

Q1 Few things to know about the rooftop solar system.

1. There are 3 Types of solar rooftops

- Monocrystalline – cells are cut from an ingot grown from a single large crystal of silicon. These panels are generally more expensive and space efficient.
- Polycrystalline – cells are cut from an ingot made up of many small crystals of silicon. These are less expensive and have slightly lower heat tolerance.
- Amorphous – a thin small solar cell. These are thin, small panels made up of several layers of photovoltaic material.

2. Raw materials used to make solar panels

- Sand, silicon, ingots, wafers, and finally, solar cells are used to make solar panels.
- Silicon is found in sand, mainly in natural beach sand, which is abundantly available. Converting sand into silicon is the most important and foremost step.
- Ingots are cylindrical shaped, melted compounds which we get from silicon rocks. When ingots are sliced into thin disks, we get wafers.
- Solar cells are formed by coating wafers with metal conductors capable of capturing solar rays and converting them into electricity, and then solar cells are joined together to form a matrix like structure called solar panels.

3. Why silicon is the most important raw material used in -making solar panels:

Silicon is one of the best conductors of heat and is the second most available element found on earth. It has a spectrum-like structure and is able to capture a large amount of radiation. It has now become a well studied element in the circuit industry and is known to be a reliable compound.

4. No Pollutants involved:

In the process of energy production, solar panels do not emit any kind of harmful greenhouse gases and do not use any component which is not readily available – neither air nor water but only sunlight.

5. Solar statistics of India:

According to a report by India Today, India has a installed capacity of 12.2 GW as of March, 2017.

In march 2017 India had installed 12.2 GW of utility scale solar. India is currently set to become the third largest solar market in the world. The bridge to India report conveys that India's clean technology market is expected to touch 18.7GW by the end of 2017 which is about 5% of global solar capacity.

6. Time-span:

Sunlight takes approximately 8 minutes to reach the earth and a few seconds to come in contact with solar panels. Solar rooftops will not even make its customers wait for hours to generate electricity.

7. Types of solar cells used in rooftop panels:

There are two types of solar cells used in rooftop panels. High watt solar cells reduce the number of cells required in a panel and also reduce initial cost. On grid system cells are used more in urban areas, and are cheaper too, which also helps the consumer to become the producer of the energy indirectly.

8. Capacity of production:

1KWp of panel will produce 1400 – 1600 units per year i.e. about 4% KWp per day in places with tremendous amount of sunshine. The average is calculated over a year. The electricity generation at individual days will depend on the location and will vary with change in atmospheric conditions.

9. Space efficiency:

The setting up of rooftop panels require a shade free area and panel efficiency will hold a significant importance in determining the space needed to set up the panel. The efficiency of the panel can be calculated with respect to the area occupied by the panel. Panels with low generating efficiency will require a larger space while the panel with higher efficiency will require less space.

10. Appliances supported by solar rooftops:

Every Appliance which requires electricity is supported by the power generated through solar rooftops. Air conditioners, coolers, TV, heaters and many more. The set-ups are for both commercial and residential buildings.

Solar energy is one of the most effective ways to save the environment as well as reduce nerve-wrecking electricity bills. Installing a solar panel will not only show human contribution towards Planet Earth but will also be beneficial for our own lives. All over the world people are shifting towards solar rooftops and the above mentioned pointers are all you need to know why.

Q2-. Does solar power work efficiently in low light conditions?

yes, it does. Here's how. Solar PV cells work with the light from the sun, not the heat. It doesn't matter how cold the temperature gets, whether it is cloudy or foggy outside, or whether there's rain and snow. In fact, solar PV cells perform better in less heat. All they need is a sunlight and you will get your uninterrupted electricity supply from your solar cell array.

Q8-Solar energy: blessing n disguise

Solar power technology has various advantages over the socio-economic factors of our country. Mainly factors include

1. Employment Generation: This is the most striking feature of the solar energy sector to bring in new job opportunities both skilled and unskilled labor force into the system.
2. Reduction in poverty and productive use: Poverty getting reduced to a certain extent as solar technology encourages regular employment and reducing energy costs per household.
3. Gender equality: Electricity and modern cookstoves facilitate the work of women and girls. Electric lighting improves living and working conditions at home, while modern stoves cook faster and cleaner, use less firewood and save up to 40 percent of the time usually spent on firewood collection. Women benefit from job creation, too, as well as earning a livelihood by using solar-powered sewing machines.
4. Health: Modern stoves and lighting systems and solar panels reduce emissions caused by traditional stoves or three-stone fires and by kerosene lamps and candles which is a conventional source of energy. Almost half of the improved cookstoves and solar powered energy solutions can be escalated to solve the greenhouse gas emissions and regulate global warming.
5. Education: Energy unserved population deprived of electric power are now enjoying energy facilities and it helps in facilitating educational goals of their children as well by the help of solar lamps worth free of cost. People are also trained for solar technology knowhows to improve their lifestyle.
6. Environment and Climate: The major advantage of going solar is attaining sustainable development goals of climate protection measures.

Q24-solar can help Delhi to breathe clean air

Most energy produced today is out of burning of fossil fuels (oil, coal, natural gas). Most combustion by-products have negative effects on the environment and human health. Environmental concerns over air pollution and the potential for global warming may encourage wider access to alternative energy sources such as nuclear power and wind or solar energy. Coal represents an alternative fossil fuel with a potentially longer life span than either oil or gas but it has the unfortunate distinction of generating more pollution than the other fossil fuels. Furthermore, coal produces more carbon dioxide during combustion than either oil or gas, but all three have been fingered as the primary sources of the greenhouse gas that is the culprit for global warming. Thankfully now India has realised and for the first time the country is investing more in renewable power than coal. Gone are the days when industrial air pollution was viewed as a by-product of economic growth. The burning of fossil fuels represents a major source of air pollutants and cleaner air will therefore be an indirect by-product of any change in energy production in the years ahead.

Health effects of the pollution we cause

Exposure to emissions of lead, mercury, sulphur dioxide, particulate matter, carbon dioxide, and ozone-forming nitrogen dioxides are hazardous to public health. Toxic compounds, like mercury and lead, poison organ systems and can lead to brain damage and death. In parts of the country where lakes and waterways have been contaminated with mercury from electric power plants, fish are no longer safe to eat because they, too, are contaminated with heavy metal pollutants. Other pollutants, like ozone and particulate matter, cause respiratory and other health problems, particularly in children and the elderly.

Alternate Energy – the answer

Renewable energy is environment friendly but its future potential is dependent upon the rate of technological advancement and operating costs. Now Solar Power has come to a pace where it is soon to become a common mans basic utility item. Solar companies are aggressively reaching out through various products and the right technological means to help at the grass-root levels and undertake large scale solar projects. New technologies associated with solar and wind energy are now the future of energy. With the growing research and product development now petroleum as the energy source of choice for transportation will also be gradually replaced with electronic vehicles everywhere.

Beating Air pollution with Solar Energy

Solar panels do not generate any kind of green house gases when generating electricity. Moreover they are recyclable.

Solar is a renewable, sustainable form of energy that can lessen your environmental impact and save lots of money in the process. Solar and a lot of solar can help reduce the dependence on coal and other fossil fuel based sources of power. The more homes and businesses that rely on solar power means less toxic emissions from fossil fuels into our air. Solar power has wide-ranging benefits for our planet, especially when it comes to our environment.

From reducing greenhouse gases, improving our air quality and conserving our precious

water, solar energy can help to reduce our reliance on fossil fuels and lower energy prices for decades to come

Q22-Empty roof an opportunity to make money

As solar panels have got cheaper and government has thrown its weight behind the adoption of solar technology to meet its ambitious target of generating 40 GW of power from rooftop projects by 2022, the eternal sun continues to give us a chance to tap into this vast power source.

Now the common man can benefit and earn from using solar power.

Net Metering concept is what has made this possible, viable and sustainable at both institutional and individual levels. In this electricity board keeps track of the energy consumed as well as generated by a solar-powered house. It allows consumers to feed surplus solar power into the state's power grid when they don't need it and receive a credit on their electricity bill.

To enable this system of net-metering, the electricity boards replaces the existing unidirectional energy meter (which can only measure and record consumption) with a bidirectional meter that records the import and export energy separately and also calculates the differential and hence called the net meter.

Simply put, if you have installed Solar on your rooftop and implemented the net metering policy, then you get credited for the electricity you deliver back to the grid at the same retail price that you pay for the electricity you take from the grid (this differs from state to state in India).

This concept uses the power grid as a giant battery, which eliminates expensive battery backups to store and balance out the power consumption through the day.

With net metering systems, one only pays for the deficit power consumed i.e. the difference between the power consumed from the grid and the solar power generated. This drastically reduces electricity bill while in some states gives you an opportunity to earn an income.

Q3-How switching to Solar Power from inverters will aid in cutting your costs at home?

Step – 1: Solar Panel Installation Made Easy

Which direction should be the solar panel face?

The mounting structure provides the base for the entire solar system so make sure it is sturdy and properly fastened to the rooftops of your house or commercial establishment. A typical mounting structure is made up of aluminium. The performance of the solar panels depends upon the direction in which these panels are placed. The best direction to face solar panels is south, since here they receive the maximum sunlight. East and West directions also work well. North is the only direction that we should not want to put our panels on. Since India lies in Northern Hemisphere, south direction works best here.

Rooftop Solar Mounting Structure is used to fix solar panel with it. You can fix both monocrystalline and polycrystalline panel with it. This is ready to use structure of 1 kw, offered by loomsolar.com. You can connect 4 panel of 270 watt.

In Which angle should you install solar panels?

The Solar panel tilt angle (the angle between the horizontal ground and the solar module) should be decided according to the latitude of your location anywhere in the world. It is generally believed that the modules placed at a tilt angle equivalent to the latitude of the place, would generate the maximum energy output. You can also use a solar tracker to increase the conversion efficiency.

Here are the latitudes of leading cities in India -

States –

Zone -1: J&K, Punjab, Himachal Pradesh, Uttarakhand – 30-36⁰

Zone – 2: Rajasthan, UP, Delhi, Haryana, Bihar, North EASTERN STATES – 24-30⁰

Zone – 3: Gujarat, MP, Jharkhand, West Bengal, Maharashtra, Chhattisgarh, Orissa – 18-24⁰

Zone – 4: Karnataka, Tamil Nadu, AP, Telengana, Kerala – 12-18⁰

Step – 2: Assemble Solar Panels

Once the solar structure is fixed accurately, we will connect it with solar modules. We should ensure that all nuts and bolts of solar modules are fixed with solar structure so that it is properly secured and lasts long.

Step-3: Electrical Wiring

MC4 connectors are used to connect solar panels. These are universal connectors and can be connected with any type of solar panels. The solar array wiring becomes simpler and faster using MC4 connectors.

Few modern solar modules come with wire leads that have MC4 connectors on the ends, else they have a built-in junction box at the back with wires jutting out. In a series connection you will have to connect the positive wire from one module to the negative wire of another module. In a parallel connection, you connect the positive to positive and negative to negative leads. A parallel connection maintains the voltage of each panel while a series connection increases the voltage in order to match it with the battery bank.

Step-4: Connection between Solar Panel and Solar Inverter

In the picture given below, the backside of an inverter is shown where solar panel wire is connected. Connect the positive wire from the solar panel with the positive inverter terminal and the negative wire with negative terminal of the inverter.

here are other connections too like battery wire connection and output wire connection with the inverter. In all, Solar panel, Solar Battery and Grid input are connected with the solar inverter to produce electricity. The output of a series string of solar modules is connected to the input of the inverter. Make sure the inverter is turned off while the connections are being done.

Step-5: Connection between Solar Inverter and Solar Battery

In an off grid solar system, Battery is mandatory where it is used to store power backup. This battery is connected with solar inverter to recharge it with solar panel and grid. The positive terminal of the battery is connected with the positive of the inverter and vice versa.

Step-6: Connection between Solar Inverter and Grid

In order to connect the inverter to the grid simply plug it in in the main power switch board, so that it gets power from the grid. The output wire is also connected with board that is supplying electricity in home.

In order to calculate the excess energy generated from the solar system we need to install a metering device. We need to connect the positive wire from the metering device with the line terminal and the negative wire to the neutral terminal of the inverter.

Step-7: Start Solar Inverter through Solar Panel & Grid

After all the connections are done, we switch on the mains. There is a digital display which shows the total solar unit generated during the day, what is supply volt and current (amp) from solar panel etc.

Q4. Is Roof top Solar systems worthy What are the prerequisites for installing a solar panel at home?

Condition of the roof

Rooftop solar panels are installed on the roof and come with a service life of 20-25 years. However, that doesn't mean that you can straightaway ask for the installation of one. Before installation, the condition of the roof should be inspected thoroughly. If your roof is old or damaged the installation would not last for its full-service life. In such a scenario, you should first invest in repairing the roof. There is no point in installing a rooftop solar panel first and then dismantling it after some years for repairing the roof. In this way, you'll have to pay extra for dismantling and re-installation. Furthermore, you should also inspect whether your roof has enough space to support the installation. It should also be shade-less so that maximum sunlight can be trapped during the daytime.

Slope of the roof

The slope of a roof plays a major role in determining the efficiency of solar panels. Furthermore, the slope is also necessary to facilitate the drainage of water during the rainy season. Ideally, a north facing roof is preferable as rooftop solar panels installed in such a roof will generate the maximum amount of electricity. Additionally, the inclination of the roof should be in the range of 10 to 30 degrees to allow proper drainage of rainwater and removal of debris ..

Calculation of weight the roof can withstand

Every roof can withstand a certain amount of weight beyond which it is likely to collapse. Undoubtedly, solar panels increase the weight on the roof. So, in order to avoid any dangerous situations such as a collapse followed by huge monetary loss, you must determine the weight that your roof can withstand. You should get it evaluated by professionals. A professional will inspect the roof and even determine if there is any need for additional support ..

Rate of consumption of the building

Different buildings have different needs based on the appliances, gadgets and machinery that need to be powered. So, before installing a rooftop solar panel, it is advisable to analyze the needs of your building. Finding the total rate of consumption facilitate in selecting the right number of solar panels. Generally, a solar panel consists of 36 to 72 PV cells, with each cell supplying approximately 0.5 V of power. Taking these figures into

consideration, the number of panels required to suffice the energy needs of a building can easily be determined.

Which type of solar panel is suitable?

There are two types of rooftop solar panels popular in India - monocrystalline and polycrystalline solar panels. A monocrystalline solar panel is made of a single crystal of silicon while a polycrystalline solar panel is made of multiple crystals of silicon. Both of these have their advantages and disadvantages. It is believed that monocrystalline solar panels are more efficient as the electrons inside a cell are free to move as they are made up of a single crystal. However, the efficiency of a solar panel may vary depending upon its make and model and therefore every solar panel must be inspected individually to ascertain its efficiency.

Cost of solar installation

The cost of solar installation varies according to the type of installation, equipment and solar panels. Usually, it ranges from Rs 40,000 to Rs 6,00,000. It may even go beyond this in the case of large installations. Though the upfront cost may seem large, it saves money in the long run as it cuts electricity bills and reduces carbon footprints. So, before installing a rooftop solar panel, you should set a budget for the installation. Then, you choose the equipment catering to your needs and budget. Ideally, it would be advisable to opt for mid-range products.

Q15. India-The Lowest Cost Solar Energy Producer Of The World

Role of Government – The specialised bodies formed by the Government of India like the Ministry of New and Renewable Energy (MNRE) and subsequently the Solar Energy Corporation of India (SECI) have played a pivotal role in helping India become one of the fastest adopter of solar energy. The journey of the country to become the 5 th largest solar installer in the world has been made possible by setting of aggressive targets and implementation of policies through streamlined efforts in promoting solar energy through various public awareness campaigns and events. According to the recent Bridge to India

report, out of the 9.4 GW utility scale solar projects commissioned through Central Government tender, about 50% of the offtake came through SECI. In fact, we are witnessing that SECI is now playing an even more important role in facilitating state level tenders.

2. Incentives and Policies – The subsidies and incentives provided by the Government and Jawaharlal Nehru National Solar Mission (JNNSM) since 2010 have been instrumental in adoption of solar energy. The top segments that have seen rapid growth are the utility scale and open access solar farms coupled with steady growth of rooftop solar plants. Some of the key tax incentives that contributed to the growth are the Accelerated Depreciation Benefit and tax holiday announced under 80-1A in the initial years between 2010 and 2015, which provided a major relief to solar developers by offering necessary tax breaks. While Government subsidies up to 30% for all rooftop solar projects initially played a major role to develop the rooftop solar market, now it has been restricted to only to non-profit and government buildings. To propel the industry, the Government also allowed custom and excise duty benefits to ensure high growth of the sector. But recently with GST imposition, s ..

3. Land Certainty –Historically land acquisition has always been a problem in India and is a major reason for cost escalation in infrastructure projects. Since the cost of land constitutes about 7% of a large scale solar project, in 2016, the MNRE Solar Park Policy introduced guidelines that would lead state governments to identify suitable large tracts of land with appropriate insolation levels, and prioritise the use of government waste/non-agricultural land in order to speed up acquisition process for setting up solar parks. One of the probable reasons of the record low tariff of INR 2.44 was that the risk and uncertainty associated with land acquisition was completely erased from the project cost of large scale solar projects.

..4. Low cost of labour –India has the lowest cost of labour allowing solar industry to employ large number of people resulting in speedy project completion at the lowest cost. For example, the cost of labour in Middle East is 5 times higher than that in India. The solar industry has utilised the availability of affordable labour to not only offer lowest cost of power to consumers but also creating ample jobs in the process. So today solar projects can be constructed with scale and speed required to build power generation capacities to support our ambitions 5 trillion economic goal. A large solar plant for 500 MW capacity can be constructed within 18 months while a similar thermal or hydro plant might take 2-3 times more.

5. Price sensitivity – It is no secret that India is a highly price sensitive market and for any industry to make significant footprint, price is a key indicator. This price sensitivity has helped the Indian solar market in two ways - The first being availability of key components like solar panels, inverters, junction boxes, etc. at much competitive prices than other countries; sometimes even from the same international vendors. This helped India achieve lower solar tariffs as compared to other countries. The second way the price sensitivity has helped, is that once solar tariffs dropped below grid electricity tariffs, there has been super quick adoption, which has furthered the economies of scale, diving prices of components even lower.

Q10. Rural Households in needs Solar Adoption, not Kerosene subsidies5. Photovoltaic Solar Water Pump

As the Indian economy enjoys a sustained positive momentum, rural India continues to be the heart of the country, accounting for 67 per cent of the total population and 37 per cent of its GDP.

Agriculture is the primary occupation of rural households and mainstay of their socio-economic structure. While the overall Indian economy is expected to grow in excess of 7 per cent – the fastest amongst large global economies – rural India still lags behind substantially.

The primary hindrance to growth in rural productivity and subsequent economic growth, is the lack of basic infrastructure such as electricity, clean water and sanitation.

Nearly 300 million people in rural India lack access to grid-connected power, promoting use of archaic sources of energy such as kerosene, diesel, wood-fired chulhas, etc, which not only results in huge government subsidies, but also substantial health and environmental hazards.

Solar power offers an opportunity to bridge this massive infrastructure gap and improve the social, economic, environment and health indicators of 30 per cent of India's population.

While solar power has been around for a while, historically high costs have necessitated it to be driven by philanthropic capital or government subsidy, thus limiting its scope.

However with a drop in capital cost by nearly 70 per cent over the last four years, solar energy has now become commercially mainstream, thus attracting private capital and entrepreneurs.

This truly makes solar power the much awaited panacea for the millions living in darkness.

Further, the Centre, under the leadership of Prime Minister Narendra Modi, has strongly supported solar power.

As part of the government's vision of 'Electricity for all by 2019', the Centre has placed special emphasis on incentivising distributed solar power, having already sanctioned 4,604 distributed solar project in rural area to power 4,745 villages/hamlets.

The decentralised and modular nature of solar power makes it easy to deploy for multiple rural applications, impacting key facets of rural population such as productivity, safety, health benefits, access to clean water, heating solution and livelihood.

Solar lighting, for example, not only provides a high quality solution to improve rural productivity, but also substantially reduces health hazards by enabling replacement of kerosene lamps. Even 4-5 hours of additional lighting can improve productivity and income of rural household by nearly 30 per cent.

Nearly 3.5 million solar lighting solutions have been installed till date, making it a \$200-million market in FY 15.

While historically these systems were funded by government-backed programs, of late most products are sold on a commercial basis, backed by financing support from MFIs/cooperative banks.

Private players like Jain Irrigation, Tata Solar, Greenlight Planet, etc, now dominate the market. Recent venture capital funding of \$10 million in Greenlight Planet by Fidelity Growth Partners truly underlines the economic viability of this model.

Solar micro and mini grid are logical extensions of standalone solar lighting solutions as they have the capability to provide incremental benefits to households like powering fans, mobile charging, community television, as well as facilitating Internet access etc.

Simpa Networks is an excellent example of a private enterprise providing commercially viable micro grid solution to the poorest of poor districts – it has provided pay per use solutions to eight districts in UP, thus lighting nearly 15,000 homes.

Simpa Network is backed by commercial and developmental institutions like ADB, OPIC, GDF Suez, etc, and has funding in place to provide solutions to additional 75,000 users.

A unique variant of this model is a mini grid solution by private players like OMC power, which use a solar telecom tower as the primary base load and supply excess power to rural households on a pay per use basis.

Smarter farming

Another important application is solar powered agri pumps, which have the potential to substantially improve productivity of Indian farmers. Solar agri pumps are an economic and environmentally-friendly alternative to nearly 26 million agri pumps installed in India, of which 10 million are diesel-fired.

Replacement of 1 million diesel pumps could, over its life, improve agricultural output by ₹30,000 crore, mitigate usage of diesel by 9.4 billion litres — translating into a reduction of diesel subsidy by ₹84,000 million and CO2 abatement of 25.3 million tonnes.

While solar pumps cost nearly 10 times more upfront than the diesel variants, they have attractive payback period of 4 years vis-a-vis diesel pumps. Central and State governments have introduced multiple favourable schemes to promote usage of solar pumps, by providing subsidy for the upfront costs.

Possible applications

Clean water remains a big challenge in rural India, since water treatment requires power.

Solar energy is finding important applications in this field. For example, Nagaland recently installed a solar powered water treatment plant in Tsiesma, a village near Kohima, which works on an advanced membrane filtration system producing pure drinking water.

Other important applications of solar power include access to the Internet and television, which can enhance — rural employment, solar-powered basic healthcare centres, solar-powered tablets like those developed by edZilla (which is transforming the scene of education in rural Karnataka), and solar telecom towers, which have the potential to provide economic and hassle-free solutions to nearly 150,000 telecom towers plagued by unreliable energy supply.

Last but not the least, solar energy also provides a multiplier effect by providing employment and entrepreneurial avenues to rural youth. Given the simple and modular nature of solar systems, large number of semi skilled labourers in rural India can be employed for installation and after sales services of these systems.

It is evident that adoption of solar power as an alternative source of energy could alter the socio-economic fabric of rural India, for the better.

Centre's role

The Centre, as always, has a key role to play in expediting this process. It must develop new and affordable sources of solar energy, besides educating the rural masses about the benefits of switching to solar.

However, the private sector must step in and complement the State's initiatives and the governments must create a climate conducive for private capital inflow to this sector.

The heightened sensitivity about solar energy is heartening to see and if this pace is maintained, rural India is indeed headed for 'sunny days'.

12. Indian Solar Sector: Is it ready for the future?

Solar energy growth has quadrupled in recent years with the help of Government backed policies and financial aids. Standing at a cumulative 10 GW energy capacity in March 2017. Keeping the impressive growth rate in mind, we can assume that India is very likely to reach 100 GW capacity by 2022.

Currently Indian solar sector has approximately 14 gigawatt of solar projects under development and more than 6 GW capacity projects are about to be auctioned. And capacity addition mandates under state policy shows- Andhra Pradesh to get 5 GW by March 2020, Haryana- 1.3 GW by 2022, Karnataka- 2 GW by 2021, Maharashtra- 7.5 GW by 2019, Tamil Nadu- 3 GW, and more.., which promises growth. Initiatives like- tax-free grants, additional one-time allowance, subsidies and rebates on capital expenditures have helped Indian solar structure to grow and brought in investments into the sector as well.

Policies like- net metering, viability gap funding, International Solar Alliance, mandating solar installation in Government buildings, raising tax free solar bonds, offering long tenure loans, 'Solar Park' development, etc. have also successfully created the environment for the Indian solar industry to grow and get prepared for the future. However, comparing Indian solar sector with global solar growth showcases challenges in the sector that we need to focus on.

Contrasting with Global Growth

The urgency of building solar capacity is dawning upon countries across the globe. Countries like China, Japan, US, and Canada have already made significant progress in utilizing solar capacities. And countries such as Philippines, South Africa, Morocco, Chile, and Kenya are now making investments in solar energy. China has installed approximately 34.2 gigawatts of new solar PV in 2016, and US (14.8 GW), Japan (8.6 GW) have claimed the second and third position in dominating the global solar industry, and leading the world PV installations to 75 GW in 2016 alone. On the other hand, India installed 5 GW within 2016, which positions the country at a fair distance from the solar energy leaders.

Countries like China, US, and Japan have built a stable infrastructure to support their solar industry. And it has helped them to create domestic demand and deliver solar modules at low cost, claiming a huge portion of the market. Global growth interprets that investment in solar industry will grow towards upholding solar energy as available replacement for traditional energy choices. India needs to put this growth scenario in perspective to move ahead and make positive changes in its own solar industry.

A Better Approach

Current Indian solar vision has divided into various segments to bring support in financing, industrial development, demand creation, and reaching competitiveness. In this crowd of choices and requirements, India is losing focus in domestic capacity enhancement, which is

the only way to achieve solar self-reliance. If India is to go toe-to-toe with countries that currently dominate the global solar industry, a strong domestic solar capacity enhancement is required. The recent announcement of Energy Minister Shri Piyush Goyal that incentives package for domestic firms will not see the light of day, is therefore actually a severe blow to the Indian solar self-reliance dream.

India desperately needs to act on-

- Stabilizing flexible financing, incentives, and tax exemption benefits to domestic manufacturing industry
- Reducing net metering implementation time frame to boost the solar projects implementation
- Creating demand for domestic solar modules
- Extending the existing RPOs to consumers
- Implementing and monitoring use of feed-in-tariff processes
- Checking if the mandated industries/utilities are using or installing solar solutions or not
- Increasing awareness on solar technologies
- Bringing quality guidelines to ensure energy sustainability
- Developing an easy certification process to establish high growth rate

Further, focusing on solar skill development can bring India the opportunity to harness solar potential by increasing domestic capacity and awareness.

Government support, raising energy demand, global acceptance towards solar energy, and increasing investor interest, are opportunities for solar sector to grow beyond expectations. And, financial support in guise of multi-billion dollar commitments, which India desperately needs, is coming through mutual efforts of Government and private solar companies ([click here for information on Indian solar investment scenario](#)). But challenges are real and they need to be addressed.

The shift towards solar sector can help India scale great heights, claiming a large portion in the global energy sector, but to reach these opportunities, the country needs to boost its own efforts.

14.Reasons Explained Why Commercial Buildings Need Solar Rooftops

1. Independent of Grid: As the solar rooftop systems do not use any electricity or fuel to operate, the dependence on the main electric grid is much reduced. Power-cuts or any kind of electricity issues do not affect the operations of Solar rooftop.

2. Cost-effectiveness: There is a billing mechanism called “Net metering” used in solar powered systems. This mechanism uses a bidirectional electricity meter. So the solar rooftop users can earn and save money by sending electricity generated by them back into the grid.
3. Low maintenance: Once installed, solar rooftops do not require any extra care or maintenance. Solar rooftops are designed to be tough to endure all weather conditions.
4. Environmentally Safe: Solar rooftops are eco-friendly as they do not release any harmful greenhouse gases. Therefore, solar rooftops for commercial buildings do not cause air pollution. Ultimately, it restricts global warming or climate change.
5. Financial Incentives: The Gujarat government provides 40% Accelerated depreciation and 10 years tax holiday on solar projects. Also, loans have been offered for up to Rs.15 Crore for renewable energy projects under Priority sector lending, i.e. Solar sector gets priority for obtaining loans from banks at a low rate of interest.