

Shrirajendra's Blog

Real life issues are serious and so is this blog

Solar Business Opportunities in India



Stepping Out

Introduction: Solar Business worldwide has great political support. Even during the recession period many governments provided funding, subsidies and tax benefits. Leading nations are Germany, Italy, France, China, USA, Canada, India etc. The threat of climate change and obligations to reduce Green House Gas (GHG) emissions has put onus on each large country, including on India, to support renewable energy power generation vigorously.

Renewable Energy Share: In India out of total installed capacity of about 145000 MW, about 12500 MW is contributed by Biomass, Small Hydro, Wind and Solar energy. The nodal Ministry, MNRE, is proposing a new policy under “Solar Mission” already approved by Prime Minister of India, to introduce big incentives by way of low rates of interest (under 4% on Indian Rupee loans), high tariffs for Solar Power Generation Plant, Tax and Duty exemptions, capital subsidy etc. This policy is expected to be implemented in the year 2009 itself.

Cost Competitiveness of Solar Power: Solar energy has been there in use for electricity generation and heating for several decades, though our focus is on Solar Power (i.e. electricity generation). High cost of PV Cells that convert Sun light directly into electricity has meant that PV deployment needed Government subsidies/incentives to attract consumer interest and penetrate the market. Countries like Japan and Germany led the way in offering attractive incentives for PV power causing the demand to grow rapidly since early 1990s, which averaged over 35% per year during 1990s and over 50% per year since the beginning of 2000 as more and more countries started to offer incentives for generating PV power. Increasing manufacturing volumes have led to continuous cost reduction in PV for the past 30 years and for every doubling of manufacturing volume, the cost of PV modules has come down by 20%. This amounted to an average cost reduction of 5-7% per year during the past 30 years, though silicon shortage due to ra



in PV demand led to price increase during 2004-2008 which has now gone through a major correction as the demand was adversely impacted due to the current global economic situation. PV costs are now projected to go down even faster over the next few years. PV power is now approaching grid-parity in many “sunny” parts of the world as its cost is rapidly declining while the cost of conventional power sources (e.g. fossil fuels) is increasing. Solar power generation is emerging as potential candidate to start supplying power cost competitively to the grid itself and once that happens, the PV market growth will become sustainable without Government subsidies. The current estimates are that by 2012 or beyond, power from solar plants and peak power from grid will be equal in cost in many countries of the world.

Solar Power Applications: Solar power applications are for roof top mounted electricity generation, stand alone lighting in remote and inaccessible places, in deserts and snow fed mountains, etc. The flexibility of applications and choice technologies to build these systems and / or its components like cells and solar panels allow enormous business opportunities for investment in this sector. There are several entry points for starting a large and durable Business in India in Solar power sector. The first one is as PV manufacturing business (at different levels in the value chain), the second one is as Solar Power Plant developer (i.e. PV systems integrator) and the third one is owning/operating a Solar Power Plant and generating revenue by feeding electricity to the grid.

Global Solar Capacity & Support Value Chain: Worldwide the total solar capacity installed last year was about 5000 MW of Solar panels. In India the total employed last year was under 100 MW. Therefore the entire PV Business in India is either based on importing Solar Panels from abroad or exporting the finished goods to Europe or North America. The industry value chain that supports this business is:

(i) Manufacturers of Poly-Silicon feedstock material,

(ii) Manufacturers of Solar grade Wafers,

(iii) Solar Cell Producers and

(iv) Module Manufacturers

Leading Manufacturers and Critical investment size for new Investor: The Poly-Silicon producers till a few years back were less than 10 all over the world located in Germany, USA, and Norway etc. Now their number has grown to over 50 to support more than five times growth in the demand for Poly-Silicon in the past six years. The minimum size of investment needed today to compete at entry level in this segment is about 300 – 400 million USD. There are no manufactures of significance in India though several companies like Reliance, GMR, Lanco Solar and Srei Infra have been talking about investing in this business.

Manufacturing wafer is second entry point after Poly Silicon. Here Poly is the raw material. The minimum entry size is about 30MW capacity wafers (about 8-10 million wafers per annum) and investment will be over 35 million USD. There is hardly any significant production capacity in India for Wafers (< 10 MW per annum). Third entry point is to manufacture Solar Cells. The minimum recommended size is 30 MW though the preferred size should be 60 MW per annum. For 30 MW Cell production line & it will cost about 20 Million USD. There are a few large Cell producers in India and these include Moser Baer, Indo -Solar, BHEL, CEL, Solar Semiconductor, etc. The total capacity installed in India will be under 200 MW per annum for Solar Cells as of now. This will double by 2010. The last entry point in Solar manufacturing business is production of Solar Panels (also called Modules). The minimum capacity will be about 25 MW and total project cost will be about 4 million USD. It is clear that least cost and low risk investment will be Module lines for a new investor. Today in India about 15 Module manufacturers are there who have capacity ranging from 5 MW to 100 MW per annum. Total installed capacity for Module producers would be over 500 MW per annum.

Time Lines for starting the business:

Poly Silicon plant is chemical industry and takes about 2 years minimum to be installed and there are practically no experts available in this segment in India. There are no proven turnkey suppliers of technology yet.

1. **For wafer manufacturing plant** it takes about 18 months to commission the plant, manpower is big constraint and technology risk is also there. It is basically a metal crystallization and Diamond cutting tools technology combination business. GT Solar (USA) and Mayer Berger (Germany) are the two leading Turnkey suppliers of this technology.
2. **Solar Cell lines** are fully automated and can be built in one year time. It is a Chemical and Mechanical process and requires highly skilled employees to operate the plant. There are a few turnkey suppliers viz., Spire Corporation (USA), Schmid (Germany), Roth & Rau (Germany) OTB Solar (Norway). Technology risk is minimal and man power pool is growing in India itself.
3. **For Module line** (or Solar Panels) there are a few global turnkey suppliers viz., Spire Corp (USA), 3S (Switzerland), Eco Progetti (Italy) etc. The total time taken to commission the Module line is about 5-6 months only.

Revenues and Profitability: The revenues from each segment are derived from the value addition made at each step.

- 30 MW equivalent of Poly- silicon sale will fetch about 15 million USD as revenue with about 20% profit margins. Due to acute silicon shortages in the past five years, Poly suppliers and traders made significantly higher profit margins, but now this segment is under tremendous margin pressure as there is significant over capacity due to sudden decline in demand under current economic situation.
- Wafer manufacturers top line for typical 30 MW equivalent supplies will be 30 million USD. The profit margins now are about 20%.
- For Cell line, with 30 MW production capacity, the current revenues could be about 40 Million USD and profit margins will be about 12-15 %.
- For Module line of 30 MW the top line will be 60 Million USD and about 5-7% will be profit margins.

Marketing Strategy: It should be recognized that the market for Wafers, Cells and Modules are primarily located in Japan, Germany, USA, Italy, France, Greece, etc., (i.e. Europe and North America). Experienced marketing team will be required to establish good priced contracts and develop brand equity in the long run.

Entry Strategy: For a new entrant Module line is best bet. There is a short learning curve for very low capital investment and risk profile. The technology is simple but requires high quality facility. Once secure in knowledge of the solar industry, backward & Forward integration is best growth strategy. All the leading companies of the world with large turnover (> 1 billion USD) and profitability (> 20-25%) are vertically integrate such as REC, Suntech, BP Solar, LDK Solar, Yingli Solar, First Solar, Schott Solar, etc.

Solar Power Plant: Solar Generation power plants are coming up in many countries such as Italy, Germany, and USA etc. There are two types of solar power plants. One employs reflectors and known as Concentrated Solar Power (CSP) type, which generates steam due to heat concentration which in-turn produces electricity through turbines, and other employs Photovoltaic Solar Panels (Modules) for direct electricity generation. The choice between the two types is not very difficult. For large capacity (> 20 MW or so) one could consider CSP. However, these are yet to be proven (some systems are being tested out) and are attractive only in the regions where there is "hot" Sun (e.g. deserts). PV panel based systems can be used anywhere in the world and for small and large capacities (a few KW to 100s of MW). The main con

of economic viability. The costs of CSP per MW will be upwards of 3.5 million USD. It employs turbines and generators so there will be operating cost as well. PV Panel based will also cost about the same (4-5 million USD per MW) but practically no operating cost as there are no moving parts in the plant. The generation cost is high from both types of Solar power plants and current estimate is about 18-20 INR per unit in India. Government of India is proposing to subsidize the solar power by about INR 12 per unit to the buyer of this power from solar plant. However we do not have any actual example of Grid connected power plant and operation of subsidy regime by GOI.

Technology Suppliers for Power Plant: The technologies for CSP and PV power plants are available from a few contractors in USA and in Europe. They can assemble the plant on turnkey basis. It is therefore possible that in states like Gujarat, Rajasthan, MP, Jharkhand, Maharashtra etc where sun falls (insolation) for upwards of 1800 hours (< 2000 Hours) a year, one can propose construction of these plants on MOU route. The entire regime of state and central incentives and land availability etc will be negotiated by the developer with the authorities. The current acceptable capacities are between 5-10 MW for one developer.

Broad contours of Solar Power Plant: For 10 MW Solar plant about 75-100 acres of land will be needed. In addition about 50,000 Solar panels (200 watt each) will be required to build the generating array of Modules. The balance of system will require Invertors, transformers, control panels, cables, connectors, support structures etc. The total construction time can be under one year after funding is in place.

Funding: There are several examples worldwide of financing these projects in USA and Europe. About 1000 MW of solar power plants today operate on grid connected basis in Spain, USA, Germany, Italy, Korea, Japan, Greece etc. The power plants based on Solar Panels or CSP will be able to attract green funds and lenders support in India.

Exit Strategy:

1. Developer of the Power plant can look for buyers from Abroad or the Utilities in India. There will be renewable obligation for the lead power producers in India from Coal and gas fired plants. Small percentage of their generation will be come from green sources including Solar Power. It will be at this time one can get high valuations from the potential buyer.

2. For the Cell and Module line manufacturers, the market will determine the price. In 2007 the market caps of large companies like REC, MEMC and Q-Cells was over 2-8 billion USD. The revenues were in the range of 200-500 million USD. The PE ratios were upwards of 20 or so. After the recession, these valuations have come down substantially. However as the recession is disappearing, it is the Solar companies who are coming out earlier from the adverse market impact. Due to Obama policies to put money on the table to support Solar installed power plants and roof top units, from 2010 onwards the US market is certainly going to drive the Module installed capacities in a big way. In that case the valuations of all the manufacturing companies will go up rapidly from 2010 -2011 onwards.

3. In about 5-10 years the solar panels and value chain products will become a commodity. In the long run the big players will stay and in the short run a good exit price will be available for mid and small size manufacturing plants when US / Asian market would boom in another 1-2 years. Therefore for entering in solar business and / or going for solar power plant development, this is the right time.

Rajendra Shrivastav





3 bloggers like this.

158 RESPONSES TO “SOLAR BUSINESS OPPORTUNITIES IN INDIA”

karthik | [November 22, 2010 at 6:02 pm](#) | [Reply](#)

This article gave me real idea about the investment that require to start a business in solar energy sector. But the above seems to be really for big players. With a capital of 10 lakhs and around, what are the areas that I can venture into the solar energy sector business.



Rajendra Shrivastav | [January 5, 2011 at 6:40 am](#) | [Reply](#)

Please read my response sent to you directly on your email address.



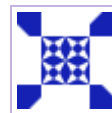
Siva | [February 4, 2011 at 4:43 pm](#) |

Hello Rajendra,

I am from Tamil Nadu, I am also having very much same question as what Karthik has asked, can you please post your reply. I could recognize you should have wide experience on the industry, would like to be in touch with you, kindly let me know your linked in profile aswell.

Thanks

Siva



Rajendra Shrivastav | [March 13, 2011 at 1:07 pm](#) |

Siva,

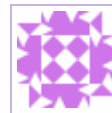
email me your coordinates for me to call you.

Rajendra



Vineet | [May 31, 2012 at 8:10 am](#) |

I have a similar query to that of Karthik. please mail me your response/solution at vineet.sharma@novatium.com



Rajendra Shrivastav | [June 10, 2012 at 11:47 am](#) |

Why you need me to reply on your email? Please use the same answer as given to Karthik.



L Patel | [December 18, 2010 at 12:30 am](#) | [Reply](#)

Hello Mr Shrivastav,



Your blog gave lots of good answers to many questions i had. It has many details, but i am still new to this subject and am thinking of getting into putting a PV Modules in Gujarat. There is a business summit in Gujarat in 2011 and i want to know more and learn more about this subject

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and how i can get into the power business. Who i need to talk to and how many people and starting capitol i need. Also about talking to banks and getting the money to start. The kind of management and technical personnel i will need to run this plant. etc. please reply back soon.

Thank You
L Patel

[Rajendra Shrivastav](#) | [January 5, 2011 at 6:39 am](#) | [Reply](#)



Please read my reply sent by email to you directly.

JAGADEESH | [March 18, 2012 at 7:16 pm](#) |



Hi sir,

This is Jagadeesh, i have seen your blog today and it gave lot of information about solar power projects but i want the details about maintainence cost and land required detials for implementation of 1MW power plant so please can you send me the details about this to my mail soon

[Rajendra Shrivastav](#) | [March 25, 2012 at 1:20 pm](#) |



jag detest,

Land neurally required is about 4 acres per MW of plant installed capacity. This is more or less the area one needs on India in solar states.

O&M is project specific, based on manpower needed, airwaves needed for cleaning, control room supervision, hardware upkeep etc.it should be a few percent of project cost.

Rajendra

Manas Kumar | [April 1, 2011 at 7:11 pm](#) | [Reply](#)



I HAVE ALL THE INFORMATION AND BUSINESS PLANT IN SHORT IN THIS BUSINESS YOU NEED TO PUT UP MONEY IN CRORES SO IF YOU ARE INTERSTED KINDLY CONTACT ME ON Mail id.

regards
Manas

Raghav | [June 28, 2011 at 5:10 am](#) |



HI

I am an NRI who already entered into this business. I am looking for some good turnkey installers for small range installations up to 100 KW. Please email me with list of some good turnkey installers that can provide good support.

Thanks

[Rajendra Shrivastav](#) | [July 7, 2011 at 4:00 pm](#) |



Raghav,

I am afraid you will have to do some homework here. It is a matter of detail and gathering



ground level information. It would require market survey and local knowledge of the competence of the integrators, feed-back from end users and assesment of MNRE about the companies.

Rajendra

Anrag | [January 22, 2011 at 8:21 am](#) | [Reply](#)

Hello Mr.Shrivastav,

Please send me your contact details so we can have a discussion on manufacturing of solar cells/modules.

Thanks.

Pritesh | [February 3, 2011 at 10:12 am](#) | [Reply](#)

Hello Sir,

I am really desperate to start this business but I don't have much knowledge about it like how much do I need to invest,? what is the planning to start? how can I expand this business in short amount of money ? Can I get any help from government? I want to start this business in Gujarat. Please reply me

Thanks

Pritesh

Rajendra Shrivastav | [March 13, 2011 at 12:43 pm](#) | [Reply](#)

Pritesh,

Desparation is only good for motivation. You will require funds. I have outlined the estimated costs in my articles in my Blogs at each value chain from Poly Silicon, wafers, cells to PV Panels. Unless you invest personal time and enegry to understand this business plesse do not waste your time and look else-where.

Government will give subsidy for products not to manufacturers. It is given to the buyer of PV panels, roof top systems and end users. Not to suppliers.

Rajendra

Ahmad Ayob | [February 28, 2011 at 7:56 am](#) | [Reply](#)

Greetings Mr Shrivastav,

I'm located in South East Asia and would like to seek your advise for the business models involved in the poly-silicon and wafer manufacturing business, not forgetting to mention the solar power plant. Thanks.

Regards

Ahmad

Rajendra Shrivastav | [March 13, 2011 at 12:35 pm](#) | [Reply](#)

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Ahmad,



You are trying hand in every vaule chain here. You know that there are tunrkey suppliers of wafer manufacturing Plant such as G T Solar in USA. Talk to them they will ascertain if you are serious and have funds before submitting their quote. You will have to tie up supply of Poly Silicon from reputed suppliers in US, Europe or China.

Do not waste your time on manufacturing Poly Silicon , it is chemical plant and only a few techologies are proven and closley held. It requires at least 200 – 300 trained engineers & technicains to start a viable poly Silicon production facility.

Solar power plant is completely different animal. you need about 4 acres of land per MW of installed capacity using P V Panels. This is assuming you have good sun shine for 300 days a year. Current estimates are that you will need about 3 – 3.5 million USD per MW of installed capacity and your buyer should pay you about 0.35 Dollars per unit for it to be viable. Besides do not try to desgine and install it yourself. Go to a Turnkey suppliers from Europe. There a re few good ones in Germany, Spain etc. Lot of experience is required to assemble an efficient Solar plant.

Rajendra

[mohan](#) | [March 8, 2011 at 3:00 am](#) | [Reply](#)



i will starte solar marketing based company so please help me sir

[Rajendra Shrivastav](#) | [March 13, 2011 at 12:24 pm](#) | [Reply](#)



Mohan,

Solar Marketing of what?

PV panels or products like Solar Lantern or grid connected KW level or roof top solution for supplying electricity for homes.

First take a call on what U wish to pursue, carry out preliminary assesment of who all clients and existing suppliers. U will have competition here.

Rajendra

[RC Yadav](#) | [March 11, 2011 at 12:36 pm](#) | [Reply](#)



Mr. Shrivastav , Appreciable information on our Blog. It would be great if you could write how much it will price to put up a 25 MW C-Si Solar Cell Manufacturing facility in Bangalore.

Thank You

Ramchander Yadav

[Rajendra Shrivastav](#) | [March 13, 2011 at 5:13 am](#) | [Reply](#)



Dear Ramchander,



I am not having the latest number for 25 MW Cell manufacturing facility. However keep following in mind:

1. The Cell line may cost up to say 10 Million USD having 17% Cell efficiency.
2. You will need fair amount of working capital. It may be about 50% of project cost of the line to buy Cells, Chemicals, pastes, cleaning agents, gases etc.
3. Cost of the project will depend on land you acquire. In Bangalore it may be expensive compared to its outskirts.
4. Since you will be tempted later to go on larger scale manufacturing, take land needs for future as well into account today. Think 100 MW final capacity at one place.
5. Buy proven lines (from known Turnkey Suppliers) , else you will waste a lot of your time in commissioning lines, material procurement and quality issues etc.
6. You will require key good quality man power. Plant Manager, Sales Manager and technology experts will determine the success of your business side.
7. In Bangalore city you have HHV company that knows this business very well. They also manufacture some of the equipment there.
8. See their operating lines to get the feel of this industry at HHV.
9. In case you have never done manufacturing, please keep the learning curve in mind which is quite different from trading, financing etc.

Rajendra Shrivastav

Rajgopal | February 4, 2013 at 6:11 pm |

Hi Rajendra,

I am interested to start solar power unit. Can you please share details to this mail id :

iapps.erp@gmail.com

contact no 9790920880

Thanks

Raj



Rajendra Shrivastav | March 14, 2011 at 11:14 pm | Reply

Yadav,

I tried to reply you two days ago. I am not sure if it reached you. Gist was as under:

1. It may cost you about 8-10 million USD excluding land and building.
2. There will be working capital needed for Wafer stocking, chemicals, pastes, gases etc.
3. You will target bigger capacity to stay competitive in due course of time and take land accordingly.
4. Land in Bangalore will be expensive and add to capital costs.
5. Rule of thumb is that 8 million USD line will have total project cost of about 16 Million USD.

Rajendra



Rajendra Shrivastav | March 13, 2011 at 12:56 pm | Reply

Vladimir,

I am not an investor. Just a purveyor of information at no cost to the reader. Generally you will pay for such services.



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Rajendra

Arunkumar Subramanian | [April 26, 2011 at 6:04 am](#) | [Reply](#)



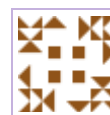
Dear Rajendra Srivastav

I am planning to set up a Solar module plant in Tamil Nadu, Could you please provide the contact details of module lines installing person in Chennai

Regards

Arunkumar Subramanian

Pankaj K.Das | [March 25, 2011 at 8:48 pm](#) | [Reply](#)



Hi,

I went thru your blog and i'm keen to know more about the last entry point solar module mfg.Can you please advise on how much initial investment is needed beforehand, i can pull an investor. And also are there any cos investing in these projects in india; govt & non-govt both.And lastly are there tax sops as well.Thanx

Rajendra Shrivastav | [March 26, 2011 at 2:57 pm](#) | [Reply](#)



Note the following:

1. For a typical 25 MW Module line you may require about 2 – 2.5 million USD for Turnkey line, plus land and building.
2. You will produce PV Modules worth 25,000000 Watts that could fetch you between 6.0 – 7.5 million USD.
3. You will require workling capital to buy cells, frames, ribbons, back sheets, EVA, Junction Box, Glass Sheets etc and 90% will be imported. at least 3 months of Top Line will be required as working capital, say 2 million USD to be on safe side.
4. The margins you can make of top line of say 7 Million USD will be 5% or 350,000 USD only.
5. Note that Module is low margin, high revenue (top line) business.
6. Out of 3 USD per Watt as sale price in market , you will spend 80 – 85% on Cell and other hardware I mentioned above , balance on sales, marketing etc.
7. The time line to start business from scratch is at least 6-8 months after ordering the line.
8. There are already about 700 MW of installed capacity inIndia and more investros are setting it up. Personally I know of two, one in Delhi and other in Chennai who are installing Module lines.

Rajendra Shrivastav | [May 12, 2011 at 2:53 am](#) | [Reply](#)



Note the following:

1. For a typical 25 MW Module line you may require about 2 – 2.5 million USD for Turnkey line, plus land and building.
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7. The time line to start business from scratch is at least 6-8 months after ordering the line.
8. There are already about 700 MW of installed capacity in India and more investors are setting it up. Personally I know of two, one in Delhi and other in Chennai who are installing Module lines and a few in Jaipur city.

Ajay | [March 28, 2011 at 8:38 am](#) | [Reply](#)

Hi Rajendra,

If one was to invest into Solar Business chain with a total capital of 1 CR (including the OPEX required) then what can that be?

Warm Regards,
Ajay



Rajendra Shrivastav | [April 2, 2011 at 7:38 pm](#) | [Reply](#)

Ajay,

With such little capital investment you can look for System Integration. You need people with skills in design and installation of Solar Water heating systems, PV power supply system etc. You can also look at Solar Products sale business like Solar lantern, lights, complete battery fitted back up system for street lighting, rural applications etc.



Pradyuman Modi | [April 23, 2011 at 12:58 pm](#) | [Reply](#)

Hello Mr. Rajendra,

I am based in Jaipur, Rajasthan. I am trying to import solar powered LED lanterns from China. Can you tell me about the duties applicable and subsidy provided by the government on import and selling of these lanterns. I am looking to market these in the rural area. I would also like to know your view on what should be the net cost to the consumer (after subsidy) for these lanterns



Chirag | [May 5, 2011 at 6:27 am](#) | [Reply](#)

Hi Rajendra,

I want to know what would be the total capital investment to establish a 50 -100MW Module line and what are returns, payback period, profit margin etc..???? Is it the right time to invest ?????



Rajendra Shrivastav | [May 12, 2011 at 2:51 am](#) | [Reply](#)

Chirag,

I had replied to another query of similar nature sometime ago. It is reproduced as under:

Note the following:

1. For a typical 25 MW Module line you may require about 2 – 2.5 million USD for Turnkey line, plus land and building.
2. You will produce PV Modules worth 25,000,000 Watts that could fetch you between 6.0 –



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7.5 million USD.

3. You will require working capital to buy cells, frames, ribbons, back sheets, EVA, Junction Box, Glass Sheets etc and 90% will be imported. at least 3 months of Top Line will be required as working capital, say 2 million USD to be on safe side.
4. The margins you can make of top line of say 7 Million USD will be 5% or 350,000 USD only.
5. Note that Module is low margin, high revenue (top line) business.
6. Out of 3 USD per Watt as sale price in market , you will spend 80 – 85% on Cell and other hardware I mentioned above , balance on sales, marketing etc.
7. The time line to start business from scratch is at least 6-8 months after ordering the line.
8. There are already about 700 MW of installed capacity in India and more investors are setting it up. Personally I know of two, one in Delhi and other in Chennai who are installing Module lines.

About timing to invest: Market due diligence is required to be done to establish buyers, there expected prices, commercial terms etc. For larger capacity the investments are almost linear. It will be four time for 100 MW module line.

Rajendra

Sanjeev | [May 5, 2011 at 6:48 am](#) | [Reply](#)



Dear Rajendra

I am working with a leading organisation. Have over 16 years experience.
Am planning to start my own business with an investment upward of 10 Lacs+ in Chandigarh.
Pls guide me on total investment costs, breakeven timeframes & profit margins.
Is it worth switching from a job to this business.

Best Regards

Rajendra Shrivastav | [May 12, 2011 at 2:44 am](#) | [Reply](#)



Sanjeev,

10 L is not good seed capital in current context to start in Solar business. This is capital intensive business and requires deep pockets.

You need to look at the following if you shift from job to doing business on your own.

1. Very clear idea , both philosophically and in terms of numbers for investment and revenues. If not wait till you get the grip on it.
2. May not get funding from outside and it at all, may be too expensive.
3. Shift from monthly income to none for months and ability to sail through like that for a year or two. Should have working capital to support business and family earmarked.
4. You should have good domain knowledge in the area you wish to enter. So build that base before you jump. No point in learning on the job. this can be done by established companies , not by individuals.
5. Soft issues are good health, temperament to do business, support from family – children and spouse etc. If you do not succeed well in time, they will be put to great hardships for your adventure. My reading is that behind one success story about 50 are failed ventures.

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6. You are the best judge , we are merely advisers.

Rajendra

Tejas K | [May 11, 2011 at 8:37 am](#) | [Reply](#)



Rajendra,

What are your thought on prospects of becoming a distributor of PV module raw materials (ribbons, EVA, backsheets etc) in the Indian module manufacturing market. I am based in USA and am looking to distribute raw materials manufactured by primarily US companies to Indian manufacturers.

Can you provide some insights into the Indian demand? How fragmented is this industry in India?

Is there a trade association/group that represents the manufacturers that we can reach out to?

Would there be enough demand (current/ future) in India to even look in this direction?

Regards

Tejas

Rajendra Shrivastav | [May 12, 2011 at 1:45 am](#) | [Reply](#)



There are a few companies and individuals who are supplying raw material inputs to Module manufacturing companies in India. The vendors are from USA as well. These items include Junction Box, EVA, Tedlar, Ribbons, Glass Sheets etc. It requires fair amount of due diligence to reply to your questions.

As of today over 300 MW of operating capacity in India and this will grow rapidly. I am aware of several new Module Line installers who could add fresh capacities in India in the coming months and years.

Frankly I do not know you sir. I cannot accept offers for agency without having proper checks of potential partner in a comprehensive manner. I am not looking at offers where beyond advisory services I need to invest in Solar business in India. I am already invested in State of art Solar Cooling technology which I am trying to establish in this country for some time based on Swedish Technology.

Hemant | [May 18, 2011 at 1:40 am](#) | [Reply](#)



Mr. Shrivastav

I am exploring opportunities in the off grid segment.

what is your estimate of

1. capital requirements
2. net margins
3. technicians (nos.)

to implement PV plants upto 50KW/yr

What would be the technical skills/qualifications of personnel to integrate systems for a single plant upto 5kw.

[Follow](#)

Thanks
Hemant

[Rajendra Shrivastav](#) | [June 13, 2011 at 6:35 pm](#) | [Reply](#)



Hemant,

Can't reply to your generic list of questions. This requires a series of assumptions to be first fixed such as scale of operation, investments, working capital, marketing team will have to be built, system integration expertise is not easily available and people are reluctant to join new comers compared to established players.

Rajendra

[vinod jain](#) | [June 1, 2011 at 3:07 pm](#) | [Reply](#)



Dear Rajendra,

Its very intresting and knowledgeable ,

I basically in kitchen appliance business and now want to divert in SOLAR ENERGY SYSTEM,as for this i have import some lanterns and torches from china,Now want to start street light and home inverter,but yet not aware of govt policy for import of solar panel and subsidy can u give me idea for this

thanks

vinod jain

[Rajendra Shrivastav](#) | [June 8, 2011 at 12:32 am](#) | [Reply](#)



Vinod,

Looks like you want to do trading using manufactured solar items / products. One way is to look at directory of Solar vendors for lanterns, invertors, panels, cells, off grid systems etc. This will give you some idea of how crowded this space is today. Also take visit to Solar Exhibitions, many take place in India, almost 4-6 times a year in different cities in India. Look at MNRE web site "www.mnre.nic.in" to check the current subsidies for solar products. Note that these subsidies are given to buyer, not vendor.

Having said all this, selling Solar Products is marketing issue, not technology challenge. This is manpower driven, dependent business, low working capital compared to making Modules and Cells. The buyers are always remote, ill financed, sometimes government or institutions. All of them need time to penetrate the system. You will need to do a good survey, talk to people in this business and prepare strategy to succeed.

Rajendra

[Raghav](#) | [June 28, 2011 at 5:12 am](#) |



Hi

sorry for the typ in the email address it should be ddd3king@yahoo.com. Please let me know.

[Rajendra Shrivastav](#) | [July 7, 2011 at 4:36 pm](#) |



[Follow](#)

OK

Rajendra Shrivastav | [July 7, 2011 at 4:32 pm](#) | [Reply](#)



Vinod,

Get on MNRE web site <http://www.mnre.nic.in> . Also get in touch with TERI (Delhi or Mumbai) or Winrock (Delhi / Gurgaon) as they have domain knowledge in this sector.

Rajendra

rohit | [June 13, 2011 at 7:39 am](#) | [Reply](#)



dear rajendra,

i am very much intrested in doin business related to solar energy. i dont have much idea about this business .read your article found it useful...i have graduated lyk an year back..kindly guide me , to which area should i start this business..i mean with low capital , which area should i start dealing with ...thank you sir

Rajendra Shrivastav | [June 13, 2011 at 6:29 pm](#) | [Reply](#)



Rohit,

Solar is not a business you can start with low capital investment. Lowest level will be agency to sell Solar Products in retail. You will require patience and deep pockets to sustain your effort for a year plus before you break into the market , generally cornered by established players. System integration requires many people and PV Module will require about 5 Million USD for 20 MW line including Working Capital etc.

Rajendra

Rajendra Shrivastav | [July 7, 2011 at 4:30 pm](#) | [Reply](#)



Rohit,

You cannot get into a business in Solar space with 15-20 lakhs or even one crore of Indian Rupees.

25 MW module line may cost 2 million USD and another 1 million for infrastructure like building , land etc. Since the top line for this kind of line will be at least 62 million USD, 80% of the that cost will be raw material in 12 months. If you store 2 months inventory like cells, glass, tibbons, junction box, tedlar, EVA etc, you will require 4 million USD of working capital.

I think you need to get the into system integration business. This is highly technical – manpower driven and you will need adequate depth in pockets to sustain the operations for 6-8 months before you start generating business income.

Rajendra

Krishna | [June 16, 2011 at 8:41 am](#) | [Reply](#)



I run a solar water heater and solar PV system integrators business. I got a offer from a leading EPC contractors for a role in mktg & admin of solar products in grid connected, in which I dont have the knowledge, Their question was how will you market grid connected solar power plants, can you please help me out.



[Rajendra Shrivastav](#) | [July 7, 2011 at 4:28 pm](#) | [Reply](#)

Krishna,

EPC for Solar power plants is extremely skilled task. New-comer cannot handle this well. One way is to ally with internationally recognised companies in this space as their local partner. Indian investor will not order a Solar plant EPC on non-experienced contractors. There are many obvious reasons but one very critical factor is the fear of investor what if “the guaranteed PLF is not realised”? For Solar Plant the PLF is so low (15-18%) that even 1% loss in PLF due to lack of design and practical experience could lead to huge revenue loss for 20 years duration of life of the plant.

Rajendra



Anubhav | [June 21, 2011 at 11:49 am](#) | [Reply](#)

Dear Mr. Rajendra

Thanks for all the information, further i want to tell you that i am an electrical engineer & recently completed my MBA in Power Management, right now i am working for a turnkey Electrical Project based company in India. I am very much interested to have my own business of the Installations of roof top solar Panels, Could please tell me how can i start the marketing & succeed, also tell me how much 1 KW system will cost, including cost of batteries.

regards,
Anubhav



[Rajendra Shrivastav](#) | [July 7, 2011 at 4:38 pm](#) | [Reply](#)

I have replied to your question elsewhere.
Rajendra



Anubhav | [June 21, 2011 at 12:05 pm](#) | [Reply](#)

Dear Rajendra

Thanks for a wonderfull blog, well i am B. Tech-MBA(Power) working in Power infrastructure based company. I am interested to do marketing & installations of offgrid Rooftop solar panels in north India , could you please suggest me how should i start & how much 1KW of such System cost in Indian Rs.

regards,

Anubhav



[Rajendra Shrivastav](#) | [July 7, 2011 at 4:03 pm](#) | [Reply](#)



Anubhav,

It is a matter of getting under the skin of business for you in person. Cost of 1 KW roof top system could be between 4K – 6K USD.

Rajendra



Thomas | [June 28, 2011 at 7:37 am](#) | [Reply](#)

At a selling price of \$3 per watt peak, a 25 MW capacity module line would return a gross revenue of \$ 75 million, isn't it? You have mentioned \$6 – \$7.5 million. Am I right?



Rajendra Shrivastav | [July 7, 2011 at 3:56 pm](#) | [Reply](#)

Thomas,

If I said 6-7 million USD, it was an error on my part. It should be 60-70 million USD revenue for 25 MW per annum capacity Module Line.

Rajendra



Thomas George | [July 1, 2011 at 7:01 pm](#) | [Reply](#)

Rajendra,

You have mentioned, for a 25 MW module line, the turnover would be \$ 6 – \$7 million and the margins at 5% would be approx \$350,000. However, at the current market prices of approx \$2 per Wp, the topline would be \$50 million and margin would be \$2.5 million @5%. Is this right or where have I gone wrong? Thanks.

Thomas George



Rajendra Shrivastav | [July 7, 2011 at 4:36 pm](#) | [Reply](#)

Thomas,

You are quite there. It was my error in writing the Top line for 25 MW per annum Module Line.

Rajendra



Nani Rayavarapu | [July 7, 2011 at 10:13 am](#) | [Reply](#)

Dear Mr.Rajendra,

i am amazed by this insightful article to help novice people like us. As you said, it is better to enter in Module line for entrants. I was wondering what kind of expertise do i need to go through before investing in Solar Energy. I am an MBA student studying in U.S and want to start a business in Solar Energy sector in India as it's green and has a potential long term growth.I want to set this up in Andhra Pradesh. Given the facts here, most of the options need high capital. I can invest up to 15-20 lakhs. Can you suggest me (by email) which is the best way for me to venture in to Solar Power business.Thanks in Advance.

Nani.



Rajendra Shrivastav | [July 7, 2011 at 3:54 pm](#) | [Reply](#)



Nani,

You cannot get into a business in Solar space with 15-20 lakhs.

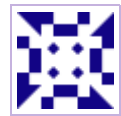


25 MW module line may cost 2 million USD and another 1 million for infrastructure like building, land etc. Since the top line for this kind of line will be at least 62 million USD, 80% of the that cost will be raw material in 12 months. If you store 2 months inventory like cells, glass, tibbons, junction box, tedlar, EVA etc, you will require 4 million USD of working capital.

I think you need to get the into system integration business. This is highly technical – manpower driven and you will need adequate depth in pockets to sustain the operations for 6-8 months before you start generating business income.

Rajendra

Amit Khanna, | [July 8, 2011 at 7:46 am](#) | [Reply](#)



Dear Mr. Rajendera,

I really appreciate your in depth knowledge of Solar industry and your sincere effort to answer every query posted.

I am keen to venture into solar module assembly line. Please advise in current competitive scenario can I start with 5-10 MW manual line keeping in mind to upgrade it to semi automated 15-25 MW line in future. How much working capital is required per month to run 5-10 MW manual line and what would be the likely revenue for this line. Does the profitability remains at 5-7% as you said for 25MW line.

I have built up infrastructure of 10,000 sq.feet readily available for this project. Is this area good enough for current 5-10 MW line considering future up gradation to 25 MW line.

Best Regards,

Amit Khanna

Rajendra Shrivastav | [July 13, 2011 at 5:37 pm](#) | [Reply](#)



Amit,

For 5-10 MW manual line you may set it up for under 1 million USD investment. Rule of thumb computation for funds are 2-3 months inventory of raw material and finished goods together, at manufacturing site.

The top line for 10 MW PV line will be simply the sale price/watt x 10 million USD. If the sale price is 3 USD per watt the topline will be 30 Million USD. The working capital required will be about 7-8 million USD for business operations.

For 10 MW installed capacity 10,000 sq ft area should be OK.

The strategy of entering with 5-10 MW production capacity is not valid in the current context. The minimal capacity should be 25 to 50 MW. There are many reasons. Vendors will not give you good price for small quantities and neither priority for delivery. Also you will face



competition from big guys in the business who can sell at lower prices and margins in a volatile market. Also you will have to find miniscule size buyers that would require 1-2 MW per annum of Modules. Keep in mind the staying power in terms of working capital is important for running Module business.

Rajendra

Vengi | [July 12, 2011 at 6:39 pm](#) | [Reply](#)



Rajendra, I am interested to have a chat with you about the opportunities. I am an NRI thinking of moving back to India to establish PV lines and power plants. Also, looking to explore the off grid opportunities. Can you please pass on your contact details, we can meet over a coffee or a drink,

Tx, Vengi

Rajendra Shrivastav | [July 13, 2011 at 5:13 pm](#) | [Reply](#)



Vengi,

We can talk. email me at “rajendra.shrivastav@gmail.com”. However, you will be better off if you get into dicussions directly with PV line vendors. There are about 4-5 of them in India from Germany, USA, Japan and Italy who have installed several 12- 25 MW annual production capacity lines in the past 4-5 years.

Rajendra

Amit Khanna, | [July 20, 2011 at 10:02 am](#) | [Reply](#)



Dear Vengi,

I am planning to put up a 10-15 MW pv module assembly line in India. If you are interested, contact me at amitkhanna70@gmail.com to discuss the proposal.

Tejas | [July 19, 2011 at 9:15 pm](#) | [Reply](#)



Hello Mr. Srivastav

I am persuing a course in Business Entrepreneurship.I have my inclinations towards Solar Business.I would be thankful if you could guide me out to make a step towards this above direction with the investment of 10-15 lakhs as an fresh entrepreneur.

Thank You

Rajendra Shrivastav | [July 21, 2011 at 2:34 pm](#) | [Reply](#)



Tejas,

This kind of fund is just not enough for foraying in Solar Business at any entry point in Solar value chain. I would suggest that you spend some of your money in attending serious Solar Exhibitions and seminars in India at Delhi, Pune, Bangalore or Chennai. This would be very good education and basis for you to assess as to where would your interest lie in Solar chain for

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entering into this business?

Rajendra

Amit Khanna, | [July 20, 2011 at 9:59 am](#) | [Reply](#)

Dear Mr. Rajendra,

Thanks for your advise.

Regards,

Amit Khanna



Sunil | [July 31, 2011 at 10:03 am](#) | [Reply](#)

interesting forum....,

I found the interesting q from people interested in solar biz, and really perfect a from Rajendraji...

I am n elect engr having rich exp in projects and maint. and I am in solar field since three years.

Would like to appreciate the advises from Rajendraji....thanks and Regards.. Sunil Parikh



[Rajendra Shrivastav](#) | [July 31, 2011 at 5:48 pm](#) | [Reply](#)

Sunil,

I have already sent you my reply by email.

Rajendra



Vaidehi Jonnalagadda | [February 6, 2013 at 5:37 am](#) | [Reply](#)

Sunil can you pl forward your e-mail to me – need guidance to understand the O&M part of solar power plants – Vaidehi. vaidehi_j@yahoo.com



saket | [August 4, 2011 at 10:05 am](#) | [Reply](#)

Dear Rajendraji,

I am interested in getting into solar related business. I got fare knowledge from article. i want to invest nearly 1 cr in this project at this staze. Can you suggest me what line of business will be good to enter in this field in jharkhand? Do jharkhand govt provide any subsidy in this field.

Even i will be visiting to delhi for renewable energy conference on 10th Aug. I do request you to give me some idea on this regards.



[Rajendra Shrivastav](#) | [August 6, 2011 at 8:31 am](#) | [Reply](#)

Saket,

I think you should make up your mind after visiting a few seminars and exhibitions where the Solar Products are displayed. The kind of business that you could look at would be Solar Products from Lanterns to Solar Water heating solutions.



You can contact three main institutions viz., MNRE, TERI and Winrock. they can help you understand the rural market and subsidies etc available for your business.

Rajendra

Richard | [August 12, 2011 at 9:49 pm](#) | [Reply](#)



Hi Rajendraji,

I am currently trying to conduct some initial research on business opportunities on off grid solar energy business (looking at mini-grid) in India. This is such a basic question, but in addition to talking to MRNE, TERI and Winrock, who would be good to talk to understand the big picture and players within the value chain of off-grid solar market in India (I do not have the picture of how different it will be from state to state)? It would be great to understand where the issues are within this rural electrification (mini-grid) value chain including customers' willingness to pay.

Best regards,
Richard

Parveen Kumar | [September 1, 2011 at 11:21 am](#) | [Reply](#)



Dear Sir/Madam,
we are manufacture of solar products like solar inverter,
solar water heater, solar water pump, solar cooker, solar cap,
solar street light, solar garden light etc.
if u need then plz cotact us.

Parveen Kumar
(sales.ex)
+918699584108

Radha Energy Cell
Manufacturer & Exporter
1st Floor Deol Market Rajesh Nagar
Badi Haibowal, Ludhiana Punjab, India

Websites:-www.radhasolar.com,
www.solarexporterindia.com,
www.solarandlights.com

E-mail :-radhasolar14@gmail.com
info@solarandlights.com

Anuj Kapoor 9911811234 | [September 14, 2011 at 12:14 pm](#) | [Reply](#)



Dear Sir,

Could you Pls confirm me, where the big Solar plants are installed by Schmid in Northern India.

1. Moserbaer – Noida,

[Follow](#)

2. Indo Solar – Noida,
3. Ajit Solar – Jaipur.

Pls send me the details for rest plant which you know in Northern India.

Pls send me detail in my E-mail Id, ie. anujkapoor3@gmail.com

Thanks and Regards
Anuj kapoor

[Rajendra Shrivastav](#) | [September 15, 2011 at 2:05 am](#) | [Reply](#)

Indosolar is the biggest one at Noida, near Delhi largely owned by H R Gupta.



[Chris Gilgallon \(@ChrisGilgallon\)](#) | [October 7, 2011 at 3:31 pm](#) | [Reply](#)

Hi Rajendra



What do you think the opportunity is like in India for starting a home rooftop Solar PV sales & installation company like Homesun (<http://homesun-solar-px.rtrk.co.uk/>) or EvoEnergy, both in the UK? I don't necessarily mean free solar, but rooftop domestic solar. As I understand it (and I don't understand it well), all feed-in tariffs in India for Solar PV have already been allocated for Phase I of the Solar Mission.

Thanks

Chris Gilgallon
UK

[Rajendra Shrivastav](#) | [October 8, 2011 at 12:44 pm](#) | [Reply](#)

Hi,

It is time to enter Roof top space in India. You need to take care of a few elements here. You should have panels that are certified in Indian context, local system installers to reduce you cost , focus on only one or two states, get smart , knowledgeable and sincere business leader to work with you. First get your business viability established as well.

Rajendra



[Rajendra Shrivastav](#) | [October 9, 2011 at 4:33 am](#) | [Reply](#)

Hi,

FIT in India is dynamic parameter. I would suggest to look at the upcoming seminar hosted by "www.renewablemarketsindia.com" on 20-21st October 2011 in Ahmadabad city, Gujarat state. A lot can be gained from experiences of others who rushed in for Phase 1 , mainly driven by the greed to capturing projects and reselling them at premium + land allocation at low cost. Policy issues and its impact will be discussed, giving clues to evolution in the coming years.

Rajendra



[Abhishek](#) | [October 20, 2011 at 2:21 am](#) | [Reply](#)

Respected Sir,



I'm BE Mechanical from Pune, want to start this kind of i.e. solar energy business. Please guide me in this process; at least about its basics.

I'll be very grateful to you.

Regards.

Abhishek

[Chris Gilgallon \(@ChrisGilgallon\)](#) | [October 21, 2011 at 5:19 pm](#) | [Reply](#)



Hi Rajendra, thanks for the reply.

I am based in the UK, so could not have gone to that conference. Thank you for the advice on setting up a rooftop solar PV business. Can I ask what you know about the feed-in-tariff and whether a home rooftop installation would qualify? Or where I can read about how the tariff works? I'm struggling to find clear information at the moment.

Best Regards

Chris

If you could let me know by email when you have replied I would really appreciate it. My email is chris.gilgallon@hotmail.co.uk. I wrote it like that to avoid the spam bots!

Thanks

[Rajendra Shrivastav](#) | [October 23, 2011 at 2:28 am](#) | [Reply](#)



Chris,

This conference got over two days ago. In case you have interest send me email at rajendra.shrivastav@gmail.com along with your coordinates like office address. I may send you the relevant presentations for your attention.

[Raju](#) | [November 13, 2011 at 3:09 pm](#) | [Reply](#)



Hi Rajendra

Appreciate your effort in supporting people like us. I would like to have a rural startup with 25Lks investment in solar energy. How much a roof top installation cost for a user and how much would be the profit? What kind of technical people required for this job?

Thank you in advance

Regards

Raju

[Rajendra Shrivastav](#) | [November 15, 2011 at 5:49 pm](#) | [Reply](#)



I am afraid that the funds you are talking about cannot kick start any serious Solar Business. What you can do is to contact TERI or Winrock in Delhi. They can help you figure out if Roof Top or Lighting would be suitable. There is "Billion Lights" program under TERI. You can become part of it.

[Rajendra Shrivastav](#) | [January 7, 2012 at 3:41 pm](#) | [Reply](#)



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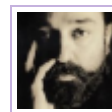
Raju,

This is too little a corpus of funds for starting Solar Business.

Rajendra



Bala | [November 29, 2011 at 6:01 pm](#) | [Reply](#)



Hello Mr. Shrivatsav,

Thanks for giving us a great insight about the solar industry. However all these businesses is possible only for large business players because of huge investment.

So I would like to know the solar business opportunities that can be started with the investment from 10-50 Lakh in India and also the resources for improving the knowledge base about this field.

It would be really great if you can write a detailed post about the low investment solar business opportunities. If not possible, please email these details to my email id balanagesh@gmail.com.

Thanks,
Bala.

Rajendra Shrivastav | [December 8, 2011 at 5:49 pm](#) | [Reply](#)



Bala,

Thanks for your comments. The funds that you are having at your disposal are too small for solar business for Cell and Module production. Even as System Integrater you will require large working capital and skilled manpower. You can consider to stock up Solar lanterns, solar devices to sell locally and try to beome part of “Light the Billion” campaign under TERI initiative. Small steps like this will teach you a lot. In addition try to attend the Seminars and Exhibitions on Solar as each month we have one in some city. You will meet dozens of investors who are running solar business in touching every concievable aspect of this technology.

About the Blog for low investment approach for enterprenuership in Solar value chain, I will pen it down when I have some clear & new ideas beyond mundane and trite suggestions.

Rajendra

VINAY SARDESHPANDE | [December 15, 2011 at 8:01 pm](#) | [Reply](#)



SIR,I WANT TO PRODUCE 1MW ELECTRICITY USING SOLAR PANELS.HOW MUCH SUBSIDY IS PROVIDED BY MAHARASHTRA GOVERNMENT TO BUY SOLAR PANELS AND OTHER EQUIPMENTS?HOW MUCH LAND I REQUIRE? WHAT ARE THE REGULATIONS AND RULES OF MERC TO OPEN SOLAR POWER PLANT?

mohammad | [December 21, 2011 at 12:52 pm](#) | [Reply](#)



hi,
Couple of questions.



1)what is ROI on Solar plant? how much revenue 1MW plant generates.
if it costs Rs. 13Cr to install a 1Mw plant how long it takes to breakeven?

2)What are the financing optinos?How much loan banks give? what is typical rate of return?

Rajendra Shrivastav | January 7, 2012 at 3:39 pm | [Reply](#)



Mohammad,

These are questions that require lot of home work. I am afraid one cannot reply without proper discussion and due diligence.

Rajendra

AKM | December 31, 2011 at 12:56 pm | [Reply](#)



This blog is extremely helpful, and the q&a is like an icing on the cake. But I feel it missing that Big Red Cherry..I am referring to Tax Incentives, Government Subsidies and Bank loans subsidies for the process of setting up a Solar Power Plant.

Rajendra, do you know where I can find information regarding that – at the end of the day, no matter how strong of a potential this industry and solar energy market has for India, every rational investor is in it because of tax incentives and government subsidies helping him/her make money by cutting down expenses..well that's how I look at it.

Rajendra Shrivastav | January 7, 2012 at 3:38 pm | [Reply](#)



AKM,

The questions you are asking to me are key factors to be taken into account for Solar business for vendors to cost its solution. For buyers also these are matters of due diligence. Broadly you can visualise them as under:

1. In case of Solar Power plant there is no subsidy as you will sell power based on Power Purchase Agreement (PPA). However the Central and State Governments may offer you land and tax exemptions from taxes and duties for hardware etc. The project cost will determine your tariff and data reliability will prove if you will evr make any money or regret the investment.
2. In case you are setting up Off Grid supply there are specific subsidies based on the type you will implement. This is one big market in India that will not fade at least for next 50 years!
3. For remote community supply you may get up to INR 270 per watt of installed capacity for full system using PV Panles, Batteries, power electronics, controls and disctribution network for lighting homes in villages.
4. For off grid for industry based on Solar solution like lighting, power backup etc, the subsidy will be INR 70 per watt without Battery and INR 90 with Battery systems.
5. For Solar Water pumps you will get INR 70 per watt and so on so forth.....

Note that all these subsidies are given to end user, not to vendor.

Rajendra



Shree Kar | [January 3, 2012 at 6:40 am](#) | [Reply](#)

Hi,

I am writing this on behalf of a group of investors willing to invest upwards of IR 20 crores depending upon the rate of return.

They are based in Karnataka but are willing to build and operate the business anywhere.

Could you please suggest the best activity and expected rate of return?

Thanks

Rajendra Shrivastav | [January 7, 2012 at 3:22 pm](#) | [Reply](#)



Kar,

In case you are not stuck to the idea of Solar , where the ROI is dicy due to lack of proven solar data and hence revenue form sale of power through PPA, you can look at other buiness as well??

Let me know if Hydrogen Production , high purity, for which there is very strong demand in India acorss country but low supply, would attract your attention. The ROI is very good and revenue streams are from proven buyers of international reput.

Rajendra

Ramesh | [June 6, 2012 at 2:18 pm](#) | [Reply](#)



Dear Shree Kar, Investment returns within 3 to 4 years for, we will take care for set up solar Pv module manufacturing plant as well as marketing for details contact my email id : rameshr25@rediffmail.com.

Prajesh Mishra | [January 4, 2012 at 9:56 am](#) | [Reply](#)



Hello Raj Sir,

I Am Mechanical Engineer having about 4 years of experince in themal power project and want to start itegration business of solar system.

Could you please giive the information about land,money lending ,manpower and other requirements for the same.

Regards,

Prajesh Mishra

ppkmtech6gmail.com

Rajendra Shrivastav | [January 7, 2012 at 3:17 pm](#) | [Reply](#)



Prajesh,

There is no ready made teaching manual here or instruction course for system integration in Solar Business value chain. People learn it on the job or by working in Solar Industry. Try to get

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to the list of companies that carry out Solar supplies, production of hardware and system integration through Seminars, exhibitions. You can contact TERI in Delhi or Winrock in Gurgaon as they are the leading institutions in this sector & would encourage new entrants to populate the country with solar systems. They can guide you with technology, market, prices, manpower, training etc.

Initially, you will have to raise money on your own. Lenders do not give money to startups implementing business for the first time. You need to generate cash flow, have balance sheet and an install company to raise loans, bank credits etc. Right now just concentrate on learning the business details and its tricks.

Rajendra

Atma Ram | [January 5, 2012 at 1:58 am](#) | [Reply](#)



What are carbon credits and how do they benefit new enterprises in solar power?

Rajendra Shrivastav | [January 7, 2012 at 3:09 pm](#) | [Reply](#)



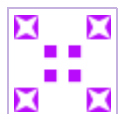
Atma Ram,

A lot of literature is on internet that can explain what it is. It was devised by experts and I think one of the pioneers is Dr R K Pauchauri from TERI, New Delhi who is also the Chairperson of IPCC (UN Body). The way one can explain it from Indian stand point is that anyone who builds Solar, Wind, Bio Mass, Small hydro generation units (a few MW) etc, these renewable energy based power plants effectively avoid carbon emission into atmosphere while supplying electricity to the grid or to the industry. The saving of Carbon Emission is proportional to the power produced by these types of power plants. For each ton of Carbon emission avoided, one Carbon Credit is earned. It can be sold to those who buy them to meet their obligations to reduce emission in Europe, but do not / shall not build such power plants on their own.

The price of each Carbon Credit has been varying from 5- 15 Euros from time to time. It can be sold directly to a buyer or to a trader who in turn will sell it in international market.

Rajendra

Shree Kar | [January 9, 2012 at 3:11 am](#) | [Reply](#)



Hi,

Thanks very much for pointing out hydrogen as having a higher ROI than solar.

The investors are definitely interested in all good opportunities. This will be in addition to their current interest in solar. A broad project profile will help in taking a decision. The investors also have extensive business interests in the MENA region.

My mail ID is kar.shree@yahoo.in

Shree Kar | [January 12, 2012 at 4:02 pm](#) | [Reply](#)



In the next 5 years, new technology using nano antennas delivering high performance will be introduced. The antennas are said to absorb 90% of sun's radiation as against the 20% of photovoltaic cells.

If this happens, will it not adversely affect the current investors who have sunk their money into photovoltaic cell technology?



Shree Kar | [January 26, 2012 at 9:06 am](#) | [Reply](#)

Hi,

Could you please share info on hydrogen as a better investment?

Thanks
Shree Kar

vinod v zite | [February 20, 2012 at 10:43 am](#) | [Reply](#)

Respected Sir,
I'm Photographer from nagpur, i want to start this kind of i.e. solar energy business. Please guide me in this process; at least about its basics.
I'll be very grateful to you.
Regards.
vinod



Rajendra Shrivastav | [March 25, 2012 at 1:31 pm](#) | [Reply](#)

Vinod,

Replying on blog will be difficult. There are many in Nagpur and Maharashtra state who have invested in this business. Please talk to them to get a sense of business, investment needed, problems that were likely to happen etc.

One way to learn is to visit Solar Exhibitions and you will learn a lot.

Rajendra



Aravanan | [March 17, 2012 at 11:20 pm](#) | [Reply](#)

Hello,

Can you please send me the options for small business in Solar power. I am currently looking to do some business in Tamilnadu in Solar.

Any help would be really helpful. Thank in Advance.

Thanks,
Aravanan



Rajendra Shrivastav | [March 25, 2012 at 1:28 pm](#) | [Reply](#)

Arvanan,

As of today only small business good in solar that could've been worth considering investment will be system integrator or vendor of solar hardware. Due to high working capital needed for other type of manufacturing business like Panel plant or Cell manufacturing unit (need more than 10 million USD and 50 million USD respectively) this could be good starting platform.



Go and talk to companies in Solar exhibitios to get the good sense of where the business will be worth investing before making investment decisions.

Rajendra

CHANDAN SHARMA | [March 20, 2012 at 10:28 am](#) | [Reply](#)

Hello Mr Shrivastav,

Your blog gave lots of good answers to many questions i had. It has many details, but i am still new to this subject and am thinking of getting into putting a PV Modules in Uttar pradesh . i want to know more and learn more about this subject and how i can get into the power business. Who i need to talk to and how many people and starting capitol i need. Also about talking to banks and getting the money to start. The kind of management and technical personnel i will need to run this plant. etc. please reply back soon.(mynerate@gmail.com)

Thank You

CHANDAN SHARMA

[Rajendra Shrivastav](#) | [March 25, 2012 at 1:14 pm](#) | [Reply](#)

Chandan,

Given the stiff competition and lowering of prices from Chinese suppliers this is not the good time to enter into Panel manufacturing business based on Cells made of poly silicon material in India.

Rajendra

Abhishek B | [March 22, 2012 at 7:12 pm](#) | [Reply](#)

Hi Rajendra,

Thanks for writing such a descriptive blog. Can I contact you through mail regarding some queries in solar business?

Abhishek B.

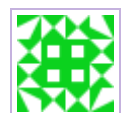
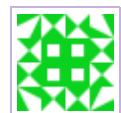
[Rajendra Shrivastav](#) | [March 25, 2012 at 1:09 pm](#) | [Reply](#)

Email your question Rajendra.shrivastav@gmail.com.

Abhishek B | [March 29, 2012 at 7:49 am](#) | [Reply](#)

Hi Rajendra,

I wanted to know a few things about solar business in India. I am more interested in roof top solar panels that can meet a single house's electricity requirement. I want to start more of an assembling business where I will buy different solar panel parts llike solar panels, batteries, inverter, voltage controller, etc and assemble them as a complete package to be sold to households. There is a peak power shortage in my state Rajasthan and in summers it gets worse as power consumption increases due to excessive use of air conditioners and other cooling equipment and power cuts are a regular site. So roof top can be a success providing power to



everyone provided it is cost effective.

I wanted to know about the total cost of this whole package that can be installed on your roof and can power your home's all appliances like AC's, TV, washing machine, microwave, everything that a normal household uses. What will be that total cost of such a system and how much space is required for solar panels. And how much subsidy is available for such a thing.

And lastly what are your views on grid connected solar PV power plants and rooftop pv panels. I have read that Germany is the leader in solar energy and nearly 60% households have solar pv on their roof. How can we implement that thing in India, what can be the major problems.

Thanks

pritam | [January 23, 2013 at 5:36 pm](#) | [Reply](#)

Hi abhishek this is sai krishna from Andhra Pradesh. I am also interested in rooftop solar panel for house hold purpose. If you have got any info from Rajendra sir or you have please suggest my mail id: preetham.7779@gmail.com



Chirag Patel | [April 3, 2012 at 4:20 am](#) | [Reply](#)

Hi, i am Chirag Patel from Gujarat, India. I am a Mechanical Engineer & at present i am having a distributorship of solar thermal system. I am really interested in starting my own solar business (Initially would like to enter in trading business & then after into production). Kindly suggest me – where can i get the complete training and detailed information about the solar energy industry (Thermal & PV). How can i get a registration for solar energy business.



Rajendra Shrivastav | [June 10, 2012 at 11:44 am](#) | [Reply](#)

Chirag,

Best bet is to contact either TERI or SEC (MNRE), both are located in Delhi.

Rajendra



S.Sathish | [April 11, 2012 at 5:25 am](#) | [Reply](#)

Dear Sir,

Good Morning.

Very useful blog for budding entrepreneurs. Thanks a lot.

I need your help for my plan to build a Solar Manufacturing unit (both cells and module assembly upto 20MW). Explain in details like Land required, initial investment and equity tie-up or angel investors, solar cell manufacturing license (if required), etc.

Please reply and help me to understand.

Thanks and Regards,

S.SATHISH,

Trichy



Jitender Sangwan | [April 18, 2012 at 4:46 am](#) | [Reply](#)



Hi Rajendra,



Thanks for providing your valuable inputs above on solar business in India, I would also like to get into solar business in India but I really dont know where to start from? I would be indebted if you guide me on this. my email id is sangwan.jitender@gmail.com.

Looking forward to hear from you soon.

Regards,
Jitender Sangwan

[Rajendra Shrivastav](#) | [June 10, 2012 at 11:43 am](#) | [Reply](#)



Jitender,

Please go to the State Renewable Energy Department to gather information about hot selling Solar Products in your state. There will be many approved vendros already in this area that will tell you the type of products they were selling and also give idea on competition in business.

You will need some knowledge about subsidies given by State,the solar potential of the state, basic technical knowledge of solar science to be successful with your clients. I suppose most of them (cleints) will be somewhat educated and would expect educated replies to their queries.

Rajendra

deepaksharma | [April 30, 2012 at 7:45 am](#) | [Reply](#)



Dear sir ,
i am interested to get agency of solar power product in Punjab kindly
kindly guide me where should i get it
Regards
deepak sharma

[Rajendra Shrivastav](#) | [June 10, 2012 at 11:40 am](#) | [Reply](#)



Deepak,

Please go to the State Renewable Energy Department , located in Chandigarh, to gather information about hot selling Solar Products in Punjab state region. There will be several approved vendros already in this area that will tell you the type of products they were selling and also give idea on competition in business.

You will need some knowledge about subsidies given by State,the solar potential of Punjab state, basic technical knowledge of solar science to be succesful with your clients. I suppose most of them (cleints) will be somewhat educated and would expect educated replies to their queries.

Rajendra

[radha solar](#) | [May 2, 2012 at 7:11 am](#) | [Reply](#)



Dear Sir/Madam,



We would like to introduce ourselves as manufacturers of solar products.
Organizations manufacturing solar products at a most competitive price.
We as an Indian manufacturer have given utmost attention to the cost without compromising with the quality.

Thank you
Rahul Soni
+91-9815097248
Radha Energy Cell
Manufacturer & Exporter
1st Floor Deol Market Rajesh Nagar
Badi Haibowal, Ludhiana Punjab, India
<http://www.radhasolar.com>, <http://www.solarexporterindia.com>,
<http://www.solarandlights.com>
Email:- mkt@solarexporterindia.com, pur@radhasolar.com
+919888897248, +919815097248
office:-0161-6572248,0161-2302179

skypee :- rahulsoni14
facebook :- [rahul_soni47@yahoo.com](https://www.facebook.com/rahul_soni47@yahoo.com)

Veera Govinda Harsha Nallam | [May 6, 2012 at 3:48 am](#) | [Reply](#)



HI Sir,
This harsha from andhra pradesh,india.I have seen your blog i have gain some knowledge from this blog...Thank you.

Sir i am interested to start a company on solar panels manufacture company in andhra pradesh, india. I need information on regarding how the solar panels manufacture in future? How to start the company? Is there any subsidies?How much budget?

can u plz give me information on this.
My Mail id :- nallamharsha@gmail.com
my mobile no:- 9989166696

Rajendra Shrivastav | [June 10, 2012 at 11:37 am](#) | [Reply](#)



Veera Govinda,

There is lot of information in market on this subject. Bascially you will need 2-4 million USD per 20 MW / yr production facility plus land / facilities cost etc. You will also need a lot of working capital to buy Cells, back sheets, Al frames, junction boxes, EVA, Tedlar etc. Keep another 5-10 million for working capital to run the business. There are more than 25 panel producers in India. Get to know some of them and it will help you to decide on the business investment.

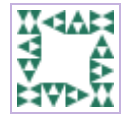
The threats are from old producers with depreciated plants. They are able to sell Panels at lower cost and match market prices. Market prices are erratic or tumbling for many months. You will

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face problems / price pressues in selling in free market.

Rajendra

pallav | [May 15, 2012 at 1:57 pm](#) | [Reply](#)



Dear Rajendra Sir,

I introduce myself as Mr.Pallav Jain having business in the field of Refrigeration And Air-conditioning.

I was exploring about the business opportunities in solar (renewable)

To be very frank, We have team of four person who all are engineers from Nirma University and have well settled family business.

But we all four have decided not to join the same and work together for a good business opportunity. There were two things that we were exploring.

1. import of related materials for indian market. We want to develop a trading firm where solar related materials can be traded with manufactureres.
2. Manufacturing of briquettes to replace coal. It is also a form of a renewable source of industry. However we are having limited knowledge about this solar industry and would like to know more.

Is there any scope of involving the trading of solar materials ?

We are positively looking forward to your response.

regards
pallav

Rajendra Shrivastav | [June 10, 2012 at 11:29 am](#) | [Reply](#)



Pallav,

Most of the Solar Materials for panel production are produced in North America and Europe. For Cells raw material (other than silicon wafers) there are few companies and they are too big to be given any competition at all by start ups and they exist in India in big way like Linde etc.

For supply to panel manufacturers , it is a matter of due diligence and already the market is flooded with existing suppliers. So far briquettes are concerned, I know about it but not enough to advise for setting up a new business.

Rajendra

coolpriti123 | [May 19, 2012 at 9:00 am](#) | [Reply](#)



Hello Mr. Rajendra Shrivastav,
First of all many thanks, for a serious and a useful blog.

I would be grateful if you could mail me the info at my email ID: coolpriti123@yahoo.com



regarding starting up this business with a capital of around Rs. 10 lacs to start with.

Thanks & Regards

[Rajendra Shrivastav](#) | [June 10, 2012 at 11:23 am](#) | [Reply](#)

I do not suggest you step into this business with such small capital investment.



amit | [May 27, 2012 at 7:02 am](#) | [Reply](#)

dear sir

i want to know about this business.please give me complete details for about it.i am waiting your response.

regards

amit



[Rajendra Shrivastav](#) | [June 10, 2012 at 11:22 am](#) | [Reply](#)

Please be specific about your question. R you looking at Solar products aor Solar Project?



ashok | [June 3, 2012 at 1:49 pm](#) | [Reply](#)

hello sir i need to know about all tax exemption and all subsidies that i can get up setting a 30mw project in andhra pradesh

i have enough fundind for this,

but still require ur suggestion on this...

my mail id is s.ashoksharma1988@yahoo.com

may be u can be our advisor of our firm



[Rajendra Shrivastav](#) | [June 10, 2012 at 11:18 am](#) | [Reply](#)

Ashok,

This is State specific issue. It also requires some due diligence on your part. I can propsoe that you look at the following items as part of your project financial viability:

1. Land cost will be given by the state at some concessional rate. 30 MW will need 120 Acres of fallow land. In case you have your own land, good luck.
2. You need to know very precisely the DNI and HNI (direct Solar and Horizontal Insoaltion rates) at the exact location you prppose to set up the plant. This will determine many issues like technology choice between solar panels versus Concentrated Photovoltaic (CPV) versus tracking versus fixed axis panels etc.
3. Many a times you can buy this data and also source from free web sites maintained by international bodies (NASA) and Solar Energy Centre (SEC) of MNRE, India. Best bet is to set up your own data generation hardware (Solar Insolation rate measuring instruments) at the proposed site. This will give you the whole year round, actual ground numbers on DNI / HNI etc. This small pre-investment is worth (under INR 30 lakhs) when compared to the overall cost of the project running into about INR 250 – 270 crores or more. You will have reliable soruce to predict the Financial viability with this approach.
4. Tax exmpetions will be mainly on Tax Free Holidays for many years, Accelerated



Depreciation still allowed till Direct Tax Code (DTC) comes into force, Carbon Credit as your project size is quite large, you can get long term PPA with State and / or extra revenue by selling on Energy Exchange under RPO obligations etc.

5. If you have enough equity funding I will suggest that you engage amongst the reputed / proven EPC contractors in solar business. This will allow you two critical controls. Firstly, the banks will agree to fund the debt based on your EPC supplier's track record and secondly you will be assured of energy/ electricity delivered each year against the EPC guarantees / warranties. Most of Solar developers have come to regret there viability expectations due lower than expected Capacity Utilisation Factor (CUF) once the plant were commissioned.

Remember that due to high tariff (8-12 INR per Kwhr) , each % loss in CUF will lead to huge drop in top line and IRR (generally CUF is about 18-20% only, based on location in India).

6. You can also test you business model by approaching IREDA (located in New Delhi at Bhikaji Cama Place) for loan and fill their forms. Ireda has experts and they will evaluate your project thoroughly ,ask good questions as they have learnt over years from the experience of many Solar investors in India. The EPC contractor should be able to sail through your proposal with IREDA, provided it had previous experience of similar project in India. Other public sector funding could be PFC in Delhi.

7. I do not advise you against fee. This is free knowledge I am willing to offer, to the extent I know about Solar Business in india and abroad.

8. I am travelling all the time, busy with my existing commitment for work. Kindly hire services of professional Solar Expert, I guess there one too many now a days, so be careful.

LKN | [June 6, 2012 at 5:41 pm](#) | [Reply](#)

Hello sir,

Thanks for writing nice blog.Im from north bengal willing to start a solar product business.What is the scope of dealership/franchise.



Rajendra Shrivastav | [June 10, 2012 at 10:45 am](#) | [Reply](#)

LKN,

Please go to the State Renewable Energy Department to gather information about hot selling Solar Products in North Bengal region. There will be many approved vendors already in this area that will tell you the type of products they were selling and also give idea on competition in business.

You will need some knowledge about subsidies given by State,the solar potential of North Bengal, basic technical knowledge of solar science to be successful with your clients. I suppose most of them (clients) will be somewhat educated and would expect educated replies to their queries.

Rajendra



rajashekar reddy | [June 12, 2012 at 11:28 am](#) | [Reply](#)

i have a thought to start to small solar panel company then how much i need to invest money . please send or post details sir pls.....



Arvind S. Sisodia | [July 1, 2012 at 4:09 pm](#) | [Reply](#)



Dear Mr. Rajendra,

Basically i am from Gujarat and would like to start Solar PV Power generation plant in Mumbai , we have 600 Acres of land in Mumbai which is located on the sea shore, i have some knowledge about it and wanted to know more about it, if possible can you suggest me exact process to start.



My id is- arvind.sisodia99@gmail.com

Best regards

Arvind

[Rajendra Shrivastav](#) | [January 18, 2013 at 6:08 pm](#) | [Reply](#)

Please contact BP Solar located in Mumbbai. They have experts who can propose the best solution taking into account the city Solar Radiation data.



Sundeep | [July 7, 2012 at 11:10 am](#) | [Reply](#)

Hello Sir,

Liked your blog.

I am interested in setting 1MW solar power plant in Shekhawati Rajasthan.

Can you please let me know the details like total fund requirement, working capital, skilled labor, government subsidies, etc.

Sundeep



[Rajendra Shrivastav](#) | [January 18, 2013 at 6:13 pm](#) | [Reply](#)

1 MW is too small and you will waste your time and money. Any way 1 MW will cost you about 10 – 12 crores investment. No government subsidy but you can sell power to the state government at fixed cost. it depends on the state regulations that you can get on net or from Rajasthan Renewable Energy Agency in Jaipur city. You will require about 5 acre for one MW but for many MWe the rule of thumb is 4 Acres per MW.

You will require technical experts to design and install the plant. Operation and Maintenance you can do your self if you take interest on your own. few people are needed to operate 1 MW.

Rajendra



[Kunjam](#) | [July 18, 2012 at 5:56 am](#) | [Reply](#)

Dear Sir,

I am a manufacturer of solar lights. My company is running in loss. I have good products but not able to market effectively. Pl advise me on advertising. where all should I advertise keeping in mind that my financial strength is very low. Also, what are other ways to increase my sales.

Thanks

Kunjam



[Rajendra Shrivastav](#) | [January 18, 2013 at 6:15 pm](#) | [Reply](#)



Kunjam,

Where are you located? One of the way is to tie up with NGOs who are funded to install Solar Lights in remote villages. For example contact Winrock or TERI. They have programs that require Solar lamps for rural installation.

Rajendra

[Rajesh](#) | [July 28, 2012 at 10:04 am](#) | [Reply](#)



Hello Sir,

We Want to start a solar panel manufacturing unit in Bihar, kindly suggest us that how we could start. we have more than 50 acres of land and all kind of basic infrastructure are available.

Rajesh

[Rajendra Shrivastav](#) | [January 18, 2013 at 6:18 pm](#) | [Reply](#)

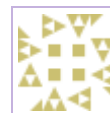


Rajesh,

As of today this is risky business. The Solar Panel costs are dropping globally and you will not be able to match the prices. With 50 Acres of land you can do other business or even set up solar power generation plant. You can join hands with investors who are looking for land in good states where Sun shines with good Solar radiation intensity.

Rajendra

[Vinnu](#) | [July 28, 2012 at 1:26 pm](#) | [Reply](#)



Hello sir,

I am from Andhra Pradesh. I completed my graduation in electrical engineering and I'm interested in investing and starting a small scale plant. Can you please help me in this thing.

[Rajendra Shrivastav](#) | [January 18, 2013 at 6:19 pm](#) | [Reply](#)



Please read my replies to so many queries like you have to judge for yourself.

[Rishav](#) | [August 20, 2012 at 11:49 am](#) | [Reply](#)



Thanks for a wonderfull blog, I am interested to do marketing & installations of offgrid solar air conditioners and many more solar products in north India , could you please suggest me how should i start.....

[Dilip Purohit](#) | [September 26, 2012 at 10:43 am](#) | [Reply](#)



Dear Sir,

I m an engineer by profession.

I Have the knowledge of installing the roof top solar power plant, and i m interested in doing the roof top installation business (Roof top EPC).

How big the scope is there for this market and when the market is going to boom for roof top in india. ?

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how much will be the minimum capital required to start this business.
We are planning to do 1Kw to 100Kw range of projects.
suggest Me please.

Rajendra Shrivastav | February 11, 2013 at 6:27 pm | [Reply](#)



Purohit,

In my view the Roof Top will be long term business in India.

The question of capital depends on the orders you will have and mostly in the form of working capital. Given the nature of work, the working capital will be 80% of your order value.

Rajendra

Saif | October 9, 2012 at 5:13 am | [Reply](#)



Sir i am from Maharashtra, above blog is so useful. I am interested in the business of generating electricity from solar. I have 4-5 acres of land but i am an common man, i want to know about the cost to form the solar electricity generation plant and is govt. of India or Maharashtra gives loan or support for it.

Rajendra Shrivastav | October 28, 2012 at 1:02 pm | [Reply](#)



Saif,

Please read this reply I gave to a few queries. I hope this will help:

This is State specific issue. It also requires some due diligence on your part. I can propose that you look at the following items as part of your project financial viability:

1. Land cost will be given by the state at some concessional rate. Typically , 30 MW will need 120 Acres of fallow land. In case you have your own land, good luck.
2. You need to know very precisely the DNI and HNI (direct Solar and Horizontal Insolation rates) at the exact location you propose to set up the plant. This will determine many issues like technology choice between solar panels versus Concentrated Photovoltaic (CPV) versus tracking versus fixed axis panels etc.
3. Many a times you can buy this data and also source from free web sites maintained by international bodies (NASA) and Solar Energy Centre (SEC) of MNRE, India. Best bet is to set up your own data generation hardware (Solar Insolation rate measuring instruments) at the proposed site. This will give you the whole year round, actual ground numbers on DNI / HNI etc. This small pre-investment is worth (under INR 30 lakhs) when compared to the overall cost of the project running into about INR 250 – 270 crores or more. You will have reliable source to predict the Financial viability with this approach.
4. Tax exemptions will be mainly on Tax Free Holidays for many years, Accelerated Depreciation still allowed till Direct Tax Code (DTC) comes into force, Carbon Credit as your project size is quite large, you can get long term PPA with State and / or extra revenue by selling on Energy Exchange under RPO obligations etc.
5. If you have enough equity funding I will suggest that you engage amongst the reputed / proven EPC contractors in solar business. This will allow you two critical controls. Firstly, the banks will agree to fund the debt based on your EPC supplier's track record and secondly you

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will be assured of energy/ electricity delivered each year against the EPC guarantees / warranties. Most of Solar developers have come to regret there viability expectations due lower than expected Capacity Utilisation Factor (CUF) once the plant were commissioned.

Remember that due to high tariff (8-12 INR per Kwhr) , each % loss in CUF will lead to huge drop in top line and IRR (generally CUF is about 18-20% only, based on location in India).

6. You can also test you business model by approaching IREDA (located in New Delhi at Bhikaji Cama Place) for loan and fill their forms. Ireda has experts and they will evaluate your project thoroughly ,ask good questions as they have learnt over years from the experience of many Solar investors in India. The EPC contractor should be able to sail through your proposal with IREDA, provided it had previous expereince of similar project in India. Other public sector funding could be PFC in Delhi.

7. I do not advise you against fee. This is free knoledge I am willing to offer, to the extent I know about Solar Business in india and abroad.

8. I am travelling all the time, busy with my existing commitment for work. Kindly hire services of professional Solar Expert, I guess there one too many now a days, so be careful.

Hemant Agrawal | [October 14, 2012 at 8:52 am](#) | [Reply](#)



Hi Rajendra,

I am interested in investing in solar power plant in Chhattisgarh. What are the prospects of a 2 MW Solar PV Plant. Subsidy offered is about 50-60 % ...what would be return on investement/profit margin.

It would be very helpful if you could provide some insight on it.

Rajendra Shrivastav | [October 28, 2012 at 1:00 pm](#) | [Reply](#)



Hemant,

Following reply I gave to another query of similar nature, I hope it will help:

This is State specific issue. It also requires some due diligence on your part. I can propsoe that you look at the following items as part of your project financial viability:

1. Land cost will be given by the state at some concessional rate. 30 MW will need 120 Acres of fallow land. In case you have your own land, good luck.
2. You need to know very precisely the DNI and HNI (direct Solar and Horizontal Insoaltion rates) at the exact location you prppose to set up the plant. This will determine many issues like technology choice between solar panels versus Concentrated Photovoltaic (CPV) versus tracking versus fixed axis panels etc.
3. Many a times you can buy this data and also source from free web sites maintained by international bodies (NASA) and Solar Energy Centre (SEC) of MNRE, India. Best bet is to set up your own data generation hardware (Solar Insolation rate measuring instruments) at the proposed site. This will give you the whole year round, actual ground numbers on DNI / HNI etc. This small pre-investment is worth (under INR 30 lakhs) when compared to the overall cost of the project running into about INR 250 – 270 crores or more. You will have reliable soruce to predict the Financial viability with this approach. I do not know who will give this 40 – 50% subsidy?



4. Tax exemptions will be mainly on Tax Free Holidays for many years, Accelerated Depreciation still allowed till Direct Tax Code (DTC) comes into force, Carbon Credit as your project size is quite large, you can get long term PPA with State and / or extra revenue by selling on Energy Exchange under RPO obligations etc.
5. If you have enough equity funding I will suggest that you engage amongst the reputed / proven EPC contractors in solar business. This will allow you two critical controls. Firstly, the banks will agree to fund the debt based on your EPC supplier's track record and secondly you will be assured of energy/ electricity delivered each year against the EPC guarantees / warranties. Most of Solar developers have come to regret their viability expectations due lower than expected Capacity Utilisation Factor (CUF) once the plant were commissioned. Remember that due to high tariff (8-12 INR per Kwhr) , each % loss in CUF will lead to huge drop in top line and IRR (generally CUF is about 18-20% only, based on location in India).
6. You can also test your business model by approaching IREDA (located in New Delhi at Bhikaji Cama Place) for loan and fill their forms. Ireda has experts and they will evaluate your project thoroughly ,ask good questions as they have learnt over years from the experience of many Solar investors in India. The EPC contractor should be able to sail through your proposal with IREDA, provided it had previous experience of similar project in India. Other public sector funding could be PFC in Delhi.
7. I do not advise you against fee. This is free knowledge I am willing to offer, to the extent I know about Solar Business in India and abroad.
8. I am travelling all the time, busy with my existing commitment for work. Kindly hire services of professional Solar Expert, I guess there are too many now a days, so be careful.

Irfan Qureshi | [October 24, 2012 at 9:37 pm](#) | [Reply](#)



Mr. Rajendra

Thanks for giving enlightening information,

I am having 40 acres of land between Mumbai and Pune, please guide me can I put solar energy plant

Rajendra Shrivastav | [October 28, 2012 at 12:56 pm](#) | [Reply](#)



Irfan,

I am tempted to insert the reply I gave to one similar question for your immediate attention as under:

This is State specific issue. It also requires some due diligence on your part. I can propose that you look at the following items as part of your project financial viability:

1. In case you have your own land, good luck.
2. You need to know very precisely the DNI and HNI (direct Solar and Horizontal Insolation rates) at the exact location you propose to set up the plant. This will determine many issues like technology choice between solar panels versus Concentrated Photovoltaic (CPV) versus tracking versus fixed axis panels etc.
3. Many a times you can buy this data and also source from free web sites maintained by international bodies (NASA) and Solar Energy Centre (SEC) of MNRE, India. Best bet is to set up your own data generation hardware (Solar Insolation rate measuring instruments) at the proposed site. This will give you the whole year round, actual ground numbers on DNI / HNI etc. This small pre-investment is worth (under INR 30 lakhs) when compared to the overall

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cost of the project running into about INR 250 – 270 crores or more. You will have reliable source to predict the Financial viability with this approach.

4. Tax exemptions will be mainly on Tax Free Holidays for many years, Accelerated Depreciation still allowed till Direct Tax Code (DTC) comes into force, Carbon Credit as your project size is quite large, you can get long term PPA with State and / or extra revenue by selling on Energy Exchange under RPO obligations etc.

5. If you have enough equity funding I will suggest that you engage amongst the reputed / proven EPC contractors in solar business. This will allow you two critical controls. Firstly, the banks will agree to fund the debt based on your EPC supplier's track record and secondly you will be assured of energy/ electricity delivered each year against the EPC guarantees / warranties. Most of Solar developers have come to regret their viability expectations due lower than expected Capacity Utilisation Factor (CUF) once the plant were commissioned.

Remember that due to high tariff (8-12 INR per Kwhr) , each % loss in CUF will lead to huge drop in top line and IRR (generally CUF is about 18-20% only, based on location in India).

6. You can also test your business model by approaching IREDA (located in New Delhi at Bhikaji Cama Place) for loan and fill their forms. Ireda has experts and they will evaluate your project thoroughly ,ask good questions as they have learnt over years from the experience of many Solar investors in India. The EPC contractor should be able to sail through your proposal with IREDA, provided it had previous experience of similar project in India. Other public sector funding could be PFC in Delhi.

7. I do not advise you against fee. This is free knowledge I am willing to offer, to the extent I know about Solar Business in india and abroad.

8. I am travelling all the time, busy with my existing commitment for work. Kindly hire services of professional Solar Expert once you are serious to start implementation, I guess there one too many now a days, so be careful. Please make a financial model before putting your money, it will be state specific as the prices for Solar Electricity will be what would be applicable in Maharashtra State.

Rajendra Shrivastav | [February 11, 2013 at 6:25 pm](#) | [Reply](#)



Irfan,

Rule of thumb is 5 acres is needed for 1 MW capacity Solar power plant that can be connected to the grid.

You will need about INR 8 crores per MW to invest, power can be sold to State Government at rates (Rupees per unit) fixed as per the Maharashtra Electricity Regulatory Commission (MERC) orders.

In case you wish to put your money please hire a EPC company of international repute or you will run into huge problems and long term investment loss.

Rajendra

N H RAO | [January 11, 2013 at 10:52 am](#) | [Reply](#)



hi rajendra

we would like to start a solar system for small business / industries need like hotel , trading



distributors etc in near by our dist , plz info any useful info. to email id :

yms.vizag@rediffmail.com

Balaji | [February 4, 2013 at 5:46 am](#) | [Reply](#)



Dear Rajendra

Thanks for all the info. and appreciate your time. Keep up the good work.! Would like to meet up when you are in chennai.!

15 yrs IT veteran.!) with a desire in solar industry.

Srikanth | [February 5, 2013 at 6:29 am](#) | [Reply](#)



Hi Rajendra Shrivastav,

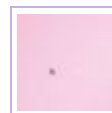
This is Srikanth from Hyderabad, wanting to start a solar power plant near my home town which is abundant with sun light for major part of the year. But wanting to know few basic details to start off.

Below are my queries.

- 1) What would minimum investment and minimum area required to start a plant
- 2) Whom should be approached to start a plant and what are the approvals needs to be taken and from whom.
- 3) Managing tasks involved in a plant
- 4) Once the power is generated, how to proceed with the tie-ups (with government?, industries? etc.)

Thanks,
Srikanth.

Sachin Gadher | [May 11, 2013 at 1:51 pm](#) | [Reply](#)



Respected Sir

My self sachin Gadher From Rajkot Guajrat.

I in at verge to starting the business of solar panels manufacturing and installation.

But i am not able to get the information regarding the permission to be taken from government to start this business.

so plz. give some guidance about it..

regards

sachin gadher