to invest a single rupee but is guaranteed of a lower cost of power than what is being paid to BESCO by your association.** Savings on electricity would vary depending on technical specifications such as roof size and shadows, but could be as high as 20% of your electricity bill. That too with zero risk.

We would not recommend PPA model as a clear winner though. If your RWA has a funds constraint that is a different matter, but if you have funds to spare, the amount of savings will always be higher in buying the solar plant outright.

## 8. THIS IS A BIG INVESTMENT FOR MY RWA. HOW DO I AS AN MC MEMBER ENSURE THAT NOTHING GOES WRONG?

As in the case of any large purchase, a fair amount of research is required to choose the right configuration of equipment and the right vendor. Rooftop solar solutions are not cookie-cutter models and need to be customized for each building depending on shape and area of rooftop, extent of shadowing, length of wiring to panel, etc. Hence the size and cost of solar plant for two rooftops in adjacent buildings with same roof size could be very different.



In addition to selecting a credible vendor, BAF strongly recommends considering having long term maintenance contracts with the vendor (over and above the free maintenance free period which could vary between 1 and 5 years from the vendor) and to seek generation guarantees to the extent possible.

Solar panels have a long life of over 25 years and typically come with a guarantee of at least 10 years. Faulty panels are replaced by the panel manufacturer for a period of 10 years for any fault that arises internally in the panels. If any panels are damaged by external force, then the cost of the panels is the replacement cost of a panel.

- *What are the annual repair costs for the solar panels?*  
No repairs are necessary for solar panels. It requires good maintenance only.
- *What is the availability of spare parts for the solar panels?*  
There are no parts for solar panels. It is a whole piece if it needs replacement or repair. Other parts in a solar power plant like wires/ AC / DC DB are easily available in the market.
- *Are spare parts available from local vendors in Bangalore or do they come from outside?*  
Every single part in the solar power plant is available easily in Bangalore. There are authorized dealers selling these branded parts.

## 9. IS THE PAPERWORK COMPLICATED FOR ROOFTOP SOLAR?

Paperwork includes signing purchase and maintenance agreements with the vendor, a 25 - year power purchase agreement with BESCO and some certifications. However, the vendor would take care of most of the Government / BESCO related paperwork.

BAF has been engaging and partnering with the Government of Karnataka (GoK) & BESCO at the highest level to simplify procedures and have pain points addressed. The GoK & BESCO have been extremely supportive and have already introduced a lot of measures to simplify the process (like removing the CEIG approval for projects below 1 MWp, introducing an online portal for rooftop solar approval etc.).

**BAF is very happy and proud to convey that GoK & BESCO are considering BAF as partners in helping Bengaluru go green and we are working very closely with GoK & BESCO in helping them achieve the targets for renewable energy!**



**10. SOUNDS GOOD IN THEORY. HAS ANY APARTMENT ACTUALLY IMPLEMENTED THIS?**

Yes, indeed!!! One of the BAF Members, Brigade Petunia in Banashankari II Stage has successfully commissioned a 96KWp rooftop solar plant (photo below) which caters to over 85% of its common area electricity consumption. This is possibly the largest RWA rooftop solar plant in Bangalore. One of the co-authors of this note, Nikhil Grover, was one of the Committee Members at Brigade Petunia spearheading this project.



**11. LASTLY, DOES BAF RECOMMEND THAT MY APARTMENT GOES FOR SOLAR?**

**YES, ABSOLUTELY, VERY MUCH INDEED!**

**Going solar helps us save lots of money while making our city and country become greener & more sustainable! It's a double bonanza!**

**LET'S GO SOLAR! LET'S GO GREEN! LET'S DO OUR BIT FOR OUR CITY & OUR COUNTRY!!!**



## ANNEXURE – I

### A SELECT LIST OF ROOFTOP SOLAR VENDORS OPERATING IN BANGALORE (in no particular order)

#### 1. Sun Sine Solutions

- Contact Person : Mr. Siva Kumar, Asst Manager (Marketing & Sales)
- Email ID : siva@sunsinesolution.com
- Mobile No. : +91 73388 66090

#### 2. Solarify

- Contact Person : Mr. Sharath Devineni, Co-Founder
- Email ID : sharath@solarify.in
- Mobile No. : +91 99806 30410

#### 3. EcoSoch Solar

- Contact Person : Mr. Santosh CK, Manager – Business Development
- Email ID : santosh@ecosoch.com
- Mobile No. : +91 90196 94625

#### 4. PlaySolar

- Contact Person : Mr. Mukundan “Mux” Narasimhan, MD & CEO
- Email ID : mux@playsolar.in
- Mobile No. : +91 99402 26072

#### 5. Solar Apps

- Contact Person : Mr. Sharat Kaul, CEO
- Email ID : sharat@solar-apps.com
- Mobile No. : +91 98459 80616

#### 6. Banyan Environmental Innovations

- Contact Person : Mr. Nityanand J Agrawal, CEO
- Email ID : nityanand@eCarbon.co.in
- Mobile No. : +91 99898 20777

**All the above vendors will offer an exclusive discount of 2.5% to BAF Members, on the final negotiated rate! Please do quote your BAF membership number to avail of this exclusive offer!**

Please feel free to engage with other vendors as well.

