PFS Web Conference

Solar Power - Project Development, Financing and Operation

FAQs

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FAQs on Solar Power Project Development, Financing and Operation

PTC India Financial Services Ltd (PFS) provides financing solutions to the energy value chain, which inter-alia includes extending fund & non-fund based financial assistance and debt syndication to power projects in generation, transmission, distribution, fuel sources, infrastructure logistics etc. Some key solutions include structured debt, mezzanine funding and last mile financing. With special focus on Renewable Sources of energy, around 50% of PFS portfolio constitutes Renewable Energy projects.

The Central Government as well as State Governments' are giving major focus on solar power in their drive to 'Power for All'. The revised goal of solar power generation capacity from 20,000 MW to 1,00,000 MW by 2022 is an ambitious target which will make India as one of the largest green energy producers in the world. The total investment towards this ambitious target is estimated at around Rs. 7 Lac Crore.

To provide a platform for stakeholders to discuss the issues and challenges in the Solar Power segment, PFS organized a web conference on "100 GW of Solar Power by 2022 - Roadmap to Target" on 30th October 2015. The conference was a great success with participation from the investors, lending community, developers, market analysts and other stakeholders. During the conference, issues and challenges present in the sector, mitigation measures and way ahead were discussed and a large number of questions across the solar power project development – conceptual, technical, implementation, operational were responded by our eminent panel.

For larger benefit of the stakeholders and at the request of the participants, interactions held during the web conference have been compiled in the form of an FAQ. The same is attached herewith.

We hope you would find the same useful.

Best Regards,

Ashok Haldia

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PFS Web Conference – Frequently Asked Questions

1. About PFS and its performance

Q: Kindly brief about PTC India Financial Services?

A: PTC India Financial Services Limited, also known as PFS, is one of the leading Financial Institutions particularly into the renewable energy space. It is an Infrastructure Finance Company and seeks to provide financial assistance to projects in the energy value chain. It has an objective to enter into relationship much beyond the financing of power projects by adding value in the project during the entire project life cycle.

Q: What are the financial instruments offered by PFS?

A: PFS provides array of financing products which caters to needs of developers during different phases of project development. These products range from mezzanine funding to debt related instrument such as Project Finance.

Q: What is the general approach of PFS while financing any project?

A: The key approach of financing any project in PFS is the risk based approach. Starting with the profile of the Project and the Promoter, PFS experts (who are drawn from the various areas of the power sector) sit across with the project team and the developer and based on the risk analysis and suggestive mitigation measures; a financing product is structured specific to the project. This makes PFS a different and distinct Financial Institution in the country.

Q: What are the general sanction terms stipulated by PFS for sanctioning power projects?

PFS endeavours to stipulate Terms and Conditions which are mutually acceptable to both PFS and the borrower. However, the broad terms of sanction depend upon a number of factors such as borrower's credit history, financial strength, status of project land, contractual tie up etc.

Q: What is PFS exposure in renewable sector particularly in solar sector?

A: Since its inception in 2007, PFS has accorded sanctions of over Rs. 10,000 Crores to different projects across the energy value chain. Out of this, 48% are in the renewable energy segment. Solar is one of the important constituents of PFS renewable energy portfolio. PFS has financed more than 27 solar power projects throughout the country and almost all eminent solar power developers have been financed by PFS.

Q: What is the usual term for financing solar power projects and how has been the experience of PFS in the last 2-3 years?

A: The experience with solar sector has been quite good and it has further improved during the last 2-3 years. Initially, there were concerns regarding construction risk and performance of the projects on account of a relatively new sector. However, with the commissioning of several projects within a period

of one year, confidence in the sector has improved a lot. Nowadays, projects are getting commissioned within 3-4 months post receipt of all necessary approvals.

Q: How is PFS trying to solve the concerns related to setting up of solar power projects?

A: Solar Power is on top of PFS agenda and PFS is giving special focus and emphasis towards the segment. However, the key concerns are Financial and Operational capabilities of the developer and viability of the projects. PFS also takes into account risks associated with solar projects which include a) Counter Party Risk, b) Land availability and c) Availability of Evacuation Infrastructure besides other factors. PFS tries to mitigate these risks through customized financial instruments.

2. About Solar Power, Bankability and Parity

Q: Is solar power parity expected to be achieved?

A: There is a declining trend in Capital Cost of solar power projects and during the last 3-4 years, capital costs have been reduced by around 50% and are expected to decline further. On account of lower costs and the recent bids for solar projects, solar power is expected to achieve grid parity in the next 3-4 years. Even today, solar tariffs are comparable with tariffs for commercial and industrial establishments.

Q: How does PFS see the bankability of solar power projects?

A**:** Presently we still do not have any mechanism which can provide clarity on the bankability of the projects. In India, currently we do not have a mechanism like white list of the EPC contractors or the white list of the equipment suppliers and their monitoring by the bank or another body which helps the bank unlike Europe or United States where there is a clear distinction of brands, products, EPC contractors etc. in terms of their bankability.

In India, we need to establish bankability of PPAs and Projects which should come as early as possible to improve the quality of EPC as well as the products.

Q: What is the expected PLF with Solar plants?

A: In India, the expected PLF varies from 17% to 21% with a fixed tilt system. It also varies from state to state. With the use of single axis tracker, those numbers would be further going up by around 3%. So the expected PLF considering trackers could vary from 21% to 24 %.

3. About Rooftop Projects

Q: How is solar rooftop capacity expected to be developed in the future?

A: Apart from the utility scale solar projects, other promising area in the context of the solar power is the roof top solar power projects. The government expects to achieve 40,000MW of solar rooftop capacity by 2022 and considering the pace and the development globally combined with the Government's focus and incentives, it seems achievable. More than 13 states have come out with the policy on roof top solar power projects including about 17-18 states on the net metering policy.

Q: What is PFS exposure in the solar rooftop sector?

A: Solar roof-top is an emerging sector. As far as PFS is concerned we are supporting rooftop power projects as well. We have financed a couple of rooftop projects and those accounts are working satisfactorily.

4. About 100 GW Solar Power Target

Q: Is 100 GW of solar power capacity achievable and how is the global solar market expected to evolve?

A: 100 GW of solar capacity by 2022 is ambitious but keeping in view the growth in solar power capacity installations in the last 4 years (having compounded growth rate of 50%), the policy initiatives, the legal initiatives and the regulatory initiatives the target seems achievable.

Globally during the last 10 years, the compounded growth rate has been more than 50% for solar capacity installation. Also by 2020, the global target for solar power is achievement of 700 GW capacity, which implies capacity growth of over 50%. Hence, keeping in view the above points, 100 GW of solar power capacity is well within the reach.

Q: What are the critical concerns which need to be resolved for achieving 100 GW of solar power capacity and how is PFS addressing those issues?

A: The first and the foremost concern is the health of the state DISCOMS and the developers' ability to mitigate the counter party risk. The state board policies must provide some mechanism to be able to pay for the solar power purchase. As a lender, PFS has been addressing that situation by providing more than normal working capital margins. As per PFS experience, there may be a delay but not denial in payment by the state DISCOMS. Besides, recently, the Ministry of Power, Government of India has also announced key reforms which are likely to improve health of state DISCOMS by transferring majority of their debt to State Governments and reducing interest costs. Hence certain risk exists but the same can be mitigated as well.

Another concern is the availability of the adequate finance for installing the targeted 100 GW of solar capacity. It is not only related in terms of the amount but also in terms of the financial products which have a longer tenure and a relatively lower cost of capital. Today the cost of the capital, i.e. the interest rates for the solar power projects have reduced considerably and are expected to go down further.

Other equally important concerns are related to the land acquisition and evacuation infrastructure for the solar power projects. The government is also concentrating on that and they have plans like the Green Corridor etc. The government is also constantly putting other efforts to mitigate these problems.

To see the overall picture, one feels that the 100 Gigawatts capacity is achievable but there are certain imperatives as would always be the case when one set up an ambitious target and starts moving towards achieving those targets.

5. About EPC Contracts

Q: What are the major issues being faced by the EPC contractors in implementing a solar project?

A: Apart from the key challenges of land acquisition and transmission infrastructure, pricing is the biggest challenge. When a developer is bidding a project and anticipating the EPC price which will enable them to win the bid, the limited time and quality which is required for the project becomes a concern.

The second thing is the solar panels. Today most of the solar panels being used are imported panels and there are concerns regarding their serviceability, maintenance and test facilities in India over the economic life of the project.

Q: What are the components of EPC pricing and how competitive is it?

A: EPC includes lot of components like steel and foundation and we are constantly talking about how to reduce the EPC price. When the new business entrants are coming either on a PPA side or on an EPC side then, there is a pressure, they are ready to pay the entry price and this is again the beginning of a challenge for all for competing with them and finally maintaining quality, reliability and the pricing in this scenario.

Q: How much EPC contractor margin would be factored in the project cost?

A: Anywhere between 5% to 10%. Today majority of reputed developers are doing in-house EPC.

6. About Project Development

Q: What are the challenges faced by a developers in the initial stage of development and during acquisition of the land?

A: On the development side, once a tender is out, the developer starts looking for sub-stations where they can evacuate power. This often leads to a stressful situation on the execution side, since the overall time available for implementing a project is limited. Some of the new tenders like that of Telangana state have been very good, with clarity on evacuation infrastructure which helps the developers in bidding accordingly.

Availability and acquisition of land in the vicinity of substations also becomes an issue. The moment a sub-station is specified, land prices go up. We have also seen that in some of the states like Punjab where land is very expensive and one has to lease out private land. Creating mortgage on a private land is an issue and even lenders are sometimes not very comfortable with the process. But we need to realize that this is how projects are going to be developed and all the stake holders need to come up to it and make sure that the projects are moving well.

Q: How is the experience of developers in getting project approvals once a project is awarded to a developer?

A: Some of the permits and clearances required for setting up the project are Consent to Establish approval from Pollution Control Board, conversion to NA, etc. It may take considerable time for

obtaining some of the clearances which affects the project implementation. Quite a few of the states have single window clearance, some of them are very effective like in Punjab but in several other states it's not always the case. These challenges are yet to be addressed.

Q: Kindly enlighten us on the financing of solar power projects as seen by the project developers?

A: Lot of the lenders initially used to insist that project appraisal will not be done till the time land is in possession. Now lenders have become comfortable with solar, they know the timelines are smaller for construction and some of them are ready to give sanctions with a pre disbursement condition of land availability, and to mention specifically, PFS is one of the lenders who have specifically addressed this issue for developers and it's definitely a welcome move on part of developers.

Also non-recourse financing is still not fully available, lenders do insist for some sort of corporate guarantee or sponsor support during construction period. It is still okay upto construction stage but anything beyond that should be avoided. Most lenders are comfortable with around 15 years of tenor. Making the financing timelines longer will enable a developer to lower the cost of financing, leading to lower cost of power.

Q: If we see globally, the interest costs are significantly higher in India. In solar power sector, one of the major costs is appreciation of the interest rate. Do we see more MNC's coming into our country and eventually taking over the market from domestic players. How do you see that?

A: Presently, considering the foreign interest cost combined with hedging costs and processing charges, there is not much difference between Indian interest cost and foreign value cost. So if somebody comes up with some innovative financial instrument then only it is possible. Else in the present scenario, even the foreign players which intend to establish solar plants in India, they are looking at domestic sources of debt funding.

Q: What is your view on raising equity for setting up solar projects?

A: Raising equity is easy in other countries as compared to that in India particularly for a solar project development. When one talks about the return on equity of 12% to 14%, raising equity is going to be a challenge for a long time and a concern towards reaching 100 GW target.

Q: What is the return expected from the solar power projects?

A: Presently, high returns are expected from low risk projects. The market is competitive; the projects carry almost no risk as there is hardly any variability. So the return expectations should be much lower from the investors also for the sector to grow in a big manner. We are now seeing the desirable trend towards reduction in interest rates and the lenders need to pass on those benefits so that the developers can make some decent returns on these projects.

7. About Counterparty Risk and PPAs

Q: How do project developers see the counter party credit risk?

A: DISCOMS financial health is a concern. Also some of the lenders are always trying to push for offtaker risk to be taken by the sponsors which is not easy for a sponsor to bear. Government is taking initiatives in this direction to improve the overall financial condition of the DISCOMS and everybody needs to work together to address this issue.

Q: Suppose a developer has executed PPA at a tariff of Rs. 8- 9 per unit and today the quote is around Rs. 6 per unit. Will the DISCOMS come back and ask for a reset in tariff? How is this risk covered?

ANS: Very clearly, DISCOMS shouldn't come back and do that because those projects were implemented at higher capital costs prevailing at that point of time that is why higher tariffs were worked out. There was a discussion by the Gujarat DISCOM to reduce the tariff which was not approved by the Hon'ble High Court of Gujarat. Furthermore, these PPA were signed for a period of 25 years and are need to be honoured to ensure viability of the projects. If the tariff is re-negotiated, it may give a negative message to the sector and may discourage the investors looking at this market.

8. About Construction Phase

Q: What are the challenges being faced by a developer during the construction phase?

A: A lot of social and local issues are faced while implementing these projects. Generally the local people want to work on the project even if they don't have necessary skills. They want people to be hired locally, which sometimes delay the projects.

The other problem is the unavailability of skilled manpower. Manpower required for setting up the project and the relevant training institutes are comparatively lesser than what is needed.

Right of way for transmission lines is always a challenge, and people understand that the entire project is at stake if the transmission line is not constructed, hence developers sometimes extortion threats. When it comes to grid infrastructure it is seen that sometimes when a developer is ready with transmission line along with physical completion of plant, the grid infrastructure, bay construction, upgradation of transformer capacity etc. is not completed. To address these issues, DISCOMS should have uniform permits, clearances requirements, policies which would make it much easier for developers to build and evaluate their financial returns accordingly.

Q: What are the local stakeholders issues seen during project implementation?

A: Generally local people want to be associated with the project even if they don't have necessary skills for working on such projects. They want people to be hired locally, which may delay some of the projects.

The other problem in this regard is the availability of skilled man power. Man power required for setting up the project and the relevant training institutes are comparatively lesser than what is needed.

9. About Operation Phase

Q: What are the problems faced by developers during operational period and in PPA of solar power projects?

A: The grid availability needs to be really good, this has lots of implications on developers' returns, and hence many PPAs have the condition that it's a take or pay contract but in reality it is not followed.

When it comes to PPA's, we still don't have adequate payment security mechanism. If we have to achieve the targeted capacity additions, we will have to attract lots of international financing institutions who will always look for very sound contracts, strong obligation of the offtaker which is generally much diluted in our PPA's.

Q: What bottlenecks do you expect from the developers point of view?

A: For 100 GW of solar power capacity, supply bottlenecks exist. Developers have already started facing the problem and as these numbers go up whether it is structures, transformers, or some other critical components, one will face bottlenecks. So the supply chain has to gear up.

10. About Solar Project Cost

Q. Cost of setting up of one MW of solar power project is roughly around Rs. 6-7 crores. Kindly breakdown the solar power project cost?

A: Today the cost break up slightly varies between a Domestic Content Requirement related projects or with an imported content project because the panel cost varies a lot between the two categories. Today the module comprises around 65%-70% of the project cost and the electrical component would constitute another 20%, structures another 10% (infrastructure related to civil works also) and the remaining 4%-5% of the total project cost is basically financial cost, contingencies etc.

Q: The cost per MW variation of Rs. 6 -7 Crores is on a higher side. Why is it so? Whether this cost includes the land cost also?

A: It varies a lot due to size of the project. It also depends on whether one is buying land or acquiring land on lease basis. Assuming that land is acquired on lease basis, then the cost per MW will be within Rs. 6 Crores.

Q: Is there a further scope for reduction in the solar cost?

A: The over cost is expected to move in southward direction only. Today we use framed modules, With technological improvements down the line, we are going to use lets say Byglass frameless modules, now the aluminum goes away, and glass is used is both sides. Glass is cheaper than other components. Also we may have 1500 Volt systems rather than 1000 volt system which will help to save cost on the Balance of

Plant side. So there are lots of ways of ensuring that overall costs may go down in addition to other efficiency improvements which happen for every manufacturer over a period of time and specially with the scales we are talking about this could always lead to cost reductions. The cost reductions will not be that drastic, so lot of these cost reductions will have to flow from a design philosophy, system innovation etc. but incremental efficiencies would always contribute to the cost reduction as well.

Q: Today with the focus on pricing, majority of the developers are cutting corners and they are bargaining heavily with the suppliers, as a result even reputed panel suppliers use very low quality cells and material. Because of this the panels may work fine for the first 5 years or so but post that, there may be issues, there can be steep degradation. How do we tackle this issue because the price pressure is so huge that many companies are looking at low quality supplies? How do we ensure that doesn't happen?

A: First of all there are all sorts of developers in the market and all sorts of manufacturers in the world. Developers which are looking for creating long term value for their shareholders are building projects which are supposed to be derisk assets. At the end of the day, Solar is nothing but a long term financial product with very minimum possible risk and ideal investment product for a pension fund, infrastructure fund etc. If one is not building such assets and is cutting corners, it will not attract that sort of money and those projects can't be built to perform well. A developer looks at the entire tier of suppliers, there are Tier 1, Tier2, Tier 3 companies and generally many of the developers in India are very particular about the choice of suppliers.

11. About Module Manufacturing

Q: Most of the module manufacturers are now indicating that have already touch the rock bottom and there is little scope for further price reduction? How do you think the module price behave in coming couple of years?

A: The price we have today with the present technology has reached the bottom. Only if there are some changes in China Solar Power policy, we may see a little bit lower price. But the module prices per watt and the cell efficiency are improving and lot of technology which people are talking will come into the market in next 2 years. At this stage we don't see an immediate reduction in the prices.

Q: We see as of now mostly MNC's operating in the segment. Why don't we see more participation by Indian Tier 1 players?

A: MNC's have low cost of fund which is available to them, which they want to liberate actually.

Q: Kindly enlighten on the module manufacturing by the local manufacturers.

A: In India whoever has done the manufacturing so far, they have just done the assembly not pure manufacturing. The basic raw material of Silica is not available here and needs to be imported. So people are importing wafers and trying to assemble it and make solar panels. The real manufacturing has not started in India as such.

Q: What about availability of silica in India, the basic raw material for panels?

A: We do not have much, there is some capacity available in Andhra which is still to be tried and tested.

Q: Crystalline silicone is a very proven technology but majority of the developers today in India go for Amorphous silicon. How reliable is this technology?

A: Initial installations of solar power projects in the country (first 500 to 1000 MW) was pre dominantly through thin film technology because at that time Indian lenders were not funding and only US EXIM Bank was funding, so lot of thin film modules have been installed in the country. Today at least 70% of the installations in the country are with crystalline silicone, which is the pre dominant technology globally as well as in India.

12. About Land Requirement

Q: What is the land requirement (acre per MW) with the current technologies? Has there been any development in the amount of land required per MW?

A: Yes, definitely. Those numbers used to be 5-5.5 acres per MW or with thin film modules much larger land per MW was required earlier. Now those numbers are already moving towards ~4 acres per MW. This is on account of the improvement in efficiency levels of the panels which enables developers to acquire much lesser land.

Q: Do you see any breakthrough happening in terms of research or innovation, how to reduce the land density per MW of solar?

A: The reduction in land requirement could only come over a period of time with efficiency improvements. There are of course R&D happening and the companies are always trying to get the maximum out of it. But commercially with an operational track record, we don't see major changes happening in the immediate future.

Q: Kindly appraise on the evacuation cost for setting up a solar project.

A: Today when developers are building the transmission lines it is not even 1% of the total cost. From a pure absolute value wise of course it depends on whether one has more of central parks generating large quantities at one place and the presence of a dedicated evacuation infrastructure. Green corridor etc. is such an example.

13. About Evacuation Infrastructure and T&D Losses

Q: Regarding transmission and distribution losses, how does a solar power developer mitigate transmission and distribution risk?

A: The T&D loss is a critical aspect right now and the Government is also coming up with solutions to tackle it. T&D comprises of 2 losses - technical loss and commercial loss. To reduce the commercial losses, the Govt. is planning to have a franchise model. Typically, T&D losses which are around 40%

right now, out of that the Govt. is targeting to implement the franchise model at least on the transmission side, so the technical loss can be reduced to between 10% to 15% and the balance can be covered.

The Govt. has initially privatized some DISCOMS and is now franchising out with a particular time period where they can improve and then get handed over the entire refurbished system. At the same time the good part about equipping with the distributed forms of energy such as renewable into the mix, is that you are much closer to the source of energy, the source of energy is much closer to the consumption point and hence the T&D losses get minimized, but yes structurally they need to be addressed in a different manner.

14. About Module Replacement

Q: With majority of the module suppliers going bankrupt, what will happen to the warranty assuming that there is insurance also. How the warranties will be honoured?

A: Module is a product which has its operational track record of life span of more than 30 years. So even if a supplier goes bankrupt for a minute, assuming that the product was good, that doesn't mean that one has to start replacing the product unless the product itself is faulty. The insurance on the panels also cover the bankruptcy of the suppliers. So if the developer has to go to the supplier and if he is not ready to pay or he's gone bankrupt then the insurance company pays to the developers.

Q: Is it possible that the developers can use another module from another supplier to replace the existing modules?

A: Of course the modules can be replaced. Presently we are talking about re-powering of wind turbines in the country. Tomorrow if there are high efficiency panels say 10 years down the line, developers can use the same. For a solar developer location of a good resource site with a good evacuation infrastructure is more important.

Q: When one says that solar power generation is an evolving technology and the prices have been coming down steadily, what happens actually? How are the older producers managing to cope up against newer producers who are benefiting from lower cost technologies and how are they able to compete with them?

A: If there are developers who have set up a project 3 years back at a higher cost, they have a power purchase agreement which have been signed at a higher tariff. They are not supplying power to an exchange or are not competing with a low cost producer per se. Tariff is fixed for a tenure of 25 years through PPAs. So if one sets up a project at a particular cost, the tariff works out accordingly. So one gets paid for what you have set up.

15. About Grid Connectivity and Storage of Power

Q: Can the existing grid connectivity be utilized for solar power projects or will it require some separate arrangement?

A: Existing capacity can also be utilized, if there is availability. After some time there could be a problem of injecting power into the grid when the grid is not available or is already having full capacity. That is the reason that many developers are working on batteries also.

Q: What if grid may not be able to take all the power?

A: That is basically the challenge which is being faced in lot of other countries especially in Europe, where the base route or the plant load factor of other conventional power plants has to be reduced to absorb the renewable, which are intermittent. In India, we still have a very small capacity of ~5 GW of solar. So we are still very small but as our numbers become substantial, this will have a very big impact on the power markets, on the entire power market structure and has its own implications and set of solutions.

Q: Grid connectivity can be an issue so power Batteries will be more relevant?

A: Going forward, it will become more relevant because the power from solar is only available in the sun hours whereas most of the utilization is during night hours. So a time will come where the batteries will be playing a key role in the overall picture.

Q: Where is the power storage happening so that the power is absorbed in the morning hours and used in the night?

A: Currently, we don't have any storage with solar applications, whatever is being produced is getting consumed. Solar power doesn't work in the night. Today the battery cost/storage cost are still on the higher side, but lot of innovations are happening, this is the next wave of technology and will play a very key role in the growth of renewable energy.